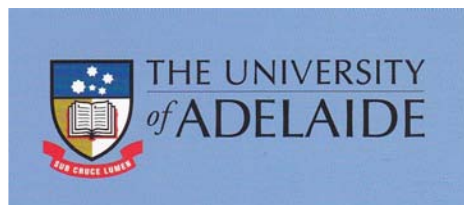


# **Development of a Sustainability Assessment Framework for Malaysian Office Buildings Using a Mixed-Methods Approach**

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**Zalina Shari**

Thesis submitted in fulfillment of the requirements for the degree of  
**Doctor of Philosophy**



**School of Architecture, Landscape Architecture and Urban Design**

**October 2011**

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## Appendix A: Key Documents on Sustainable Development

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NOTE:

Appendix A is included in the print copy of the thesis held in the University of Adelaide Library.

## **Appendix B: Hierarchy and Classification of Malaysian Policies and Legislations Relating to the Building Industry**

B 2-3

NOTE:  
Appendix B is included in the print copy of the  
thesis held in the University of Adelaide Library.

**NOTE:**

The appendices as listed below (from the CD accompanying the print thesis), have been included in full in this digital copy.

**APPENDIX C: Interview Documents**

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H-1: Distribution of Total Points Available by Phases of Assessment

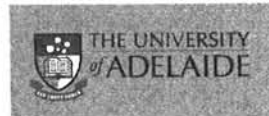
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**ZALINA SHARI**

School of Architecture, Landscape Architecture & Urban Design

The University of Adelaide

October 2011



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## Appendix C-1: Interview Questionnaire

No.	Questions	Consultants	Builders	Developer/ Owner/ Investor	Facility Managers	Regulators/ Policy Makers
<b>A. Aim: to gauge their perceptions on GOOD office buildings</b>						
Q1	According to you as an architect/ engineer/ environmental consultant, what are the characteristics of good office building?	√				
	According to you as a builder/ developer/ facility manager/ regulator, what are the characteristics of good office building?		√	√	√	√
Q2	What can an architect/ engineer/ environmental consultant do to achieve good office building?	√				
	What can a builder/ developer/ facility manager/ regulator do to achieve good office building?		√	√	√	√
Q3	Can you nominate one good office building that you are familiar or have involved with (local or overseas)? Name of project, location, year built, no. of floors, total cost?	√	√	√	√	√
<b>B. Aim: to gauge their perceptions on GREEN &amp; SUSTAINABLE office buildings</b>						
Q4	Have you heard the word "green building"? If yes, can you explain what do you understand by the term?	√	√	√	√	√
Q5	Do you think there is any difference between a "green" and "sustainable" office building? If yes, how would you describe a "sustainable office building"?	√	√	√	√	√
Q6	Have you ever been involved in sustainable office building projects? If so, could you please explain more about this project? In what phase of the project was it decided to include sustainability aspects? Why were sustainability aspects considered?	√	√	√		
	Have you ever been involved in operating & maintaining a sustainable office building? If so, could you please explain more about this building? In what phase of the project was it decided to include sustainability aspects? Why were sustainability aspects considered?				√	
<b>C. Aim: to gauge their perceptions on sustainability issues in general</b>						
Q7	Referring to this card, from 1 to 5, how would you rate the importance of each of these aspects, in comparison to each other? a) Environmental protection b) Enhance human well-being c) Economic development	√	√	√	√	√
<b>D. Aim: to gauge their perceptions on recently built office buildings in Malaysia</b>						
Q8	What are your general comments on office buildings being built in Malaysian cities since 5 years ago?	√	√	√		√
	What are your general comments on office building O&M practices in Malaysian cities since 5 years ago?				√	
	Do you think office building commissioning is a standard practice in Malaysia? If not, what has been the problem?			√	√	
<b>E. Aim: to investigate the current ENVIRONMENT practices of office building design &amp; development</b>						
E1	<b>Environmental: General</b>					
Q9	What environmental issues have you considered in designing/ constructing/ developing/ operating & maintaining an office building to reduce the negative effects on the environment?	√	√	√	√	
	What environmental issues have the Ministry considered in formulating regulations and guidelines to ensure environmentally friendly office building development?					√
Q10	In your opinion, what are the strategies that an architect/ engineer/ environmental consultant could implement to address those issues?	√				
	In your opinion, what are the strategies that a builder/ developer/ owner/ investor/ fm could implement to address those issues?		√	√	√	
	In your opinion, what are the strategies that the Government could implement to ensure new office building projects are developed based on environmental concern?					√
E2	<b>Environmental: Reused/recycled &amp; sustainable bldg materials</b>					
Q11	Have you heard about reused/recycled building products/materials? Would you specify them in your office building projects? Why would or wouldn't you do that? Do you think there is an opportunity for reused/recycled materials in the Malaysian office building industry?	√				
	Have you heard about reused/recycled building products/materials? If yes, have you had any experience in using these materials in office building projects? What do you think about the practice of recycling site materials such as topsoil, limerock & concrete into new buildings? Do you think there is an opportunity for reused/recycled materials in the Malaysian office building industry?		√			
	Have you heard about reused/recycled building products/materials? Do you think there is an opportunity for reused/recycled materials in the Malaysian office building industry?			√		
	Have you heard about reused/recycled building products/materials? Would you encourage designers to specify these products/materials in office building projects? Why would or wouldn't you do that? Do you think there is an opportunity for reused/recycled materials in the Malaysian office building industry?				√	
	Have you heard about reused/recycled building products/materials? Would you encourage the					√



No.	Questions	Consultants	Builders	Developer/ Owner/ Investor	Facility Managers	Regulators/ Policy Makers
	industry to use these products/materials in office building projects? Why would or wouldn't you do that? Do you think there is an opportunity for reused/recycled materials in the Malaysian office building industry?					
Q12	Have you heard of ecologically friendly and healthy products/materials? Would you specify them in your office building projects? Or would you mind having them specified in your office building projects? Why would or wouldn't you do that? Do you think these products/materials are widely available and easily recognisable in the local market?	√	√	√	√	√
Q13	How is reduction of waste from building considered in your design? How is reduction of waste from building construction considered?	√	√			
Q14	What do you think about the practice of separating and collecting office recyclables? Do you think by providing recycling waste storage in office building is the key to encourage recycling among building users? If not so, why?	√		√	√	√
<b>E3</b>	<b>Environment: ISO14000 EMS certification</b>					
Q15	Have you had any experience working with ISO 14000 EMS certified contractors? If yes, how different was their performance compared to the non-certified ones?	√				
Q16	Has your company or your subcontractors been certified with ISO14000 EMS? If yes- when and why? If yes, what are the benefits that have been achieved so far?		√	√		
Q17	Have you ever awarded any projects to contractors certified with ISO14000? How different was their performance compared to the non-certified ones?			√		
<b>E4</b>	<b>Environment: Corporate Environmental Reporting</b>					
Q18	Does your company implement Corporate Environmental Reporting practices (i.e. voluntarily reporting some kind of environmental issues in their corporate annual reports)? If yes, what are the benefits that have been achieved so far?		√	√		
Q19	Are there any measures been taken by the Government to encourage local building industry players to implement Corporate Environmental Reporting practices?					√
<b>F.</b>	<b>Aim: to investigate the current SOCIAL practices of office building design &amp; development</b>					
<b>F1</b>	<b>Social: Malaysian building characters</b>					
Q20	Imagine I came from the UK and visiting Malaysia for the very first time to see office buildings in Malaysia. What would you suggest me to look out for that I wouldn't find anywhere else that reflect good practice here in Malaysia?	√	√	√	√	√
Q21	According to you, what are the spaces & facilities that should be provided in an office building to enhance Malaysian cultures and religious beliefs?	√	√	√	√	√
Q22	Do you think it is important for office space arrangements in Malaysia to reflect the hierarchy or structure of the organisation? If reflecting structure or hierarchy is not too important, what are other parameters for arranging the office space in Malaysian office buildings?	√		√	√	√
Q23	Do you think office space arrangements have any impact on the organisation's productivity? If so, how do you think office spaces have to be arranged to enhance office productivity? Do you have any other suggestions on how design can be used to improve the organisation's productivity?	√		√	√	√
<b>F2</b>	<b>Social: Education &amp; training</b>					
Q24	What is the place of education & training in order to increase knowledge and awareness in sustainability issues in general and green/sustainable design/construction/O&M in specific? If important, how do you achieve that in your company/ Ministry? Does the company/ Ministry allocate annual budget for this?	√	√	√	√	√
Q25	Does the Ministry play any role in educating the public in general or the building industry in particular in sustainability issues?					√
Q26	Do you use any tool i.e. software, guidelines to help you operating and maintaining buildings in a green manner? Which tool(s)? Do you use any design tool i.e. software, guidelines to help you designing/ constructing/ developing a green/sustainable building? Which tool(s)?	√	√	√	√	
<b>F3</b>	<b>Social: Occupants' health &amp; well-being</b>					
Q27	In your opinion, is it important for you to know how the building that you have designed/ built/ developed performs during its occupancy period or how satisfied occupants are with the building's IEQ? If important, could this be practiced in the Malaysian building industry? If not so important, why? In your opinion, is it important for you to know how the building you operate & maintain performs during its occupancy period or how satisfied occupants are with the building's IEQ? If important, could this be practiced in the Malaysian building industry? If not so important, why? In your opinion, is it important for the industry players to evaluate how their buildings perform or how satisfied occupants are with the IEQ of the office building they have designed/ developed? If important, could this be practiced in the Malaysian building industry? If not so important, why?	√	√	√		
Q28	Are there any regulatory requirements to ensure good IEQ of office buildings? If so, is there any monitoring to ensure the compliance of these regulations by the building industry?					√
<b>F4</b>	<b>Social: Health &amp; safety planning in construction operations</b>					

No.	Questions	Consultants	Builders	Developer/ Owner/ Investor	Facility Managers	Regulators/ Policy Makers
Q29	What is the place of health & safety planning in construction operations as a means to address the health of workers on site and the health of the building's future occupants? If important, what are the measures that have been taken by your company to address this issue?		√			
<b>F5</b>	<b>Social: Disabled friendly office</b>					
Q30	What is your view of designing an office block to accommodate disabled people?	√		√	√	√
<b>G.</b>	<b>Aim: to investigate the current ECONOMIC practices of office building design &amp; development</b>					
Q31	Based on your experience, have economic issues always been the first priority in any decision-makings for office building projects/O&M? If yes, what are these economic issues: economic return, or minimising running cost, or minimising construction/capital cost due to budget constraints? If not so, what issues have been the first priority?	√	√	√	√	√
Q32	Has minimising the capital/ construction cost always been considered more important than minimising the long-term operational costs (utilities & maintenance) of the building? Or both have been considered equally important?	√	√	√	√	√
Q33	Are there any incentives available to promote investments in green technologies or energy efficient equipments? Examples?	√	√	√	√	√
Q34	Do you think there is a relationship between sustainability and property market value in the Malaysian context?			√		
<b>H.</b>	<b>Aim: to investigate the current POLICIES &amp; REGULATIONS</b>					
Q35	Are there regulatory requirements and/or economic incentives to expand re-manufacturing and recycling industry?					
Q36	In developed countries like the US, UK, Australia, provision of less number of car parking spaces than the maximum local planning allowances is encouraged to promote the use of public transports for commuting to work. Do you think this could be implemented in Malaysia? If couldn't, why?			√		√
<b>I.</b>	<b>Aim: to understand their CHALLENGES &amp; ASPIRATIONS</b>					
Q37	In your opinion, what are the major barriers faced by local architect/ engineer/ environmental consultant to widespread sustainable office building practices in Malaysia?	√				
	In your opinion, what are the major barriers faced by local contractors to widespread sustainable office building practices in Malaysia? Technical? Financial? Legal? People?		√			
	In your opinion, what are the major barriers faced by local developers to widespread sustainable office building development in Malaysia? Technical? Financial? Legal? People/Demand?			√		
	In your opinion, what are the major barriers faced by facility managers to widespread sustainable office building O&M in Malaysia? Technical? Financial? Legal? People?				√	
	In your opinion, what are the major barriers faced by the government to widespread sustainable office building practices in Malaysia? Technical? Financial? Legal? People?					√
Q38	How would you suggest to lower those barriers in order to encourage building professionals/ builders/ facility managers to adopt more sustainable office building practices?	√	√		√	
	How would you suggest to lower those barriers in order to encourage local developers to develop more sustainable office buildings?			√		
	How would you suggest to lower those barriers in order to encourage the building industry to adopt more sustainable office building practices?					√
Q39	What suggestions do you have to promote 'sustainability' in the Malaysian office building industry?	√	√	√	√	√

## Appendix C-2: Ethics Application Cover Sheet

**PROJECT NO: H/**

**THE UNIVERSITY OF ADELAIDE HUMAN RESEARCH ETHICS COMMITTEE  
ETHICS APPLICATION COVER SHEET**

**SUMMARISING THE PROTOCOL AND INCLUDING INVESTIGATORS'  
SIGNATURES**

**COVER SHEET AND APPLICATIONS MUST BE TYPED**

Applications will be considered according to requirements of the National Statement on Ethical Conduct in Human Research (2007).

An application should include: (1) this **cover sheet**; (2) the proposal addressing the **list of headings**; (3) participant **information sheet**; (4) participant **consent form**, and (5) **independent complaints procedure statement** (please access these online at <http://www.adelaide.edu.au/ethics/human/guidelines/applications/>).

Submit **ELEVEN** copies of the application to the Secretary, Human Research Ethics Committee, Research Ethics and Compliance Unit, Research Branch, Level 7, 115 Grenfell Street, The University of Adelaide SA 5005 Ph. (08) 8303 6028, Fax (08) 8303 7325, email [sabine.schreiber@adelaide.edu.au](mailto:sabine.schreiber@adelaide.edu.au)

Please attach this to the front of the application.

<p><b>APPLICANT Name</b> include title Professor/Dr/Ms/Mr and Position Associate Professor Veronica Soebarto Principal Supervisor If this is a student project the principal supervisor is to be the applicant.</p>
<p><b>DEPARTMENT</b> including campus/institution contact address  School of Architecture, Landscape Architecture and Urban Design The University of Adelaide, Sa 5005</p>
<p><b>Phone No and email address</b> Ph. 61 8 8303-5695 Email: <a href="mailto:veronica.soebarto@adelaide.edu.au">veronica.soebarto@adelaide.edu.au</a></p>
<p><b>OTHERS INVOLVED</b>  Mrs. Zalina Shari School of Architecture, Landscape Architecture &amp; Urban Design Ph.D. candidate If this is a student project please indicate name/department/candidature</p>
<p><b>PROJECT TITLE</b> <b>(PhD Research Title)</b> Towards Achieving Sustainable Development in Malaysia: An Assessment Framework to Assist and Evaluate Stakeholders' Decisions in Building Activities</p>
<p><b>LOCATION OF RESEARCH</b> Kuala Lumpur &amp; Selangor, Malaysia</p>
<p><b>DATE PROJECT TO BEGIN</b> January 2009 (interviews in Kuala Lumpur)</p>
<p><b>ESTIMATED DURATION OF PROJECT</b> 3 months</p>
<p><b>SOURCE OF FUNDING</b> Ministry of Higher Education, Malaysia (for flight ticket only)</p>
<p><b>AIMS OF PROJECT</b> please give concise description in lay terms The aim of the project is to interview Malaysian participants, in a semi-structured way, particularly those who can contribute information about their primary concerns in pursuing sustainable office building development and assessment. In other words, the project will investigate the current problems and challenges faced by each participant in playing a better role, as well as their aspirations to promote sustainable office buildings development in Malaysia.</p>

<b>PLAN/DESIGN OF PROJECT</b> brief description in lay terms	
Once approval has been given by the Human Research Ethics Committee, letters will be sent to the proposed participants with the Information Sheet, Consent Form and Independent Complaints Procedure Statement. This will be followed up with telephone calls to arrange a mutually convenient time for the interviews (to be recorded). A summary will be provided to each participant to confirm the accuracy of the transcript. The participants may withdraw from the interviews whenever they desire.	
<b>PARTICIPANTS</b>	
<ul style="list-style-type: none"> <li>• <b>Source:</b> Stakeholder groups of commercial buildings to be interviewed include designers, developers, builders, managers &amp; regulators and owners &amp; investors. Stakeholders will be selected from membership lists of the following professional and public organizations: <ul style="list-style-type: none"> <li>√ Designers <ul style="list-style-type: none"> <li>- Malaysian Institute of Planners (MIP)</li> <li>- Malaysian Institute of Architects (PAM)</li> <li>- Institute of Engineers Malaysia (IEM)</li> <li>- Association of Environmental Consultants and Companies of Malaysia (AECCOM)</li> </ul> </li> <li>√ Builders <ul style="list-style-type: none"> <li>- Master Builders Association Malaysia (MBAM)</li> </ul> </li> <li>√ Developers <ul style="list-style-type: none"> <li>- Real Estate and Housing Developers' Association Malaysia (REHDA)</li> </ul> </li> <li>√ Managers &amp; regulators <ul style="list-style-type: none"> <li>- Project Management Institute Malaysia (PMIMY)</li> <li>- Ministry of Housing and Local Government</li> <li>- Ministry of Public Works</li> <li>- Ministry of Natural Resources and Environment</li> <li>- Ministry of Energy, Water and Communications</li> </ul> </li> <li>√ Owners / investors <ul style="list-style-type: none"> <li>- Association of Valuers and Property Consultants in Private Practice Malaysia (PEPS)</li> <li>- The Malaysian Institute of Estate Agents (MIEA)</li> </ul> </li> </ul> </li> <li>• <b>Age range:</b> 35 years and above</li> <li>• <b>Selection criteria:</b> <ul style="list-style-type: none"> <li>- Have worked in the relevant field for more than 10 years of experience</li> <li>- Owners &amp; investors of sustainable/green purpose built office buildings</li> </ul> </li> <li>• <b>Exclusion criteria:</b> Nil</li> </ul>	
<b>ETHICAL IMPLICATIONS OF PROJECT</b>	
Nil	
<b>DRUGS</b>	
Will drugs be administered to participants?	YES / <b><u>NO</u></b>
• If so give name of drug(s)	
• Dosage:	
• Method of administration	
Is the administration for therapeutic purposes?	YES / <b><u>NO</u></b>
Will the project be conducted under the Clinical Trials Notification (CTN) Scheme?	YES / <b><u>NO</u></b>
Clinical Trials Exemption (CTX) Scheme?	YES / <b><u>NO</u></b>
Is Commonwealth Department of Health permission required?	YES / <b><u>NO</u></b>
If so, has permission been obtained?	YES / <b><u>NO</u></b>
<b>SIGNATURE OF ALL INVESTIGATORS NAMED IN THE PROTOCOL</b>	
Date	



## Appendix C-3: Information Sheet

### INFORMATION SHEET

#### Data Collection for Developing a Malaysian Sustainable Office Building Assessment Framework

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Dear Mr. (or Mrs.): (Name)

I am a Malaysian PhD student at the School of Architecture, Landscape Architecture & Urban Design, University of Adelaide, Australia. My research topic is "Towards Achieving Sustainable Development in Malaysia: An Assessment Framework to Assist and Evaluate Stakeholders' Decisions in Building Activities". The Sustainable Office Building (SOB) assessment framework proposed by this study could be used as the basis of developing a SOB assessment system for Malaysia, which in turn would help to regulate, encourage and promote SOB practices. In order to establish an appropriate SOB assessment framework for Malaysia, it is important to understand the most significant concerns of building stakeholders in pursuing sustainable office building development in Malaysia.

Therefore, I would like to interview you with regard to your descriptions of sustainability and sustainable building, your current problems and challenges in playing a better role, as well as your aspirations to promote sustainable office buildings development in Malaysia. It is anticipated that the interview will take half-an-hour to forty-five minutes and will be audio-taped. The interviews will be an important part of the research leading to the thesis that will be submitted for the degree of Doctor of Philosophy.

The information obtained will be discussed with other post-graduate students and staff, particularly the researcher's Supervisors, at the School of Architecture, Landscape Architecture, and Urban Design. A summary of the interview will be provided to you to confirm the accuracy of the transcription. Any special editorial requests from you will be given due regard. The information will be part of the thesis and be appropriately referenced, but the confidentiality of information provided in confidence will be respected. You will not be identifiable in any way by the collected data as well as in the published results.

Your participation in this interview survey is completely voluntary. You may withdraw from the interview whenever you desire by simply advising the researcher of your intention to do so.

This interview survey has been approved by the Human Research Ethics Committee, University of Adelaide (approval number H-077-2008). Information about the Independent Complaints Procedure and the role of the Human Research Ethics Committee is provided on a separate sheet.

Contacts for this Study:

**Zalina Shari**

(PhD candidate)

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47100 Puchong, Selangor, Malaysia.

Ph. +61 4 22423791 (Aus), 016 2873003 (M'sia)

Email: zalina.shari@adelaide.edu.au

**Assoc. Prof. Dr. Veronica Soebarto**

(Principal Supervisor)

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University of Adelaide, SA

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Email: veronica.soebarto@adelaide.edu.au

## Appendix C-4: Standard Consent Form

THE UNIVERSITY OF ADELAIDE HUMAN RESEARCH ETHICS COMMITTEE

**STANDARD CONSENT FORM  
FOR PEOPLE WHO ARE PARTICIPANTS IN A RESEARCH PROJECT**

1. I, ..... *(please print name)*  
consent to take part in the research project entitled: *“Towards Achieving Sustainable Development in Malaysia: An Assessment Framework to Assist and Evaluate Stakeholders’ Decisions in Building Activities”*
  2. I acknowledge that I have read the Information Sheet entitled: *“Data Collection for Developing a Malaysian Sustainable Office Building Assessment Framework”*
  3. I have had the project, so far as it affects me, fully explained to my satisfaction by the researcher. My consent is given freely.
  4. I have been informed that the information gained during the study may be published as part of the PhD Thesis.
  5. I have been informed that the interview session will be audio-taped and the data will be stored until the PhD thesis has been completed.
  6. I understand that I am free to withdraw from the project at any time.
  7. I am aware that I should retain a copy of this Consent Form, when completed, and the attached Information Sheet.
- .....  
*(signature)* *(date)*

**WITNESS**

I have described to ..... *(name of participant)*  
the nature of the research to be carried out. In my opinion she/he understood the explanation.

Status in Project: Ph.D. Candidate

Name: Zalina Shari

.....  
*(signature)*.....  
*(date)*

## Appendix C-5: Independent Complaints Procedure Statement

### THE UNIVERSITY OF ADELAIDE HUMAN RESEARCH ETHICS COMMITTEE

*Document for people who are participants in a research project*

#### CONTACTS FOR INFORMATION ON PROJECT AND INDEPENDENT COMPLAINTS PROCEDURE

The Human Research Ethics Committee is obliged to monitor approved research projects. In conjunction with other forms of monitoring it is necessary to provide an independent and confidential reporting mechanism to assure quality assurance of the institutional ethics committee system. This is done by providing research participants with an additional avenue for raising concerns regarding the conduct of any research in which they are involved.

The following study has been reviewed and approved by the University of Adelaide Human Research Ethics Committee:

Project title: *“Towards Achieving Sustainable Development in Malaysia: An Assessment Framework to Assist and Evaluate Stakeholders’ Decisions in Building Activities”*

1. If you have questions or problems associated with the practical aspects of your participation in the project, or wish to raise a concern or complaint about the project, then you should consult the project co-ordinator:

*Name: Zalina Shari*

*telephone: +614 22423791 (Australia) 03-80600153 (Malaysia)*

2. If you wish to discuss with an independent person matters related to
  - making a complaint, or
  - raising concerns on the conduct of the project, or
  - the University policy on research involving human participants, or
  - your rights as a participant

contact the Human Research Ethics Committee’s Secretary on phone +61 8 8303 6028

**Appendix C-6: Overall Interview Summaries**

<b>A: GOOD OFFICE BUILDINGS</b>	<b>C 11-25</b>
<b>B: GREEN &amp; SUSTAINABLE OFFICE BUILDINGS</b>	<b>C 26-40</b>
<b>D: CURRENT ENVIRONMENTAL PRACTICES</b>	<b>C 41-105</b>
<b>E: CURRENT SOCIAL PRACTICES</b>	<b>C 106-173</b>
<b>F: CURRENT ECONOMIC PRACTICES</b>	<b>C 174-205</b>
<b>G: CURRENT POLICIES &amp; REGULATIONS</b>	<b>C 206-213</b>
<b>H: CHALLENGES &amp; ASPIRATIONS</b>	<b>C 214-270</b>



**A. GOOD OFFICE BUILDINGS**

**Q.1 According to you as an architect/engineer/builder/developer/owner/regulator, what are the characteristics of a “good” office building?**

TEXT/ ANSWERS	CODE (INDIVIDUAL)
<b>ARCHITECT:</b>	
... must have all the qualities related to comfort i.e. IEQ (KK-A:8-9) The building must also within budget (KK-A:9-10)	<ul style="list-style-type: none"> <li>Comfortable/conducive indoor environment <b>IEQ</b></li> <li>Within budget <b>ECON</b></li> </ul>
Fits for its purpose (WS-A:7) Has good space quality, conducive for working and accessibility of the project (WS-A:7) ...informal space quality which is a good working culture. Everybody works there as a big community rather than in isolation. (WS-A:14-15)	<ul style="list-style-type: none"> <li>Functional <b>SP</b></li> <li>Easily accessible <b>INCL</b></li> <li>Conducive <b>IEQ</b></li> <li>Informal space quality – communal arrangement <b>SP</b></li> </ul>
... it serves its function which can accommodate the people who work in the office in a comfortable environment. (CSA-A:8-9) ... serve as a symbol to show off the client or owner’s corporate identity (CSA-A:10) Then the programming of the spaces will reflect how the culture of the office works (CSA-A:13)	<ul style="list-style-type: none"> <li>Functional <b>SP</b></li> <li>Comfortable/conducive indoor environment <b>IEQ</b></li> <li>Corporate identity <b>AES</b></li> <li>Space planning reflect organization’s culture <b>SP</b></li> </ul>
Functional and good IEQ (TLM-A:8)	<ul style="list-style-type: none"> <li>Functional <b>SP</b></li> <li>Comfortable/conducive indoor environment <b>IEQ</b></li> </ul>

CODE (GROUPED)	CATEGORY
<b>From all 30 interviewees</b>	
<ul style="list-style-type: none"> <li>Comfortable/conducive indoor environment IEQ (12x)</li> <li>Good ventilation IEQ (2x)</li> <li>Healthy IEQ (2x)</li> <li>Accessible to view IEQ</li> <li>Adequate privacy level IEQ</li> <li>Conducive IEQ</li> <li>Good IAQ IEQ</li> <li>Good lighting IEQ</li> <li>Optimise daylight IEQ</li> <li>Optimum level of fresh air IEQ</li> <li>Use low or zero VOC products IEQ</li> <li>Use non-toxic materials/products IEQ</li> </ul>	<b>INDOOR ENVIRONMENTAL QUALITY</b> (mentioned 25x)
<ul style="list-style-type: none"> <li>Efficient floor space SP (5x)</li> <li>Functional SP (5x)</li> <li>Flexible space planning SP (2x)</li> <li>Adequate floor-to-ceiling heights SP</li> <li>Adequate space &amp; facilities SP</li> <li>Flexible use of workspace SP</li> <li>Flexible workstation SP</li> <li>Functional for users – based</li> </ul>	<b>SPACE PLANNING</b> (mentioned 19x)

<i>Responsive, interactive, healthy (KY-A:8)</i>	<ul style="list-style-type: none"> <li>• Responsive to climate <b>GEN</b></li> <li>• Healthy <b>IEQ</b></li> </ul>
<p><i>...intelligent, energy efficient, flexible, and holistic in terms of the overall design, M&amp;E and structure (SH-A:9-10)</i></p> <p><i>The post-occupancy is as important as the pre-occupancy (SH-A:10-11)</i></p>	<ul style="list-style-type: none"> <li>• Energy efficient <b>EE</b></li> <li>• Flexible space planning <b>SP</b></li> <li>• Holistic design <b>GEN</b></li> <li>• Consider post-occupancy issue <b>O&amp;M</b></li> </ul>
<p><i>...designed with passive elements of energy efficiency (SA-A:8)</i></p> <p><i>...fulfil the client's requirements, their needs and within the budget and also other environmental factors (SA-A:10-11)</i></p>	<ul style="list-style-type: none"> <li>• Passive design <b>GEN</b></li> <li>• Energy efficient <b>EE</b></li> <li>• Fulfil client's requirements <b>GEN</b></li> <li>• Within budget <b>ECON</b></li> </ul>

<ul style="list-style-type: none"> <li>• on users' work flow <b>SP</b></li> <li>• Informal space quality – communal arrangement <b>SP</b></li> <li>• Space planning reflect organization's culture <b>SP</b></li> </ul>	
<ul style="list-style-type: none"> <li>• Energy efficient <b>EE (8x)</b></li> <li>• Building envelop that cut down heat gain &amp; reduce cooling load <b>EE</b></li> <li>• Minimize use of resources i.e. water, energy, materials <b>EE, WAT, MAT</b></li> <li>• Use energy efficient office equipment <b>EE</b></li> <li>• Utilize renewable energy <b>EE</b></li> </ul>	<b>ENERGY EFFICIENCY &amp; RENEWABLE ENERGY</b> (mentioned 12x)
<ul style="list-style-type: none"> <li>• Within budget <b>ECON (3x)</b></li> <li>• Low maintenance cost <b>ECON (2x)</b></li> <li>• Low maintenance <b>ECON (2x)</b></li> <li>• Low maintenance &amp; running costs <b>ECON</b></li> <li>• Low operation &amp; maintenance cost <b>ECON</b></li> <li>• Consider life cycle cost <b>ECON</b></li> <li>• Maximum return <b>ECON</b></li> <li>• Maximum ROI <b>ECON</b></li> </ul>	<b>ECONOMIC CONSIDERATION</b> (mentioned 12x)
<ul style="list-style-type: none"> <li>• Aesthetically pleasing <b>AES (6x)</b></li> <li>• Malaysian character &amp; identity <b>AES (2x)</b></li> </ul>	<b>AESTHETICS</b> (mentioned 11x)

<p><i>Of course the indoor comfort level ... and the building has to be energy efficient. On top of that, the building must be able to be self sustaining, if possible. As we are going to green buildings so all green features like rainwater harvesting, the choice of materials especially like the embodied energy, then choice of ... energy efficient office equipment (LCH-A:10-15)</i></p> <p><i>... occupants must be aware and educated on energy efficiency program that is being undertaken by the building management side (LCH-A:19-22)</i></p>	<ul style="list-style-type: none"> <li>• Comfortable/conducive indoor environment <b>IEQ</b></li> <li>• Energy efficient <b>EE</b></li> <li>• Self-sustained <b>GEN</b></li> <li>• Utilize rainwater harvesting <b>WAT</b></li> <li>• Use low embodied energy materials <b>MAT</b></li> <li>• Use energy efficient office equipment <b>EE</b></li> <li>• Participation from occupants <b>O&amp;M</b></li> </ul>
<p><i>...comfortable and healthy ...recycled water, orientation north-south is there...(NB-A:8-11)</i></p>	<ul style="list-style-type: none"> <li>• Comfortable/conducive indoor environment <b>IEQ</b></li> <li>• Healthy <b>IEQ</b></li> <li>• Recycle used water <b>WAT</b></li> <li>• Optimum orientation <b>GEN</b></li> </ul>
<b>TEXT/ ANSWERS</b>	
<b>ENGINEERS:</b>	
<p><i>Flexibility relates to a lot of things in particular the workstation flexibility... Flexibility also relates to the users. The way modern offices are run, you don't need to have everyone in the office all the time. Not all the staff will be permanent there. A lot have to travel to and from overseas, other branch office. So they don't need to have the same workstation and access to everything (CTL-ME:14-19)</i></p>	<ul style="list-style-type: none"> <li>• Flexible workstation <b>SP</b></li> <li>• Flexible use of workspace <b>SP</b></li> </ul>

<ul style="list-style-type: none"> <li>• Attractive facades and easy to maintain and repair <b>AES, O&amp;M</b></li> <li>• Corporate identity <b>AES</b></li> <li>• Good workmanship <b>AES</b></li> </ul>	
<ul style="list-style-type: none"> <li>• Utilize rainwater harvesting <b>WAT (4x)</b></li> <li>• Utilize grey water system <b>WAT (3x)</b></li> <li>• Minimize use of resources i.e. water, energy, materials <b>EE, WAT, MAT</b></li> <li>• Recycle used water <b>WAT</b></li> <li>• Reduce potable water consumption <b>WAT</b></li> <li>• Water efficient <b>WAT</b></li> </ul>	<p><b>WATER EFFICIENCY</b> (mentioned 11x)</p>
<b>CODE (GROUPED)                      CATEGORY</b>	
<ul style="list-style-type: none"> <li>• Functional equipments <b>M&amp;E</b></li> <li>• Good M&amp;E systems <b>M&amp;E</b></li> <li>• M&amp;E components &amp; system will not obsolete in the future <b>M&amp;E</b></li> <li>• Reliable <b>M&amp;E services M&amp;E</b></li> <li>• Speed of lifts <b>M&amp;E</b></li> </ul>	<p><b>M&amp;E SERVICES &amp; VERSATILITY</b> (mentioned 7x)</p>

<p>...energy efficiency, the design using the materials that are environmental friendly like the paint that you use, the carpet; you also have to look into IEQ. This is very important, like you see in this office...there is no fresh air (NYK-ME:12-14)</p> <p>You also have to make full use of other resources efficiently...harnesses rain water... recycle used water... use the condensed water that condensate from the chillers (NYK-ME:15-20).</p>	<ul style="list-style-type: none"> <li>Energy efficient <b>EE</b></li> <li>Use low or zero VOC products <b>IEQ</b></li> <li>Optimum level of fresh air <b>IEQ</b></li> <li>Water efficient <b>WAT</b></li> <li>Utilize rainwater harvesting <b>WAT</b></li> <li>Utilize grey water system <b>WAT</b></li> </ul>
<p>They should be comfortable thermally, visually and even psychologically. The environment must be conducive for them to be creative and to be productive (CKT-EC:11-13)</p>	<ul style="list-style-type: none"> <li>Comfortable/conducive indoor environment <b>IEQ</b></li> </ul>
TEXT	CODE (INDIVIDUAL)
BUILDER & BUILDER-DEVELOPER:	
<p>Good space maximization layout that can give the best return on rental income (SA-B/D:9)</p> <p>Good selection of building materials to ensure low construction cost, non-toxic to promote healthy working environment, green products (recyclable materials) which can be translated to less impact to the environment (SA-B/D:10-12)</p> <p>Renewal energy building systems and holistic designs to ensure low maintenance and running cost, for e.g., solar panels, rain harvesting, grey water system etc. (SA-B/D:13-14)</p> <p>Aesthetically pleasing design (SA-B/D:15)</p> <p>Good ventilation system to prevent "sick building syndrome" (SA-B/D:16)</p>	<ul style="list-style-type: none"> <li>Efficient floor space <b>SP</b></li> <li>Use non-toxic materials/products <b>IEQ</b></li> <li>Use green materials <b>MAT</b></li> <li>Utilize renewable energy <b>EE</b></li> <li>Utilize rainwater harvesting <b>WAT</b></li> <li>Utilize grey water system <b>WAT</b></li> <li>Low maintenance &amp; running costs <b>ECON</b></li> <li>Aesthetically pleasing <b>AES</b></li> <li>Good ventilation <b>IEQ</b></li> </ul>
<p>As a builder, I would look at the buildability of the building (JD-B:7)</p> <p>Time is always the constraint that's why a lot of contractors, they just</p>	<ul style="list-style-type: none"> <li>Good buildability <b>GEN</b></li> </ul>

<ul style="list-style-type: none"> <li>Use up-to-date modern technology M&amp;E</li> <li>Versatile M&amp;E infra for refurbishment &amp; renovation M&amp;E</li> </ul>	
<ul style="list-style-type: none"> <li>Attractive facades and easy to maintain and repair AES, O&amp;M</li> <li>Consider post-occupancy issue O&amp;M</li> <li>Easy to maintain O&amp;M</li> <li>Participation from occupants O&amp;M</li> <li>Sustainable operation &amp; maintenance O&amp;M</li> <li>Use durable technology O&amp;M</li> </ul>	<p><b>OPERATION &amp; MAINTENANCE</b> (mentioned 6x)</p>
CODE (GROUPED)	CATEGORY
<ul style="list-style-type: none"> <li>Minimize use of resources i.e. water, energy, materials EE, WAT, MAT</li> <li>Use green materials MAT</li> <li>Use local materials MAT</li> <li>Use low embodied energy materials MAT</li> <li>Use of quality materials MAT</li> <li>Use sustainable materials MAT</li> </ul>	<p><b>MATERIALS</b> (mentioned 6x)</p>
<ul style="list-style-type: none"> <li>Optimum safety &amp; security S&amp;S (2x)</li> </ul>	<p><b>SAFETY &amp; SECURITY</b> (mentioned 3x)</p>

<i>push it at the expense of the client's requirement on the quality (JD-B:9-10)</i>	<ul style="list-style-type: none"> <li>• Good workmanship <b>AES</b></li> </ul>
<i>...efficient in terms of floor space, architecturally attractive, good IEQ, and energy efficient (TYT-B:7-8)</i>	<ul style="list-style-type: none"> <li>• Efficient floor space <b>SP</b></li> <li>• Aesthetically pleasing <b>AES</b></li> <li>• Energy efficient <b>EE</b></li> </ul>
<b>TEXT</b>	<b>CODE (INDIVIDUAL)</b>
<b>DEVELOPER, OWNER &amp; DEVELOPER-OWNER:</b>	
<i>...space efficiency and sellable; good services and maintenance; architectural aesthetics (NA-D:8-10).</i>	<ul style="list-style-type: none"> <li>• Efficient floor space <b>SP</b></li> <li>• Low maintenance <b>ECON</b></li> <li>• Aesthetically pleasing <b>AES</b></li> </ul>
<i>...the one that can meet the needs of the tenants, the one that can provide maximum return to the landlord, the one that has full facilities, up-to-date sort of modern technology, can facilitate all the needs of the tenant, flexible..., and then various accommodation for handicap, and of course location, availability of public transportation...(MM-D:9-13)</i>	<ul style="list-style-type: none"> <li>• Fulfil client's requirements <b>GEN</b></li> <li>• Maximum return <b>ECON</b></li> <li>• Use up-to-date modern technology <b>M&amp;E</b></li> <li>• Flexible space planning <b>SP</b></li> <li>• Disabled friendly <b>INC</b></li> <li>• Close proximity to public transport <b>LOC</b></li> </ul>
<i>...optimization of space for functionality; floor area efficiency; attractive contemporary façade treatment which take into consideration on ease of maintenance and repair; the selection of suitable local building materials which are readily available. (BTC-D:15-17).</i>  <i>M&amp;E...to package utilities and services design for maximum reliability; low maintenance cost; design of M&amp;E infra must take into account versatility for refurbishment and renovation; emphasis on selection of components and system that will not become obsolete in the future. (BTC-D:20-23).</i>	<ul style="list-style-type: none"> <li>• Functional <b>SP</b></li> <li>• Efficient floor space <b>SP</b></li> <li>• Attractive facades and easy to maintain and repair <b>AES, O&amp;M</b></li> <li>• Use local materials <b>MAT</b></li> <li>• Reliable M&amp;E services <b>M&amp;E</b></li> <li>• Versatile M&amp;E infra for refurbishment &amp; renovation <b>M&amp;E</b></li> <li>• M&amp;E components &amp; system will not obsolete in the future <b>M&amp;E</b></li> </ul>

<ul style="list-style-type: none"> <li>• Optimum security level S&amp;S</li> </ul>	
<ul style="list-style-type: none"> <li>• Easily accessible <b>INCL</b></li> <li>• Disabled friendly <b>INC</b></li> <li>• User friendly <b>INC</b></li> </ul>	<b>INCLUSIVENESS</b> (mentioned 3x)
<b>CODE (GROUPED)</b>	<b>CATEGORY</b>
<ul style="list-style-type: none"> <li>• Preservation of physical environment <b>SITE</b></li> <li>• Sustainable landscaping <b>SITE</b></li> </ul>	<b>SUSTAINABLE SITE &amp; MANAGEMENT</b> (mentioned 2x)
<ul style="list-style-type: none"> <li>• Close proximity to public transport <b>LOC</b></li> <li>• Located in prime area <b>LOC</b></li> </ul>	<b>LOCATION &amp; EMISSIONS TO AIR</b> (mentioned 2x)
<ul style="list-style-type: none"> <li>• Reduce impact on adjacent properties <b>ADJ</b></li> </ul>	<b>IMPACT ON ADJACENT PROPERTIES</b> (mentioned 1x)

<p>... it must be less maintenance which means the cost of maintenance must be below the standard as much as possible (WR-D/O:9-10).                  ...functional... in term of equipment and the building itself and functional for the staff...So, for those who are designing without studying how the end users work, they may just apply the standard because they expect the end users to do renovations later which costs money...(WR-D/O:10-15).</p>	<ul style="list-style-type: none"> <li>• Low maintenance cost <b>ECON</b></li> <li>• Functional equipments <b>M&amp;E</b></li> <li>• Functional for users – based on users' work flow <b>SP</b></li> </ul>
<p>The aspects that developers look for in a 'Grade A' building are primarily location, physical building infrastructure, speed of the lifts, security level, use of fit out materials e.g. granite or tiles, floor to ceiling heights. For us, we look at the efficiency in terms of space (CN-D/O:8-10)</p>	<ul style="list-style-type: none"> <li>• Located in prime area <b>LOC</b></li> <li>• Speed of lifts <b>M&amp;E</b></li> <li>• Aesthetically pleasing <b>AES</b></li> <li>• Optimum security level <b>S&amp;S</b></li> <li>• Use of quality materials <b>MAT</b></li> <li>• Adequate floor-to-ceiling heights <b>SP</b></li> <li>• Efficient floor space <b>SP</b></li> </ul>
TEXT	
FACILITY MANAGER:	
<p>Simple in terms of design, interior, M&amp;E facilities and easy to look after. Some buildings are rhetoric. A building has to be friendly, in order to be friendly, it has to be simple (NM-FM:16-17)</p>	<ul style="list-style-type: none"> <li>• Low maintenance <b>ECON</b></li> <li>• User friendly <b>INC</b></li> </ul>
<p>If you look into sustainability it must able to minimize the resources to be utilized... safety, comfort, security...(OCL-FM:9-11)</p> <p>I'm always unhappy with many new technologies that have been implemented without assessing their durability, without knowing the cost of maintaining that over a period of time...they don't look into the life cycle cost. (OCL-FM:12-18)</p>	<ul style="list-style-type: none"> <li>• Minimize use of resources i.e. water, energy, materials <b>EE, WAT, MAT</b></li> <li>• Optimum safety &amp; security <b>S&amp;S</b></li> <li>• Comfortable/conducive indoor environment <b>IEQ</b></li> <li>• Use durable technology <b>O&amp;M</b></li> <li>• Low operation &amp; maintenance cost</li> </ul>

<ul style="list-style-type: none"> <li>• Sustainable construction <b>CONS</b></li> </ul>	<p><b>CONSTRUCTION STRATEGIES</b> (mentioned 1x)</p>
<ul style="list-style-type: none"> <li>• Responsive to climate <b>GEN (2x)</b></li> <li>• Fulfil client's requirements <b>GEN (2x)</b></li> <li>• Good buildability <b>GEN</b></li> <li>• Optimum orientation <b>GEN</b></li> <li>• Self-sustained <b>GEN</b></li> <li>• Fulfil client's requirements <b>GEN</b></li> <li>• Passive design <b>GEN</b></li> <li>• Holistic design <b>GEN</b></li> </ul>	<p><b>GENERAL DESIGN STRATEGIES</b> (mentioned 10x)</p>

<p><i>They do not know how to run the OTTV [Overall Thermal Transfer Value], they do not know how to run ROI. .(OCL-FM:20-21)</i></p>	<p><b>ECON</b></p> <ul style="list-style-type: none"> <li>• Consider life cycle cost <b>ECON</b></li> <li>• Building envelop that cut down heat gain &amp; reduce cooling load <b>EE</b></li> <li>• Maximum ROI <b>ECON</b></li> </ul>
<p><i>The functionality of M&amp;E system, easier and not too expensive to maintain, good comfort level, good indoor air quality and energy efficient (KCD-FM:9-10)</i></p>	<ul style="list-style-type: none"> <li>• Functional <b>SP</b></li> <li>• Easy to maintain <b>O&amp;M</b></li> <li>• Low maintenance cost <b>ECON</b></li> <li>• Comfortable/conducive indoor environment <b>IEQ</b></li> <li>• Good IAQ <b>IEQ</b></li> <li>• Energy efficient <b>EE</b></li> </ul>
<p><i>... adequate and comfortable working space; adequate facilities e.g. pantries, toilets; and good M&amp;E systems e.g. cooling system, PA system, IT infrastructure, no power outages. It should have optimum security &amp; security and adequate privacy level where necessary (ZS-FM:8-11)</i></p>	<ul style="list-style-type: none"> <li>• Comfortable/conducive indoor environment <b>IEQ</b></li> <li>• Adequate space &amp; facilities <b>SP</b></li> <li>• Good M&amp;E systems <b>M&amp;E</b></li> <li>• Optimum safety &amp; security <b>S&amp;S</b></li> <li>• Adequate privacy level <b>IEQ</b></li> </ul>
<p><b>TEXT</b></p>	<p><b>CODE (INDIVIDUAL)</b></p>
<p><b>REGULATOR, POLICY MAKER &amp; GOVERNMENT PROJECT IMPLEMENTOR</b></p>	
<p><i>For a government building, we need to satisfy government departments' needs based on the budget obtained from the government (CPK-PI:16-17)</i></p>	<ul style="list-style-type: none"> <li>• Fulfil client's requirements <b>GEN</b></li> <li>• Within budget <b>ECON</b></li> </ul>
<p><i>For a good office building, I'd like to see a good indoor environment. Because that would help the productivity of the workers, e.g. windows with view, more pleasant and conducive environment.(KSK-PM:8-10)</i></p>	<ul style="list-style-type: none"> <li>• Comfortable/conducive indoor environment <b>IEQ</b></li> <li>• Accessible to view <b>IEQ</b></li> </ul>
<p><i>...blocks interact with each other, with its neighbouring blocks as well as to the environment...Design must have character, identity and personality. Materials used must not harm the environment. (AMN-</i></p>	<ul style="list-style-type: none"> <li>• Reduce impact on adjacent properties <b>ADJ</b></li> <li>• Malaysian character &amp; identity</li> </ul>

R/PM:11-14)	<p><b>AES</b></p> <ul style="list-style-type: none"> <li>• Use sustainable materials <b>MAT</b></li> </ul>
<i>... aesthetics, public facilities, landscaping and lots of shelter from the sun and the rain. But now we are looking into energy savings...maintaining the culture, Malaysian character, while still taking care of the environment via technologies and designs. (NN-R/PM:10-16)</i>	<ul style="list-style-type: none"> <li>• Aesthetically pleasing <b>AES</b></li> <li>• Sustainable landscaping <b>SITE</b></li> <li>• Responsive to climate <b>GEN</b></li> <li>• Energy efficient <b>EE</b></li> <li>• Malaysian character &amp; identity <b>AES</b></li> </ul>
<i>... aesthetics...nice working environment. Another thing is the ventilation ... lighting, indoor environment quality and maybe the interior decorations are also very important. (MCA-PM:11-14)</i>	<ul style="list-style-type: none"> <li>• Aesthetically pleasing <b>AES</b></li> <li>• Comfortable/conducive indoor environment <b>IEQ</b></li> <li>• Good ventilation <b>IEQ</b></li> <li>• Good lighting <b>IEQ</b></li> </ul>
<i>A conducive working environment, free of SBS (Sick building Syndrome) elements, Efficient energy (EE) use optimising daylight use, &amp; optimal water use, with rain water harvest &amp; recycling, Sustainable construction and O&amp;M (Operations &amp; Maintenance) practices, Preservation of the environment in its vicinity to create a healthy micro-climate. (GL-PM:10-14)</i>	<ul style="list-style-type: none"> <li>• Comfortable/conducive indoor environment <b>IEQ</b></li> <li>• Energy efficient <b>EE</b></li> <li>• Optimise daylight <b>IEQ</b></li> <li>• Reduce potable water consumption <b>WAT</b></li> <li>• Utilize rainwater harvesting <b>WAT</b></li> <li>• Utilize grey water system <b>WAT</b></li> <li>• Sustainable construction <b>CONS</b></li> <li>• Sustainable operation &amp; maintenance <b>O&amp;M</b></li> <li>• Preservation of physical environment <b>SITE</b></li> </ul>



**Q.2 What can an architect/engineer/builder/developer/owner/regulator do to achieve a “good” office building?**

TEXT	CODE (INDIVIDUAL)
<b>ARCHITECT:</b>	
<i>...mix passive and active (KK-A:12-13)</i>	<ul style="list-style-type: none"> <li>Design for mix-mode</li> </ul>
<i>Building design in terms of facilities and usage (WS-A:10).</i>	<ul style="list-style-type: none"> <li>Design accordingly</li> </ul>
<i>That would be for the planning ... Then, for the corporate image for the company, normally a lot of companies, they have their corporate philosophy and on top of that, they have the goals of the organization. Designs must follow those.(CSA-A:16-18)</i>	<ul style="list-style-type: none"> <li>Include in planning stage</li> <li>Design to follow organization's corporate philosophy &amp; goals</li> </ul>
<i>You have to plan for it. For most practices the big restriction to why people don't green their offices because they are renting. And when you buy existing building, there's not much you can do. I think the way we should tackle is that architects should design offices green straight away. Then the tenants got little to say... (TLM-A:10-13)</i>	<ul style="list-style-type: none"> <li>Include green in planning stage</li> <li>Design green even for rented offices</li> </ul>
<i>Last time they were more designed based on marketability. As long as there is a nice corporate look with a lot of glass, that is what people wanted. (TLM-A:21-22)</i>	<ul style="list-style-type: none"> <li>Design based on its environmental impact not only on marketability.</li> </ul>
<i>Just design (KY-A:10)</i>	<ul style="list-style-type: none"> <li>Design accordingly</li> </ul>
<i>Providing, if you can, passive design but not always relevant....(SH-A:13-14)</i>	<ul style="list-style-type: none"> <li>Follow passive design</li> </ul>
<i>So we understand the site. Then after that you sit down with the client and get the brief done. ... Then go on with the next step of discussing the budget, and then we start with the schematic and so on. (SA-A:13-18)</i>	<ul style="list-style-type: none"> <li>Understand the site prior to project brief preparation</li> </ul>
<i>...incorporate the ideas, orientation and everything start</i>	<ul style="list-style-type: none"> <li>Incorporate sustainability during</li> </ul>

CODE (GROUPED)	CATEGORY
<b>From all 12 designers</b>	
<ul style="list-style-type: none"> <li>Design accordingly (2x)</li> <li>Follow passive design</li> <li>Design for mix-mode</li> <li>Design with nature</li> <li>Follow sustainable design based on program, budget &amp; site restrictions.</li> <li>Design green even for rented offices</li> <li>Design based on its environmental impact not only on marketability.</li> <li>Design to follow organization's corporate philosophy &amp; goals</li> </ul>	<b>DESIGN ACCORDINGLY</b>
<ul style="list-style-type: none"> <li>Incorporate sustainability during schematic design stage</li> <li>Include green in planning stage</li> <li>Include in planning stage</li> <li>Understand the site prior to project brief preparation</li> </ul>	<b>INCORPORATE DURING PLANNING &amp; STAGE</b>
<ul style="list-style-type: none"> <li>Ensure architects are competent in sustainable building design – not to leave it all to engineers</li> <li>Ensure engineers are competent in sustainable design</li> </ul>	<b>BE A COMPETENT &amp; KNOWLEDGEABLE DESIGNER</b>

<i>from the schematic design stage (LCH-A:25-26)</i>	schematic design stage
<i>Rather than everything at the end of the day just leave it to the engineer... the owner wanted a green building, but they leave it to the architect but the architect is the ignorant of how to design a green building... So he leaves most of the things especially the services to the M&amp;E engineer. (LCH-A:26-33)</i>	<ul style="list-style-type: none"> <li>Ensure architects are competent in sustainable building design – not to leave it all to engineers</li> </ul>
<i>It will be other advantage if he [architect] knows some building simulation programs like Ecotech or IES. (LCH-A:48-49)</i>	<ul style="list-style-type: none"> <li>Use building simulation programs during design stage</li> </ul>
<i>Most of our office buildings – within institutional projects – are creeping on the site... I am happy if we can 20-50% sustainable depending on the content of the project, the budget and restrictions of the site.(NB-A:13-18)</i>	<ul style="list-style-type: none"> <li>Design with nature</li> <li>Include as much sustainability aspects as possible based on program, budget &amp; site restrictions.</li> </ul>
<b>TEXT</b>	<b>CODE (INDIVIDUAL)</b>
<b>ENGINEER &amp; ENVIRONMENTAL CONSULTANT:</b>	
<i>Engineers have to understand not only the fundamental engineering skills, you must catch up with what the industry requires so you can adapt the engineering design to suit it... You must be on top of the cutting-edge technology... But your challenge is how do you localize it, customize it and then apply and it can work (CTL-ME:23-35)</i>	<ul style="list-style-type: none"> <li>Engineers must be conversant with cutting-edge technologies, and able to localize and apply them.</li> </ul>
<i>... the engineers also have to convince themselves first, only then they have better chances to convince the owner/developer. (NYK-ME:26-27)</i>	<ul style="list-style-type: none"> <li>Ensure engineers are competent in sustainable design</li> </ul>
<i>We can influence on the air quality, on the daylight quality. (CKT-EC:16)</i>	<ul style="list-style-type: none"> <li>Engineers to influence architects on the environmental design</li> </ul>
<b>TEXT</b>	<b>CODE (INDIVIDUAL)</b>
<b>BUILDER &amp; BUILDER-DEVELOPER:</b>	

<ul style="list-style-type: none"> <li>Engineers must be conversant with cutting-edge technologies, and able to localize and apply them.</li> </ul>	
<ul style="list-style-type: none"> <li>Use building simulation programs during design stage</li> </ul>	<b>USE BUILDING SIMULATION PROGRAMS</b>
<ul style="list-style-type: none"> <li>Engineers to influence architects on the environmental design</li> </ul>	<b>COLLABORATE WITH ENGINEERS ON ENVIRONMENTAL DESIGN</b>
<b>CODE (GROUPED)</b>	<b>CATEGORY</b>
<b>From all 3 builders</b>	

<i>To develop awareness in green building materials and push for its usage. (SA-B/D:20)</i>	<ul style="list-style-type: none"> <li>Develop awareness on &amp; encourage usage of green materials &amp; products among builders</li> </ul>
<i>To always upgrade and improve knowledge in construction methods, buildability, cost and energy savings methods.(SA-B/D:21-22)</i>	<ul style="list-style-type: none"> <li>Improve knowledge on sustainable construction among builders</li> </ul>
<i>Appoint an able designer or consultant team with good experience and knowledge...(SA-B/D:18-19)</i>	<ul style="list-style-type: none"> <li>Appoint a competent and experienced professional team in sustainable building</li> </ul>
<i>We can always propose to the client if these are not in the original contract or not designed for them. (TYT-B:13-14)</i>	<ul style="list-style-type: none"> <li>Propose alternative/better solutions to the client (if not in the contract)</li> </ul>
<i>Contractors basically, they have to work together with the architects and the client...(JD-B:12-14)</i>	<ul style="list-style-type: none"> <li>Collaborate with architects &amp; client</li> </ul>
<b>TEXT</b>	<b>CODE (INDIVIDUAL)</b>
<b>DEVELOPER, OWNER &amp; DEVELOPER-OWNER:</b>	
<i>We must know what we want. Then we get the right team... We must know our local market. If we know who the possible buyers/tenants are, we can build a better building because we can build according to their requirements (NA-D:13-16)</i>	<ul style="list-style-type: none"> <li>Developers must be conversant with sustainable building requirements</li> <li>Appoint a competent and experienced professional team in sustainable building</li> <li>Build according to potential buyer/tenants' requirements</li> </ul>
<i>... choose a good place to build...If they want to pay for a higher price, suppose then they have a good location, somewhere all the infrastructures are available. (MM-D:16-</i>	<ul style="list-style-type: none"> <li>Choose urban sites with existing infrastructure</li> </ul>

<ul style="list-style-type: none"> <li>Develop awareness on &amp; encourage usage of green materials &amp; products among builders</li> </ul>	<b>DEVELOP AWARENESS &amp; KNOWLEDGE AMONG BUILDERS</b>
<ul style="list-style-type: none"> <li>Improve knowledge on sustainable construction among builders</li> </ul>	
<ul style="list-style-type: none"> <li>Appoint a competent and experienced professional team in sustainable building</li> </ul>	<b>APPOINT A COMPETENT &amp; EXPERIENCED PROFESSIONAL TEAM</b>
<ul style="list-style-type: none"> <li>Propose alternative/better solutions to the client (if not in the contract)</li> </ul>	<b>PROPOSE TO CLIENT</b>
<ul style="list-style-type: none"> <li>Collaborate with architects &amp; client</li> </ul>	<b>COLLABORATE WITH ARCHITECTS &amp; CLIENT</b>
<b>CODE (GROUPED)</b>	<b>CATEGORY</b>
<b>From all 5 developers/owners</b>	
<ul style="list-style-type: none"> <li>Appoint a competent and experienced professional team in sustainable building (3x)</li> <li>Select reputable &amp; reliable contractor</li> <li>Select C&amp;S engineer who are able to perform value engineering design</li> <li>Developers must be knowledgeable on sustainable construction &amp; building requirements</li> </ul>	<b>APPOINT A COMPETENT &amp; KNOWLEDGEABLE PROJECT TEAM</b>

18)	
<i>The appointment of competent professional building consultants is vital...(BTC-D:13)</i>	<ul style="list-style-type: none"> <li>Appoint a competent and experienced professional team in sustainable building</li> </ul>
<i>C&amp;S Engineer – must be able to perform prudent value engineering design on the sub/super structure without compromising on structural integrity for economy. (BTC-D:18-19)</i>	<ul style="list-style-type: none"> <li>Select C&amp;S engineer who are able to perform value engineering design</li> </ul>
<i>Building Contractor - the selection for a reputable and reliable contractor who has the resources to construct and complete the entire building constitutes the final ingredient for the product. (BTC-D:24-26)</i>	<ul style="list-style-type: none"> <li>Select reputable &amp; reliable contractor</li> </ul>
<i>...developer must be very knowledgeable also on the construction... experts also need to be fed with information...So, if you don't tell, people will always assume just a standard. (WR-D/O:21-28)</i>	<ul style="list-style-type: none"> <li>Developers must be knowledgeable on sustainable construction &amp; building requirements</li> </ul>
<i>... design brief. That was not really given a deep thought... So when the design brief was not in depth, people will not design to the requirement. ...If green building is not stated in there, then that's it! You won't be getting that kind of building. (WR-D/O:30-35)</i>	<ul style="list-style-type: none"> <li>Ensure the design brief is detailed &amp; included with sustainable building requirements</li> </ul>
<i>But when the owner hires architects who are familiar with or interested in green buildings, they'll suggest this to owners and owners will start demand [for green buildings]...And that needs to be captured in the ITB (Invitation to Bid) or the contract document. (WR-D/O:39-44)</i>	<ul style="list-style-type: none"> <li>Appoint a competent and experienced professional team in sustainable building</li> <li>Capture sustainable building requirements in contract doc</li> </ul>
<b>TEXT</b>	<b>CODE (INDIVIDUAL)</b>
<b>FACILITY MANAGER:</b>	

<ul style="list-style-type: none"> <li>Developers must be conversant with sustainable building requirements</li> </ul>	
<ul style="list-style-type: none"> <li>Ensure the design brief is detailed &amp; included with sustainable building requirements</li> <li>Capture sustainable building requirements in contract documents</li> </ul>	<b>SPECIFY IN DESIGN BRIEF &amp; CONTRACT DOCS</b>
<ul style="list-style-type: none"> <li>Build according to potential buyer/tenants' requirements</li> </ul>	<b>FOLLOW BUYERS' REQUIREMENTS</b>
<ul style="list-style-type: none"> <li>Choose urban sites with existing infrastructure</li> </ul>	<b>SELECT URBAN SITES</b>
<b>CODE (GROUPED)</b>	<b>CATEGORY</b>
<b>From all 4 FMs</b>	

<i>Facility managers can get involved during the conceptual or design stage so the building can be friendly...To achieve a good building, there should be a multidisciplinary collaboration during the early development stage. (NM-FM:20-22)</i>	<ul style="list-style-type: none"> <li>Get involved in early development stage</li> </ul>
<i>When buildings have been completed, there would be a period of familiarization and trainings, if required. Certain things [equipments and their maintenance] need to be exposed and trained to the tenants. However, that never happens. Any training or familiarization should be handled by the project team after the commissioning. (NM-FM:28-31)</i>	<ul style="list-style-type: none"> <li>Ensure consultants expose &amp; train tenants/operation staff on equipments and their maintenance after commissioning phase.</li> </ul>
<i>implementing FM during the design ...FM should start during the design stage...(OCL-FM:42)</i>	<ul style="list-style-type: none"> <li>Implement FM in the design stage</li> </ul>
<i>Energy managers should be well-trained and well-qualified... We communicate with the occupants a lot to receive their feedback in terms of their satisfaction level. (KCD-FM:14-17)</i>	<ul style="list-style-type: none"> <li>Ensure operation &amp; maintenance staff are well-trained &amp; qualified</li> <li>Conduct occupants' satisfaction survey</li> </ul>
<i>We have to perform tenant survey every 6 months to discover their level of satisfaction on the environment in the building... Any of their complaints have to be entertained and fulfilled... We also conduct scheduled inspections or 'safety walk' once a month. (ZS-FM:15-20)</i>	<ul style="list-style-type: none"> <li>Conduct occupants' satisfaction survey</li> <li>Conduct scheduled inspections</li> </ul>
<b>TEXT</b>	<b>CODE (INDIVIDUAL)</b>
<b>REGULATOR, POLICY MAKER &amp; GOVERNMENT PROJECT IMPLEMENTOR</b>	
<i>... I was in the EPU [Economic Planning Unit, Prime Minister Dept.]. They were chairing a committee on sustainable development. I requested them and say, "When you approve a project, make sure that there is a print down there saying that the project considers</i>	<ul style="list-style-type: none"> <li>EPU to ensure government projects are energy efficient/green/sustainable prior to budget approval.</li> </ul>

<ul style="list-style-type: none"> <li>Get involved in the early development stage</li> </ul>	<b>COLLABORATE EARLY</b>
<ul style="list-style-type: none"> <li>Ensure consultants expose &amp; train tenants/operation staff on equipments and their maintenance after commissioning phase.</li> <li>Ensure operation &amp; maintenance staff are well-trained &amp; qualified</li> </ul>	<b>ENSURE O&amp;M STAFF ARE TRAINED &amp; QUALIFIED</b>
<ul style="list-style-type: none"> <li>Incorporate FM in the design stage</li> </ul>	<b>INCORPORATE FM EARLY</b>
<ul style="list-style-type: none"> <li>Conduct occupants' satisfaction survey (2X)</li> <li>Conduct scheduled inspections</li> </ul>	<b>POST-OCCUPANCY EVALUATION</b>
<b>CODE (GROUPED)</b>	<b>CATEGORY</b>
<b>From all 6 policy makers</b>	
<ul style="list-style-type: none"> <li>Introduce guidelines on EE</li> <li>Introduce guidelines &amp; policies</li> <li>Ensure guidelines &amp; policies are followed prior to planning approval.</li> </ul>	<b>INTRODUCE GUIDELINES, POLICIES, CODES &amp; STANDARDS</b>

<i>environmental conservation and energy efficiency...</i> ” (CPK-PI:30-33)	
<i>... we are preparing the project documents for approval at the UNDP level. Hopefully with that project, we can actually develop the competency of local consultants and also the designers within JKR [Public Works Department or PWD] who design public buildings...(CPK-PI:41-45)</i>	<ul style="list-style-type: none"> <li>• Develop competency of local consultants &amp; designers within PWD</li> </ul>
<i>As far as our construction site is concerned, we already have our ISO14000. When we start constructing, we will take care of the environmental issues such as erosion controls, scheduled waste management, waste management, noise, dust and all these things that are already in our system. (CPK-PI:45-50)</i>	<ul style="list-style-type: none"> <li>• PWD to operate according to ISO14000 requirements</li> </ul>
<i>...bring in some guidelines, talk to the industry or give some information to them... (KSK-PM:12-14)</i>	<ul style="list-style-type: none"> <li>• Introduce guidelines on EE</li> <li>• Promote green/sustainable building practices to the industry</li> </ul>
<i>We can provide guidelines &amp; policies covering aspects I've mentioned just now. We also thoroughly check the planning submission drawings on these aspects prior to giving planning approval. (AMN-R/PM:16-18)</i>	<ul style="list-style-type: none"> <li>• Introduce guidelines &amp; policies</li> <li>• Ensure guidelines &amp; policies are followed prior to planning approval.</li> </ul>
<i>Now, we are actually designing a term of reference for our urban design guidelines and we are already there... steps by steps. The criteria are now as the guidelines based on the structure plan and the city plan...The guidelines are adopted from the PAM's Green Building Index [GBI]. (NN-R/PM:21-24)</i>	<ul style="list-style-type: none"> <li>• Introduce green urban &amp; building design guidelines</li> </ul>
<i>So, we are trying to figure out an incentive for the public who implement GBI...less requirement for parking numbers, perhaps more plot ratio, waives of processing</i>	<ul style="list-style-type: none"> <li>• Give incentives to encourage the adoption of Green Building Index</li> </ul>

<ul style="list-style-type: none"> <li>• Ensure appropriate mandatory building codes</li> <li>• PWD to operate according to ISO14000 requirements</li> <li>• Introduce green urban &amp; building design guidelines</li> <li>• EPU to ensure government projects are energy efficient/green/sustainable prior to budget approval.</li> <li>• Develop &amp; enforce sustainable building design codes &amp; criteria</li> </ul>	
<ul style="list-style-type: none"> <li>• Give incentives to encourage the adoption of Green Building Index</li> <li>• Encourage voluntary adoption through incentives or punitive disincentives for non-compliance</li> </ul>	<b>GIVE INCENTIVES</b>
<ul style="list-style-type: none"> <li>• Promote green/sustainable building practices to the industry</li> <li>• Develop competency of local consultants &amp; designers within PWD</li> <li>• CIDB to promote, educate &amp; train industry players on sustainable building practices</li> </ul>	<b>PROMOTE, EDUCATE &amp; TRAIN INDUSTRY PLAYERS</b>
<ul style="list-style-type: none"> <li>• Reduce subsidies for energy prices to end-users</li> </ul>	<b>REDUCE SUBSIDIES FOR ENERGY PRICES</b>

<p>fees... (NN-R/PM:25-32)</p>	
<p><i>CIDB is more on promotional and educational level and not on regulatory. (MCA-PM:19-20)</i></p>	<ul style="list-style-type: none"> <li>• CIDB to promote, educate &amp; train industry players on sustainable building practices</li> </ul>
<p><i>Ensure appropriate mandatory building codes... Encourage “voluntary” adoption of above practices, through suitable incentives or punitive disincentives for non-compliance, Develop &amp; enforce existing &amp; where applicable, new sustainable building design codes &amp; criteria, For Malaysia, reduce the subsidies for energy prices to end-users to reflect a true price of the commodity, while giving direct support to the deserving “have-nots” to give them such a commodity at an affordable rate. (GL-PM:16-24)</i></p>	<ul style="list-style-type: none"> <li>• Ensure appropriate mandatory building codes</li> <li>• Encourage voluntary adoption through incentives or punitive disincentives for non-compliance</li> <li>• Develop &amp; enforce sustainable building design codes &amp; criteria</li> <li>• Reduce subsidies for energy prices to end-users</li> </ul>



## B: GREEN & SUSTAINABLE OFFICE BUILDINGS

### Q.4 Have you heard the word “green building”? Q4a: Can you explain what do you understand by the term?

TEXTS/ ANSWERS	CODE (INDIVIDUAL)	CODE (GROUPED)	CATEGORY
<b>ARCHITECT:</b>		<b>From all 30 interviewees</b>	
<i>Yes. Green building must have all the 5 elements i.e. energy efficiency, site management, indoor air quality, water harvesting &amp; materials. I am referring to elements covered in LEED. (KK-A:22-23)</i>	<ul style="list-style-type: none"> <li>• Energy efficiency <b>EE</b></li> <li>• Site management <b>SITE</b></li> <li>• IAQ <b>IEQ</b></li> <li>• Water Efficiency <b>WAT</b></li> <li>• Materials <b>MAT</b></li> </ul>	<ul style="list-style-type: none"> <li>• Energy efficiency <b>EE (15x)</b></li> <li>• A smart, energy efficient building <b>EE, GEN4</b></li> <li>• Closing the energy &amp; environmental cycle <b>EE, GEN1</b></li> <li>• Fundamental issue is energy – i.e. design with passive elements, use energy efficient equipments &amp; use <b>RE EE, EE, EE</b></li> <li>• Systemic integration of internal processes with the ecosystems in nature <b>WAT, EE</b></li> </ul>	<b>ENERGY EFFICIENCY &amp; RENEWABLE ENERGY</b> (mentioned 21x)
<i>Yes. Green building covers all in term of the materials usage, the systems, the maintenance, building operations and energy efficiency. It also considers working quality and the indoor environment. (WS-A:21-23)</i>	<ul style="list-style-type: none"> <li>• Materials <b>MAT</b></li> <li>• Operation &amp; Maintenance <b>O&amp;M</b></li> <li>• Energy Efficiency <b>EE</b></li> <li>• IEQ <b>IEQ</b></li> </ul>		
<i>Yes. My own interpretation of green or sustainable building would be a building that can function for its entire life expectancies without becoming a redundant structure. (CSA-A:31-32)</i>	<ul style="list-style-type: none"> <li>• Functional for its entire life <b>O&amp;M</b></li> </ul>	<ul style="list-style-type: none"> <li>• Water Efficiency <b>WAT (6x)</b></li> <li>• Efficient use of water, reuse rainwater &amp; reuse recycled water <b>WAT, WAT, WAT</b></li> <li>• Systemic integration of internal processes with the ecosystems in nature <b>WAT, EE</b></li> <li>• Water efficiency including reuse of rainwater &amp; recycled water <b>WAT, WAT, WAT</b></li> </ul>	<b>WATER EFFICIENCY</b> (mentioned 13x)



<p>Yes. My interpretation of green building is that it must comply with the 6 issues of Green Building Index (GBI) i.e. Energy Efficiency, Indoor Environmental Quality, Sustainable Site and Management, Materials &amp; Resources, Water Efficiency and Innovation. (TLM-A:36-38)</p>	<ul style="list-style-type: none"> <li>• Energy Efficiency <b>EE</b></li> <li>• Sustainable Site &amp; Mgt. <b>SITE</b></li> <li>• IEQ <b>IEQ</b></li> <li>• Materials &amp; Resources <b>MAT</b></li> <li>• Water Efficiency <b>WAT</b></li> <li>• Innovation <b>INNO</b></li> </ul>	<ul style="list-style-type: none"> <li>• Materials <b>MAT (3x)</b></li> <li>• Materials &amp; Resources <b>MAT (2x)</b></li> <li>• Design to physically integrate with the ecosystem – site ecology, use of green materials, facilitate reuse &amp; recycle <b>MAT, MAT</b></li> <li>• Local materials <b>MAT</b></li> <li>• Materials from sustainable sources <b>MAT</b></li> <li>• Non-hazardous/toxic materials <b>MAT</b></li> <li>• Recycled &amp; recyclable materials <b>MAT</b></li> <li>• Sustainable materials <b>MAT</b></li> </ul>	<p><b>MATERIALS</b> (mentioned 12x)</p>
<p>I see green building as designing to bio-integrate. To me there are 3 level bio-integration i.e. systemic, temporal and physical... Any activity from our design takes place with the objective to physically integrate with the ecosystems. So we need to carry out an analysis of the site's ecology. Green design also requires us to use green materials and assemblies of materials and components that facilitate reuse, recycling and reintegration for temporal integration with the ecological systems. Another issue is the systemic integration of our built forms and its operational systems and internal processes with the ecosystems in nature. We should integrate not the organic waste but also the inorganic ones as well. (KY-A:19-28)</p>	<ul style="list-style-type: none"> <li>• Design to physically integrate with the ecosystem – site ecology, use of green materials, facilitate reuse &amp; recycle <b>MAT, MAT</b></li> <li>• Temporal integration with the ecological systems <b>SITE</b></li> <li>• Systemic integration of built forms and its operation systems <b>O&amp;M</b></li> <li>• Systemic integration of internal processes with the ecosystems in nature <b>WAT, EE</b></li> </ul>		
<p>Yes. We are not prepared in terms of producing materials that are sustainable, having the selection of materials, buying certain materials within certain radius, transport is not there for us also. Under the UNDP, we don't reach quite that level. We are not a developed country in a way. Reliance on public transports from where we live, having to cycle – and I'm wondering whether we'll ever get to that level where we would strike a different balance. We sit in the middle. Neither are we pushed to a same limit of energy efficiency or sustainability that Singapore will be. Singapore is more about energy producing as an option</p>	<ul style="list-style-type: none"> <li>• Sustainable materials <b>MAT</b></li> <li>• Local materials <b>MAT</b></li> <li>• Reliance on public transports <b>LOC</b></li> <li>• Energy efficiency <b>EE</b></li> <li>• Water efficiency <b>WAT</b></li> </ul>	<ul style="list-style-type: none"> <li>• Effective &amp; efficient O&amp;M <b>O&amp;M</b></li> <li>• Efficient operation &amp; maintenance <b>O&amp;M</b></li> <li>• Functional for its entire life <b>O&amp;M</b></li> <li>• Occupants' attitude <b>O&amp;M</b></li> <li>• Operation &amp; Maintenance <b>O&amp;M</b></li> <li>• Sustainable occupation practices <b>O&amp;M</b></li> <li>• Sustainable operation &amp;</li> </ul>	<p><b>OPERATION &amp; MAINTENANCE</b> (mentioned 8x)</p>

<i>because their tariff is much higher and in Australia, they have a problem with water. And our emphasis is always different. (SH-A:35-43)</i>	
<i>Yes. A green building is normally an energy efficient building but an energy efficient building is not necessarily a green building. A green building cares about every aspect, for example energy, social, and environment and so on. What is meant by green is what we can see in the environment now – to reduce the amount of carbon emission. (SA-A:30-32)</i>	<ul style="list-style-type: none"> <li>• Energy efficiency <b>EE</b></li> <li>• Social aspects <b>GEN3</b></li> <li>• Reduce impacts on environment <b>GEN1</b></li> </ul>
<i>Yes. A green building should be able to adapt itself to the local environment, at the same time giving the comfort to the occupants and minimizing energy resources. (LCH-A:70-71)</i>	<ul style="list-style-type: none"> <li>• Adaptable to local environment <b>GEN1</b></li> <li>• IEQ <b>IEQ</b></li> <li>• Energy efficiency <b>EE</b></li> </ul>
<i>Yes. But green is just a colour to me [laughs]. Nothing to do with sustainability. I think the word is symbolic. It is just a name which has been coined up with somebody. The preferable word for us is ‘sustainability’. (NB-A:31-33)</i>	<ul style="list-style-type: none"> <li>• No meaning</li> </ul>
<b>TEXT</b>	<b>CODE (INDIVIDUAL)</b>
<b>ENGINEER &amp; ENVIRONMENTAL CONSULTANT:</b>	
<i>Some people thought the environmental quote is the best. But my own is closing the energy and environmental cycle. So you have to learn to close the entire loop. (CTL-ME:109-110)</i>	<ul style="list-style-type: none"> <li>• Closing the energy &amp; environmental cycle <b>EE, GEN1</b></li> </ul>
<i>When you talk about green, they usually relate to the environment, better use of natural resources. And of course the word of ‘energy efficient’ cannot be avoided.</i>	<ul style="list-style-type: none"> <li>• Better use of natural resources <b>GEN2</b></li> <li>• Energy efficiency <b>EE</b></li> </ul>

<ul style="list-style-type: none"> <li>• maintenance <b>O&amp;M</b></li> <li>• Systemic integration of built forms and its operation systems <b>O&amp;M</b></li> </ul>	
<ul style="list-style-type: none"> <li>• Site management <b>SITE (2x)</b></li> <li>• Sustainable Site &amp; Mgt. <b>SITE (2x)</b></li> <li>• Not only good landscaping <b>SITE</b></li> <li>• Sustainable site management <b>SITE</b></li> <li>• Temporal integration with the ecological systems <b>SITE</b></li> </ul>	<b>SUSTAINABLE SITE &amp; MANAGEMENT</b> (mentioned 7x)
<ul style="list-style-type: none"> <li>• IAQ <b>IEQ (7x)</b></li> </ul>	<b>INDOOR ENVIRONMENTAL QUALITY</b> (mentioned 7x)
<ul style="list-style-type: none"> <li>• Innovation <b>INNO (2x)</b></li> </ul>	<b>INNOVATION</b> (mentioned 2x)
<ul style="list-style-type: none"> <li>• Reliance on public transports <b>LOC</b></li> </ul>	<b>LOCATION &amp; EMISSIONS TO AIR</b> (mentioned 1x)
<b>CODE (GROUPED)</b>	<b>CATEGORY</b>
<b>General Meanings</b>	
<ul style="list-style-type: none"> <li>• Reduce impact on the environment <b>GEN1 (4x)</b></li> <li>• Environmentally friendly <b>GEN1 (3x)</b></li> <li>• Adaptable to local environment <b>GEN1</b></li> <li>• Closing the energy &amp; environmental cycle <b>EE, GEN1</b></li> </ul>	<b>REDUCE IMPACTS ON ENVIRONMENT</b> (mentioned 12x)

(NYK-ME:57-58)	
<i>Green building would have zero impact on the environment in term of carbon emissions, in term of material usage... in the end it should not contribute to the any degradation of the environment. Eventually it may able to be positive. The building in the end might be able to clean the air, clean the water, and produce more energy then it uses for itself. So that will be the future where the building is not just neutral but also contributing positive to the environment. (CKT-EC:35-40)</i>	<ul style="list-style-type: none"> <li>• <b>Zero impact on the environment. May contribute positively to the environment e.g. clean the air, clean the water, produce energy and etc. GEN1</b></li> </ul>
TEXT	CODE (INDIVIDUAL)
BUILDER & BUILDER-DEVELOPER:	
<i>Yes. Construction, operation and maintenance of such buildings will not have an adverse impact on the environment; in fact it might even improve the surrounding in a holistic manner. (SA-B/D:42-43)</i>	<ul style="list-style-type: none"> <li>• <b>Construction, operation &amp; maintenance do not have adverse impact on the environment GEN1</b></li> </ul>
<i>A green building for me is an environmentally friendly building. It makes use of nature like for instance energy, like solar system, making use of rainwater, recycle, treatment plant to treat the water in a modular form and use the water in the building for drinking. Minimal use of vehicles. Minimize use of fossil fuels. (JD-B:35-38)</i>	<ul style="list-style-type: none"> <li>• <b>Environmentally friendly GEN1</b></li> </ul>
<i>My understanding on green is more than just the nice landscaping. A green building should have the 6 elements covered in the GBI [Green Building Index] i.e. energy efficiency, indoor environmental quality, sustainable site and management, materials &amp; resources, water efficiency, and innovation. (TYT-B:27-30)</i>	<ul style="list-style-type: none"> <li>• <b>Energy Efficiency EE</b></li> <li>• <b>Sustainable Site &amp; Mgt. SITE</b></li> <li>• <b>IEQ IEQ</b></li> <li>• <b>Materials &amp; Resources MAT</b></li> <li>• <b>Water Efficiency WAT</b></li> <li>• <b>Innovation INNO</b></li> </ul>

<ul style="list-style-type: none"> <li>• Construction, operation &amp; maintenance do not have adverse impact on the environment <b>GEN1</b></li> <li>• Reducing impacts on environment throughout building lifecycle <b>GEN1</b></li> <li>• Zero impact on the environment. May contribute positively to the environment e.g. clean the air, clean the water, produce energy and etc. <b>GEN1</b></li> </ul>	
CODE (GROUPED)	CATEGORY
<ul style="list-style-type: none"> <li>• Better use of natural resources <b>GEN2</b></li> <li>• Efficient use of resources <b>GEN2</b></li> <li>• Save resources throughout building lifecycle <b>GEN2</b></li> </ul>	<b>EFFICIENT USE OF RESOURCES</b> (mentioned 3x)
<ul style="list-style-type: none"> <li>• Social aspects <b>GEN3</b></li> <li>• Reducing impacts on human health throughout building lifecycle <b>GEN3</b></li> </ul>	<b>REDUCE IMPACTS ON HUMAN HEALTH</b> (mentioned 2x)
<ul style="list-style-type: none"> <li>• Similar to intelligent building <b>GEN4</b></li> <li>• A smart, energy efficient building <b>EE, GEN4</b></li> </ul>	<b>SIMILAR TO 'INTELLIEGENT' BUILDING</b> (mentioned 2x)

TEXT	CODE (INDIVIDUAL)
<b>DEVELOPER, OWNER &amp; DEVELOPER-OWNER:</b>	
<i>I am not quite sure. But what I've heard, it should reduce the heat that comes in, less air-conditioning is used, good orientation...basically reduce environmental impact. (NA-D:29-30)</i>	<ul style="list-style-type: none"> <li>Reduce impact on the environment <b>GEN1</b></li> </ul>
<i>I have, but not in depth. I think the one which is environmentally friendly. I think because of the word 'green'. But, what are the features expected to be in a green building, I'm not very familiar. (MM-D:63-64)</i>	<ul style="list-style-type: none"> <li>Environmentally friendly <b>GEN1</b></li> </ul>
<i>Yes. It is the practice of increasing the efficiency of building that use resources i.e. energy, water and materials, while reducing impacts on human health and environmental degradation, through better siting, design, construction, operation, and maintenance. (BTC-D:39-41)</i>	<ul style="list-style-type: none"> <li>Efficient use of resources <b>GEN2</b></li> <li>Reducing impacts on human health throughout building lifecycle <b>GEN3</b></li> <li>Reducing impacts on environment throughout building lifecycle <b>GEN1</b></li> </ul>
<i>It always goes on how deep the green are – light green or mild green or deep green. In my opinion, if you say that my building is a green building, there must be an effort that translates into reality with regard to energy.... Because fundamentally, green building is sustainable, so the pressing issue is about energy because when you use a lot of energy of course it will relate to the commercially supply energy, fossil fuel, and relates to the emission of carbon etc etc. So to me, fundamentally it is energy first and how much we tackle the energy issues in that building determines how deep the green [of the building] is.... you do a passive design [to reduce energy consumption], then try to use energy efficient equipment, then after that you try to do renewable energy – and that is one aspect of the</i>	<ul style="list-style-type: none"> <li>Fundamental issue is energy – i.e. design with passive elements, use energy efficient equipments &amp; use <b>RE EE, EE, EE</b></li> <li>Efficient use of water, reuse rainwater &amp; reuse recycled water <b>WAT, WAT, WAT</b></li> </ul>

CODE (GROUPED)	CATEGORY
<ul style="list-style-type: none"> <li>No meaning</li> </ul>	<b>NO MEANING – PREFER 'SUSTAINABLE'</b>
<ul style="list-style-type: none"> <li>Don't know</li> </ul>	<b>DO NOT KNOW</b>
<ul style="list-style-type: none"> <li></li> </ul>	
<ul style="list-style-type: none"> <li></li> </ul>	

<p>energy.  <i>Another aspect of it which is a deeper green is when you try to be more sustainable by minimizing the need to use other resources like water. So, in my building I am trying to see the potential of using rainwater harvesting which is good. We don't only save energy in one aspect, we also save water. Another green thing which is a very difficult to do is something related to sewerage [recycling grey and black water]. I don't think that any office buildings [in KL] look into that before. That's how I see the hierarchy in my opinion. (WR-D/O:66-86)</i></p>	
<p><i>Now we have gone through with the Green Mark certification process, we are definitely more sensitive to what contributes to green. It is not just about being energy efficient, but looking at the sustainability issues and operational sustainability... So we have to put in our water implementation plan how we can save water....water efficient fittings. We have a system to collect our condensate water and rainwater harvesting system to irrigate our plantings. Definitely, the IEQ part is something that I didn't really aware of until I went through with Green Mark. (CN-D/O:78-86)</i></p> <p><i>For the fit out that we use... as much as possible materials which come from sustainable sources. ((CN-D/O:119-120)</i>  <i>Operational sustainability is all about the mentality of our manpower...if there is no energy saving culture in the building – lights and air-cond are left on even when there's nobody there. When people don't conform to standard operation procedures, you're also wasting money. To control people is not that easy. (CN-D/O:121-124)</i></p>	<ul style="list-style-type: none"> <li>• Energy efficiency <b>EE</b></li> <li>• Water efficiency <b>WAT</b></li> <li>• IEQ <b>IEQ</b></li> <li>• Materials from sustainable sources <b>MAT</b></li> <li>• Sustainable operation &amp; maintenance <b>O&amp;M</b></li> <li>• Occupants' attitude <b>O&amp;M</b></li> </ul>
<p><b>TEXT</b></p>	<p><b>CODE (INDIVIDUAL)</b></p>

<b>FACILITY MANAGER:</b>	
<p><i>Green building can be environmentally friendly... You are not building a new environment, you are building into an existing environment... We should preserve the natural features on the site and creep our buildings in the environment...(NM-FM:50-57)</i></p>	<ul style="list-style-type: none"> <li>• Environmentally friendly <b>GEN1</b></li> <li>• Sustainable site management <b>SITE</b></li> </ul>
<p><i>...it provides minimum energy consuming environment, allowing if possible materials to be recycled, looking into the comfort level required optimally and to me the most important one is the equipments installed, must have low life cycle costs....ensuring an energy consuming efficiently. Efficient running in our context is number one. Can you save through operation? Can you save through maintenance aspect because you are ensuring the equipments to be maintained to the design specifications? We are talking about... can you ensure saving through [reducing] wastages. For example you got the air-cond running too cold you actually waste the energy for that matter. Only then you talk about improving the limitation of the design all due to the change of the operating environment or you have to change or upgrade or add equipments to ensure the operation is running efficiently. (OCL-FM:51-64)</i></p>	<ul style="list-style-type: none"> <li>• Energy efficiency <b>EE</b></li> <li>• Efficient operation &amp; maintenance <b>O&amp;M</b></li> </ul>
<p><i>Yes. It is about reducing the impact on the environment. Issues like energy efficiency, water, indoor environmental quality are considered. (KCD-FM:26-27)</i></p>	<ul style="list-style-type: none"> <li>• Reduce impact on the environment <b>GEN1</b></li> <li>• Energy efficiency <b>EE</b></li> <li>• Water efficiency <b>WAT</b></li> <li>• IEQ <b>IEQ</b></li> </ul>
<p><i>Green building concerns energy savings. The first thing that comes to your mind is the architectural and engineering design of the building – taking into</i></p>	<ul style="list-style-type: none"> <li>• Energy efficiency <b>EE</b></li> <li>• Similar to intelligent building <b>GEN4</b></li> </ul>

TEXT	CODE (INDIVIDUAL)
<i>consideration all the energy savings criteria. It goes in line with the intelligent building. (ZS-FM:36-38)</i>	
<b>REGULATOR, POLICY MAKER &amp; GOVERNMENT PROJECT IMPLEMENTOR</b>	
<i>Yes. As far as I am concern, energy is one of the criteria... We have done any of the green criteria other than site management and energy efficiency. (CPK-PI:61-62)</i>	<ul style="list-style-type: none"> <li>• Site management <b>SITE</b></li> <li>• Energy efficiency <b>EE</b></li> </ul>
<i>Yes...reduce the environmental impact... should also be energy efficient...Although they are devising towards it but generally they go more on materials, recycling, reusing and so on. In that aspect I feel we still not ready to that yet. Green building does not imply that you must have a good landscaping, nice parks. (KSK-PM:23-29)</i>	<ul style="list-style-type: none"> <li>• Reduce impact on the environment <b>GEN1</b></li> <li>• Energy efficiency <b>EE</b></li> <li>• Materials <b>MAT</b></li> <li>• Not only good landscaping <b>SITE</b></li> </ul>
<i>I think green building is like a smart building, energy efficient building. Somehow I am confused. How come energy efficient buildings in Malaysia have full-glass façades? (AMN-R/PM:29-30)</i>	<ul style="list-style-type: none"> <li>• A smart, energy efficient building <b>EE, GEN4</b></li> </ul>
<i>I always say that green building is a building that can save resources. Resources can be anything. Right from its planning stage and as we go into the design, we build it, and then we occupy and maintain the building. The building uses minimum energy while being taught to handle the situation. And then again, in the future time when the building is obsolete, the building is recycled or reused without having it totally demolished and build a new one. (NM-R/PM:51-56)</i>	<ul style="list-style-type: none"> <li>• Save resources throughout building lifecycle <b>GEN2</b></li> </ul>
<i>I have heard about it, but I don't really know about it in depth. (MCA-PM:29)</i>	<ul style="list-style-type: none"> <li>• Don't know</li> </ul>

A “green building” embodies all the elements of sustainability in the design, construction, occupation & operation of the building. These elements include use of recycled and recyclable materials, avoidance of environment degrading materials that could create SBS or negatively impact the indoor environment, efficient use of energy (built in from the design stage), optimum use of water including rain water harvest & recycling, adoption of sustainable occupation practices, and effective & efficient O&M practices. (GL-R/PM:38-43)

- Recycled & recyclable materials **MAT**
- Non-hazardous/toxic materials **MAT**
- Energy efficiency **EE**
- Water efficiency including reuse of rainwater & recycled water **WAT, WAT, WAT**
- Sustainable occupation practices **O&M**
- Effective & efficient O&M **O&M**



**Q.5 Do you think there is any difference between a “green” and “sustainable” office building?**

TEXT	CODE (INDIVIDUAL)
<b>ARCHITECT:</b>	
<i>Through green, you'll achieve sustainability. Sustainability covers the whole life not just the building... There are many criteria involved apart from environmental issues. (KK-A:26-29)</i>	<ul style="list-style-type: none"> <li>Sustainable&gt;green – no explanation on what sustainable building means</li> </ul>
<i>I suppose green is part of sustainability. (WS-A:26)</i>	<ul style="list-style-type: none"> <li>Sustainable&gt;green – no explanation on what sustainable building means</li> </ul>
<i>To me, sustainable building and green building is the same. (CSA-A:35)</i>	<ul style="list-style-type: none"> <li>Sustainable=green</li> </ul>
<i>No. The terms are used interchangeably. (TLM-A:41)</i>	<ul style="list-style-type: none"> <li>Sustainable=green</li> </ul>
<i>They are the same. What is sustainable? Even architects between themselves cannot even agree. So what's the</i>	<ul style="list-style-type: none"> <li>Sustainable=green</li> </ul>

CODE (GROUPED)	CATEGORY
<b>From all 30 interviewees</b>	
<ul style="list-style-type: none"> <li>Sustainable=green (17x)</li> <li>Sustainable&gt;green – but explanation of sustainable building=green building</li> <li>Sustainable≠green – but explanation seems sustainable=green</li> </ul>	<b>SUSTAINABLE=GREEN (19x)</b>
<ul style="list-style-type: none"> <li>Sustainable&gt;green – sustainable building considers social &amp; economic aspects</li> <li>Sustainable&gt;green – sustainable building covers cultural &amp; social issues</li> <li>Sustainable&gt;green – sustainable building covers cultural, environmental, social &amp; economic aspects</li> <li>Sustainable&gt;green. Sustainability affects the social economy of the people in the building as much as it does in producing the building.</li> <li>Sustainable&gt;green – no explanation on what sustainable building means (4x)</li> </ul>	<b>SUSTAINABLE&gt;GREEN (8x)</b>
<ul style="list-style-type: none"> <li>Sustainable&lt;green – green building covers social aspects</li> </ul>	<b>SUSTAINABLE&lt;GREEN (2x)</b>

<i>point. (KY-A:31-32)</i>	
<i>Yes. I think sustainability affects the social economy of the people working in the building as much as it does in producing the building. Unless we are doing the concept of work and live in the same environment, we can't reach that level of sustainability. (SH-A:50-53)</i>	<ul style="list-style-type: none"> <li>Sustainable&gt;green. Sustainability affects the social economy of the people in the building as much as it does in producing the building.</li> </ul>
<i>Indirectly it is the same but I think green building looks beyond sustainable building, maybe it looks from the social aspects as well...I might be wrong (SA-A:36-39)</i>	<ul style="list-style-type: none"> <li>Sustainable&lt;green – green building covers social aspects</li> </ul>
<i>To me, green building or sustainable building, it should have a holistic approach rather than planting trees on your buildings then you call it green building...Even during the design stage, construction stage, minimizing waste materials... the whole holistic approach. That is a sustainable building. (LCH-A:74-81)</i>	<ul style="list-style-type: none"> <li>Sustainable=green</li> </ul>
<i>No, they are similar... I agree with the word "sustainable building" wholeheartedly because the world is going backwards, environmental damages everywhere and we are the culprits due to our ignorance. So we need to sustain what is left, what God has given us. Sustainable architecture to me is about the belief of the very real possibility of resolving the nation's social problems...(NB-A:36-46)</i>	<ul style="list-style-type: none"> <li>Sustainable=green</li> </ul>
<b>TEXT</b>	<b>CODE (INDIVIDUAL)</b>
<b>ENGINEER &amp; ENVIRONMENTAL CONSULTANT:</b>	
<i>No. It is a word that is interchangeable. These are the marketing terms like intelligent, high performance and etc. All these terms, the important underlying factor is energy. From energy then you realize that the environment is</i>	<ul style="list-style-type: none"> <li>Sustainable=green</li> </ul>

<ul style="list-style-type: none"> <li>Sustainable&lt;green – no explanation given</li> </ul>	
<ul style="list-style-type: none"> <li>Sustainable≠green – not sure what the differences are</li> </ul>	<b>SUSTAINABLE≠GREEN (1x)</b>

<i>infected. Green started first, then sustainable, then high performance, then they go back to green again because laymen understand the word green. (CTL-ME:113-117)</i>	
<i>From my reading, I think they are almost the same. (NYK-ME:69)</i>	<ul style="list-style-type: none"> <li>• Sustainable=green</li> </ul>
<i>To me I think it is more or less the same. The word green right now is so vague. Green and sustainable can be used interchangeably. (CKT-EC:43-44)</i>	<ul style="list-style-type: none"> <li>• Sustainable=green</li> </ul>
<b>TEXT</b>	<b>CODE (INDIVIDUAL)</b>
<b>BUILDER &amp; BUILDER-DEVELOPER:</b>	
<i>The one with renewable energy systems that will not tax or demand further resources or maybe minimise the demands on resources which have adverse impact on the environment. (SA-B/D:46-47)</i>	<ul style="list-style-type: none"> <li>• Sustainable=green</li> </ul>
<i>Whereas, a sustainable building does not only care about the environment but also consider the social and economic aspects. It encompasses so many things where it goes back from one generation to one generation whereby the positive environment will sort of prepare itself for the next generation. Sustainability is definitely covering a bigger scope than green. Green I would say is a subset of sustainability. (JD-B:42-47)</i>	<ul style="list-style-type: none"> <li>• Sustainable&gt;green – sustainable building considers social &amp; economic aspects</li> </ul>
<i>Similar. (TYT-B:43)</i>	<ul style="list-style-type: none"> <li>• Sustainable=green</li> </ul>
<b>TEXT</b>	<b>CODE (INDIVIDUAL)</b>
<b>DEVELOPER, OWNER &amp; DEVELOPER-OWNER:</b>	
<i>'Green' is more towards the environmental issue. 'Sustainable' may go beyond by looking at our culture and social issues. I would say that green is the subset of sustainability. (NA-D:35-36)</i>	<ul style="list-style-type: none"> <li>• Sustainable&gt;green – sustainable building covers cultural &amp; social issues</li> </ul>

<i>I think they are different. There must be certain reasons why they called differently. But I'm not sure what the reasons are. (MM-D:80-81)</i>	<ul style="list-style-type: none"> <li>• Sustainable≠green – not sure what the differences are</li> </ul>
No (BTC-D:44)	<ul style="list-style-type: none"> <li>• Sustainable=green</li> </ul>
<i>When you talk about sustainability, there are many aspects to consider. Typically in text books, they are talking about the '4 main pillars'. They are talking about the cultural, environmental, social and economic aspects. So, when you talk about sustainability, it has to cover all those aspects, but when we talk about green building, it normally comes from one angle alone... So, I think in a way, there is a difference because sustainability is broader, it is like a macro view of it. You can use it interchangeably but the concern that I feel by using sustainability interchangeably with green if somebody has done green building, they say that they are sustainable. It is not necessarily so, for example doing very green building at a place where by everybody needs to travel by car to go there, it doesn't sound like sustainable...(WR-D/O:95-105)</i>	<ul style="list-style-type: none"> <li>• Sustainable&gt;green – sustainable building covers cultural, environmental, social &amp; economic aspects</li> </ul>
<i>...for me the evolution from energy saving to green and then sustainable. For me green and sustainable are more or less the same. (CN-D/O:112-113)</i>	<ul style="list-style-type: none"> <li>• Sustainable=green</li> </ul>
<b>TEXT</b>	<b>CODE (INDIVIDUAL)</b>
<b>FACILITY MANAGER:</b>	
No. (NM-FM:61)	<ul style="list-style-type: none"> <li>• Sustainable=green</li> </ul>
<i>Malaysia right now has GBI. We are talking about LEED and many other things. But at the same time, even ASHRAE is talking about sustainability as well. Sustainability in my opinion is very similar to green except</i>	<ul style="list-style-type: none"> <li>• Sustainable&gt;green – but explanation of sustainable building=green building</li> </ul>

<i>that they have a wider scope...I personally think sustainability is part of those green elements. In Malaysia they are talking about 6 elements right now- Energy, Water, IEQ, Sustainable Sites and Management, Material Resources; and Innovation. In my opinion, these cover quite a large area of sustainability. Of course, post commissioning is covered but the operation and maintenance is not really emphasized. But again because GBI emphasizes the need for a building to be reassessed every 3 years, so O &amp; M will probably be looked at again. (OCL-FM:77-89)</i>	
<i>I don't know. Maybe green building covers much bigger issues. (KCD-FM:30)</i>	<ul style="list-style-type: none"> <li>• Sustainable&lt;green – no explanation given</li> </ul>
<i>To a certain extent, green and sustainable buildings are the same. But sustainable building covers bigger scope. (KS-FM:41-42)</i>	<ul style="list-style-type: none"> <li>• Sustainable&gt;green – no explanation on what sustainable building means</li> </ul>
<b>TEXT</b>	<b>CODE (INDIVIDUAL)</b>
<b>REGULATOR, POLICY MAKER &amp; GOVERNMENT PROJECT IMPLEMENTOR</b>	
<i>I thought they are not much different. When you talk about green and sustainable, they are more than energy efficiency. (CPK-PI:65-55)</i>	<ul style="list-style-type: none"> <li>• Sustainable=green</li> </ul>
<i>Actually it is different. A green building as such maybe built with materials or designs which contribute to various criteria. But sustainable building would definitely consume less utilities. That would not only affect the building but the industry &amp; nation at large. The use of utilities i.e. electricity &amp; water should be practised to prolong their life. (KSK-PM:32-36)</i>	<ul style="list-style-type: none"> <li>• Sustainable≠green – but explanation seems sustainable=green</li> </ul>
<i>I think sustainable building covers beyond the energy</i>	<ul style="list-style-type: none"> <li>• Sustainable=green</li> </ul>

<i>issue. (AMN-R/PM:33)</i>	
<i>I don't like to use the word sustainable. I am one of those who don't understand the word sustainable. To me sustainable is an expansive word. The problem in Malaysia is that when you say 'sustainable' it sounds much more important. When you say green, people think it means the building has lots of plant and trees. But, for me sustainable or green, they mean the same. (NM-R/PM:60-64)</i>	<ul style="list-style-type: none"> <li>• Sustainable=green</li> </ul>
<i>I don't really know about 'green building' but I think it has some similarities with sustainable building. What I can interpret about sustainable building is that whatever you do, you are not causing any harm to the environment. I mean that we are trying to protect the environment. (MCA-PM:33-35)</i>	<ul style="list-style-type: none"> <li>• Sustainable=green</li> </ul>
<i>A "green building" and a sustainable building should incorporate all the elements mentioned above. However, by classification at any level, a green building may not necessarily incorporate all the elements for sustainability. (GL-PM:46-48)</i>	<ul style="list-style-type: none"> <li>• Sustainable&gt;green – no explanation on what sustainable building means</li> </ul>

**D: CURRENT ENVIRONMENTAL PRACTICES (D1: General)**

**Q.8 What environmental issues have you considered in designing/ constructing/ developing/ operating & maintaining an office building to reduce the negative effects on the environment? What environmental issues have your organization considered in formulating regulations and guidelines to ensure environmentally friendly office building development?**

TEXT	CODE (INDIVIDUAL)
<b>ARCHITECT:</b>	
<i>Site planning is the first thing that an architect should tackle...(KK-A:54-55)</i>	<ul style="list-style-type: none"> <li>• Site protection planning</li> </ul>
<i>Energy consumption, minimise wastage in terms of materials used, selection of materials in term of availability, normally we consider toxication. Building placement, treatment of the façade. (WS-A:42-45)</i>	<ul style="list-style-type: none"> <li>• Energy efficiency</li> <li>• Solid wastes minimization</li> <li>• Non-toxic and local materials</li> <li>• Building placement</li> <li>• Façade treatments</li> </ul>
<i>Normally we look at the energy consumption. Because the maintenance cost on the energy is the highest. Not only the cost, but also the impact to the environment. If you say you've chopped down some trees, the impact is immediate and that's it. Whereas energy use aspect is pulled out the whole life of the building. So if you have badly designed building, effectively means if the building stands for 100 years, it will affect the environment for 100 years. (CSA-A:67-72)</i>	<ul style="list-style-type: none"> <li>• Energy efficiency</li> </ul>
<i>Green design is a composite of 4 infrastructures: Gray, Blue, Red, Green infrastructures. Gray means eco-engineering i.e. renewable energy, zero energy. Blue is water management. That means you understand the water</i>	<ul style="list-style-type: none"> <li>• Eco-engineering i.e. RE, EE</li> <li>• Water efficiency</li> <li>• Human, society &amp; social system</li> </ul>

CODE (GROUPED)	CATEGORY
<b>From all 30 interviewees</b>	
<ul style="list-style-type: none"> <li>• Energy efficiency (13x)</li> <li>• Energy efficiency during construction</li> <li>• Energy consumption monitoring</li> <li>• Eco-engineering i.e. RE, EE</li> </ul>	<b>ENERGY EFFICIENCY (15x)</b>
<ul style="list-style-type: none"> <li>• Building placement</li> <li>• Eco-environmental planning</li> <li>• Ecological impacts on site (3x)</li> <li>• Green infrastructure</li> <li>• Land use</li> <li>• Limit footprint of construction operations</li> <li>• Site &amp; project management</li> <li>• Site protection planning (2x)</li> <li>• Site protection planning – erosion &amp; sedimentation control, reduce damage to the site;</li> </ul>	<b>SUSTAINABLE SITE &amp; MANAGEMENT (14x)</b>

<i>metabolism. Red is the human, society, social system. Green is the nature i.e. vegetation and organisms. (KY-A:56-59)</i>	<ul style="list-style-type: none"> <li>Green infrastructure</li> </ul>
<i>Basically the energy consumption because if you don't plan it properly like orientation, insulation &amp; materials, you'll spend a lot of money cooling it... If possible, we should have public transport access to it. Now, one of the things we are doing for PJX-Tower is that we're putting in free bicycles. (TLM-A:75-82)</i>	<ul style="list-style-type: none"> <li>Energy efficiency</li> <li>Public transport accessibility</li> </ul>
<i>We have done a holistic approach to our passive designs by being aware of what our façade skin can do for us or perform for us. And daylight is certainly the aspect that at all levels we tried to maintain and therefore change the way we do some of the planning...(SH-A:107-110)</i>	<ul style="list-style-type: none"> <li>Energy efficiency</li> <li>IEQ</li> <li>Façade treatment</li> </ul>
<i>Try to retain natural features on the site as much as possible... Whatever that you can maintain, retain or upgrade or whatever, then you should do that. For the water issue, I tried to propose rainwater harvesting. But it is an additional cost... Then of course during construction... whatever construction methods that you are going to use, you should think of any possible impacts on the environment, piling system for example. Accessibility to the public transportation is very important... Because of our weather, we need to consider the protection for the pedestrians or public transport users. (SA-A:82-92)</i>	<ul style="list-style-type: none"> <li>Ecological impacts on site</li> <li>Water consumption</li> <li>Public transport accessibility</li> </ul>
<i>I always consider wastage during the construction stage... For instance, the use of timber formworks, after they used them, some of them are not recycled... (LCH-A:119-121)</i>	<ul style="list-style-type: none"> <li>Construction wastes management</li> </ul>

<ul style="list-style-type: none"> <li>Sustainable Site Planning and Management</li> <li>Flash flood mitigation – stormwater management</li> </ul>	
<ul style="list-style-type: none"> <li>Solid wastes minimization</li> <li>Construction wastes management (7X)</li> <li>Materials handling &amp; installation</li> <li>Standardized &amp; prefabricated building materials &amp; components</li> </ul>	<b>SOLID WASTE MANAGEMENT (10x)</b>
<ul style="list-style-type: none"> <li>Non-toxic and local materials</li> <li>Materials &amp; Resources</li> <li>Materials usage</li> </ul>	<b>MATERIALS (3x)</b>
<ul style="list-style-type: none"> <li>IEQ (2X)</li> <li>Noise control</li> <li>IEQ monitoring</li> </ul>	<b>IEQ (4x)</b>
<ul style="list-style-type: none"> <li>Impact on adjacent properties i.e. light pollution</li> </ul>	<b>IMPACTS ON ADJACENT PROPERTIES (1X)</b>



<i>We place emphasis on eco-environmental planning. (NB-A:90)</i>	<ul style="list-style-type: none"> <li>Eco-environmental planning</li> </ul>
<b>TEXT</b>	<b>CODE (INDIVIDUAL)</b>
<b>ENGINEER &amp; ENVIRONMENTAL CONSULTANT:</b>	
1) <i>Sustainable Site Planning and Management</i> 2) <i>Energy Efficiency</i> 3) <i>Materials &amp; Resources</i> 4) <i>Water Efficiency (CTL-E:162)</i>	<ul style="list-style-type: none"> <li>Sustainable Site Planning and Management</li> <li>Energy Efficiency</li> <li>Materials &amp; Resources</li> <li>Water Efficiency</li> </ul>
<i>It is IEQ, but indirectly it is related to the energy efficiency. Because by using my system it can affect the use of energy (NYK-E:110-111).</i>	<ul style="list-style-type: none"> <li>Energy efficiency</li> </ul>
<i>Most of the work we concentrate on energy and daylighting... So we use a lot of daylighting to save energy as well... (CKT-EC:94-98)</i>	<ul style="list-style-type: none"> <li>Energy efficiency &amp; daylighting</li> </ul>
<b>TEXT</b>	<b>CODE (INDIVIDUAL)</b>
<b>BUILDER &amp; BUILDER-DEVELOPER:</b>	
<i>Site Protection Planning – erosion &amp; sedimentation control, reduce damage to the site;</i> <i>Limit Footprint of Construction Operations</i> <i>Construction Waste Management</i> <i>Materials Handling &amp; Installation</i> <i>But at the end of the day, commercial factors will take precedent. (SA-B/D:70-74)</i>	<ul style="list-style-type: none"> <li>Site protection planning – erosion &amp; sedimentation control, reduce damage to the site;</li> <li>Limit footprint of construction operations</li> <li>Construction waste management</li> <li>Materials handling &amp; installation</li> </ul>
<i>Site planning is important. We also reduce construction wastes as much as possible. Recycling water is not really</i>	<ul style="list-style-type: none"> <li>Site protection planning</li> <li>Construction waste management</li> </ul>

<ul style="list-style-type: none"> <li>Public transport accessibility (3X)</li> <li>Refrigerant issue</li> <li>Open burning on site</li> </ul>	<b>LOCATION &amp; EMISSIONS TO AIR (5X)</b>
<b>CODE (GROUPED)</b>	<b>CATEGORY</b>
<ul style="list-style-type: none"> <li>Façade treatments (3x)</li> <li><b>Human, society &amp; social system</b></li> </ul>	<b>COMBINATION &amp; OTHERS</b>

<i>an issue because we have abundant of rainwater. In terms of conserving water, it is difficult to impose unlike drier environment like Adelaide. (TYT-B:64-66)</i>	<ul style="list-style-type: none"> <li>• Water efficiency</li> </ul>
<b>TEXT</b>	<b>CODE (INDIVIDUAL)</b>
<b>DEVELOPER, OWNER &amp; DEVELOPER-OWNER:</b>	
<i>Reduction of energy and water used on site during the construction period. To ensure minimum waste is generated by diverting all recyclables away from landfill. Hazardous waste must be properly disposed Where possible recycled building materials shall be used if applicable. (BTC-D:71-74)</i>	<ul style="list-style-type: none"> <li>• Energy efficiency during construction</li> <li>• Water efficiency during construction</li> <li>• Construction waste management</li> </ul>
<i>I say energy and water first and a bit of noise control. Because we've LRT [Light Rail Transit system] integrated in our planning consideration, the huge noise generated by this system, I mean when the trains pass every 5 minutes, is a problem that needs to be tackled. (WR-D/O:178-180)</i>	<ul style="list-style-type: none"> <li>• Energy efficiency</li> <li>• Water efficiency</li> <li>• Noise control</li> </ul>
<i>Refer to Green Mark (CN-D/O:162)</i>	<ul style="list-style-type: none"> <li>• Energy efficiency</li> <li>• Water efficiency</li> <li>• Site &amp; project management</li> <li>• IEQ</li> </ul>
<b>TEXT</b>	<b>CODE (INDIVIDUAL)</b>
<b>FACILITY MANAGER:</b>	
<i>For example air-conditioning, energy consumption, and refrigerant issue. You need to have the refrigerant recovery unit whenever you reclaim, so the operation will not leak. (OCL-FM:135-136)</i>	<ul style="list-style-type: none"> <li>• Energy efficiency</li> <li>• Refrigerant issue</li> </ul>
<i>Mainly on energy and water efficiency. (KCD-FM:49)</i>	<ul style="list-style-type: none"> <li>• Energy efficiency</li> <li>• Water efficiency</li> </ul>
<i>We manage our scheduled solid wastes. We send our solid</i>	<ul style="list-style-type: none"> <li>• Construction waste management</li> </ul>

<p>wastes to authority-licensed dumping areas. But this service is outsourced. We monitor our energy and water consumption, manage our solid waste, monitor our indoor environmental quality. (ZS-FM:65-67)</p>	<ul style="list-style-type: none"> <li>• Energy consumption monitoring</li> <li>• Water consumption monitoring</li> <li>• IEQ monitoring</li> </ul>
<p><b>TEXT</b></p> <p><b>REGULATOR, POLICY MAKER &amp; GOVERNMENT PROJECT IMPLEMENTOR</b></p>	<p><b>CODE (INDIVIDUAL)</b></p>
<p>When we go to the site, first thing is to ensure there is no open burning during construction. Preserving existing trees on site are within the control of the local authority. We can control the amount of cuttings. That is how we designed our buildings. Whether to preserve the existing natural landscape or flatten the whole site, that is part of the designers' job. Those are the things we can incorporate in the project. Once we cut the slope, we need to do erosion control. Then you have the scheduled waste and waste management. Construction produces 40% of the solid waste in our country. So we have to concern about this. (CPK-PI:131-137)</p>	<ul style="list-style-type: none"> <li>• No open burning on site</li> <li>• Ecological impacts on site</li> <li>• Construction waste management</li> </ul>
<p>Definitely the Ministry has developed a code called MS1525 for good energy efficient office building. The other thing is that the buildings have energy efficient office equipment e.g. computers and other appliances. (KSK-R/PM:51-53)</p>	<ul style="list-style-type: none"> <li>• Energy efficiency</li> </ul>
<p>Our regulations and planning guidelines cover issues like materials usage, façade glazing ratio, light pollution, site irrigation, landscaping and transportation. Our Detail Urban Design (DUD) guidelines control design parameters like building height, skyline, visual axis &amp; termination, street façade, building massing, building typology, pedestrian link, open space coverage &amp; streetscape. (AMN-R/PM:47-51)</p>	<ul style="list-style-type: none"> <li>• Materials usage</li> <li>• Impact on adjacent properties i.e. light pollution</li> <li>• Façade treatment</li> <li>• Public transport accessibility</li> <li>• Site irrigation</li> <li>• Land use</li> </ul>

<p><i>Raining at 5pm always create flash floods, traffic jams and so on. So we need to find the cause behind it. Getting the water out into the river is not the problem. The problem is to get the surface water to stay in the monsoon drain for a while before it goes to the river. (NN-R/PM:84-89)</i></p>	<ul style="list-style-type: none"> <li>• Flash flood mitigation – site planning</li> </ul>
<p><i>We cover issues like erosion and sedimentation control in construction site and material wastage. In line of trying to improve our environment, we also stress on the use of IBS [Industrialized Building System]. Where most of the IBS components are manufactured at the factories, there will be less dust, less materials wastage, less noise on the construction site and etc. (MCA-PM:48-53)</i></p>	<ul style="list-style-type: none"> <li>• Ecological Impacts on Site</li> <li>• Construction waste management</li> <li>• Standardized &amp; prefabricated building materials &amp; components</li> </ul>
<p><i>My organisation does not regulate the above, but I have been involved in a number of initiatives through my work as a consultant on related issues. Among the Guidelines established are:</i></p> <ul style="list-style-type: none"> <li>▪ <i>MS 1525:2007 for the design of non-residential buildings of over 4,000 sq. m.,</i></li> <li>▪ <i>Construction of EE buildings such as the LEO &amp; ZEO buildings by the government on the basis of “Leadership by Example”,</i></li> <li>▪ <i>The on-going efforts to institute the GBCM (Green Building Council of Malaysia) and the GBI (Green Building Index).</i></li> </ul> <p><i>Formulation of mandatory standards and criteria are yet to be achieved. (GL-PM: 62-70)</i></p>	<ul style="list-style-type: none"> <li>• Energy efficiency</li> </ul>

**Q.9 In your opinion, what are the strategies that an architect/engineer/builder/developer/facility manager/government could implement to address those issues?**

TEXT	CODE (INDIVIDUAL)
<b>ARCHITECT:</b>	
<i>Orientation, passive solar design and etc. are among the basics that should be thought first. Whatever gadgets you want to be placed in your buildings are secondary. These would further enhance the building environment. Architects must understand what site analysis is all about. (KK-A:58-60)</i>	<ul style="list-style-type: none"> <li>• Site analysis – passive design (Arch)</li> </ul>
<i>...building placement and then the selection of the materials, and then the selection of the building systems – air-conditioning, lighting, building operations and then you also have to consider socio-cultural issues, social quality is equally the psychology of the space. (WS-A:48-51)</i>	<ul style="list-style-type: none"> <li>• Building placement (Arch)</li> <li>• Selection of green materials (Arch)</li> <li>• Selection of highly efficient building M&amp;E system (Arch)</li> <li>• Consider socio-cultural issues (Arch)</li> </ul>
<i>There are lots of strategies. From the way we plan the site right down to the way we plan the building. (CSA-A:80-81)</i>	<ul style="list-style-type: none"> <li>• From site to building planning (Arch)</li> </ul>
<i>We have done a holistic approach to our passive designs by being aware of what our façade skin can do for us or perform for us...The sense of not being in tiny corridors or confined spaces but have a sense of connecting to the outside... we open up the central spines and see the benefits of having break-up spaces and bring some daylight down in there. (SH-A:112-115)</i>	<ul style="list-style-type: none"> <li>• Holistic approach to passive designs including building envelope, connection to outside, open up central spines and having break-up spaces with daylight (Arch)</li> </ul>
<i>Perhaps architects should be able to specify a better material for the formworks. Now with the latest one, we could use metal which can be used repeatedly or a better quality of timber which can be used for the next project. Or even the timber that can be recycled to make other things</i>	<ul style="list-style-type: none"> <li>• Specify metal or better quality timber for formwork which can be used repeatedly (Arch)</li> <li>• To design a building that will not cause any disruption to nearby water</li> </ul>

CODE (GROUPED)	CATEGORY
<b>From Designers</b>	
<ul style="list-style-type: none"> <li>• Site analysis – passive design (Arch)</li> <li>• Building placement (Arch)</li> <li>• From site to building planning (Arch)</li> <li>• Holistic approach to passive designs including building envelope, connection to outside, open up central spines and having break-up spaces with daylight (Arch)</li> <li>• To design a building that will not cause any disruption to nearby water bodies (Arch)</li> <li>• Designers should be well-versed with slope construction to avoid land erosion (Arch)</li> <li>• Responsive planning and design by understanding the topography, climate, drainage patterns and other environmental influences (Arch)</li> <li>• Preservation of trees, scale of building masses, quality of intermediate spaces, sympathy for natural land forms (Arch)</li> <li>• Shape the building to avoid land cutting (Engr)</li> <li>• Treat a contaminated land and build</li> </ul>	PASSIVE DESIGN & SUSTAINABLE SITE PLANNING

<p><i>rather than just discarding or burning it... Of course, if there is a river or whatever it is, then the building must be able to be designed so that it will not disrupt the flow of the river and will not caused any erosion... They [Government] should impose certain guidelines on environmental protections especially on slope reinforcement techniques. So the engineers or the architects, the rest of the consultants should be well-versed with slope constructions. (LCH-A:124-138)</i></p>	<p>bodies (Arch)</p> <ul style="list-style-type: none"> <li>• Designers should be well-versed with slope construction to avoid land erosion (Arch)</li> </ul>
<p><i>Responsive planning and design by understanding the topography, climate factors, drainage patterns and other environmental influence. The preservation of trees, scale of building masses, quality of intermediate spaces, sympathy for natural land forms – all important aspects in design for the environmentally sustainable living. (NB-A:93-96)</i></p>	<ul style="list-style-type: none"> <li>• Responsive planning and design by understanding the topography, climate, drainage patterns and other environmental influences (Arch)</li> <li>• Preservation of trees, scale of building masses, quality of intermediate spaces, sympathy for natural land forms (Arch)</li> </ul>
TEXT	CODE (INDIVIDUAL)
ENGINEER & ENVIRONMENTAL CONSULTANT:	
<p><i>1) Sustainable Site Planning and Management</i>  <i>If you have to cut half the hill, is that your choice? Why not shape it [the building] like this so you don't have to cut? If you have a contaminated land, you have to solve it first. Local authorities have to be educated. When people built in a developed area, you don't have to damage more environment to build more infrastructure... Don't go and start at a new place and start chopping off everything and clear up everything... In the city centre, give them high density. In fact, if they build a green building, give them higher density as an incentive...we have a lot of social</i></p>	<ul style="list-style-type: none"> <li>• Shape the building to avoid land cutting (Engr)</li> <li>• Treat a contaminated land and build on it (Engr)</li> <li>• Build on a developed area with existing infrastructure to avoid further environmental damage (Engr)</li> <li>• Local Authority should give higher density for green development in city centres as an incentive (Engr)</li> <li>• <b>Address social and pollutions</b></li> </ul>

<ul style="list-style-type: none"> <li>• on it (Engr)</li> <li>• Build on a developed area with existing infrastructure to avoid further environmental damage (Engr)</li> <li>• Incorporate all aspects from active to passive architecture (BEnvCon)</li> </ul>	
<ul style="list-style-type: none"> <li>• To appeal for higher density for green development in city centres as an incentive from Local Authority (Engr)</li> </ul>	<p>PLANNING DENSITY</p>
CODE (GROUPED)	CATEGORY
<ul style="list-style-type: none"> <li>• Selection of green materials (Arch)</li> <li>• Specify metal or better quality timber for formwork which can be used repeatedly (Arch)</li> <li>• Buy/specify local non-toxic materials/products (Engr)</li> </ul>	<p>MATERIALS SPECIFICATION</p>
<ul style="list-style-type: none"> <li>• Selection of highly efficient building M&amp;E system (Arch)</li> <li>• Design cooling systems that utilize condensed water from air-conditioning system (Engr)</li> </ul>	<p>M&amp;E SYSTEMS DESIGN &amp; SELECTION</p>

<p><i>problems, pollution problems, caused by construction workers.</i></p> <p><b>2) Energy Efficiency</b>  <i>The understanding of the industry on life-cycle cost. You are going to save in the long run. Don't be so narrow-minded to say that I want to develop and then sell off. This shouldn't be allowed. That's why I said we need laws to prevent such thing from happening. 2 things have to happen: one is to prevent such developers having such attitudes, the other one which is more effective but you cannot do in Malaysia is to make sure that manufacturers who are hopeless are not allowed to manufacture.</i></p> <p><b>3) Materials &amp; Resources</b>  <i>Buy local...You think local is not better? Imported means good, huh?... You also have to be conscious of what you buy, too many toxic things around.</i></p> <p><b>4) Water Efficiency</b>  <i>We are very lucky, we have very heavily subsidized utility i.e. water...Our office buildings use air-conditionings and our condensed water is plentiful... These are pure cold water. We have to harvest it and put it into our cooling tower. Then we save water and cooling tower becomes more efficient. But we have to design and make it work that way. Another thing is rainwater harvesting...Even at the local authorities I said, "Please...open your eyes up!" I have projects that I am going to reuse water. When I submit for approval, straight away it got rejected because to them, we have to use portable water only. If not, I would never get the approval. Now they [local authorities] are waking up. Now they are accepting it. These are the things that I've done so many years that are such a torture to be</i></p>	<p><b>problems caused by construction workers</b></p> <ul style="list-style-type: none"> <li>• Buy/specify local non-toxic materials/products (Engr)</li> <li>• Design cooling systems that utilize condensed water from air-conditioning system (Engr)</li> <li>• To design rainwater harvesting system (Engr)</li> </ul>	<ul style="list-style-type: none"> <li>• To design rainwater harvesting system (Engr)</li> <li>• Advise all project team players on green design/construction strategies (BEnvCon).</li> </ul> <p><b>ADVISE OTHER TEAM PLAYERS</b></p>
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<i>innovative... We do not need to reach the stage of recycling all the waste water yet because our water is abundant and cheap but it will come. (CTL-E:162-258)</i>	
<i>A building environmental consultant must look at the all aspects from mechanical to passive architecture. We have to incorporate everything as much as we can. We try to influence everyone including the ID as well on how the finishes should be. The least amount of work is actually on C&amp;S but still we influence them on environmental, waste management at site and designing on IBS or repeatability so that we can use steel formwork instead of wood and things like that. We try to influence in all those things in all sectors in fact. The least is most probably the QS. So the only thing we have to influence the QS is to locate more money for us! [giggles] (CKT-EC:109-115)</i>	<ul style="list-style-type: none"> <li>• Incorporate all aspects from active to passive architecture (BEnvCon).</li> <li>• Influence and educate all project team players on green design/construction strategies (BEnvCon).</li> </ul>
<b>TEXT</b>	<b>CODE (INDIVIDUAL)</b>
<b>BUILDER &amp; BUILDER-DEVELOPER:</b>	
<i>Not to look so much at the cost impact at the initial stage but in the long run. To look at every development as an investment not only in commercial sense but also an investment to our future generations and civilization.(SA-B/D:77-79)</i>	<ul style="list-style-type: none"> <li>• Consider capital cost, along with long-term operation costs (Bldr)</li> </ul>
<i>Any project we do, we have protective strategic plan. We address all issues that may arise during the construction period. At the end of the day, everybody is going for dollars and cents...Contractors may overlook a lot of things especially the safety and security; and the environment as well... Extensive site clearing making the site as bare and as flat as possible is a very typical Malaysian practice. All existing natural features on the site</i>	<ul style="list-style-type: none"> <li>• Implement measures that protect the environment and humans' safety and security (Bldr)</li> <li>• Avoid extensive site clearing, maintain as many natural features as possible (Bldr)</li> <li>• Advise developers to be more</li> </ul>

<ul style="list-style-type: none"> <li>• Address social and pollutions problems caused by construction workers</li> </ul>	
<b>CODE (GROUPED)</b>	<b>CATEGORY</b>
<b>From Builders</b>	
<ul style="list-style-type: none"> <li>• Implement measures that protect the environment and humans' safety and security (Bldr)</li> <li>• Avoid extensive site clearing, maintain as many natural features as possible (Bldr)</li> </ul>	SUSTAINABLE SITE MANAGEMENT
<ul style="list-style-type: none"> <li>• Advise developers to be more considerate by not requiring maximum number of units for development on hillsides to minimize land cuttings (Bldr)</li> <li>• Advise designers and planners to preserve existing mature trees in</li> </ul>	ADVISE OTHER PROJECT TEAM PLAYERS



<p><i>like trees and terrain will be gone. This is one of the main reasons why we can find a lot of our rivers are muddy. Developers on the hillside, they should not cut the hill. The reason why did that was because they wanted more houses to be built. So that they can sell more. But why not...within that whole area that they want to develop, they just concentrate on one of the areas can cut but all the trees are maintained and then the environmental impact like sedimentation becomes everybody's concern... But of course the number of unit of houses to be built will be minimized but nevertheless the environment is protected. You still have cool breeze, you still have the green view when you go for a jogging. These can be seen in most of western countries, where you can find they have beautiful lakes, the lakes are well preserved with a house in one corner, another house in another corner...don't really see the need for them to build a huge area with tarmac road everywhere. They feel that it is only for this destination and this destination...they only do what is required and necessary. In Malaysia, no. The reason why is simple. "The more they do, the more they gain." Developers' most concern is to build more properties, so they can sell more, so they can get more money. The end of the day, those who build the roads and all are the contractors. But the contractors can't do anything because they are only complying with the requirements of the clients or owners themselves. Contractors basically cannot be blamed. Basically it is the requirement by the owners. And those who actually suppose to monitor, probably are the architects, consultants...A typical masterplan of any development shows new small plants and trees to be planted after chopping off the existing mature trees. Those</i></p>	<p>considerate by not requiring maximum number of units for development on hillsides to minimize land cuttings (Bldr)</p> <ul style="list-style-type: none"> <li>• Advise designers and planners to preserve existing mature trees in their masterplans (Bldr)</li> </ul>	<p>their masterplans (Bldr)</p> <ul style="list-style-type: none"> <li>• Advise designers on the dimensions of components to enhance repetitiveness, hence system formwork would be more efficient (Bldr)</li> <li>• Minimize the use of timber formwork as much as possible i.e. by using standard metal formwork (Bldr)</li> </ul>	<p>MATERIALS SELECTION</p>
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<p><i>new plants and trees would take years to become mature. What's the point? That's why I said, it is the mentality of the people, economic of scale. Believe me...it's all happening because of money and greed. (JD-B:71-130)</i></p>	
<p><i>We use system formwork so that we can get more repetitions...We try to get away from using timber formwork as much as possible. We do process some of the aluminium formwork but of course in many times, about 1/3 would be odd spaces – the repetition is not there 100%. So we can't use that standard aluminium formwork and we have to get back to timber. If we can, we use aluminium formwork only...For design-and-build projects, we influence the designers in terms of dimensions [of components] – not so much on the design because some designs have to meet the client's requirements. We influence in terms of dimensions so that the system formwork would be efficient – to get more typical sections. Otherwise more mouldings need to be made to get more formworks with different dimensions. That costs a lot of money. (TYT-B:69-80)</i></p>	<ul style="list-style-type: none"> <li>• Minimize the use of timber formwork as much as possible i.e. by using standard metal formwork (Bldr)</li> <li>• Advise designers on the dimensions of components to enhance repetitiveness, hence system formwork would be more efficient (Bldr)</li> </ul>
<p><b>TEXT</b> <b>DEVELOPER, OWNER &amp; DEVELOPER-OWNER:</b></p>	<p><b>CODE (INDIVIDUAL)</b></p>
<p><i>EIA approval is very important to developers especially if they develop in an area like Cyberjaya which used to be a green, oil palm area. Now, we have ponds and we still preserve certain extra features and certain areas. That's why we have got zoning. I think that will help. (MA-D:101-103)</i></p>	<ul style="list-style-type: none"> <li>• Refer to EIA report for development in environmentally sensitive/ rural areas/ green fields before determining the development zoning (Dev)</li> </ul>
<p><i>'Green' manager can be appointed to oversee and implement Environmental and Waste Management Plan on development site during construction period. Adopt the</i></p>	<ul style="list-style-type: none"> <li>• Appoint 'green' manager to monitor the implementation of Environmental and Waste Management Plan on</li> </ul>

<p><b>CODE (GROUPED)</b></p>	<p><b>CATEGORY</b></p>

<i>principal to reduce, reuse and recycle.(BTC-D:77-79)</i>	construction site (Dev)
TEXT	CODE (INDIVIDUAL)
FACILITY MANAGER:	
<p><i>How are you able to optimise the operational wise to give a maximum efficiency? We need to know the equipments' characteristics, we need to look into the load profile, we need to monitor them... So you ensure the equipment is maintained to the design specification because in Malaysia, we don't have a maintenance culture... So maintenance is another aspect, why? Because equipments are subject to wear and tear. If you cannot maintain as far as possible to the original design specification or condition, you cannot get the kind of efficiency that you want. (OCL-FM:145-161)</i></p>	<ul style="list-style-type: none"> <li>• Well-versed with the equipment's characteristics and monitor the load profile. Ensure equipment is maintained to the original design specification or condition in order to optimise the operation to a maximum efficiency (FM).</li> </ul>
<p><i>We have SOP [Standard Operation Procedures] to follow. It is like a checklist or manual. Every floor of this building has one person in-charge on the monitoring of the indoor environmental performance of that floor by referring to the SOP. They report to us every month. We also monitor occupants' satisfaction every 6 months. We conduct awareness programs among new staff for proper handling of building features, appliances and equipment to save energy and water. (KCD-FM:52-57)</i></p>	<ul style="list-style-type: none"> <li>• Appoint one person per floor to monitor the indoor environmental performance by following Standard Operation Procedures (FM)</li> <li>• Monitor tenants' satisfaction every 6 months (FM)</li> <li>• Conduct awareness program for new tenants for proper handling of building features, appliances and equipment to save energy and water (FM)</li> </ul>
<p><i>During their operation, we do regular "safety walks" to check on how they are operating. We would advise them if we found that they are operating in such a way that waste energy or water and etc. For IEQ, we monitor our space temperature, humidity level, how clean are your air filters or ducts and etc...we do have and maintain logbooks and utilise facility management tools such as QMS system,</i></p>	<ul style="list-style-type: none"> <li>• Do regular monitoring of the operation to save energy and water</li> <li>• Monitor space temperature, humidity level, the cleanliness of air filters and ducts.</li> <li>• Maintain logbooks and utilise FM tools such as QMS system, ISO</li> </ul>

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<i>ISO 9000: 2008, Centralised Computer Maintenance System and other sorts of reporting medium to stake holders, Clients, our own top management etc. (ZS-FM:72-89)</i>	9000:2008, Centralised Computer Maintenance System as reporting medium to stakeholders (FM)
TEXT	CODE (INDIVIDUAL)
REGULATOR, POLICY MAKER & GOVERNMENT PROJECT IMPLEMENTOR	
<i>We have put this into a standard guideline. Inside there, we have various aspects. When ever we do our project, we go through each item and select the most relevant items. It is a kind of checklist. We go through the whole complete list to see whether they are relevant or not.(CPK-PI:140-142)</i>	<ul style="list-style-type: none"> <li>• Environmental issues are transformed into checklists as a standard guideline. Issues to be addressed are selected based on the project and its site context (GovPI).</li> </ul>
<i>I have been the proponent saying that the Government should start with their buildings first because many of the existing Government buildings cannot be considered as environmentally friendly. So it is a good example for the Government to start on their own because then they don't require any regulation or law. They can show the economic or financial benefits and of course they can also predict some savings what ever it is. (KSK-R/PM:64-68)</i>	<ul style="list-style-type: none"> <li>▪ Government should start greening their buildings first and demonstrate the economic benefits to the private sector (PMaker).</li> </ul>
<i>We could enforce the industry players to follow our guidelines to ensure approval to their planning &amp; building submissions. (AMN-R/PM:54-55)</i>	<ul style="list-style-type: none"> <li>• Enforce the industry players to follow local authority's green guidelines to ensure approval to their planning &amp; building submissions (Regr-PMaker).</li> </ul>
<i>... we are limiting the usage of glass windows for buildings, air-conditioning system and etc... we are requiring people in the city centre to put pavers instead of tiles. DBKL did a major mistake by tiling all the pavements before. After the tiling, we got the worst flash floods. So</i>	<ul style="list-style-type: none"> <li>• Implement stormwater management strategies to minimize the risk of flash floods (Regr-PMaker).</li> </ul>

<p>now, driveways even surface car parks, are required to use pavers. So part of the surface water is absorbed to the ground and it will stay longer before it goes to the river. (NN-R/PM:85-93)</p>	
<p>Another area that CIDB involves is giving training, awareness in terms of environmental friendly construction methods or technologies... we don't impose the industry to follow any guidelines produced. (MCA-PM:49-59)</p>	<ul style="list-style-type: none"> <li>• Training &amp; awareness programs in terms of environmental friendly construction methods &amp; technologies (PMaker)</li> </ul>
<p>Among the key strategies would be:</p> <ul style="list-style-type: none"> <li>▪ Escalating the energy rates to reflect the true cost as against the currently subsidised rates that consumers pay,</li> <li>▪ Establishing finite standards (not just guidelines) to set out appropriate design criteria for compliance by developers,</li> <li>▪ Ensuring ALL government facilities comply with the more stringent building codes and standards within a pre-determined time frame to demonstrate its "Leadership by Example",</li> <li>▪ Granting of Incentives for those who successfully adopt the respective standards (e.g. by reducing or eliminating the "Stamp Duty" for the sale of the premises complying with the stated design parameters),</li> <li>▪ Granting of concession on Rates &amp; Assessment under the Local Authority Bye-Laws for such buildings,</li> <li>▪ Imposing punitive surcharges on building owners who do not comply with the stated Standards (even for existing buildings over a specified time frame; Singapore did this in 1978 to 1980). (GL-PM:73-88)</li> </ul>	<ul style="list-style-type: none"> <li>▪ Escalating the energy rates to reflect the true cost as against the currently subsidised rates that consumers pay,</li> <li>▪ Establishing finite standards (not just guidelines) to set out appropriate design criteria for compliance by developers,</li> <li>▪ Ensuring ALL government facilities comply with the more stringent building codes and standards within a pre-determined time frame to demonstrate its "Leadership by Example",</li> <li>▪ Granting of Incentives for those who successfully adopt the respective standards (e.g. by reducing or eliminating the "Stamp Duty" for the sale of the premises complying with the stated design parameters),</li> <li>▪ Granting of concession on Rates &amp; Assessment under the Local Authority Bye-Laws for such buildings,</li> </ul>

	<ul style="list-style-type: none"><li>• Imposing punitive surcharges on building owners who do not comply with the stated Standards (even for existing buildings over a specified time frame; Singapore did this in 1978 to 1980).</li></ul>
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### Q.10 What are your general comments on office buildings being built in Malaysian cities since 5 years ago?

TEXT	CODE (INDIVIDUAL)	CODE (GROUPED)	CATEGORY
<b>ARCHITECT:</b>		<b>From all 30 interviewees</b>	
<i>Most of office buildings are designed for air-conditioning. They never really consider any of the natural aspects. The look of the buildings is pretentious... They even add unnecessary features/decorations...(KK-A:64-71)</i>	<ul style="list-style-type: none"> <li>Architectural features</li> </ul>	<ul style="list-style-type: none"> <li>Spaces are unsubdividable to allow different tenancy situations</li> <li>Central core syndrome - ??</li> <li>Service lifts, toilets and other services are in the middle with office spaces at perimeter</li> <li>Impersonal, no socio-cultural quality of space</li> </ul>	<b>SPACE PLANNING</b>
<i>It is very impersonal, no social cultural quality. Impersonal is in a sense that they designed just for a place to work, it is not a place to spend 10 hours a day, and it doesn't improve the quality of life, it is just for you to produce. All designs follow formula and designed by numbers in the sense that to fulfil how many square feet to fit certain construction cost, for how many people. (WS-A:54-57)</i>	<ul style="list-style-type: none"> <li>Impersonal, no socio-cultural quality of space</li> </ul>		
<i>Very variable, that's a big variation...we can see some extremely well- designed buildings, both from climatic point of view, from a low energy point of view, from the functional point of view. On the other hand, you have extremely very poor designed buildings which take no consideration of the energy use of the buildings...Most of them fall in the middle. A poorly designed building is something that is built with all glass on the 4 facades, 100% clear glass with no external shading at all. Then the poor tenants start putting up all their shadings on the inside which is not really effective. (CSA-A:84-94)</i>	<ul style="list-style-type: none"> <li>Non-climatic façade designs</li> </ul>	<ul style="list-style-type: none"> <li>Architectural features</li> <li>Non-climatic façade designs</li> <li>Not responsive to the local climate</li> <li>Inefficient building envelope</li> <li>More focusing on aesthetics</li> <li>More concerned on being an iconic building</li> <li>Full with glass</li> <li>Attractive but no due respect to energy issues</li> </ul>	<b>BUILDING EXTERIOR</b>
<i>Mostly commercially driven. Corporate image and impression with glass, marble, granite. Also wrong choice of materials because when you have to ship the materials from Spain, move them to China to cut and grind then move them back here – they have a huge carbon footprint. (TLM-A:100-102)</i>	<ul style="list-style-type: none"> <li>Commercially driven</li> <li>Imported materials – huge carbon footprint</li> </ul>	<ul style="list-style-type: none"> <li>Obsessed with glass boxes i.e. “function follows form”</li> <li>Before 5 years ago – precast glass panels which is simple to design,</li> </ul>	

		fast to build and comes with maximum profit.	
<i>First of all, office buildings should allow for different tenancy situations – single, double and multiple with different levels of efficiency for each of these conditions. When I look at the office plans, I said “totally un-subdividable”. That is my first observation. My second observation is that they are not green. A typical office building in Singapore uses 250 kWh/m2/year. A typical office building in Malaysia uses 265 I think. We should try to reach 140-150 if we can. So the energy efficiency index is very high for most office buildings. (KY-A:82-88)</i>	<ul style="list-style-type: none"> <li>• Spaces are unsubdividable to allow different tenancy situations</li> <li>• Energy index is very high</li> </ul>	<ul style="list-style-type: none"> <li>• Mostly commercially driven. Corporate image and impression with glass, marble, granite.</li> </ul>	
<i>I think we still suffer the syndrome of central cores. Not many people have moved to the total open plan to the perimeter, not just an open plan and giving all your cellular offices to the perimeter where the daylight is. Giving break-up spaces going to what I call level-5 spatial arrangement in terms of touch-down areas, work where and when necessary. We are not in that mental capacity. (SH-A:124-128)</i>	<ul style="list-style-type: none"> <li>• Central core syndrome - ??</li> </ul>	<ul style="list-style-type: none"> <li>• Commercially driven</li> <li>• Economy oriented with little concern on environmental &amp; social issues</li> <li>• Economic return oriented – maximize net lettable area &amp; minimize cost</li> <li>• Contractors are more concerned on costs</li> </ul>	<b>ECONOMIC ISSUES</b>
<i>You like it or not, especially private buildings... most of our developers are concerned with dollars and cents. Nothing is considered from the environmental aspect and social aspect. What we are facing now is the result of what had been done 5, 10 years ago. They didn't look into the drainage aspect and etc. That is why we have landslides, floods, hot spots...(SA-A:97-101)</i>	<ul style="list-style-type: none"> <li>• Economy orientated with little concern on environmental &amp; social issues</li> </ul>	<ul style="list-style-type: none"> <li>• Lots were not commissioned or maintained properly</li> <li>• Better designed – lower maintenance cost &amp; energy efficient</li> <li>• Poor maintenance</li> <li>• Government buildings were poor maintained but have improved since a year ago</li> <li>• Preventive maintenance is rarely practiced (2x)</li> <li>• Building energy index is rarely monitored</li> </ul>	<b>OPERATION &amp; MAINTENANCE</b>
<i>Generally, I think the overall design is not energy efficient, with all curtain walling that kind of things. So that their heat gain is</i>	<ul style="list-style-type: none"> <li>• Inefficient building envelope</li> </ul>	<ul style="list-style-type: none"> <li>• Lots were not commissioned or maintained properly</li> </ul>	<b>TESTING &amp; COMMISSIONING</b>



<p>tremendous and also the air-cond loading is very high. (LCH-A:163-164)</p>	
<p>... What is done in Dubai is similar to what is being done here in Malaysia. Our designers simply say that they have adopted our life-style, our culture, put some overhangs here and there....But generally I would say we are as the culprits as the West. Buildings should be designed to be responsive to the local climate. But our skyscrapers are artificial; we can put them on the moon! Office buildings in Malaysia should have steps of layers of cantilevers with set-in windows and cross wind, nicely ventilated, lots of balconies, terraces and all. (NB-A:99-105)</p>	<ul style="list-style-type: none"> <li>• Not responsive to the local climate</li> </ul>
<p><b>TEXT</b></p>	<p><b>CODE (INDIVIDUAL)</b></p>
<p><b>ENGINEER &amp; ENVIRONMENTAL CONSULTANT:</b></p>	
<p>Maybe 5-10 years ago, that time I used to comment that after you've built it, a lot of them were not commissioned properly or maintained properly. But since then, there are buildings that are done properly and people are willing to pay more to make sure they are kept properly...For the past 5 years, you can see more and more quality buildings were coming up because there is a demand for it. Don't forget, MNCs [multi-national corporations] are coming here.... Do your buildings comply with NFP 101 Life Safety?... "Is your building green? If not I don't want to rent it." The MNCs are now demanding for it. Local big corporations, because of the CSR [Corporate Social Responsibility], they also show that they are green. It is catching up. (CTL-ME:281-296)</p>	<ul style="list-style-type: none"> <li>• Lots were not commissioned or maintained properly</li> <li>• Demand for green buildings is catching up – especially by MNCs</li> </ul>
<p>I would say energy efficiency is always on people's mind. When</p>	<ul style="list-style-type: none"> <li>• Cooling system is not properly</li> </ul>

<ul style="list-style-type: none"> <li>• Testing &amp; commissioning is a standard practice</li> <li>• Proper building commissioning is not widely practiced</li> <li>• Commissioning is a standard practice for government buildings</li> </ul>	
<ul style="list-style-type: none"> <li>• Energy index is very high</li> <li>• Little consideration to passive elements for energy efficiency</li> </ul>	<p><b>ENERGY EFFICIENCY</b></p>
<p><b>CODE (GROUPED)</b></p>	<p><b>CATEGORY</b></p>
<ul style="list-style-type: none"> <li>• Demand for green buildings is catching up – especially by MNCs</li> <li>• Green office buildings are only demanded by MNCs who are practicing CSR or CER &amp; the forward-thinking local companies</li> </ul>	<p><b>GREEN BUILDING DEMAND</b></p>
<ul style="list-style-type: none"> <li>• Government staffs are given</li> </ul>	<p><b>ATTITUDE &amp;</b></p>

<p><i>you talk about energy efficiency in a building, it is not just buying products and equipment and your building will become energy efficient. You must integrate the whole design as energy efficient. A chiller can be efficient at that particular load...you know...but the fine tuning of the selection. I can tell you that you need an energy efficient chiller... it cannot stop there. Most of the chillers will be efficient when it runs till 100% load, but most of the chillers may not be running till 100% load. You must plot the curves. Where is the swift curve? How do you select it? Those are the fine tuning which only the mechanical engineers or air-conditioning designers know exactly what to do. (NYK-ME:116-124)</i></p>	<p>fine-tuned after the system has been setup</p>
<p><i>We've been trying very hard to influence the architects and engineers to do this [green building design] but at the end of the day it is the client who says that they don't have the market for it, whether the public wants it or not.... Actually energy and environment is important but nobody cares about that... Yeah, but I think things will change in the next few years.... influence is also the multinational companies who are coming to Malaysia...a lot of multinational companies (MNCs) are fulfilling their corporate social responsibility and they need to project their image in Malaysia...So, all these buildings are coming up...Before these buildings come out to critical mass, there will be very few demands. Like now, I would say it is hard to sell. It is hard to convince clients to built green buildings. There are some forward-thinking ones who can see that if they don't build their building green now, maybe in 10 years down the road their building will be obsolete or they can't rent or sell their building anymore...</i></p>	<ul style="list-style-type: none"> <li>• Green office buildings are only demanded by MNCs who are practicing CSR or CER &amp; the forward-thinking local companies</li> </ul>
<p><b>TEXT</b> <b>BUILDER &amp; BUILDER-DEVELOPER:</b></p>	<p><b>CODE (INDIVIDUAL)</b></p>

<p>awareness program by JKR</p> <ul style="list-style-type: none"> <li>• The awareness on life-cycle analysis for office building design &amp; construction is only raised when the energy price is escalated</li> </ul>	<p><b>AWARENESS</b></p>
<ul style="list-style-type: none"> <li>• Imported materials – huge carbon footprint</li> <li>• Improper disposal of waste especially scheduled wastes</li> </ul>	<p><b>MATERIALS &amp; SOLID WASTE</b></p>
<p><b>CODE (GROUPED)</b></p>	<p><b>CATEGORY</b></p>

<i>Getting better in aesthetics but not much advancement in energy efficiency, sustainable issues and green products. (SA-B/D:82-83)</i>	<ul style="list-style-type: none"> <li>• More focusing on aesthetics</li> </ul>
<i>We are building everything in a cluster, everything all next to each other as if we don't have enough land. I don't see the reason why we need to reclaim land...In Malaysia, I feel we should not have a lot of concrete pavers in the cities. That's why we have flash floods. At the end of the day, the emissions of CO2 and all make our cities much hotter. (JD-B:139-144)</i>	<ul style="list-style-type: none"> <li>• Some built on reclaimed land</li> <li>• Excessive areas covered with concrete pavers</li> </ul>
<i>A lot of architects are not also focusing on energy efficiency or environmentally concern architecture but more on iconic buildings. The worst is the maintenance. It is a common practice among contractors to flatten the whole site, chop all of the trees and bare the land during site clearance. Even though the building footprint is small but the site area covers for operation is huge. That is the current normal practice until you go for green development. (TYT-B:83-90)</i>	<ul style="list-style-type: none"> <li>• More concerned on being an iconic building</li> <li>• Environmentally destructive methods of construction</li> </ul>
<b>TEXT</b>	<b>CODE (INDIVIDUAL)</b>
<b>DEVELOPER, OWNER &amp; DEVELOPER-OWNER:</b>	
<i>Some buildings are green but they are full of glass so I don't know how these buildings reduce the heat gain. (NA-D:64-65)</i>	<ul style="list-style-type: none"> <li>• Full with glass</li> </ul>
<i>Normally, office buildings are built for investment purposes. Either they want to sell them out or they want to rent them out. And one thing that brings to their mind is the return meaning that how much income can be generated from the building. So, as the result of that, they will have bigger net lettable areas. Net lettable area has got to be maximized, and then your cost</i>	<ul style="list-style-type: none"> <li>• Economic return oriented – maximize net lettable area &amp; minimize cost</li> </ul>

<ul style="list-style-type: none"> <li>• Environmentally destructive methods of construction</li> <li>• Unsustainable construction at the earthwork stage</li> </ul>	<b>CONSTRUCTION METHODS</b>
<ul style="list-style-type: none"> <li>• Excessive areas covered with concrete pavers</li> </ul>	<b>LANDSCAPE</b>
<ul style="list-style-type: none"> <li>• Started to use fibre optic network</li> <li>• Technologies used are imported &amp; easily obsolete</li> </ul>	<b>M&amp;E SERVICES</b>
<b>CODE (GROUPED)</b>	<b>CATEGORY</b>
<ul style="list-style-type: none"> <li>• Some built on reclaimed land</li> <li>• Little consideration to slope sensitivity</li> </ul>	<b>BUILDING SITE</b>
<ul style="list-style-type: none"> <li>• Green/sustainability concepts have been used since 5 years ago</li> </ul>	<b>OVERALL DESIGN</b>

<p><i>obviously got to be very low... sometimes I see corridors are getting smaller and smaller because they maximized the net lettable area... (MM-D:108-117)</i></p>	
<p><i>Nowadays there are many architects who are well-verse with office space planning or template. Normally they have service lifts, toilets services and other services in the middle. And then the office place are outside the perimeter...yeah... that's right...I think you can serve well for tenant who needs one whole floor or quarter of the floor or what ever. Then you have to think of the access or entrance to each tenant's office. You cannot have one point/entrance when the floor is divided into 4 sections! (MM-D:141-146)</i></p>	<ul style="list-style-type: none"> <li>• Service lifts, toilets and other services are in the middle with office spaces at perimeter</li> </ul>
<p><i>Current office buildings are better designed to cater to the need of the market that prefers lower maintenance cost, smarter building with energy conservation/saving features. (BTC-D:82-83)</i></p>	<ul style="list-style-type: none"> <li>• Better designed – lower maintenance cost &amp; energy efficient</li> </ul>
<p><i>Just looking at the outside you can tell that they are not designed using passive architecture and that is a bit of shame. Because there is no due respect to the energy issues and the energy cost is rising. So now they [the owners] are paying for it. The owners have spent so much money to have their buildings and now they are spending a lot of money for the maintenance... No doubt that the modern buildings look attractive but when you talk about the bills, then you can tell which one is actually attractive. (WR-D/O:231-240)</i></p>	<ul style="list-style-type: none"> <li>• Attractive but no due respect to energy issues</li> </ul>
<p><i>We use the fibre optic network within the building for our telephone system; broadband and televisions – all running on the same cable. By doing that we cut out the requirement for having extra copper wires for our building. Instead of having one cable for this and another cable for that...we save money there.</i></p>	<ul style="list-style-type: none"> <li>• Started to use fibre optic network</li> </ul>

<ul style="list-style-type: none"> <li>• Most are comfortable &amp; safe</li> <li>• Air motion is important in cooling system</li> </ul>	<p><b>INDOOR ENVIRONMENT</b></p>
<ul style="list-style-type: none"> <li>• Low electricity price discourages the adoption of energy efficiency</li> </ul>	<p><b>GOVERNMENT RELATED</b></p>

TEXT	CODE (INDIVIDUAL)
<p><b>FACILITY MANAGER:</b></p> <p><i>Whatever technology you put in your building, within one year your building would become obsolete. Technologies are most imported...Yes, testing and commissioning will be the cut-off points contractually, it will dictate that whatever have been installed are in order and handed over to the owner. (NM-FM:85-86)</i></p>	<ul style="list-style-type: none"> <li>• Technologies used are imported &amp; easily obsolete</li> <li>• Testing &amp; commissioning is a standard practice</li> </ul>
<p><i>So you ensure the equipments are maintained to the design specification because in Malaysia, we don't have a maintenance culture... So maintenance is another aspect, why? Because equipments are subject to wear and tear. If you cannot maintain as far as possible to the original design specification or condition, you cannot get the kind of efficiency that you want... (OCL-FM:155-160)</i></p>	<ul style="list-style-type: none"> <li>• Poor maintenance</li> </ul>
<p><i>...commissioning is something not being widely practiced here in Malaysia. Malaysia when you talk about 5 years or 10 years ago, the consultants just pressed the button "Oh lights are on, the air-conditioning works." That's it. They didn't talk about energy balance, water balance, temperature balance, so many things were not looked at. (OCL-FM:170-174)</i></p>	<ul style="list-style-type: none"> <li>• Proper building commissioning is not widely practiced</li> </ul>
<p><i>... government buildings had been poorly maintained since 5 years ago...But 1 year ago, JKR opened up its Maintenance Branch specifically to look after government buildings. So since then, government buildings have been maintained properly. They are audited in terms of their energy performance. JKR also has its own Environmental &amp; Energy Branch. They give inputs as much as possible to ensure government buildings are developed in an environmentally friendly manner. They also give awareness among government building users in terms of</i></p>	<ul style="list-style-type: none"> <li>• Government buildings were poor maintained but have improved since a year ago</li> <li>• Government staffs are given awareness program by JKR</li> <li>• Commissioning is a standard practice for government buildings</li> </ul>

<i>environmental issues...Building commissioning is a standard practice especially for government buildings. (KCD-FM:60-68)</i>	
<i>Level of comfort is there.... I think majority of Malaysian office buildings are safe. In terms of maintenance, preventive maintenance is rarely practiced... I think it [commissioning] is a standard practice. (ZS-FM:92-98)</i>	<ul style="list-style-type: none"> <li>• Most are comfortable &amp; safe</li> <li>• Preventive maintenance is rarely practiced</li> </ul>
<b>TEXT</b>	<b>CODE (INDIVIDUAL)</b>
<b>REGULATOR, POLICY MAKER &amp; GOVERNMENT PROJECT IMPLEMENTOR</b>	
<i>Some buildings actually didn't give due consideration to slope sensitivity. Some buildings were designed with little consideration on passive elements for energy efficiency like wrong orientation, too much glass, not optimizing daylighting, no or wrong shading devices and etc. (CPK-PI:145-149)</i>	<ul style="list-style-type: none"> <li>• Little consideration to slope sensitivity</li> <li>• Little consideration to passive elements for energy efficiency</li> </ul>
<i>I think most of them are standard buildings and they are built at the lowest cost...our building maintenance is poor...For example, they only change light bulbs when they are faulty. That type of maintenance and not maintenance to improve. So always ensure that your building is monitored and has the same energy index as it goes along. You should provide a monitoring system in every building. That index should be monitored every month. This is where we have a qualified energy manager...But during economic downturn, building owner or tenants refuse to employ energy manager. So the building energy ends up unmonitored. like PTM building itself, there is no thermal comfort because there is no air motion. It is a so a tight building. So in most of the rooms, they have fans because of the design of the air conditioning system. In heating, you don't need that [air motion] but in cooling, you need the air motion. (KSK-PM:78-87)</i>	<ul style="list-style-type: none"> <li>• Preventive maintenance is rarely practiced</li> <li>• Building energy index is rarely monitored</li> <li>• Air motion is important in cooling system</li> </ul>

<p><i>Generally, I think there are lack of connectivity between the building and the environment. Designers nowadays somehow are obsessed with glass boxes, more like “function follows form” rather than “form follows function”. More emphasis has been given to the form of the buildings or how the buildings look like rather than the practicality and comfort of the building users. (AMN-R/PM:58-62)</i></p>	<ul style="list-style-type: none"> <li>• Obsessed with glass boxes i.e. “function follows form”</li> </ul>
<p><i>5 years ago was quite okay actually. We have looked into using green concept and sustainability, well-designed buildings. So we’ve got the conceptual buildings in the city. It was the buildings built more than 5 years go that worry us a bit because during that time, people were in a hurry to build. So, they ended up to be in precast glass panels – fast, simple, maximum profit! But since 5 years ago, the culture of our developers has turned towards appreciating more on the architectural design along with the requirements of the City Hall. So they’ve started to build better buildings. Now there are developers who keen to develop green buildings... The requirement of not having a full-glass office block came in even before 5 years ago. It was a struggle for the City Hall and the developers. (NN-R/PM:99-114)</i></p>	<ul style="list-style-type: none"> <li>• Green/sustainability concepts have been used since 5 years ago</li> <li>• Before 5 years ago – precast glass panels which is simple to design, fast to build and comes with maximum profit.</li> </ul>
<p><i>To be specific, in terms of managing the environment at the initial stage i.e. earthwork, I think it is still not up to the standard. That’s why you see we still have flash floods, river sedimentation and so on. Another thing is in terms of managing the disposal of wastage, especially the scheduled wastes. Not many contractors really follow whatever is required under the act because this entire thing involves costs. When it involves costs, some of the contractors just dump their waste selfishly, which is not a good practice. (MCA-PM:62-67)</i></p>	<ul style="list-style-type: none"> <li>• Unsustainable construction at the earthwork stage</li> <li>• Improper disposal of waste especially scheduled wastes</li> <li>• Contractors are more concerned on costs</li> </ul>
<p><i>Some new buildings, constructed for “owner-occupation”, have attempted to adopt EE features that have been demonstrated</i></p>	<ul style="list-style-type: none"> <li>• Low electricity price discourages the adoption of energy efficiency</li> </ul>

*through the MEWC's LEO & PTM's ZEO buildings. These initiatives have also become more affordable over the time period concerned. However, the still subsidised low electricity price does little to encourage the adoption of even EE, let alone fully sustainable or green buildings standards on a wide scale. The recent energy price escalation (w.e.f. 1 July 2008) raised some serious awareness of the impact of energy cost on a modified "life-cycle-analysis" for office building design & construction, but the partial retraction of the tariff increases w.e.f. 1 March 2009 sent out a contradictory message. (GL-PM:91-99)*

w.e.f = with effect from

- The awareness on life-cycle analysis for office building design & construction is only raised when the energy price is escalated



**D: CURRENT ENVIRONMENTAL PRACTICES (D2: Sustainable Materials)**

**Q.11 Have you heard about reuse/recycle products/materials? Q.11a Would you specify them in your office building projects? Why? Q.11a Would you encourage the industry to use them in office building projects? Q.11b Is there any opportunity for reused/recycled materials in the Malaysian office building industry?**

TEXT	CODE (INDIVIDUAL)	CODE (GROUPED)	CATEGORY
<b>ARCHITECT:</b>		<b>From all 30 interviewees</b>	
<p>Q.11a <i>If it is save enough, not too expensive, yes, I would definitely specify them.</i></p> <p>Q.11b <i>I think that can be done. If the industry goes for rating system which has this aspect as one of the criteria, then these materials will have more demand. (KK-A:75-83)</i></p>	<ul style="list-style-type: none"> <li>• Would specify if not too expensive</li> <li>• There is an opportunity if specified in a rating system</li> </ul>	<ul style="list-style-type: none"> <li>• Only expensive materials like steel &amp; timber are recycled/reused</li> <li>• Malaysian steel has recycled content because it has a high value (2X)</li> <li>• Using waste materials from construction site i.e. formwork &amp; left-over cement as part of interior décor.</li> <li>• Specified for 2 LEED Gold buildings</li> <li>• Discarded glasses &amp; broken tiles are used for interior décor</li> <li>• Use formwork made of recycled timber</li> <li>• Recycled steel are available</li> </ul>	<b>HAVE SPECIFIED/USED THEM (PRIVATE SECTOR)</b>
<p>Q.11a <i>...we use reconstituted timber for ceilings...when it was first introduced it was cheap but now when we want to use it this year, it becomes more expensive even than timber itself. So it doesn't become an advantage and it's not attractive.</i></p> <p>Q.11b <i>Possible (WS-A:64-84)</i></p>	<ul style="list-style-type: none"> <li>• Specified reconstituted timber but recently becomes more expensive</li> <li>• There is a possible opportunity</li> </ul>	<ul style="list-style-type: none"> <li>• Never used them</li> <li>• Never used them</li> <li>• Dumping unseparated construction wastes in landfill is a common practice</li> <li>• Reusing salvaged materials to new buildings is rarely practiced</li> </ul>	<b>HAVE NEVER SPECIFIED/USED THEM (PRIVATE SECTOR)</b>
<p>Q.11a <i>No...The market doesn't provide it. The problem is that the Malaysian market doesn't provide it because the suppliers perceive that recycled materials are equated with poor quality materials, which is not true.</i></p> <p>Q.11b <i>...Because steel is expensive, so a lot of it gets back into the steel mill, they recycle the steel. Actually in Malaysia there is no steel waste...The other materials</i></p>	<ul style="list-style-type: none"> <li>• Would not specify for office – perceived as low quality</li> <li>• Only expensive materials like steel &amp; timber are recycled/reused</li> <li>• Malaysian steel has recycled content because it has a high value</li> <li>• Used timber is hardly available in the</li> </ul>		

<p><i>being recycled quite well now in Malaysia is timber...like the railway sleepers and old timber decks from old shop houses, the minute they are demolished, somebody will buy them up because they have value. A lot of people are doing high end residential projects. These people would buy out all these timber. There is nothing left for you to choose from. So when you talk about office buildings, you want to use those nice recycled timbers, there is nothing left in the market for you. It is too expensive and I think the economics of it is not there. (CSA-A:64-121)</i></p>	<p>market because it is consumed by high end residential projects – too expensive for office project</p> <ul style="list-style-type: none"> <li>• Opportunity is there especially for steel but not timber</li> </ul>	<ul style="list-style-type: none"> <li>• Government buildings never use them</li> <li>• Not familiar with &amp; have no experience in using them</li> <li>• [10 others didn't explicitly mention that they've never specified/used them but they would specify if certain conditions are met]</li> </ul>	
<p><i>Q.11a We have got a lot of formwork from the casting of concrete slabs. We are keeping all the formwork, drill some holes on it, create patterns. So we are trying to use it to line the lobbies. Instead of using granite, we are using back recycled materials from the construction to line the lobbies.... Our motif wall in front is from cement left-over. We made a mould, we told them anything left over, you put it there and let it dry. So we got few pieces done and put them on our wall. Q.11b Yes. (TLM-A:108-120)</i></p>	<ul style="list-style-type: none"> <li>• Using waste materials from construction site i.e. formwork &amp; left-over cement as part of interior décor.</li> <li>• Opportunity is there</li> </ul>	<ul style="list-style-type: none"> <li>• Would encourage the industry if they are readily and easily available; and cost effective (2x)</li> <li>• Would encourage the industry to reduce the amount of waste</li> <li>• Would encourage but rarely practised because clients always prefer new materials</li> <li>• Would encourage the industry for environmental &amp; economic reasons</li> <li>• <u>Tried to encourage</u> the industry but unsuccessful because resources are quite cheap</li> </ul>	<p><b>WOULD ENCOURAGE THE INDUSTRY TO USE THEM (PUBLIC SECTOR)</b></p>
<p><i>Q.11a It is good for the environment Q.11b Yes (KY-A:92-97)</i></p>	<ul style="list-style-type: none"> <li>• Opportunity is there</li> </ul>	<ul style="list-style-type: none"> <li>• Recycled products are more expensive (4x) <b>TYT,</b></li> </ul>	<p><b>CONCERN ABOUT COST 17x</b> (mentioned by 15)</p>
<p><i>Q.11a How far and what measure...is there a standard...before you ask this question...is the market (a) Singapore &amp; Malaysia and (b) global market, are there standard measures to what is determined a material as a recycled material? Because if there isn't, then it makes us very hard to monitor – recycled or non-recycled. Second is</i></p>	<ul style="list-style-type: none"> <li>• Specified for 2 LEED Gold buildings</li> <li>• Difficult to monitor/differentiate recycled materials in the market because there is no standard measures to trace/prove its recycled</li> </ul>	<ul style="list-style-type: none"> <li>• Would specify if not too expensive <b>KK</b></li> <li>• Would encourage the industry if they are readily and easily available; and cost effective (2X) <b>KSK, AMN</b></li> <li>• Specified reconstituted timber but</li> </ul>	

<p><i>to what limit do we put it, we still building in concrete, the only thing we can do with concrete is put ash. We put ash but then 30% more expensive in the concrete cost.... then you have to ask "How can the industry respond to this, especially when it is not made mandatory?" Singapore has made it mandatory, therefore now all producers and manufacturers have started to find and produce them. But here, when it doesn't become that, when it just becomes "branding", how can we impress on the manufacturing market on doing that? (SH-A:141-155)</i></p> <p><i>Q.11b I think there is but how fast depends on branding, cultivating [the use of these materials] as well. The Australian Green Building Council...they have on their board, industry players. So whilst they don't have the mandate for decision making as a whole because how can industry members who are commercially minded be doing that. But they find bigger responses because Australians as a whole are a little bit conscious as a society. We aren't. Malaysia is always straddled between Singapore and Australia. (SH-A:160-166)</i></p>	<p>content</p> <ul style="list-style-type: none"> <li>• Concrete with fly ash content is 30% more expensive than normal concrete</li> <li>• Issue of "branding" in Malaysia – not so much on being concern to the environment</li> <li>• Opportunity is there</li> </ul>	<p>recently becomes more expensive <b>WS</b></p> <ul style="list-style-type: none"> <li>• Concrete with fly ash content is 30% more expensive than normal concrete <b>SH</b></li> <li>• PVC formwork is not widely used – expensive &amp; industry still prefer timber formwork <b>TYT</b></li> <li>• Aluminium formwork is only economically viable for mega projects <b>TYT</b></li> <li>• Nobody recycle concrete – cost &amp; quality issues <b>TYT</b></li> <li>• Malaysian Green Building Index would popularize these materials in the market, hence reduce the price <b>CTL</b></li> <li>• The opportunity is there if commercially viable <b>SA-B</b></li> <li>• The opportunity is there if they are cost effective <b>BTC</b></li> <li>• The opportunity is there if they are cost effective</li> <li>• Tried to encourage the industry but unsuccessful because resources are quite cheap <b>NN</b></li> </ul>	
<p><i>Q.11a I've never had a chance to do it but I'd do it.</i></p> <p><i>Q.11b Yeah. Recycled products are expensive... if you have developed the habit of recycling all your rubbish, then you can start the recycling of materials. So capture that</i></p>	<ul style="list-style-type: none"> <li>• Never specified because not demanded by clients</li> <li>• Recycled products are expensive</li> </ul>	<ul style="list-style-type: none"> <li>• Rubbish is not recycled, let alone construction materials <b>SA</b></li> <li>• Have not seen construction</li> </ul>	<p><b>CONCERN ABOUT AVAILABILITY OF MATERIALS 10x</b></p>

<p><i>habit first before you can have recycled materials. (SA-A:158-160)</i></p>	<ul style="list-style-type: none"> <li>• Rubbish is not recycled, let alone construction materials</li> <li>• Opportunity is there if people develop the habit of recycling</li> </ul>
<p><i>Q.11b I think so. Nowadays they are using like for instant discarded glasses it cooperate with a very interesting feature walls; they grind the glass in pieces, they pile it up then become part of the interior design...Normally tiling, there are wastage around 15 to 20% because of the edges and they have to cut the tiles. These broken tiles or cut tiles during those days they just threw them away. But nowadays, they take these tiles of course with many designs and different colours, they mix them all together like a tapestry and become a design. So the interior designers also play an important role in understanding of recycling of building construction materials. (LCH-A:172-719)</i></p>	<ul style="list-style-type: none"> <li>• Discarded glasses &amp; broken tiles are used for interior décor</li> <li>• Interior designers should play an important role</li> <li>• The opportunity is there</li> </ul>
<p><i>Q.11a We've never given a chance to use these materials actually. I guess we ought to use these materials. We have at one point we got ourselves involved in a project where we wanted all the cut tiles for example, to be reused in another building of a similar project. But our client didn't want them. (NB-A:111-114)</i></p>	<ul style="list-style-type: none"> <li>• Tried to specify but not accepted by the client</li> <li>• Little opportunity because lack of client demand</li> </ul>
<p><b>TEXT</b></p>	<p><b>CODE (INDIVIDUAL)</b></p>
<p><b>ENGINEER &amp; ENVIRONMENTAL CONSULTANT:</b></p> <p><i>Q.11b It's difficult but it is not impossible. For example, fly ash could be used but it is wasted down there. Every time you talk about it ooh...it is very expensive this and that. Economic scale again. The GBI will make people do it then these materials will become more popular. Then economic</i></p>	<ul style="list-style-type: none"> <li>• Difficult to widespread but not impossible</li> <li>• Recycled materials are expensive</li> <li>• Malaysian Green Building Index</li> </ul>

<p>materials being recycled in Malaysia <b>JD</b></p> <ul style="list-style-type: none"> <li>• Have not come across these materials in Malaysia <b>NA</b></li> <li>• Recycled materials are unavailable <b>CN</b></li> <li>• Believe that contractors never salvage any components during demolition/renovation <b>CN</b></li> <li>• Not many materials with recycled content in local market <b>TYT</b></li> <li>• Not widely used/available <b>CPK</b></li> <li>• Used timber is hardly available in the market because it is consumed by high end residential projects – too expensive for office project <b>CSA</b></li> <li>• Would encourage the industry if they are readily and easily available; and cost effective (2X) <b>KSK, AMN</b></li> </ul>	<p>(mentioned by 9)</p>
<p><b>CODE (GROUPED)</b></p>	<p><b>CATEGORY</b></p>
<ul style="list-style-type: none"> <li>• Would not specify for office – perceived as low quality <b>CSA</b></li> <li>• Nobody recycle concrete – cost &amp; quality issues <b>TYT</b></li> </ul>	<p><b>CONCERN ABOUT QUALITY 10x</b> (mentioned by 7)</p>

<p><i>scale will come and kick in. Of course we are very notorious at recycling because as much as the Ministry of Housing has been promoting, you look at it, it is very hard to move. Unless you put some laws and penalties, then it will move. (CTL-ME:307-312)</i></p>	<p>would popularize these materials in the market, hence reduce the price</p> <ul style="list-style-type: none"> <li>• Government to impose with laws and penalties</li> <li>• Opportunity is there if there are laws and penalties</li> </ul>
<p><i>Q.11b I think there is...Usually, people just throw away things. I think they should use... these alternative resources or recycled materials. But I think it has to be the right education from the primary school level...If we don't educate people and inculcate awareness... it cannot be practiced. (NYK-ME:152-157)</i></p>	<ul style="list-style-type: none"> <li>• The opportunity is there if the public is educated enough</li> </ul>
<p><i>Q.11b Yes, huge! In Malaysia we are lucky in the sense that a lot of our steel is actually recycled steel. We do not have raw steel ourselves. But the problem is getting it documented that all these are recycled steel...LEED says "10% of the building material cost to be recycled materials" then you score 1 point in LEED. Then it becomes so easy [to score] as long as our steel is actually recycled... Not [labelled as such] in Malaysia right now because in Malaysia our glasses are mostly produced by MSG (Malaysian Sheet Glass Sdn Bhd) only and imported glasses have a very high import tax in it – about 40%. So MSG doesn't have the recycled content, they may have but they are not labelled yet. Our steel also is not labelled yet. They are getting their paperwork done. But once we have something like this set up [MGBC], we want it to be labelled and I'm sure there are people who want to have their products labelled so they can get into this market. Because you don't label them, we can't buy them! (CKT-CE:165-</i></p>	<ul style="list-style-type: none"> <li>• Malaysian steel has recycled content</li> <li>• No documentation to prove its recycled content</li> <li>• Recycled materials are not properly labelled</li> <li>• Huge opportunity especially for steel but recycled content need to be labelled</li> </ul>

<ul style="list-style-type: none"> <li>• Considered as second-class quality <b>TYT</b></li> <li>• Not accepted by clients because they are not new materials <b>TYT</b></li> <li>• Would encourage designers to specify if their performance &amp; durability is not compromised. <b>BTC</b></li> <li>• Would encourage designers to specify if they meet the specification and standard requirements <b>CN</b></li> <li>• Some developers perceive them to be low in quality <b>CN</b></li> <li>• Would encourage designers to specify if there is data/results/track record of their performance in local buildings <b>WR</b></li> <li>• Would encourage but rarely practised because clients always prefer new materials <b>MCA</b></li> <li>• Little opportunity because important business players always prefer new materials <b>GL</b></li> </ul>	
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178)	
TEXT	CODE (INDIVIDUAL)
BUILDER & BUILDER-DEVELOPER:	
<p>Q.11a No Q.11b Yes, as long as it is commercially viable. (SA-B/D:89-95)</p>	<ul style="list-style-type: none"> <li>• Never used them</li> <li>• The opportunity is there if commercially viable</li> </ul>
<p>Q.11a No, we have not. But of course one of the reasons is that the economic of scale...Everybody tends to make use of it and then throw it. Nobody really take the initiative to recycle. Clients also don't demand these materials. In Holland, they recycle formwork to turn into chipboards. They recycled concrete, they separate the concrete then they take out the aggregate. In Malaysia, I have not seen these. I tried to promote this because I have a friend who actually wanted to sell these machines here in Malaysia but nobody is really interested... You see house and office renovations are very common in Malaysia. Building components and finishes just built are hacked and destroyed. Construction wastes are plentiful by the roadside and everywhere. You know what they'll do [with those wastes]? They'll find a valley, they'll dump all the waste inside the valley and then they bury it... We should regulate all these things. Probably the CIDB or the ministry; they should come up with a regulation. People should dispose their construction wastes at a proper designated place equipped with recycling plant to segregate the wastes. They could actually sell it at a much cheaper price. This is more on the know-how, maybe the publicity is not there and people do not know about it. (JD-B:150-176)</p>	<ul style="list-style-type: none"> <li>• Never used them</li> </ul> <p>Reasons:</p> <ul style="list-style-type: none"> <li>• Recycled materials are expensive</li> <li>• No demand from clients</li> <li>• Have not seen construction materials being recycled in Malaysia</li> <li>• No initiative by anybody</li> <li>• Dumping unseparated construction wastes in landfill is a common practice</li> </ul> <p>Suggestions:</p> <ul style="list-style-type: none"> <li>• To have designated places equipped with recycling plant to segregate &amp; recycle</li> <li>• Regulation from government</li> <li>• Fiscal incentives from government</li> <li>• Opportunity is there if they are introduced, regulated and encouraged</li> </ul>

CODE (GROUPED)	CATEGORY
<ul style="list-style-type: none"> <li>• To have designated places equipped with recycling plant to segregate &amp; recycle</li> </ul>	<p><b>CONCERN ABOUT FACILITIES &amp; INFRASTRUCTURE</b></p>
<ul style="list-style-type: none"> <li>• Regulation from government</li> <li>• Fiscal incentives from government</li> <li>• Opportunity will only come with a regulation because people won't use them voluntarily</li> <li>• Government to impose with laws and penalties</li> <li>• DBKL has encouraged owners to reuse existing structures for new projects</li> <li>• Designers will be allowed to submit their skeletal building (without finishes, fittings &amp; fixtures) for building approval</li> <li>• Buyers/owners will be given a 6-month TCF to put in their own selection of tiles, fittings &amp; fixtures</li> </ul>	<p><b>CONCERN ABOUT GOVERNMENT INITIATIVES</b></p>

<p>Q.11b There is an opportunity, of course. It is only a matter of somebody to come up with it, introduce it and then the Government or the right authority come to play, try to regulate it, then encourage it, then I think definitely it will happen. An incentive maybe...bringing in from overseas, maybe they can get a waiver on import duties or they can say who ever start with this kind of business, they don't have to pay tax for the next 5 years or something.(JD-B:187--191)</p>			
<p>Q.11a ...formwork system. We use recycled timber...If they handle it properly, maybe it can be used 4 times maximum. Currently in the industry, there are PVC formworks but they are not widely used. We invested in one set, but people are used to timber because it is easy to cut and resize. Aluminium formwork is slightly different. It is only used for big projects because you need more repetitions. Aluminium formwork is easier to handle than PVC but it is more expensive. Concrete is not recycled. We are not using any crushed aggregate or crushed concrete because that would be more costly and at the moment...nobody does that. Basically because of the cost and quality issues especially for structural components. Reusing broken tiles salvaged from another site to a new project for floor finishes is something specified by the architect and not within our control. We are just implementing. Broken marbles for floor finishes...considered as second class. Glass manufacturer recycle broken glass to produce another kind of products. The process of recycling materials in the factory actually makes the product more</p>	<ul style="list-style-type: none"> <li>• Use formwork made of recycled timber</li> <li>• PVC formwork is not widely used – expensive &amp; industry still prefer timber formwork</li> <li>• Aluminium formwork is only economically viable for mega projects</li> <li>• Nobody recycle concrete – cost &amp; quality issues</li> <li>• Designers are responsible to specify these materials as part of interior décor/finishes</li> <li>• Considered as second-class quality</li> <li>• Recycled products are more expensive</li> <li>• Not many materials with recycled content in local market</li> <li>• No opportunity</li> <li>• Not accepted by clients because they are not new materials</li> </ul>	<ul style="list-style-type: none"> <li>• Difficult to monitor/differentiate recycled materials in the market because there is no standard measures to trace/prove its recycled content</li> <li>• No documentation to prove its recycled content</li> <li>• Recycled materials are not properly labelled</li> </ul>	<p><b>CONCERN ABOUT STANDARD MEASURES &amp; LABELLING</b></p>

<p>costly...  <i>We tried to use materials with recycled content but there are not many of them in the local market. (TYT-B:98-120)</i>  <i>Q.11b As you know a lot of owners do not want to use recycle materials. The word 'recycle' means it is not new. Recycled &amp; reused materials are not well accepted by people. We have abundance of natural resources, that's the reason why people don't appreciate recycling or reusing building materials. (TYT-B:142-146)</i></p>	<ul style="list-style-type: none"> <li>• Little opportunity because they are not appreciated</li> </ul>
<b>TEXT</b>	<b>CODE (INDIVIDUAL)</b>
<b>DEVELOPER, OWNER &amp; DEVELOPER-OWNER:</b>	
<p><i>... I have never come across with this kind of materials. (NA-D:68)</i></p>	<ul style="list-style-type: none"> <li>• Have not come across these materials in Malaysia</li> <li>• Not sure whether the opportunity is there or not</li> </ul>
<p><i>Q.11a I would not object to the usage of recycled building products if their performance specification and durability is not compromised. Maintenance to normal wear and tear is acceptable but will definitely avoid the use of dubious recycled component that may lead to premature failure which is not cost effective.</i>  <i>Q.11b Yes, however it must be cost effective to encourage widespread usage. (BTC-D:89-95)</i></p>	<ul style="list-style-type: none"> <li>• Would encourage designers to specify if their performance &amp; durability is not compromised.</li> <li>• The opportunity is there if they are cost effective</li> </ul>
<p><i>Q.11a Normally, as an owner, I want to see where it has been tested and it has to be tested in local buildings. The question I would ask is the performance of that particular material in another building in Malaysia and I want to see some results from that precedent. Without that, I will not go for it...Okay, I would pay a bit more, because being an owner who concerns about environment; I wouldn't mind pay a bit more. But what I want to see is the track record.</i></p>	<ul style="list-style-type: none"> <li>• Would encourage designers to specify if there is data/results/track record of their performance in local buildings</li> <li>• The opportunity is there</li> </ul>

<b>CODE (GROUPED)</b>	<b>CATEGORY</b>
<ul style="list-style-type: none"> <li>• Concrete is the most commonly used material but currently difficult to be recycled – lack of technical know-how</li> </ul>	<b>CONCERN ABOUT TECHNICAL KNOW-HOW</b>
<ul style="list-style-type: none"> <li>• The opportunity is there if the public is educated enough</li> <li>• No initiative by anybody</li> <li>• Opportunity will come when people are environmentally conscious and willing to pay or when it is less expensive</li> </ul>	<b>CONCERN ABOUT PUBLIC AWARENESS</b>
<ul style="list-style-type: none"> <li>• Never specified because not demanded by clients</li> <li>• Tried to specify but not accepted by the client</li> <li>• No demand from clients</li> <li>• There is an opportunity if specified in a rating system</li> </ul>	<b>CONCERN ABOUT DEMAND</b>



<p>So, I want somebody else to do it first. (WR-D/O:246-255) Q.11b Yeah, of course. (WR-D/O:271)</p>	
<p>Q.11a I think I would if it meets the specs and standard that we want. Some developers refuse to use them because they believe that these materials are low in quality... Certain components like wooden products, broken tiles can actually be reused. We just have to be creative in how to reuse them. It may actually cost us a little bit more to actually get it, dismantle it, cut it to the required size... but I would love to use it (CN-D/O:217-222) Q.11b I think there is a huge potential in that sector. In Malaysia, we just don't have access to it. There is no place where we can go and get recycled construction materials. I believe our contractors never salvage any components when they hack down buildings. We've tried to move around and look for it but we can't find it. (CN-D/O:210-213)</p>	<ul style="list-style-type: none"> <li>• Would encourage designers to specify if they meet the specification and standard requirements</li> <li>• Some developers perceive them to be low in quality</li> <li>• Want designers to be creative to reuse finishes materials as interior décor</li> <li>• The opportunity is there</li> <li>• Recycled materials are unavailable</li> <li>• Believe that contractors never salvage any components during demolition/renovation</li> </ul>
TEXT	CODE (INDIVIDUAL)
FACILITY MANAGER:	
<p>Q.11b Yes...People recycle scrap metals, roof tiles...those are recyclable but we seldom reuse them straightaway to new buildings. (NM-FM:102-103)</p>	<ul style="list-style-type: none"> <li>• The opportunity is there</li> <li>• Recycled steel are available</li> <li>• Reusing salvaged materials to new buildings is rarely practiced</li> </ul>
<p>Q.11b If you are talking about construction materials, a bit difficult in this point of time because we don't use so much steel and wood as compared to the West... In Malaysia, our most commonly used material is concrete. It is not easy to recycle concrete at this point of time. That's why I am fully agree with GBI Malaysia to cut down the rating for recycling materials but I heard that there is one country</p>	<ul style="list-style-type: none"> <li>• Possible but difficult</li> <li>• Concrete is the most commonly used material but currently difficult to be recycled – lack of technical know-how</li> <li>• Little opportunity</li> </ul>

<ul style="list-style-type: none"> <li>• Interior designers should play an important role</li> <li>• Designers are responsible to specify these materials as part of interior décor/finishes</li> <li>• Want designers to be creative to reuse finishes materials as interior décor</li> </ul>	<p><b>CONCERN ABOUT KEY PLAYER</b></p>
CODE (GROUPED)	CATEGORY
<ul style="list-style-type: none"> <li>• The opportunity is there (7x)</li> <li>• The opportunity is there. Local universities are undergoing related research</li> <li>• There is a possible opportunity</li> <li>• Opportunity is there because people are realized the amount of construction wastes</li> <li>• Opportunity is there especially for steel but not timber</li> </ul>	<p><b>YES (11x)</b></p>

<i>which able to recycle concrete. I will be going to that country to see how it is done. (OCL-FM:197-203)</i>	
<i>Q.11b Reusing materials from demolished building to new project or recycling building waste to produce new products are not being practiced for government buildings. So I think, the opportunity for these materials might come in 5-10 years time. (KCD-FM:78-80)</i>	<ul style="list-style-type: none"> <li>• The opportunity might come in 5-10 years time</li> <li>• Government buildings never use them</li> </ul>
<i>Q.11a No because I've never come across or experienced using these materials. Q.11b I am not sure. (ZS-FM:101-107)</i>	<ul style="list-style-type: none"> <li>• Not familiar with &amp; have no experience in using them</li> <li>• Not sure whether the opportunity is there or not</li> </ul>
<b>TEXT</b>	<b>CODE (INDIVIDUAL)</b>
<b>REGULATOR, POLICY MAKER &amp; GOVERNMENT PROJECT IMPLEMENTOR</b>	
<i>Q.11a Yes, I would encourage mainly to reduce the amount of waste going to the landfill. Q.11b Yes, why not? I don't think it is very widespread now...There are local universities which undergo research and testing on recycled materials. (CPK-PI:155-161)</i>	<ul style="list-style-type: none"> <li>• Would encourage the industry to reduce the amount of waste</li> <li>• Not widely used/available</li> <li>• The opportunity is there. Local universities are undergoing related research</li> </ul>
<i>Q.11a Encourage? Of course...I suppose that is one way preventing the waste going to the environment. But depends whether such materials are readily easily available. And then whether their costs are competitive... So these things do not attract people unless you say "use!" force them to use it. Q.11b Opportunity will only come with a regulation. I don't think our builders will voluntarily use them. (KSK-PM:93-103)</i>	<ul style="list-style-type: none"> <li>• Would encourage the industry if they are readily and easily available; and cost effective</li> <li>• Opportunity will only come with a regulation because people won't use them voluntarily</li> </ul>
<i>Q.11a But we are only encouraging the industry to use</i>	<ul style="list-style-type: none"> <li>• Would encourage the industry if they</li> </ul>

<ul style="list-style-type: none"> <li>• There is an opportunity if specified in a <u>rating system</u></li> <li>• Opportunity will only come with a <u>regulation</u> because people won't use them voluntarily</li> <li>• Opportunity is there if there are <u>laws and penalties</u></li> <li>• Opportunity is there if they are introduced, <u>regulated</u> and encouraged</li> <li>• The opportunity is there if <u>commercially viable</u></li> <li>• The opportunity is there if they are <u>cost effective</u></li> <li>• Opportunity will come when people are <u>environmentally conscious</u> and willing to pay or when it is <u>less expensive</u></li> <li>• Opportunity is there if people develop the <u>habit of recycling</u></li> <li>• The opportunity will come in the future</li> <li>• The opportunity might come in 5-10 years time</li> </ul>	<b>YES, WHEN CERTAIN CONDITIONS ARE MET IN THE FUTURE (10x)</b>
<ul style="list-style-type: none"> <li>• No opportunity</li> </ul>	<b>LITTLE OR NO</b>

<p><i>these materials, we are not imposing. These materials are not easily found in Putrajaya because Putrajaya is a new city. So there is no building being demolished for materials to be salvaged and reused for new buildings. Even if these materials can be brought from outside Putrajaya, they are more expensive especially the recycled ones.</i></p> <p><i>Q.11b Yes, when people are willing to pay or when these materials become less expensive in the future. (AMN-R/PM:68-76)</i></p>	<p>are readily and easily available; and cost effective</p> <ul style="list-style-type: none"> <li>• Opportunity will come when people are environmentally conscious and willing to pay or when it is less expensive</li> </ul>	<ul style="list-style-type: none"> <li>• Little opportunity</li> <li>• Little opportunity because important business players always prefer new materials</li> <li>• Little opportunity because they are not appreciated</li> <li>• Little opportunity because lack of client demand</li> <li>• Possible but difficult</li> <li>• Difficult to widespread but not impossible</li> </ul>	<p><b>OPPORTUNITY (7x)</b></p>
<p><i>Q.11a We've tried to do that but it is not happening in the city where our resources are quite cheap...The best way is to get people to recycle their buildings (conservation/adaptive reuse projects). And we receive a lot of applications to upgrade their buildings rather than knocked them off and build new ones, which is good. So facade materials are taken off because of the wear and tear. So we understand if they don't want to recycle... Inside the building is always kept intact except the finishes and the partitioning...They retain the existing structure and reclad everything. (NN-R/PM:127-138)</i></p> <p><i>Q.11b I would think so. People have started to realize that we are actually throwing a lot of garbage from the building construction sites. But right now, we are still in dilemma where people in Malaysia love to renovate. On the first day they get their CF [Certificate of Fitness], all tiles and the toilet fittings will be gone. They just leave the structures and start rebuilding their units again. DBKL is doing something about it. We are going to allow people to submit only for basic without the finishes. We allow people to buy skeletal buildings. So they will get CF without finishes, we will give them a 6 month TCF [Temporary Certificate of Fitness]. Within the next 6 months, the individual owner</i></p>	<ul style="list-style-type: none"> <li>• Tried to encourage the industry but unsuccessful because resources are quite cheap</li> </ul> <p>Actions taken:</p> <ul style="list-style-type: none"> <li>• DBKL has encouraged owners to reuse existing structures for new projects</li> <li>• Designers will be allowed to submit their skeletal building (without finishes, fittings &amp; fixtures) for building approval</li> <li>• Buyers/owners will be given a 6-month TCF to put in their own selection of tiles, fittings &amp; fixtures</li> <li>• Opportunity is there because people are realized the amount of construction wastes</li> </ul>		

<p>can put in their own selection of tiles, fittings, fixtures an so on and do whatever they want to do. And actually you get positive response from the owners. They spend zero for demolition and we will get less wastage. And the construction industry will get moving faster. (NN-R/PM:142-153)</p>	
<p>Q.11a I would encourage but that [use of salvaged or used or recycled materials] is rarely practised and I don't think it's taking place here because clients always want new materials for their buildings. Q.11b I think it should be in the future, but not at the moment...(MCA-PM:79-84)</p>	<ul style="list-style-type: none"> <li>• Would encourage but rarely practised because clients always prefer new materials</li> <li>• The opportunity will come in the future</li> </ul>
<p>Q.11a Use of recycled and recyclable materials reduces to some extent the depletion of natural resources &amp; contributes to overall sustainability. Such initiatives have positive impact on the potential future price escalation of the materials concerned as well as reducing the need for landfill &amp; waste disposal needs. Q.11b Yes, there is but it is on a rather limited basis due to the "culture" of "newness" amongst the most important business players involved, especially from an image perspective (&amp; also Feng Shui &amp; its Indian version of Vastu Shastra). (GL-PM:105-116)</p>	<ul style="list-style-type: none"> <li>• Would encourage the industry for environmental &amp; economic reasons</li> <li>• Little opportunity because important business players always prefer new materials</li> </ul>

<ul style="list-style-type: none"> <li>• Not sure whether the opportunity is there or not (2x)</li> </ul>	<p><b>NOT SURE (2X)</b></p>

**Q.12 Have you heard of eco or health preferable products/materials? Q.12a Would you specify them in your office building projects? Why? Q.12b Do you think that this product is widely available and easily recognizable?**

TEXT	CODE (INDIVIDUAL)
<b>ARCHITECT:</b>	
Q.12a Yes, if their price are reasonable. Usually they are slightly more expensive. So these products should start to be used in government projects. Q.12b Not widely available...Some products have their green labels, but how far they can be trusted we won't know. (KK-A:87-92)	<ul style="list-style-type: none"> <li>• Would specify if cost is attractive-most of the time they are expensive</li> <li>• Not widely available</li> <li>• Some are recognizable – with green labels</li> <li>• Government buildings should start first</li> </ul>
Q.12a I would if the cost is attractive. Most of the time the eco product is more expensive, because of not so much on the quality of the materials but because of the branding. So it is a false value. Q.12b Yes. It is available in the market...(WS-A:88-92)	<ul style="list-style-type: none"> <li>• Would specify if cost is attractive-most of the time expensive</li> <li>• Available</li> </ul>
Q.12a I would but our Malaysian business people and the public are not educated enough...so there is a lack of awareness. Q.12b It is available... (CSA-A:125-131)	<ul style="list-style-type: none"> <li>• Would specify if clients are aware enough to demand</li> <li>• Available</li> </ul>
Q.12a We are very far behind on that. I would specify but there is no green labelling in Malaysia. So we are trying to study on how to do that. Q.12b Not at all. (TLM-A:122-128)	<ul style="list-style-type: none"> <li>• Would specify but they have no green labels</li> <li>• Not widely available</li> <li>• Not easily recognizable</li> </ul>
Q.12b These products are easily recognizable but not widely available in the local market. They have to be imported. (KY-A:103-104)	<ul style="list-style-type: none"> <li>• Would specify</li> <li>• Easily recognizable</li> <li>• Not widely available</li> </ul>

CODE (GROUPED)	CATEGORY
<b>From all 30 interviewees</b>	
<p><b>All architects</b></p> <ul style="list-style-type: none"> <li>• Would specify if cost is attractive-most of the time they are expensive (2x)</li> <li>• Would specify but they are not recognizable (2x)</li> <li>• Would specify if clients are aware enough to demand</li> <li>• Would specify but they have no green labels</li> <li>• Would specify</li> <li>• Would specify eco-timber</li> </ul> <p><b>All builders</b></p> <ul style="list-style-type: none"> <li>• Have not used them before but would give the support (2x)</li> <li>• More relevant to renovation projects where occupants are in the building. Rarely used in new building projects because contaminants are flushed out with fresh air before occupancy</li> </ul> <p><b>All developers</b></p> <ul style="list-style-type: none"> <li>• Specified to be used</li> <li>• Have used eco products because it</li> </ul>	<p><b>WOULD SPECIFY/USE THEM (PRIVATE SECTOR except facility managers)</b></p>

	<ul style="list-style-type: none"> <li>• Most are imported</li> </ul>	<p>has been driven by the owner's top management personnel</p> <ul style="list-style-type: none"> <li>• Would encourage designers to specify if ready to pay extra. Only international tenant-landlords would go for it.</li> <li>• Would encourage designers to specify if easily available, economical &amp; high in performance</li> <li>• Would encourage designers to specify if they have good local track record &amp; the cost does not exceed 30% than conventional products</li> </ul>	
<p><i>Q.12b I think if the government says all projects must have this rating, not make mandatory but all government buildings must be rated... The concept of organic came to me when I was in Australia. But when you come here, you don't have it. But now you get it at the supermarket. How organic it is...needs certain verification. Not as expensive as it used to be and not as inaccessible as it used to be. Same goes to building materials. Just give it another 5-7 years....You need an institution to be able to give you the green label. We just don't have that yet. Unless SIRIM has its own department that would do that, then they have to work a little bit faster. So you don't have those so you have to setting it up. 7 years from now you will have at least 30% of the market available on our materials. (SH-A:173-187)</i></p>	<ul style="list-style-type: none"> <li>• Would specify but they are not recognizable</li> <li>• Government buildings should start first</li> <li>• Not as expensive and inaccessible as it used to be</li> <li>• May be in great demand in 5-7 years</li> <li>• No credible independent body to verify &amp; certify eco products</li> </ul>		
<p>[Answers not relevant] (SA-A)</p>	<ul style="list-style-type: none"> <li>•</li> </ul>	<ul style="list-style-type: none"> <li>• Would encourage the industry to use but not within their control to enforce (2x)</li> <li>• Would encourage the industry to use if they serve the purpose</li> <li>• Would encourage the industry but they are not clearly labelled</li> <li>• Would encourage the industry to use but only the effluent ones would be willing to pay</li> <li>• Would encourage the industry to use but only the knowledgeable and effluent would be aware &amp; willing to pay</li> </ul>	<p><b>WOULD ENCOURAGE THE INDUSTRY TO USE THEM (PUBLIC SECTOR)</b></p>
<p><i>Q.12b Not easily recognizable and not widely available in Malaysia yet. But they are beginning to come in. Clients nowadays are more sensitive because of health problems... Not necessary more expensive. It depends on where they come from. But they still have to be imported... Labelling is another thing because there is no green labelling yet in Malaysia. Secondly because these products must include all the material specs. But currently certain materials which are sold off the shelves from the hardware shops are not furnished with all these details. (LCH-A:186-196)</i></p>	<ul style="list-style-type: none"> <li>• Would specify but they are not recognizable</li> <li>• Not widely available</li> <li>• Not easily recognizable</li> <li>• No green labelling</li> <li>• Not necessarily more expensive</li> <li>• Most are imported</li> </ul>		
<p><i>Q.12a ...I agree with the philosophy of eco-timber. Because of that I have no problem specifying timber in all of my projects... Q.12b I don't think so because there are no proper green</i></p>	<ul style="list-style-type: none"> <li>• Would specify eco-timber</li> <li>• Not widely available</li> <li>• Not easily recognizable</li> </ul>		

<p>labels. Like plastics by-products, polymers of plastic material, PVCs, local authorities should rethink about the impacts of these materials to the environment. Don't just restrict legislations. Start recognizing natural materials like clay. Water pipes with lead, copper pipes for hot water – those are unhealthy. (NB-A:123-131)</p>	<ul style="list-style-type: none"> <li>No green labelling</li> <li>Want local authorities to be more proactive in recognizing eco &amp; health preferable products</li> </ul>
TEXT	CODE (INDIVIDUAL)
ENGINEER & ENVIRONMENTAL CONSULTANT:	
<p>Q.12b No. In GBI, we want sustainable timber, then who to look for? We might want to adopt what Singapore approves or what other countries approve for the time being until we set up a voluntary body to start doing that. These materials are not readily available in Malaysia but beginning to. Like none-VOC paint. Now Singapore is marketing that. If we demand for it, the manufactures can bring it in. We don't demand for it, they won't.... Malaysian timber is extensively exported. They [imported countries] also have to get all this approval [eco-timber certification]. I think we can get it. I believe so because we are exporting. We have to give eco-timber because other countries force us to, which is good. (CTL-ME:320-329)</p>	<ul style="list-style-type: none"> <li>Not readily available</li> <li>Not easily recognizable</li> <li>No credible independent body to verify &amp; certify eco products</li> <li>Locals have to use eco products approved by other countries</li> <li>Lack of local demand &amp; marketing</li> <li>Malaysia is exporting eco timber to fulfil foreign countries' requirement</li> </ul>
<p>Q.12b It's hard to see those around maybe because they have no label as green products. I think to be fair; we should have a marking or rating star system to accredit these products... Later when we have products which are classified in terms of their eco friendliness, we can slowly tighten the screw to enforce it. Something is better than nothing. (NYK-ME:163-168)</p>	<ul style="list-style-type: none"> <li>Not widely available</li> <li>Not easily recognizable</li> <li>No green labelling</li> <li>No credible independent body to verify &amp; certify eco products</li> </ul>
<p>Q.12 Yes, like timber certified by FSC [Forest Stewardship Council] or MTCC [Malaysian Timber Certification Council]. Q.12b It is not widely used yet, but surprisingly there are</p>	<ul style="list-style-type: none"> <li>Familiar with Malaysian eco timber certified by MTCC</li> <li>Eco timber is not widely used in local</li> </ul>

CODE (GROUPED)	CATEGORY
<p><b>Not widely available (14x)</b></p> <ul style="list-style-type: none"> <li>Not widely available (8x)</li> <li>Not readily available (2x)</li> <li>Not widely available esp. eco timber (2x)</li> <li>Not widely available because the market has yet to develop</li> <li>Would encourage designers to specify if easily available, economical &amp; high in performance</li> </ul> <p><b>Available but imported (3x)</b></p> <ul style="list-style-type: none"> <li>Most are imported (2x)</li> <li>Available locally but imported</li> </ul> <p><b>Available (9x)</b></p> <ul style="list-style-type: none"> <li>Available (3x)</li> <li>Widely available (2x)</li> <li>Eco-paint products is widely available &amp; easily recognizable</li> <li>Eco-timber and low VOC products are available locally</li> <li>Malaysia is exporting eco timber to</li> </ul>	<p><b>CONCERN ABOUT AVAILABILITY (28x)</b></p>

<p>about 60 companies that are manufacturing timber products using wood certified by MTCC in Malaysia. It's not widely known but like I said it is the public awareness. The FSC requirements and our MTCC's requirements are different. They all have their own rating system as well. The local one does not look into the social aspects of felling trees, displacement of the orang asli [indigenous], they don't counter that at all whereas FSC does. So when we talk about sustainability, I think FSC is far ahead in that sense. They are available but not easily recognizable or not recognized by people. I think Malaysian people don't even know there is a labelling scheme for equipments, let alone timber. (CKT-CE:186-200)</p>	<p>construction industry due to lack of awareness</p> <ul style="list-style-type: none"> <li>• MTCC's certification or MTCS's (Malaysian Timber Certification Scheme) requirements doesn't cover social criteria</li> </ul>
TEXT	CODE (INDIVIDUAL)
BUILDER & BUILDER-DEVELOPER:	
<p>Q.12 No Q.12b Yes. I believe there are eco and healthy paint products now. (SA-B/D:101)</p>	<ul style="list-style-type: none"> <li>• Have not used them before</li> <li>• Eco-paint products is widely available &amp; easily recognizable</li> </ul>
<p>Q.12b It may be available but not recognized. The reason is simple...because it is expensive. Probably, Malaysians in particular, I don't think they are keen for that. What they keen is this...anything that comes from China which is cheaper, make use of it. I strongly support that everything must be eco-friendly because at the end of the day it improves our health... It is not recognizable because there is no proper labelling. Another thing is that they are not being promoted in the right perspective. For instance, when the government agency sees these eco-products been used, the government should give incentives to the people. Your submission fees, your processing fees...we will give you 50% discount, that kind of thing. Then everybody will</p>	<ul style="list-style-type: none"> <li>• Have not used them before but would give the support</li> <li>• May be available</li> <li>• Not recognized</li> <li>• Normally expensive</li> <li>• No green labelling</li> <li>• No right promotion done by the government e.g. incentives</li> </ul>

<p>fulfil foreign countries' requirement</p> <ul style="list-style-type: none"> <li>• May be available</li> </ul> <p><b>Not sure (2x)</b></p> <ul style="list-style-type: none"> <li>• Not sure of its availability (2x)</li> </ul>	
CODE (GROUPED)	CATEGORY
<ul style="list-style-type: none"> <li>• Would specify if clients are aware enough to demand</li> <li>• May be in great demand in 5-7 years</li> <li>• Lack of local demand &amp; marketing</li> <li>• Only international tenant-landlord would go for it</li> <li>• Only the big multinational companies would go for it</li> <li>• More difficult to be specified unless requested by clients</li> <li>• Ignorant owners wouldn't recognized unless informed by consultants</li> <li>• Landlord do not consider it as a priority</li> </ul>	<p><b>CONCERN ABOUT AWARENESS &amp; DEMAND (14x)</b></p>



<p><i>go for it. There is nobody really coming forward to promote this. I think it is about time the government should play a role in this matter. (JD-B:199-212)</i></p>	
<p><i>Q.12b They are not widely available because these eco products are carrying heavier premium. Just like the Nippon paint which is the most expensive on the shelves. This kind of products is a bit difficult to be used unless clients request them to be specified. For projects it is difficult to implement because after having the building painted, there is a certain period of time aimed to flush out the building with fresh air for gases to escape and the building won't be occupied so soon. Unless renovation projects where the occupants are there in the building or they move in much quicker than new building project. Renovation projects might go for health preferable products. Usually most of the buildings which are completed on time have 2 months before the tenants come in. That is also the time for testing and commissioning (TYT-B:153-164)</i></p>	<ul style="list-style-type: none"> <li>• Not widely available because they are expensive</li> <li>• More difficult to be specified unless requested by clients</li> <li>• Rarely used in new building projects because contaminants are flushed out with fresh air before occupancy</li> <li>• More relevant to renovation projects where occupants are in the building</li> </ul>
TEXT	CODE (INDIVIDUAL)
DEVELOPER, OWNER & DEVELOPER-OWNER:	
<p><i>Q.12a We have specified this kind of products to be used in our projects. Q.12b No, I can't actually identify them. (NA-D:76-79)</i></p>	<ul style="list-style-type: none"> <li>• Specified to be used</li> <li>• Available</li> <li>• Not easily recognizable</li> </ul>
<p><i>Q.12a Yes. Normally, the internal decoration are specified by the tenants, unless the tenants are the landlord, then their requirements are agreed as part as the deal. International companies normally are quite particular with finishes. They want the durable ones even the imported ones. Sometimes they like the eco ones. But I think in</i></p>	<ul style="list-style-type: none"> <li>• Would encourage designers to specify if ready to pay extra. Only international tenant-landlord would go for it.</li> <li>• Would encourage designers to specify if ready to pay extra</li> </ul>

<ul style="list-style-type: none"> <li>• Not widely available because lack of awareness to demand</li> <li>• Have used eco products because it has been driven by the owner's top management personnel</li> <li>• Eco timber is not widely used in local construction industry due to lack of awareness</li> <li>• Not preferred due to lack of awareness</li> <li>• Lack of public awareness on the availability (2x)</li> </ul>	
CODE (GROUPED)	CATEGORY
<p><b><u>Not easily recognizable (25x)</u></b></p> <ul style="list-style-type: none"> <li>• Not easily recognizable (8x)</li> <li>• No credible independent body to verify &amp; certify eco products (5x)</li> <li>• No green labelling (4x)</li> <li>• Not easily recognizable because they have no clear labelling (3x)</li> <li>• Health preferable products are not easily recognizable because they</li> </ul>	<p><b>CONCERN ABOUT RECOGNIZABILITY (LABELLING) (29x)</b></p>

<p><i>Malaysia we don't aware about it. If I were given a choice, obviously I would choose that eco-materials but then I would have to be ready to pay extra cost.</i>  <i>Q.12b In Malaysia, not yet until they are prepared to pay for it. Mainly the tenants. For the landlords, they would be prepared to pay the rental provided that we give them the features that they want. But normally, landlords wouldn't put that as their priority. (MM-D:179-189)</i></p>	<ul style="list-style-type: none"> <li>• Not readily available</li> <li>• Most tenants &amp; landlords are not prepared to pay extra</li> <li>• Landlord do not consider it as a priority</li> </ul>	<p>have no clear labelling</p> <ul style="list-style-type: none"> <li>• Would specify but they have no green labels</li> <li>• Not recognized</li> <li>• Locals have to use eco products approved by other countries</li> <li>• Suggests for SIRIM to certify these products</li> </ul> <p><b><u>Some are recognizable (4x)</u></b></p> <ul style="list-style-type: none"> <li>• Familiar with Malaysian eco timber certified by MTCC</li> <li>• MTCC's certification or MTCS's (Malaysian Timber Certification Scheme) requirements doesn't cover social criteria</li> <li>• Some are recognizable – with green labels</li> <li>• Easily recognizable</li> </ul>	
<p><i>Q.12a YES if they are easily available, economical to use and perform as it was intended for the purpose...</i>  <i>Q.12b Public awareness on the availability of these products are lacking in the local market as there are not enough information by the manufacturers to promote their use. Currently, most eco-friendly products cost more than conventional items. (BTC-D:100-106)</i></p>	<ul style="list-style-type: none"> <li>• Would encourage designers to specify if easily available, economical &amp; high in performance</li> <li>• Lack of public awareness on the availability</li> <li>• Lack of promotion by manufacturers</li> <li>• Normally expensive</li> </ul>		
<p><i>Q.12a If I found a building material that can even emit oxygen after apply it... to that extent...I want to know who is that applicator, and how is the track record, and the supplier, I will check their account. Is the supplier trustworthy as far as the financial is concern? Has the material been applied in local buildings? Sometimes you have good products, but the supplier's account statement is a bit dodgy, I wouldn't go for it, because as the owner, I am making a commercial decision...Consultants can promote that this product is good, but as the owner, you just cannot consider like that because there's a lot of things to consider.</i></p>	<ul style="list-style-type: none"> <li>• Would encourage designers to specify if they have good local track record &amp; the cost does not exceed 30% than conventional products</li> <li>• Not widely available</li> <li>• Ignorant owners wouldn't recognized unless informed by consultants</li> </ul>	<p><b><u>More expensive (11x)</u></b></p> <ul style="list-style-type: none"> <li>• Would specify if cost is attractive-most of the time they are expensive (2x)</li> <li>• Normally expensive (2x)</li> <li>• Most tenants &amp; landlords are not prepared to pay extra</li> <li>• Not widely available because they are expensive</li> <li>• Would encourage designers to</li> </ul>	<p><b>CONCERN ABOUT COST (13x)</b></p>

<p><i>I would definitely use them if they have been widely applied locally. But it has to be cheap. In my opinion, up to more than 30%...it's okay. I can consider. Because, as the owner you'll look at the [economic] bottom line, you don't look at the specific product. For example, if I need to spend 30% more to use eco products and I can then claim and market to the foreign tenants that my building is green, because the trend now foreigners are going for green, then they can save the energy, maintenance and operation bills, then I'm okay because the bottom line is more or less is the same [the economic benefits]. (WR-D/O-286-300)</i></p> <p><i>Q.12b No, I don't think so. Unless the consultants tell me, then I would know... We have to be a learned owner. I mean if you are not a learned owner, if the consultants didn't say a word, then you wouldn't know. (WR-D/O-323-327)</i></p>	
<p><i>Q.12b We used Jotun paint and carpets with has low VOC content which cost us a little bit more. But we get a better product. It has to be driven from the top [building owner]. If you leave it to just the project managers, it won't happen... If you've left it to the QS or architects, they would come up with something different because they are looking at the cost... In our country, the certification process is not there. They are available locally but they are imported... We may be supplying paint, but why can't we just supply eco-paint, or eco-timber? Get them certified as green or coming from sustainable sources or something... Based on the feedback that we've got, we believe [that] there are people who are very conscious in green philosophies. These are usually the big multinational companies. (CN-D/O:232-255)</i></p>	<ul style="list-style-type: none"> <li>• Have used eco products because it has been driven by the owner's top management personnel</li> <li>• No credible independent body to verify &amp; certify eco products</li> <li>• Available locally but imported</li> <li>• Only the big multinational companies would go for it</li> </ul>
<p><b>TEXT</b></p>	<p><b>CODE (INDIVIDUAL)</b></p>

<p>specify if easily available, economical &amp; high in performance</p> <ul style="list-style-type: none"> <li>• Would encourage designers to specify if ready to pay extra</li> <li>• Would encourage designers to specify if they have good local track record &amp; the cost does not exceed 30% than conventional products</li> <li>• Would encourage the industry to use but only the effluent ones would be willing to pay</li> <li>• Would encourage the industry to use but only the knowledgeable and effluent would be aware &amp; willing to pay</li> </ul> <p><b>Not necessarily more expensive (2x)</b></p> <ul style="list-style-type: none"> <li>• Not as expensive and inaccessible as it used to be</li> <li>• Not necessarily more expensive</li> </ul>	
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<b>FACILITY MANAGER:</b>	
<p>Q.12b I think they are widely available at local market. We have actually eco timber right now. Materials with low VOC are there. In fact we have 2 or 3 companies in Malaysia who do the wood panelling and they are talking about eco features inside there and they are labelled as such... I saw the label says "eco timber production". (OCL-FM:210-215)</p>	<ul style="list-style-type: none"> <li>• Widely available</li> <li>• Eco-timber and low VOC products are available locally</li> </ul>
<p>Q.12b It is available but not easily recognizable. The main problem in Malaysia is that we have no awareness to prefer for these products. (KCD-FM:86-87)</p>	<ul style="list-style-type: none"> <li>• Widely available</li> <li>• Not easily recognizable</li> <li>• Not preferred due to lack of awareness</li> </ul>
<p>Q.12b I am not sure. Normally we specify good quality paint with certain standard even though they are expensive. (ZS-FM:113-114)</p>	<ul style="list-style-type: none"> <li>• Not sure of its availability</li> <li>• Just specify good quality products even though expensive</li> </ul>
<b>TEXT</b>	<b>CODE (INDIVIDUAL)</b>
<b>REGULATOR, POLICY MAKER &amp; GOVERNMENT PROJECT IMPLEMENTOR</b>	
<p>Q.12b As far as I am concerned, we don't have any eco-timber in Malaysia...About the non-toxic or products with low or zero VOC, I don't think the public knows about these products because they have no labelling clearly state this quality. They are not widely available in the market. (CPK-PI:170-173)</p>	<ul style="list-style-type: none"> <li>• Would encourage the industry but they are not clearly labelled</li> <li>• Not widely available esp. eco timber</li> <li>• Health preferable products are not easily recognizable because they have no clear labelling</li> </ul>
<p>Q.12a Yes. But I think these materials are more for upper strata kind of people who really know about it and willing to pay for it. Maybe about 10-15% of people...</p> <p>Q.12b That is one thing. And then people don't promote it also you see. The cost becomes the factor again. People don't know because there are no labels so people can be conned into it. No authority also to certify that the products</p>	<ul style="list-style-type: none"> <li>• Would encourage the industry to use but only the affluent ones would be willing to pay</li> <li>• Lack of public awareness on the availability</li> <li>• Lack of promotion</li> <li>• Not easily recognizable because they</li> </ul>

<i>are actually eco or healthy. (KSK-PM:108-115)</i>	<ul style="list-style-type: none"> <li>• have no clear labelling</li> <li>• No credible independent body to verify &amp; certify eco products</li> </ul>
<p><i>Q.12a Yes, but that is not within our control as a local authority.</i></p> <p><i>Q.12b No. There is a lack of promotion to use these products. People can't easily recognize these products because there is no label explaining their aspects of environmentally friendly. (AMN-R/PM:81-85)</i></p>	<ul style="list-style-type: none"> <li>• Would encourage the industry to use but not within their control to enforce</li> <li>• Lack of promotion</li> <li>• Not easily recognizable because they have no clear labelling</li> </ul>
<p><i>Q.12a Yes, but that one is not under DBKL's scope of work. That would be the developers'.</i></p> <p><i>Q.12b Not actually. Not yet. But people are beginning to realize it, since the China melamine chaos... But when people start to be aware of this kind of materials [health preferable products/materials] and the benefit of them, they will start to demand the local manufacturers to produce. I think SIRIM would need to do a lot of this control. They've got MS [Malaysian Standard] for a lot of things. I think later, they will start looking into these materials. (NN-R/PM:168-179)</i></p>	<ul style="list-style-type: none"> <li>• Would encourage the industry to use but not within their control to enforce</li> <li>• Not widely available because lack of awareness to demand</li> <li>• Not easily recognizable</li> <li>• Suggests for SIRIM to certify these products</li> </ul>
<p><i>Q.12a Yes but again it is always related to cost. Those materials are mostly expensive... For the knowledgeable people who know about these materials and afford to pay, they may request, but for normal people, not many aware and willing to pay for it.</i></p> <p><i>Q.12b That one, I'm not so sure. But I don't think so, maybe because there is no 'green' label or printed indication that declares the products are green or eco-friendly that could easily be recognizable. (MCA-PM:91-101)</i></p>	<ul style="list-style-type: none"> <li>• Would encourage the industry to use but only the knowledgeable and affluent would be aware &amp; willing to pay</li> <li>• Not sure of its availability</li> <li>• Not easily recognizable because they have no clear labelling</li> </ul>
<p><i>Q.12a Yes. If eco &amp; health preferable products serve the</i></p>	<ul style="list-style-type: none"> <li>• Would encourage the industry to use</li> </ul>

<p><i>purpose that needs to be fulfilled, why not use them?</i></p> <p><i>Q.12b Such products are not widely available in Malaysia because the market has yet to develop. The particular “fanatic” NGOs &amp; a few concerned individuals &amp; groups are nevertheless fighting a sterling battle to widen the discerning population. (GL-PM:121-128)</i></p>	<p>if they serve the purpose</p> <ul style="list-style-type: none"><li>• Not widely available because the market has yet to develop</li></ul>
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**Q.13 How is reduction of waste from building considered in your design? OR Q.13 How is reduction of waste from building construction considered?**

TEXT	CODE (INDIVIDUAL)
<b>ARCHITECT:</b>	
<i>I sometimes go for modular or IBS [Industrialised Building System]. (KK-A:95)</i>	<ul style="list-style-type: none"> <li>• Use modular approach or Industrialised Building System</li> </ul>
<i>We consider in terms of size of components. It is not necessarily modular. We specify the sizes based on the available sizes, I mean the manufacturer's sizes. (WS-A:95-96)</i>	<ul style="list-style-type: none"> <li>• Specify based on manufacturer's standard sizes but not necessarily in modular</li> </ul>
<i>...for most of the clients we have, we give them the options to go for Industrialized Building System (IBS). What we do is, when we do the initial design, we don't really think IBS into consideration yet... when we are moving from the concept into the production drawings and the design development...that's when we start to look at it. That is when we say, "Okay, can we use IBS components inside this building or not?"... the waste generation was huge when we used the old system. Especially when we are talking about plywood formwork – easily generated a few hundred thousand dollars of rubbish and it caused a lot of work and money to dispose that rubbish. I think this is something which a lot of contractors in Malaysia don't realize...(CSA-A:146-157)</i>	<ul style="list-style-type: none"> <li>• Consider the use of IBS at the later stage of design process- aware that the conventional system causes a lot of work, wastage &amp; money</li> </ul>
<i>So our current legislation encourages a lot of wastage and no recycling. That is something that needs to be addressed. Like in China, developing countries like Vietnam as well, they don't have floor finishes, sometimes no wall finishes. They hand-over the building just like that. So when the buyers come in, they don't have to hack the floor because it is empty. So they buy their own marble,</i>	<ul style="list-style-type: none"> <li>• Current legislation encourages a lot of wastage and no recycling</li> <li>• Support the idea of designing and handing-over buildings without finishes, fixtures &amp; fittings</li> <li>• Prefer modular approach than IBS</li> </ul>

CODE (GROUPED)	CATEGORY
<b>From designers &amp; contractors</b>	
<ul style="list-style-type: none"> <li>• Use modular approach or Industrialised Building System</li> <li>• Specify based on manufacturer's standard sizes but not necessarily in modular</li> <li>• Consider the use of IBS at the later stage of design process- aware that the conventional system causes a lot of work, wastage &amp; money</li> <li>• Prefer modular approach than IBS because of its pitfalls</li> <li>• Incorporate IBS at the beginning of design stage</li> <li>• Aware that the use of 70% IBS components in government buildings has been made mandatory</li> <li>• Use standardized and prefabricated building components and modular system</li> <li>• Doesn't fully support IBS because of its pitfalls</li> <li>• Aware that the use of 70% IBS components in government buildings has been made mandatory</li> <li>• Design using Modular Coordination</li> </ul>	<b>INDUSTRIALISED BUILDING SYSTEM (IBS) (15x)</b>

<p><i>their own timber and they put in what they want... Whereas most of our projects we have to put everything finished, the moment you hand-over, within a week, it becomes a construction site. All materials are thrown out. (TLM-A:135-143)</i></p> <p><i>IBS will help. I actually have different view on IBS. I believe in modular approach. That means you use component approach rather than industrialized approach... You need volume to survive... The moment you hit the downturn, factories will shut down. There is nothing to build. Another problem is the heavy lifting. You cannot build the IBS factories all over the place. So, the transportation is very expensive. (TLM-A:150-165)</i></p>	<p>because of its pitfalls</p>	<p>concept – a system of preferred dimensions</p> <ul style="list-style-type: none"> <li>• IBS must comes with expertise</li> <li>• Think about how a building, its components &amp; its output can be reused and recycled at the design stage</li> <li>• Connection between components are mechanically joined for ease of demountability</li> <li>• Connection should be modular to facilitate reuse</li> <li>• IBS is <u>not popular</u> because it is expensive JD</li> </ul>	
<p><i>We need to think about how a building, its components and its output can be reused and recycled at the outset in design before production. This determines the processes, the materials selected and the way in which these are connected to each other and used in the built form. For instance, to facilitate reuse, the connection between components in the built form and in manufactured products needs to be mechanically joined for ease of demountability. The connection should be modular to facilitate reuse in an acceptable condition. (KY-A:106-111)</i></p>	<ul style="list-style-type: none"> <li>• Think about how a building, its components &amp; its output can be reused and recycled at the design stage</li> <li>• Connection between components are mechanically joined for ease of demountability</li> <li>• Connection should be modular to facilitate reuse</li> </ul>	<ul style="list-style-type: none"> <li>• Influence engineers to design for repeatability so that steel formwork can be used instead of wood formwork</li> <li>• Metal formwork can only be afforded by developer-contractor but not small contractors</li> </ul>	<p><b>USE NON-TIMBER FORMWORK (2x)</b></p>
<p><i>...only those going for Green Mark, Green Index, LEED will be doing that. How many percent buildings will be doing that. You have to ask yourself. 5% maybe. (SH-A:195-197)</i></p>	<ul style="list-style-type: none"> <li>• Only those going for green building certification would care</li> </ul>	<ul style="list-style-type: none"> <li>• Only those going for green building certification would care</li> <li>• Promote recycling during construction &amp; occupancy stages in GBI</li> </ul>	<p><b>AWARENESS &amp; PROMOTION (2x)</b></p>
<p><i>IBS has been used in Malaysia for so long. One of the</i></p>	<ul style="list-style-type: none"> <li>• Incorporate IBS at the beginning of</li> </ul>	<ul style="list-style-type: none"> <li>• Current legislation encourages a lot</li> </ul>	<p><b>DEVELOP BASED ON</b></p>



<p>components of IBS is prefab... IBS...you must have the quantities. If you don't have the right quantities it will defeat the purpose because the cost is more than the conventional [construction method]... its cost on transportation becomes expensive... there are not many experts or companies that are able to do this. What we have in the market are all the standard components; when they are just being standard, you only develop barracks. IBS is something that architects have to venture right from day one. Now the government has imposed the use of 70% of IBS components [on government building projects]. They said it is achievable because it is based on cost. (SA-A:195-213)</p>	<p>design stage</p> <ul style="list-style-type: none"> <li>• Aware that the use of 70% IBS components in government buildings has been made mandatory</li> <li>• Doesn't fully support IBS because of its pitfalls</li> </ul>	<p>of wastage and no recycling</p> <ul style="list-style-type: none"> <li>• Support the idea of designing and handing-over buildings without finishes, fixtures &amp; fittings</li> </ul>	<p><b>'CORE &amp; SHELL' CONCEPT (2x)</b></p>
<p>...strategy to reduce wastage is on the project management. The understanding of the sequence of construction activities...If you do not coordinate properly... can cause wastage not only on materials but also on time and resources.</p> <p>Of course anything that is industrialized has an advantage. If you manufacture it offsite and bring in onsite during construction, you save time, wastage and the types of material that are used will be minimized... They have the component type and also the modular type. In terms of the component type, Malaysia has been doing it for long time especially the precast or concrete wall panels, precast slabs, and precast columns, but I think we should take one step further and go into modular system. Modular system means that we have a complete set in the factory. For instance if you have a hostel project, the whole hostel rooms can be built in the factory and brought to the site and assemble them like a Lego set. So in factory you can control everything in terms of your choice of materials,</p>	<ul style="list-style-type: none"> <li>• Proper coordination on the sequence of construction activities</li> <li>• Use standardized and prefabricated building components and modular system</li> </ul>	<ul style="list-style-type: none"> <li>• Proper planning</li> <li>• Proper &amp; efficient construction methodology</li> <li>• Only segregate construction wastes on site</li> <li>• Components/materials (e.g timber, steel bars) in good conditions are not identified to be reused or recycled</li> <li>• Does not know any recycling centre which can accept the segregated wastes (except for steel &amp; glass)</li> <li>• Influence contractors to recycle concrete</li> <li>• Influence contractors to recycle packaging wastes</li> <li>• Not much mechanical engineer could do to reduce solid waste</li> </ul>	<p><b>IMPLEMENT CONSTRUCTION WASTE MANAGEMENT</b></p>

<p>even your quality of fixing, wastage control and minimize onsite works and minimize the intervention on the site and other site's problems. (LCH-A:203-227)</p>	
<p>Now, on government projects, they put the requirements for 70% IBS...we use...CI/SfB coding...a Scandinavian system of classification...and specially designed for the construction sector – where they use datum dimensional 1.2m or 4ft because components materials and structural components have come into dimensions visible by this number, the datum of 1.2 or by-products of 1.2. For example, 300mmx300mm tiles, you can get 4 tiles to get 1.2m. Door - 2.1m height x 900mm width. 900mm is 75% of 1.2m, 2.1m is....things like that. Ceiling board – 1200x600mm or 600x600mm. So in a way, it helps to cut down wastages. You can go for IBS provided that you know how to do it. (NB-A:133-143)</p>	<ul style="list-style-type: none"> <li>• Aware that the use of 70% IBS components in government buildings has been made mandatory</li> <li>• Design using Modular Coordination concept – a system of preferred dimensions</li> <li>• IBS must comes with expertise</li> </ul>
<p><b>TEXT</b></p>	<p><b>CODE (INDIVIDUAL)</b></p>
<p><b>ENGINEER &amp; ENVIRONMENTAL CONSULTANT:</b></p>	
<p>Office building itself, the biggest waste is always water. So we start installing efficient fixtures there. I am not talking about solid waste because there is nothing much we can do. In the GBI [Green Building Index], we have during construction, recycling requirement. Post construction, during occupancy, you also have to show you are recycling things. We are promoting that. (CTL-ME:331-334)</p>	<ul style="list-style-type: none"> <li>• Not much mechanical engineer could do to reduce solid waste</li> <li>• Install waster efficient fixtures</li> <li>• Promote recycling during construction &amp; occupancy stages in GBI</li> </ul>
<p>I use less of outdoor air to reduce the level of CO<sup>2</sup> indoors. The amount of outdoor fresh air that should be supplied to a room depends on the type of facility and room. In office spaces, ASHRAE recommends 15-20 cubic feet per minute per person (cfm/person) [for a 1000 square foot occupied by 5 people) of outdoor air. I go to the barest minimum</p>	<ul style="list-style-type: none"> <li>• Use the minimum level of outdoor air allowed by ASHRAE to ventilate indoor spaces, hence reduce chillers load</li> <li>• Use CO<sup>2</sup> monitoring system to supply fresh air based on demand</li> </ul>

<ul style="list-style-type: none"> <li>• Use the minimum level of outdoor air allowed by ASHRAE to ventilate indoor spaces, hence reduce chillers load</li> <li>• Use CO<sup>2</sup> monitoring system to supply fresh air based on demand</li> </ul>	<p><b>SUPPLY FRESH AIR BASED ON DEMAND</b></p>
<p><b>CODE (GROUPED)</b></p>	<p><b>CATEGORY</b></p>
<ul style="list-style-type: none"> <li>• Install water efficient fixtures</li> </ul>	<p><b>INSTALL WATER EFFICIENT FIXTURES</b></p>

<p><i>allowed by the ASHRAE to about 5. By using that my chillers load will be reduced. When the chillers load is reduced, instead using 1000 tonne chillers, you can use 800 tonne chillers; you already save a lot! How do I control it? I have the sensor to control ventilation based on demand. If the fresh air is insufficient, it will pump more fresh air. That is how I reduce waste. (NYK-ME:177-184)</i></p>	
<p><i>We try to influence our engineers to design things there are repeatable so that we can use steel formwork instead of using wood because the biggest problem in construction base that cannot be recycled is actually wood formwork. Before, they burnt it. Now, they discard it in landfills after using it for 3-4 times depending on how much concrete actually stick onto it. Because all this concrete that stuck on the wood, we can't use it as a biomass... they can crush concrete and reuse it in hard core. The other waste is actually brought in by the contractors like packaging wastes. A lot of these packaging wastes can be recycled, that shouldn't be a problem. (CKT-EC:217-231)</i></p>	<ul style="list-style-type: none"> <li>• Influence engineers to design for repeatability so that steel formwork can be used instead of wood formwork</li> <li>• Influence contractors to recycle concrete</li> <li>• Influence contractors to recycle packaging wastes</li> </ul>
<p><b>TEXT</b></p>	<p><b>CODE (INDIVIDUAL)</b></p>
<p><b>BUILDER &amp; BUILDER-DEVELOPER:</b></p>	
<p><i>Proper and efficient construction methodology. (SA-B/D:103)</i></p>	<ul style="list-style-type: none"> <li>• Proper &amp; efficient construction methodology</li> </ul>
<p><i>Reducing waste during construction is more on planning...formwork, we do it and at the end of the day we can use the IBS stuff. But of course it is expensive. That's the reason why people don't really go for it... Yes, instead of timber we can use metal formwork but it is very expensive. The capital investment is very high. One set may cost you 20-30K. That is for a small job but for the big job it may cost hundreds of thousand. They cannot afford it</i></p>	<ul style="list-style-type: none"> <li>• Proper planning</li> <li>• IBS is not popular because it is expensive</li> <li>• Metal formwork can only be afforded by developer-contractor but not small contractors</li> </ul>

<p><i>and we cannot blame them. But of course, for developer-cum-contractor, I think they should [invest]. I think they do quite fair bid in reducing construction waste because to them it is money. The more construction waste there is, the more money is drained out. Therefore the developers really calculate this. But to small contractors, they don't see the importance of it. They simply want to finish what they have to do. (JD-B/D:214-233)</i></p>	
<p><i>We separate our wastes, for example timber we put it aside. We have not practiced this to our level best. By right we should do more than putting recycle bins and segregating our wastes. Before they even become waste, we should identify those components/materials which are good enough to be reused or recycle. If we can, we would like to implement that on site. Certain steel bars are good enough to be reused, so they should be put aside. When there is a need, we can reuse them. It can be a cost saving for us. Some timber is still in good shape but we dump it anyway. By right when we segregate this type of wastes, it should not go to the landfill. By right, timber should be sent to people producing saw dust, chipboards or something. The problem is that we don't know any centre which receives all these things. Even after segregating all our wastes on site, we are wondering where to send them to recycle them. Steel and glass are quite simple and straightforward to be recycled but the rest I hope they don't simply go to the landfills. (TYT-B:167-178)</i></p>	<ul style="list-style-type: none"> <li>• Only segregate construction wastes on site</li> <li>• Components/materials (e.g timber, steel bars) in good conditions are not identified to be reused or recycled</li> <li>• Does not know any recycling centre which can accept the segregated wastes (except for steel &amp; glass)</li> </ul>
<p><b>TEXT</b></p>	<p><b>CODE (INDIVIDUAL)</b></p>
<p><b>DEVELOPER, OWNER &amp; DEVELOPER-OWNER:</b></p>	
<p>NA</p>	<ul style="list-style-type: none"> <li>•</li> </ul>

<b>TEXT</b>	<b>CODE (INDIVIDUAL)</b>
<b>FACILITY MANAGER:</b>	
NA	•
<b>TEXT</b>	<b>CODE (INDIVIDUAL)</b>
<b>REGULATOR, POLICY MAKER &amp; GOVERNMENT PROJECT IMPLEMENTOR</b>	
NA	•

**Q.14 What do you think about the practice of separating and collecting office recyclables? Q.14a Do you think by providing recycling waste storage in office building is the key to encourage recycling among building users?**

TEXT	CODE (INDIVIDUAL)
<b>ARCHITECT:</b>	
Very good. Q.14a Yes, definitely. The facility should be available, otherwise people won't do it. (KK-A:98-101)	<ul style="list-style-type: none"> <li>• Good practice</li> <li>• Facility should be made available</li> </ul>
I think it's fine. Q.14a Yes (WS-A:99-102)	<ul style="list-style-type: none"> <li>• Good practice</li> <li>• Facility is the key to encourage</li> </ul>
In fact, that is the place where it can easily be practiced. Because a lot of offices generate a lot of paper waste, a lot of plastics, the things that can easily be separated. Q.14a Definitely, because if there is no where to put it then they won't do it. So that is the key to do it. The second is of course the policy of the company. If the management of the company says that everybody must recycle, then you can see everybody starts to recycle. If there is no direction from the top, nothing will move usually. (CSA-A:178-181)	<ul style="list-style-type: none"> <li>• Easy to be practiced</li> <li>• Facility is the key to encourage but must come with enforcement from the top management of the company</li> </ul>
Essential. We've doing it for 10 years. No wastage. Q.14a Down here, there is a guy who comes here every week to collect out waste papers...We don't have to provide a special bin or storage. But for big office buildings like skyscrapers, they should have it [recycling waste storage]. There are a lot of people who want to collect it. (TLM-A:178-180)	<ul style="list-style-type: none"> <li>• Essential to be practiced. Own office separates &amp; collects recyclables (papers only)</li> <li>• Facility should be provided in big office buildings. Small offices normally have small bins and someone will collect the wastes</li> </ul>
It should be done. Q.14a No. If the facility is provided but people don't have the awareness of the importance of recycling, then there is no point. Awareness must come first. (KY-A:117-118)	<ul style="list-style-type: none"> <li>• Should be practiced</li> <li>• Facility is not the key, awareness must come first</li> </ul>

CODE (GROUPED)	CATEGORY
<b>From all 25 interviewees</b>	
<p><b>Fully support the practice (8x)</b></p> <ul style="list-style-type: none"> <li>• Good practice (4x)</li> <li>• Easy to be practiced</li> <li>• Should be practiced</li> <li>• Possible to be practiced</li> <li>• Good and easy to be practiced</li> </ul> <p><b>Support the practice but government should take the lead (1x)</b></p> <ul style="list-style-type: none"> <li>• Need to be practiced &amp; encouraged. Private sector prefers the government to take the lead</li> </ul> <p><b>Support the practice but people have lack of awareness to practice it (3x)</b></p> <ul style="list-style-type: none"> <li>• Can be practiced if people have the awareness (2x)</li> <li>• Can be practiced if people have the awareness. Own office does not separate &amp; collect recyclables</li> </ul> <p><b>Support the practice but need to be enforced (3x)</b></p> <ul style="list-style-type: none"> <li>• Can be practiced but need to be enforced</li> <li>• Good practice but requires discipline</li> </ul>	<p><b>LEVEL OF SUPPORT (26x)</b></p> <p><b>1 code is categorized twice</b></p>

<p><i>I think it is very easy to do, just a matter of initiating.</i>                  Q.14a No, the key is to get the tenants to buy into the idea of recycling. It doesn't start at the bottom where you collect it. It starts from the collection point, isn't it? (SH-A:125-126)</p>	<ul style="list-style-type: none"> <li>• Easy to be practiced. Own office separates &amp; collects recyclables</li> <li>• Facility is not the key, awareness must come first</li> </ul>
<p><i>habit and enforcement... And everybody has to start, not only us...</i>                  Q.14a I think we have to start somewhere. That is a start – but then it goes back to attitude. It is a human factor whether you want to do it or not. (SA-A:228-229)</p>	<ul style="list-style-type: none"> <li>• Can be practiced but need to be enforced</li> <li>• Facility is just a start. Attitude towards recycling comes next.</li> </ul>
<p><i>I think possible.</i>                  Q.14a I think we have to start with the awareness first. Why you have to do it and what is the benefit? Then only the people will understand. If you just enforce it out of nowhere or out of the blue, they won't be doing it because they don't understand why they should to do it in the first place... If they are aware and they want to do it and the facilities are there then will be more sustainable. If the top management is changed, the whole policy is changed, then the whole project of recycling will be scraped. (LCH-A:233-241)</p>	<ul style="list-style-type: none"> <li>• Possible to be practiced</li> <li>• Facility is not the key, awareness must come first. Enforcement might not work without peoples' awareness</li> </ul>
<p><i>Very good and easy to do if everybody is aware of the reason behind that practice.</i>                  Q.14a Facilities should be provided. (NB-146-149)</p>	<ul style="list-style-type: none"> <li>• Good and easy to be practiced</li> <li>• Facility is not they key, awareness must come first – but it should be provided</li> </ul>
<p><b>TEXT</b></p>	<p><b>CODE (INDIVIDUAL)</b></p>
<p><b>ENGINEER &amp; ENVIRONMENTAL CONSULTANT:</b></p> <p><i>If we start training our office staff, it is a workable thing... Education must start from the young. In Australia, they are</i></p>	<ul style="list-style-type: none"> <li>• Must start to be practiced but</li> </ul>

<p>and enforcement</p> <ul style="list-style-type: none"> <li>• Easy to be practiced if imposed by top management</li> </ul>	
<p><b><u>Support the practice but there is no recycling facilities (2x)</u></b></p>	
<ul style="list-style-type: none"> <li>• Must start to be practiced but Malaysia has no recycling facilities</li> <li>• Good practice but Malaysia needs the infrastructure. Own office separates &amp; collects recyclables but Alam Flora just mix them all back.</li> </ul>	
<p><b><u>Support the practice and practicing it in own office (9x)</u></b></p>	
<ul style="list-style-type: none"> <li>• Essential to be practiced. Own office separates &amp; collects recyclables (papers only) (2x)</li> </ul>	
<ul style="list-style-type: none"> <li>• Accept the practice. Some tenants employ a contractor to supply recycle bins and collect the recyclables</li> </ul>	
<ul style="list-style-type: none"> <li>• Easy to be practiced but rarely been practiced. Own office separates &amp; collects recyclables (papers only, no station accepts used batteries)</li> </ul>	
<ul style="list-style-type: none"> <li>• Easy to be practiced. Own office separates &amp; collects recyclables</li> </ul>	
<p><b>CODE (GROUPED)</b></p>	<p><b>CATEGORY</b></p>
<ul style="list-style-type: none"> <li>• Good &amp; easy to be practiced. Own</li> </ul>	<p><b>CONT'D</b></p>

<p>very good at it. But in Malaysia, we might want to recycle things, but the facilities are not there.                  Q.14a It is good start. Yes, you should have the facility because then the peer pressure will spread. (CTL-ME:337-344)</p>	<ul style="list-style-type: none"> <li>Malaysia has no recycling facilities</li> <li>Facility should be provided because peer pressure will spread the practice</li> </ul>
<p>I think it is a very good practice. The only thing that I heard is collecting papers only... I've never heard about recycling bottles or cans here that come from offices. They maybe are collected from house to house, but never from offices.                  Q.14a Okay I think it will be a good move. But of course these kind of things, it must be approved and enforced from the top management, top-down approach. (NYK-ME:187-198)</p>	<ul style="list-style-type: none"> <li>Good practice. Own office separates &amp; collects recyclables (papers only)</li> <li>Facility is a good move but must come with enforcement from the top management of the company</li> </ul>
<p>I think it is very easy to do yet people rarely doing it. We are doing here mostly papers, batteries. The problem with batteries is just that we don't know where to dump it in Malaysia at all, there is no station that accepts batteries... Papers I think is the biggest amount recycled products in office buildings, but very rare people are practicing it... For papers, I think it is the awareness.                  Q.14a Yeah, definitely...Once we put bins there, people will start to use it. As long as you can get one guy to start it then the other people will start to follow. (CKT-EC:235-250)</p>	<ul style="list-style-type: none"> <li>Easy to be practiced but rarely been practiced. Own office separates &amp; collects recyclables (papers only, no station accepts used batteries)</li> <li>Facility is the key because peer pressure will spread the practice</li> </ul>
<b>TEXT</b>	<b>CODE (INDIVIDUAL)</b>
<b>BUILDER &amp; BUILDER-DEVELOPER:</b>	
NA	
<b>TEXT</b>	<b>CODE (INDIVIDUAL)</b>
<b>DEVELOPER, OWNER &amp; DEVELOPER-OWNER:</b>	
<p>Yes, it can be practiced if we get the right exposure and direction.                  Q.14a Yes, it would help people to recycle. (NA-D:82-85)</p>	<ul style="list-style-type: none"> <li>Can be practiced if people have the awareness</li> </ul>

<ul style="list-style-type: none"> <li>office separates &amp; collects recyclables (done by cleaners). Own office enforces reduce-reuse-recycle practices</li> <li>Good practice but Malaysia needs the infrastructure. Own office separates &amp; collects recyclables but Alam Flora just mix them all back.</li> <li>Good practice. Offices in Malaysia have cleaners to separate &amp; collects recyclable. Own office implements reduce-reuse-recycle practices</li> <li>Good practice. Own office separates &amp; collects recyclables</li> </ul>	
<b>CODE (GROUPED)</b>	<b>CATEGORY</b>
<b>CODE (GROUPED)</b>	<b>CATEGORY</b>
<ul style="list-style-type: none"> <li>Facility is the key to encourage (7x)</li> <li>Facility should be made available</li> </ul>	<b>RECYCLING FACILITY IN THE OFFICE IS THE</b>



<p><i>I got no problems with that. Some of the international tenants here, they have their own companies who come and collect wastes from the bins. The bins are supplied by them. So, of course the staffs are trained to throw recyclables in the coloured bins.</i>                  Q.14a That storage must be at the back or basement easily accessible by lorries. People want it but they don't want to see it. (MM-D:192-203)</p>	<ul style="list-style-type: none"> <li>• Facility is the key to encourage</li> <li>• Accept the practice. Some tenants employ a contractor to supply recycle bins and collect the recyclables</li> <li>• Facility is the key – accessible by lorries but not visible by the tenants/public</li> </ul>
<p><i>It is a good practise... A lot of office waste can be recycled if only they are sorted and separated for collection. This do not necessary translate into additional cost and manpower as the sorting should begin within each individual effort.</i>                  Q.14a Yes. (BTC-D:109-114)</p>	<ul style="list-style-type: none"> <li>• Good practice</li> <li>• Facility is the key to encourage</li> </ul>
<p><i>That is good, it is easy to be practiced. Unlike house, in office you have regulations and rules that you implement... Anybody who gives me a draft letter which was not printed on old/used paper, they'll pay me 50 cent. Anybody who draft me a letter for me to sign on the letter head, but there's a lot of error and not bother to get the spell check done by the computer, then pay me 50 cent... So, sometimes, you inform people one thing, but you also have to be stern about it. (WR-D/O:330-344)</i>                  Q.14a No, I go back to the culture of Malaysians... if you just say to your staff to reuse papers with no enforcement, nothing would happen...If the company has incorporated sustainability agenda, it will do it, it will come naturally. This is culturally another aspect of being sustainable. So if the cultural aspect is not good although environmentally everybody understands about it, then it doesn't work, and then comes the enforcement. (WR-D/O:350-371)</p>	<ul style="list-style-type: none"> <li>• Good &amp; easy to be practiced. Own office separates &amp; collects recyclables (done by cleaners). Own office enforces reduce-reuse-recycle practices</li> <li>• Facility is not the key, awareness must come first followed by enforcement</li> </ul>

<ul style="list-style-type: none"> <li>• Facility is the key – accessible by lorries but not visible by the tenants/public</li> <li>• Facility should be provided because peer pressure will spread the practice</li> <li>• Facility is the key because peer pressure will spread the practice</li> <li>• Facility should be provided in big office buildings. Small offices normally have small bins and someone will collect the wastes</li> </ul>	<p><b>KEY (12x)</b></p>
<ul style="list-style-type: none"> <li>• Facility is not the key, awareness must come first (3x)</li> <li>• Facility is not they key, awareness must come first – but it should be provided</li> <li>• Facility is not the key, awareness must come first. Enforcement might not work without peoples' awareness</li> <li>• Facility is not the key, awareness must come first followed by enforcement ***</li> <li>• Facility is just a start. Attitude towards recycling comes next. ***</li> </ul>	<p><b>AWARENESS MUST COME FIRST (7x)</b></p>

TEXT	CODE (INDIVIDUAL)
<b>FACILITY MANAGER:</b>	
<i>It should be done. It is good. Q.14a Definitely, you must provide people with facilities to achieve that objective. (OCL-FM:220-226)</i>	<ul style="list-style-type: none"> <li>• Good practice</li> <li>• Facility is the key to encourage</li> </ul>
<i>Can be done if the office users are aware of the importance of doing this. This ministry is not practicing it. All the wastes are dumped into the same bin. We don't separate them. All the wastes are sent to landfills. Q.14a No. I think awareness should come first. (KCD-FM:90-95)</i>	<ul style="list-style-type: none"> <li>• Can be practiced if people have the awareness. Own office does not separate &amp; collect recyclables</li> <li>• Facility is not the key, awareness must come first</li> </ul>
<i>That is a good practice. In fact, we collect and separate our wastes before sending them out. We have different coloured bins on every floor for the recyclables. Q.14a Definitely. (ZS-FM:117-121)</i>	<ul style="list-style-type: none"> <li>• Good practice. Own office separates &amp; collects recyclables</li> <li>• Facility is the key to encourage</li> </ul>
TEXT	CODE (INDIVIDUAL)
<b>REGULATOR, POLICY MAKER &amp; GOVERNMENT PROJECT IMPLEMENTOR</b>	
<i>We practice this in our department but I am not sure about the other departments in JKR. If we have used one side of the paper, we use the other side to print our fax message and draft documents. After using both sides, we collect and send for recycling centre. Q.14a Usually, offices in Malaysia have cleaners to segregate office recyclables. They are the ones who send for recycling and they will get the incentives. In government buildings, order from the top management is the key component to encourage recycling among staffs. On top of that, there should be reminders and monitoring, only then it works. Providing the facilities only will not work. (CPK-PI:177-187)</i>	<ul style="list-style-type: none"> <li>• Good practice. Offices in Malaysia have cleaners to separate &amp; collect recyclable. Own office implements reduce-reuse-recycle practices</li> <li>• Facility is not the only key. It must come with enforcement followed by reminders and monitoring (for government buildings)</li> </ul>

CODE (GROUPED)	CATEGORY
<ul style="list-style-type: none"> <li>• Facility is a good move but must come with enforcement from the top management of the company (2x)</li> <li>• Facility is not the only key. It must come with enforcement followed by reminders and monitoring (for government buildings)</li> <li>• Facility is not the only key. It must be ordered from the top management. Collection points should be on every floor – then sent to the central collection.</li> </ul>	<b>NEED ENFORCEMENT (4x)</b>
CODE (GROUPED)	CATEGORY
<ul style="list-style-type: none"> <li>• Facility is not the key – the mechanism to segregate wastes at Alam Flora's level is more important. Alam Flora has lack of resources to collect recyclables separately</li> <li>• Facilities or services for the removal &amp; disposal of segregated recyclables are more important. Otherwise, segregated office recyclables may still end up in the same landfill.</li> </ul>	<b>CONCERN ON FACILITY AT REGIONAL LEVEL (2x)</b>

<p><i>Definitely they should do it. It a good practiced and it can be done. Just require a bit of discipline...It should be enforced.</i></p> <p><i>Q.14a Provision can be there but again you need somebody to say that it is there...use it! Having the storage will of course encourage people to use it. But it depends on the location. If they have to go somewhere [chuckles]....whereas if all on the same floor and then sent to the central collection, then that would be more practical. (KSK-PM:118-127)</i></p>	<ul style="list-style-type: none"> <li>• Good practice but requires discipline and enforcement</li> <li>• Facility is not the only key. It must be ordered from the top management. Collection points should be on every floor – then sent to the central collection</li> </ul>
<p><i>I think it is very important, no problem. It is easy to be practiced if imposed by the top management. I mean if the top management themselves are environmentally conscious people.</i></p> <p><i>Q.14a Definitely, that would be an ideal building. (AMN-R/PM:88-93)</i></p>	<ul style="list-style-type: none"> <li>• Easy to be practiced if imposed by top management</li> <li>• Facility is the key to encourage</li> </ul>
<p><i>We separate our office garbage... But it is unfortunate because Alam Flora [Solid waste management privatised contractor for central and eastern Regions of Malaysia] does not take it seriously. It is sad when we separate our waste but when it gets downstairs and it is compacted all together. So I think we have a long way to go unless the whole country has a law for it.</i></p> <p><i>People are aware from the media, but the resources are useless. The worst part is the infrastructure... Alam Flora does not take it to their advantage. They think that their job is to pick and get rid. Probably they don't even pick and get rid of it properly. The problem is that we don't have enough manpower to do that [collecting recyclables separately]. Alam Flora doesn't have the mechanism to pick the waste separately unless the government makes enforcement on that. (NN-R/PM:185-204)</i></p>	<ul style="list-style-type: none"> <li>• Good practice but Malaysia needs the infrastructure. Own office separates &amp; collects recyclables but Alam Flora just mix them all back.</li> <li>• Facility is not the key – the mechanism to segregate wastes at Alam Flora's level is more important. Alam Flora has lack of resources to collect recyclables separately</li> </ul>

<p>Q.14a Yes, if Alam Flora thinks about it the same way as people cleaning up this office... it works. We just miss out this little bit thing; we don't have the mechanism of separating the wastes at Alam Flora's level. (NN-R/PM:212-214)</p>	
<p>At the moment, we are not practising it in this office. Everything is dumped into one plastic/dustbin. I think that can be adopted in office buildings as well provided that there are efforts towards that, and also awareness campaign and so on. Q.14a I think it can. (MCA-PM:104-113)</p>	<ul style="list-style-type: none"> <li>• Can be practiced if people have the awareness. Own office does not separate &amp; collect recyclables</li> <li>• Facility is the key to encourage</li> </ul>
<p>It is an initiative that needs to be encouraged. Again, the government can be a good leader if the political leaders will just choose to show the way. The Malaysian business community is not very innovative in this respect; they prefer to let the government to take the lead... Q.14a Yes. Providing such facilities is only a part of the solution. A more important element that must be introduced is to provide facilities or services for the removal and disposal of the segregated recyclable products. Otherwise the office waste may be segregated at the office but may still end up in the same landfill. (GL-PM:131-141)</p>	<ul style="list-style-type: none"> <li>• Need to be practiced &amp; encouraged. Private sector prefers the government to take the lead</li> <li>• Facilities or services for the removal &amp; disposal of segregated recyclables are more important. Otherwise, segregated office recyclables may still end up in the same landfill.</li> </ul>

**D: CURRENT ENVIRONMENTAL PRACTICES (D3: ISO 14000 EMS Certification)**

**Q. 15 Have you had any experience working with ISO 14000 EMS certified contractors? Q.15a How different was their performance compared to the non-certified ones?**

TEXT	CODE (INDIVIDUAL)
<b>ARCHITECT:</b>	
Never. (KK-A:104)	<ul style="list-style-type: none"> <li>No</li> </ul>
No. (WS-A:105)	<ul style="list-style-type: none"> <li>No</li> </ul>
Yes. I have experienced working with them but they won't practice it [as what is required by the ISO]. Q.15a Only slightly better. (CSA-A:184-188)	<ul style="list-style-type: none"> <li>Yes but they never practice</li> <li>Performance slightly better</li> </ul>
No (TLM-A:187)	<ul style="list-style-type: none"> <li>No</li> </ul>
No (KY-A:121)	<ul style="list-style-type: none"> <li>No</li> </ul>
Yes. Q.15a Yes, I think they are more disciplined, a little bit more forward planning on the spot. (SH-A:210-212)	<ul style="list-style-type: none"> <li>Yes</li> <li>More disciplined &amp; more forward planning</li> </ul>
No (SA-A:236)	<ul style="list-style-type: none"> <li>No</li> </ul>
... don't have any experience...(LCH-A:244)	<ul style="list-style-type: none"> <li>No</li> </ul>
No (NB-A:152)	<ul style="list-style-type: none"> <li>No</li> </ul>
<b>TEXT</b>	
<b>ENGINEER &amp; ENVIRONMENTAL CONSULTANT:</b>	
Personally, no because none of our contracts insists on this. So we don't know whether they have or not. ISO 9000 yes, but not ISO 14000. (CTL-ME:347-248)	<ul style="list-style-type: none"> <li>No</li> </ul>
No. But, I understand and aware that ISO14000 is more towards the environmental issue. (NYK-ME:201-202)	<ul style="list-style-type: none"> <li>No</li> </ul>
No (CKT-EC:254)	<ul style="list-style-type: none"> <li>No</li> </ul>

CODE (GROUPED)	CATEGORY
<b>From all designers</b>	
<ul style="list-style-type: none"> <li>No (10x)</li> <li>Yes (2x)</li> </ul>	<b>PAST EXPERIENCE</b>
<ul style="list-style-type: none"> <li>...they never practice</li> <li>Performance slightly better</li> <li>More disciplined &amp; more forward planning</li> </ul>	<b>DIFFERENCE IN PERFORMANCE</b>

**Q. 16 Has your company (or your subcontractors) been certified with ISO 14000 EMS? Q.16a What are the benefits achieved so far?**

TEXT	CODE (INDIVIDUAL)
<b>BUILDER &amp; BUILDER-DEVELOPER:</b>	
Yes Q.16a The work processes are better documented that can be translated to better quality if properly enforced. (SA-B/D:106-109)	<ul style="list-style-type: none"> <li>• Yes</li> <li>• Work processes are better documented</li> </ul>
9002 yes, but not the EMS14000. To tell you the truth, now people are going for the certification for marketing strategies. It is not really because of maintaining the quality system. I have international auditors coming in who will go my quality manual and everything in detail. But there are some who just come and certify just like that. Overnight, they become ISO9000 certified company. This is happening. Some of my clients have this but they really practice... But those certified ones, I saw they just doing the same thing...nothing new. (JD-B:242-253)	<ul style="list-style-type: none"> <li>• No</li> <li>• Certification is only for marketing strategies instead of maintaining the quality system</li> <li>• There are cases where certification is abused</li> <li>• Business-as-usual attitude among the certified ones</li> </ul>
Yes. We just been certified last month [January 2009]. Q.16a One thing from ISO14000 is to segregate wastes. 3R – reduce, reuse & recycle. Reduce and reuse has actually given the cost benefits to the construction. ISO14000 also gives social benefits to us. (TYT-B:183-185)	<ul style="list-style-type: none"> <li>• Yes</li> <li>• Economic &amp; social benefits</li> </ul>

CODE (GROUPED)	CATEGORY
<b>From all 3 builders</b>	
<ul style="list-style-type: none"> <li>• No (1x)</li> <li>• Yes (2x)</li> </ul>	<b>CERTIFIED WITH ISO14000</b>
<ul style="list-style-type: none"> <li>• Certification is only for marketing strategies instead of maintaining the quality system</li> <li>• There are cases where certification is abused</li> <li>• Business-as-usual attitude among the certified ones</li> </ul>	<b>CONCERN ON CERTIFICATION EXERCISE</b>
<ul style="list-style-type: none"> <li>• Work processes are better documented</li> <li>• Economic &amp; social benefits</li> </ul>	<b>BENEFITS</b>

**Q.17 Have you awarded any projects to ISO 14000 EMS certified contractors?**

TEXT	CODE (INDIVIDUAL)	CODE (GROUPED)	CATEGORY
<b>DEVELOPER, OWNER &amp; DEVELOPER-OWNER:</b>		From all 30 interviewees	
Q.16 No. Q.17 No. ISO14000 is not in our criteria. (NA-D:88-91)	• No		
Q.16 No. Q.17 No. (MM-D:206-209)	• No		
Q.16 No. Q.17 No. (BTC-D:120-123)	• No		
Q.16 I am not quite sure about Bank Rakyat. Q.17 Yes, they have to be certified with ISO. Otherwise they cannot get Class A. Because it is a requirement, I think so. The thing is this...in our contract, we need that. Q.17a Because they work on the bottom line and cash flow, so being prudent about all these environmental aspect as far as recycle, reduce waste, will save them a lot of money and hassle. (WR-D/O:377-386)	<ul style="list-style-type: none"> <li>• Yes, it is required in our contract</li> <li>• Prudent with recycling &amp; reduce waste in order to save money</li> </ul>		
TEXT	CODE (INDIVIDUAL)	CODE (GROUPED)	CATEGORY
<b>FACILITY MANAGER:</b>			
NA	•		
TEXT	CODE (INDIVIDUAL)	CODE (GROUPED)	CATEGORY
<b>REGULATOR, POLICY MAKER &amp; GOVERNMENT PROJECT IMPLEMENTOR</b>			
NA	•		

## E. CURRENT SOCIAL PRACTICES (E1: Malaysian Office Building Characteristics)

*Q.20 Imagine I came from the UK and visiting Malaysia for the very first time to see office buildings in Malaysia. What would you suggest me to look out for that I wouldn't find anywhere else that reflect good practice here in Malaysia?*

TEXT	CODE (INDIVIDUAL)	CODE (GROUPED)	CATEGORY
<b>ARCHITECT:</b>		<b>From all 30 interviewees</b>	
<i>I don't see any... (KK-A:111)</i>	<ul style="list-style-type: none"> <li>Nothing</li> </ul>	<ul style="list-style-type: none"> <li>Nothing (9x)</li> <li>Nothing – we emulate even though it doesn't work in the local context</li> <li>Nothing – we only copy and try to meet the minimum standard requirements</li> <li>Nothing comes from local; technologies are imported but modified to suit local climate &amp; conditions</li> <li>Have no own identity</li> </ul>	<b>There is nothing to look for or comes from local</b>
<i>For office, there is nothing. (WS-A:112)</i>	<ul style="list-style-type: none"> <li>Nothing</li> </ul>		
<i>Malaysia buildings are tropical buildings so the first thing you will see is a lot of sun shadings... The more sun shading, the better the building will be. But of course there will be a balance somewhere, isn't it? How far can you go? Then you start blocking out the light which is not good already. There a balance somewhere, you block out the sun but you let the daylight in. (CSA-A:196-204)</i>	<ul style="list-style-type: none"> <li>Sun shading devices that block the heat but allows daylight</li> </ul>	<ul style="list-style-type: none"> <li>Sun shading devices that block the heat but allows daylight</li> <li>Learn how Malaysian buildings respond to the climate (i.e. sun, wind, rain, seasons of the year, time of the day) using passive mode strategies</li> <li>Look for climate responsive/tropical high rise (e.g. Ken Yeang's)</li> <li>Look for PWD's old blocks designed in the 70s – friendlier to local hot &amp; humid climate</li> <li>Look for climate responsive building, recognized from façade treatment</li> </ul>	<b>Learn how Malaysian office buildings respond to local climate using passive mode strategies</b>
<i>When you find a building that is well maintained, the temperature feels about right, the water in the toilets is not consistently flowing, doesn't smell bad, then that is probably the good office building to rent. This is very rare. (TLM-A:195-198)</i>	<ul style="list-style-type: none"> <li>For renting purpose, look for a small number of buildings which are well-maintained</li> </ul>		
<i>Climate responsive design... There are essentially five modes: passive mode, mixed mode, full mode, productive mode and composite mode... Design strategy must start with passive mode. Passive mode must be the first level of design consideration in the process, followed by other modes to further enhance the energy efficiency.</i> <i>When you come to Malaysia, first you want to see is how does the building respond as a passive mode building? Passive mode building is basically a bioclimatic design – designing with climate. You look at the sun, wind and seasons. So in Malaysia, the sun is in the east and west. The morning sun has different implication; the western sun has different implication. So a true bioclimatic building, the respond is in the climate. Each façade is treated differently. So this is what you should look at for buildings in Malaysia... Respond to the climate –</i>	<ul style="list-style-type: none"> <li>Learn how Malaysian buildings respond to the climate (i.e. sun, wind, rain, seasons of the year, time of the day) using passive mode strategies</li> </ul>		



<i>respond to the sun, respond to the wind, respond to the rain, respond to the seasons of the year and respond to the time of the day. (KY-A:128-156)</i>	
<i>Well, it depends if you want to say identity or responsive to climate. If it is identity, then Hijjas would tell you that Tabung Haji, Menara Maybank and whatever, have a distinct identity and the identity comes back to the concept. It wants to portray something symbolic. When it wants to portray something symbolic it becomes an identity, an icon. So my question to you was, "Is it identity or climate responsiveness?" It can be separate or it can be the same. But not so many climate responsive buildings...ohh "this building cannot be in China or cannot be in New York"... For high rise, if you are saying Ken Yeang's buildings kind of meet that kind of criteria, perhaps, because it "appears" to be a tropical design. It does in terms of look, having gardens going up to look more tropical..."High rise tropical", that's the term. The "green skyscraper", yes, but once you start doing it in temperate countries, then it is just your branding style. If you told me that you only do it in tropical countries and not in non-tropical countries and do something else differently, then I'd say "you're fine". (SH-A:220-246)</i>	<ul style="list-style-type: none"> <li>Look for office buildings which is symbolic/iconic that have distinct Malaysian identity (e.g. Hijjaz's)</li> <li>Look for climate responsive/tropical high rise (e.g. Ken Yeang's)</li> </ul>
<i>I don't think that we have our own identity because nowadays lifestyles are naturally evolved. (SA-A: 255)</i>	<ul style="list-style-type: none"> <li>Have no own identity</li> </ul>
<i>Currently there is none. (LCH-A:252)</i>	<ul style="list-style-type: none"> <li>Nothing</li> </ul>
<i>There is very little to learn from office buildings in Malaysia. Unfortunately, all NOT what to do! (NB-A:160)</i>	<ul style="list-style-type: none"> <li>Nothing</li> </ul>
<b>TEXT</b>	<b>CODE (INDIVIDUAL)</b>
<b>ENGINEER &amp; ENVIRONMENTAL CONSULTANT:</b>	

<ul style="list-style-type: none"> <li>Look for office buildings which is symbolic/iconic that have distinct Malaysian identity (e.g. Hijjaz's)</li> <li>Buildings in Putrajaya were designed to reflect Islamic &amp; Malaysian identity – using Islamic patterns &amp; Malay motifs.</li> <li>Look for office buildings designed based on vernacular architecture</li> <li>Nothing, but believes that interior design can reflect Malaysian unique character</li> <li>Interior decorations based on local traditional elements</li> <li>Buildings in Putrajaya have character &amp; identity of Malaysia – using Islamic patterns &amp; Malay motifs</li> </ul>	<b>Look for office buildings with distinct Malaysian identity i.e. interior &amp; exterior</b>
<ul style="list-style-type: none"> <li>Look for mix-development projects with 3-living concepts of work, stay &amp; play</li> <li>Look for rainwater harvesting system because Malaysia gets a huge amount of annual rainfall</li> <li>Low rise &amp; beautifully landscaped office buildings in Cyberjaya – no stressful waiting in lift core, less pollution &amp; pleasant outdoor environment to rest/socialize</li> </ul>	<b>Others</b>
<b>CODE (GROUPED)</b>	<b>CATEGORY</b>

<p><i>When you come from a temperate climate area, you are used to a very low air movement. In this part of the world, if you follow their type of air movement, everyone will start complaining...Because we have humid air outside, walking...if you don't evaporate fast enough, you'll be uncomfortable. Maybe that is why PTM [Energy Commission Centre] is in trouble, you know why? Lack of air movement. That's why all the fans are running now. They use chilled-beam.... the problem is this is a tropical country. Air movement is very important. follow ASHRAE Standard, it tells you air movement must not exceed 0.25 m/s, you know in MS [Malaysia Standard 1525], I raised it to 0.7 (maximum)! No way we're going to survive here [with 0.25m/s] because you must now know the cultural habit, the habitat, I call it the art side not the science side.</i></p> <p><i>Our fresh air change is very crucial for us. That's why we cannot adopt LEED just like that. Singapore realizes this. We don't bring so much fresh air, we are dead – all energy here. We bring in fresh air, we don't have to remove the heat, we have to remove the moisture. That is the costly part. In the UK, no problem. They have dry air. Even in Australia &amp; UK, [in] certain months of the year, [they can] 100% flush [their building], no need [to use] air conditioning. It is a big difference here. So we cannot adopt their system here.</i></p> <p><i>Another factor is that the office density is higher here. You know, fresh air... if you go by [number of] people, [it] is very dangerous because we'll suffer in terms of energy [consumption]. I always resist [the idea of] increasing the fresh air change without understanding</i></p>	<ul style="list-style-type: none"> <li>• Tropical hot &amp; humid countries needs higher indoor air movement than countries in temperate climate zone</li> <li>• Fresh air change required in local buildings doesn't have to be as high as in the UK – energy intensive &amp; costly to remove the air moisture</li> <li>• Local office density is higher. Fresh air change rate based on occupancy rate will consume lots of energy. The base level should be low but adjusted based on performance.</li> <li>• Illuminance level required in local office buildings is much lower than in the UK – due to intensity of the sun</li> </ul>	<ul style="list-style-type: none"> <li>• Tropical hot &amp; humid countries needs higher indoor air movement than countries in temperate climate zone</li> <li>• Fresh air change required in local buildings doesn't have to be as high as in the UK – energy intensive &amp; costly to remove the air moisture</li> <li>• Local office density is higher. Fresh air change rate based on occupancy rate will consume lots of energy. The base level should be low but adjusted based on performance.</li> <li>• Illuminance level required in local office buildings is much lower than in the UK – due to intensity of the sun</li> <li>• Air-cooled chillers are used in Malaysia even though they are less efficient than the water-cooled chillers</li> <li>• Local climate allows buildings to have windows with balconies that can be opened for ventilation &amp; view. Daylighting can be utilized all year around.</li> <li>• Typical to use water-cooled chillers instead of air-cooled chillers</li> </ul>	<p><b>Learn the different requirements for good IEQ between tropical &amp; temperate climate zones</b></p>
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<p><i>the other factor (i.e. energy consumption) long time ago. I've been proven right again, you know why? Our building bylaw for office, the fresh air change minimum is 5cfm/person which is 2.5litre/sec/person. ASHRAE over the years has raised it to 8 litres then 10 litres/sec/person, everybody starts adopting it because people are smoking and other toxic. But now... no more smoking in the building. I am so happy that ASHRAE 207 goes back to exactly 2.5litre/sec/person but based on performance. That's the base. This is what I want...I keep caution everyone, don't overdo it.</i></p> <p><i>Lighting level is another thing. Right we are all equal, UK [and] Malaysia. You know why? Everybody says, we want 500 lux. Do you know how bright is 500 lux? But LEO building [Low Energy Building, Ministry of Energy, Water &amp; Communication] has shown that 350 lux can work. Our Malaysia Standard, 300-400 [lux]. Then again, researchers have been arguing. In the UK, the intensity of the sun is not that bright, so your office is quite bright. In fact 500 lux is ridiculous anyway...(CTL-ME:356-406).</i></p>		<p>For renting purpose, look for a small number of buildings which are well-maintained (2x)</p>	<p><b>Well-maintained office buildings</b></p>
<p><i>Not many. The Securities Commission building has underfloor air-conditioning/ventilation. Not many buildings have that kind of system...what you have here, other countries have had it. I really cannot think of anything else because nothing really comes from us. Maybe because what we have adopted are imported. We get the best from everywhere. So if you want me to suggest things that could not be found elsewhere, I can't, because we have modified the equipments from the overseas to suits with our climate and conditions. Some people prefer air-cooled chillers rather than water-cooled chillers even though water-cooled chillers are more efficient. They don't like the cooling towers because it could cause legionnaire</i></p>	<ul style="list-style-type: none"> <li>• Nothing comes from local; technologies are imported but modified to suit local climate &amp; conditions</li> <li>• Air-cooled chillers are used in Malaysia even though they are less efficient than the water-cooled chillers</li> </ul>		

<i>decease. But the thing is it is more efficient! (NYK-ME:214-223)</i>	
<i>Nothing comes to mind... I don't think there is any building I can recommend that is different. (CKT-EC:261-253)</i>	<ul style="list-style-type: none"> <li>• Nothing</li> </ul>
<b>TEXT</b>	<b>CODE (INDIVIDUAL)</b>
<b>BUILDER &amp; BUILDER-DEVELOPER:</b>	
<i>What we might have here is the expansion of ideas that combined the three living concepts of work, stay and play in one single development which might be different from the UK. (SA-B/D:123-125)</i>	<ul style="list-style-type: none"> <li>• Look for mix-development projects with 3-living concepts of work, stay &amp; play</li> </ul>
<i>I think there is nothing. Anything that we are doing here is a copy from the western countries... Even so with the building architecture. Everything they do is only to meet the minimum requirement. All this back to dollars and cents. No initiatives to make 100% eco-friendly...People are not ready for it...(JD-B:271-276)</i>	<ul style="list-style-type: none"> <li>• Nothing – we only copy and try to meet the minimum standard requirements</li> </ul>
<i>I don't think there is any. We like to follow the western culture. We like to emulate people. Even though it doesn't apply here, we just follow [laughing]. It might be good for the environment but not for the people, but we do it anyway! (TYT-B:199-201)</i>	<ul style="list-style-type: none"> <li>• Nothing – we emulate even though it doesn't work in the local context</li> </ul>
<b>TEXT</b>	<b>CODE (INDIVIDUAL)</b>
<b>DEVELOPER, OWNER &amp; DEVELOPER-OWNER:</b>	
<i>From my experience working in Putrajaya, architects love to do arched designs to reflect the Islamic and Malaysian identity. A lot of government buildings in Putrajaya have this e.g. MOF building, Palace of Justice and etc. 'Songket' pattern on the archway of Putrajaya Corporation. The boulevard pavement has "Batik" patterns. "Tikar weavings" on the facades. (NA-D:103-106)</i>	<ul style="list-style-type: none"> <li>• Buildings in Putrajaya were designed to reflect Islamic &amp; Malaysian identity – using Islamic patterns &amp; Malay motifs.</li> </ul>
<i>One thing that that I think of is that foreigners appreciate green areas, open areas. Like my office here, the setting is like a resort with landscape all around. To them, these can release their tension. Since I work here, I've never had to press a lift button and wait to go up. Do you know how stressful it is to wait during peak hours to go down or up using lifts? If the lift is full, you have to wait for the next, and the next...Over here [in Cyberjaya], our building guidelines say the tallest I think is around 5-6 storeys. To them [foreigners] if you get the area</i>	<ul style="list-style-type: none"> <li>• Low rise &amp; beautifully landscaped office buildings in Cyberjaya – no stressful waiting in lift core, less pollution &amp; pleasant outdoor environment to rest/socialize</li> </ul>

<p><i>like this [low-rise and beautifully landscaped], with benches outside, that would be where they'd work. There's where they have their sandwiches during lunch time...the climate is very friendly to them – even though not to us...So, I think that is something that they wouldn't find in their home countries. Cyberjaya is less polluted than Kuala Lumpur or anywhere else. So being outside is very pleasant. (MM-D:220-231)</i></p>	
<p><i>There are many offices and institutions in Kuala Lumpur which is based on vernacular architecture design that is unique to this region – traditional roofing design with high ceiling, large windows, deep overhangs, motifs, intricate timber carvings on doors and decorative panelling. (BTC-D:137-140)</i></p>	<ul style="list-style-type: none"> <li>• Look for office buildings designed based on vernacular architecture</li> </ul>
<p><i>It is a good question actually. What would you brag about your sustainable building? I think I would brag about rainwater harvesting because we've got a lot of rain. That's one thing. The second thing I would brag about is – unlike in the UK, you cannot open windows most of the time, here I can do that. I would brag about that. I don't need to use artificial lightings so much because we've got abandon of daylight, but that if my building is orientated correctly according to the sun path. I'll brag about the fact that I can open the windows sometimes for fresh air, and I can have open balconies. (WR-D/O:397-403)</i></p>	<ul style="list-style-type: none"> <li>• Look for rainwater harvesting system because Malaysia gets a huge amount of annual rainfall</li> <li>• Local climate allows buildings to have windows with balconies that can be opened for ventilation &amp; view. Daylighting can be utilized all year around.</li> </ul>
<b>TEXT</b>	<b>CODE (INDIVIDUAL)</b>
<b>FACILITY MANAGER:</b>	
<p><i>Nothing, I guess... Our heritage is low rise, sprawling like rumah kampong (traditional village houses). Once you build a tower, it is difficult to materialize this concept. Maybe it is difficult to reflect our culture and heritage from the exterior of the building, but we can have them in the interior. (NM-FM:117-121)</i></p>	<ul style="list-style-type: none"> <li>• Nothing, but believes that interior design can reflect Malaysian unique character</li> </ul>
<p><i>For example, in the UK they do not use so much of the water-cooled chillers for example. In Malaysia we use cooling tower because our water is cheap and our temperature is high but their design is different. Of course air-cooled chillers designed in the UK are obviously less efficient...So air-cooled...the temperature difference is</i></p>	<ul style="list-style-type: none"> <li>• Typical to use water-cooled chillers instead of air-cooled chillers</li> </ul>

<i>lesser. It would not be efficient as water-cooled where you can cool down more and do more heat exchange. (OCL-FM:235-240)</i>	
<i>Nothing, I guess. (KCD-FM:102)</i>	<ul style="list-style-type: none"> <li>• Nothing</li> </ul>
<i>Reception counters, it is our culture to greet and welcome our visitors. (ZS-FM:128)</i>	<ul style="list-style-type: none"> <li>• Nothing</li> </ul>
<b>TEXT</b>	<b>CODE (INDIVIDUAL)</b>
<b>REGULATOR, POLICY MAKER &amp; GOVERNMENT PROJECT IMPLEMENTOR</b>	
<i>I don't think there is any. Most of our new office blocks look like those in the US. I can't see any unique building with a Malaysian character down here. But our old office buildings built in the 70s have a Malaysian character. For example, the original standard design of JKR blocks with verandahs outside acting as shading devices as well, shallow plan (about 15m deep) which is good for cross ventilation and bring in more daylight. Nowadays, most have been renovated – become dark. (CPK-PI:215-220)</i>	<ul style="list-style-type: none"> <li>• Look for PWD's old blocks designed in the 70s – friendlier to local hot &amp; humid climate</li> </ul>
<i>Very difficult because all you can find are the bad practices [chuckles]. Certain architecture looks nice if you see from outside. Many of the modern buildings are quite presentable especially more recent office buildings that portray good corporate image and so on. But they are typical buildings, can be found anywhere else. (KSK-PM:138-141)</i>	<ul style="list-style-type: none"> <li>• Nothing</li> </ul>
<i>If you notice, many office buildings in Putrajaya have the character and identity of Malaysia. For example by using Islamic patterns &amp; motives with the right colour and materials. The patterns &amp; motifs also come from our traditional cultural objects. Our climate is also different from the UK or other western part of the world. So some buildings in Malaysia would try to incorporate climatic responsive design to minimize glare and maximize shading. These can be recognized by looking at the façade treatments. (AMN-R/PM:106-111)</i>	<ul style="list-style-type: none"> <li>• Buildings in Putrajaya have character &amp; identity of Malaysia – using Islamic patterns &amp; Malay motifs</li> <li>• Look for climate responsive building, recognized from façade treatment</li> </ul>
<i>...It [KL] has been richer since the development of KLCC. KLCC is a very...very rich and cultured building. Since then, nothing has been done in a simplified way because people look at architecture differently. (NN-R/PM:238-248)</i>	<ul style="list-style-type: none"> <li>• Interior decorations based on local traditional elements</li> </ul>

<p><i>A lot of people have tried it on screens, small things like glass hatching, floor layering and etc. We have tried to do that and they look absolutely fantastic! If you go to Wisma Sejarah, you can see their stainless steel lifts were hatched with a lot of Malaysian traditional decorations, small things like that contribute to our uniqueness. Our City Hall building also portrays the decoration of Batik, Songket patterns on the floor tiles and glass hatching on the walls... And it is so cultured. But it doesn't have to reflect the Malay. (NN-R/PM:258-263)</i></p>	
<p><i>I think now, most of Malaysian office buildings are westernized with the corporate look...Nowadays, it is quite hard to find a truly Malaysian office building design. (MCA-PM:145-147)</i></p>	<ul style="list-style-type: none"> <li>• Nothing</li> </ul>
<p><i>Look for places that practice good housekeeping for sustainability (will be rather rare to find), but there are a few. (GL-PM:160-161)</i></p>	<ul style="list-style-type: none"> <li>• Look for a small number of buildings which are well-maintained</li> </ul>

**Q.21 According to you, what are the spaces & facilities that should be provided in an office building to enhance Malaysian cultures and religious beliefs?**

**Q.21a Do you always balance between the social interaction spaces and the workspaces? OR Spaces like lobbies, lounges, terraces, common areas for social interactions are not calculated as lettable area. Some developers or owners reduce these spaces and maximize workspaces to maximize their profit. What is your view on this?**

TEXT	CODE (INDIVIDUAL)
<b>ARCHITECT:</b>	
<i>If surau is for the Muslims, other people can go to a recreational area within the building... Waterless toilets might not work in Malaysia. It is our culture to use water in toilets. Urinals are not encouraged, because Muslims are not allowed to stand while doing it, they have to sit. Nursery for kids or room for mothers are important. (KK-A:118-122)</i>	<ul style="list-style-type: none"> <li>Prayer rooms <b>R</b></li> <li>Recreational area <b>REC</b></li> <li>No waterless toilets, no urinals</li> <li>Nursery <b>N</b></li> <li>Mothers' room <b>N</b></li> </ul>
<i>We do have public common facilities to reflect the social interactions in the office. Let say surau... Food court and reading area but not so much on the recreational activities for example game room, gym. It is good to have nursery, but it depends on the scale of the office. But if you want your building to reflect us who live in a Muslims country, it doesn't have to be strictly limited to religious practices, say...you must have surau, that's it! Not necessarily! What are the Islamic values in the working environment? It is the personal scale, moderate scale and not the personal space; it is not the isolated space. It should reflect the accents of Islamic values rather than limited to the praying areas. (WS-A:115-127)</i>	<ul style="list-style-type: none"> <li>Prayer rooms <b>R</b></li> <li>Food court <b>E</b></li> <li>Reading area</li> <li>Recreation facilities e.g. game room, gym – rare <b>REC</b></li> <li>Nursery but depends on the office scale <b>N</b></li> <li>Personal &amp; moderate scale of working environment instead personal &amp; isolated space – reflect the accents of Islamic values <b>SP</b></li> </ul>
<i>...surau is a must. Then you have the ablution area. That is the standard. Nursery... if you have sufficient numbers of people who need it... it depends on the number of occupants and what type of occupants we have. So, if you have a lot of parents with young children, then definitely you need to provide it. (CSA-A:207-214)</i>	<ul style="list-style-type: none"> <li>Prayer rooms <b>R</b></li> <li>Nursery – if the demand is sufficient – depending on the number and type of occupants <b>N</b></li> </ul>
<i>Eating place, prayer rooms, pantry for breakfast. In office</i>	<ul style="list-style-type: none"> <li>Prayer rooms <b>R</b></li> </ul>

CODE (GROUPED)	CATEGORY
<b>From all 30 interviewees</b>	
<ul style="list-style-type: none"> <li>Prayer rooms (18x)</li> <li>Prayer rooms with better facilities e.g. fountain, landscape (2x)</li> <li>Prayer rooms at appropriate location</li> <li>Prayer rooms – must be in a good location</li> <li>Prayer rooms with ablution area (already in building guidelines)</li> <li>If no food court on upper floor - prayer room is best at the podium/first floor</li> <li>Location of &amp; connection between toilets, prayer area &amp; food court – separated but next/near to each other</li> <li>Prayer rooms – already included in local authorities' guideline – must be in a good location</li> <li>Prayer rooms – must be in a good location e.g. at the break point where the amenity space is, usually in the middle of the tower</li> <li>Facilities for Christians to perform spiritual quotient</li> </ul>	<b>PROVIDE RELIGIOUS FACILITIES (28X)</b> (Mentioned by 26 interviewees)
<b>Transitional spaces/ common areas</b>	<b>PROVIDE</b>



<p>buildings, breakfast is more important than lunch because people go out for lunch. (TLM-A:204-205)</p>	<ul style="list-style-type: none"> <li>• Eating place <b>E</b></li> <li>• Pantry for breakfast <b>E</b></li> </ul>	<ul style="list-style-type: none"> <li>• Common area/lounge to relax and interact</li> <li>• Common areas to enhance cultural &amp; community development/ interaction</li> <li>• Common spaces for social interactions give value to the building</li> <li>• Event hall</li> <li>• Informal discussion area</li> <li>• Lounge accessible to the garden</li> <li>• Lounge to relax</li> <li>• Open public lobbies, patios &amp; seating areas to intermingle during breaks and to conduct informal discussions</li> <li>• Open verandahs</li> <li>• Sitting areas</li> <li>• <i>Does not support the provision of recreational facilities &amp; interaction areas</i></li> </ul>	<p><b>TRANSITIONAL SPACES/ COMMON AREAS (10X)</b> (Mentioned by 9 interviewees)</p>
<p>Transitional spaces. Transitional spaces are neither inside nor outside like verandah, balcony etc. These are ideal spaces for mix mode. Another is that by reducing the enclosed area, you reduce the area that needs to be mechanically environmentally controlled... If activities can be taken place in transitional spaces, go as much as possible. (KY-A:159-163)</p>	<ul style="list-style-type: none"> <li>• Maximize the use of facilities in transitional spaces – to reduce enclosed areas, hence save energy for mechanically ventilation <b>SP</b></li> </ul>		<ul style="list-style-type: none"> <li>• Maximize the use of facilities in transitional spaces – to reduce enclosed areas, hence save energy</li> </ul>
<p>But people tuck the surau down in the car park spaces or somewhere up in the mezzanine... if it was me, I would put it (surau) in the amenity floor, in the break location in the middle of the tower...For 38 storey building usually you have a break point where the amity space is... I think about having my eating area at the top or at the podium where there is a roof-top garden that I can look out when I can feel aarrgh...I am taking a break now...not "I have to eat and get back to work".</p> <p>I'd like to see that in an office instead of having floor by floor by floor, I can have cut outs and internal floor connections that gives me far better sense of accessibility between one floor to another, have visual connections and things like that...Hong Kong and Shanghai Bank in that way... My lifts are outside, my lifts get daylight from the outside. You spend x amount of hours in a day, why can't that x amount of hours be "a good experience" versus "I need to work"?</p> <p>Q.21a That was already an important criteria to us however not always that we can push for that because of net lettable area. (SH-A:249-271)</p>	<ul style="list-style-type: none"> <li>• Prayer rooms – must be in a good location e.g. at the break point where the amenity space is, usually in the middle of the tower <b>R</b></li> <li>• Food court at the top floor or podium with access to roof-top garden (e.g. food court with outdoor garden café) <b>E</b></li> <li>• Cut-out spaces/voids – to promote interactions &amp; give a better sense of accessibility and visual connection between floors <b>SP</b></li> <li>• External lifts with daylight &amp; view</li> <li>• Cannot push to be balanced because of the net lettable area</li> </ul>		
<p>Looking at the way we use our toilet i.e. we use so much water, it is inefficient to have them mechanically ventilated. They have to be naturally ventilated and naturally lighted, this is a must. Authorities have already included [in their</p>	<ul style="list-style-type: none"> <li>• Naturally ventilated &amp; naturally lighted toilets</li> <li>• Prayer rooms – already included in</li> </ul>		

<p><i>guidelines] that complexes should include praying areas in a good location. Depends on the developers, sometimes they just put praying areas in the basement or other non-strategic places...food court; also not located at the right place.</i></p> <p><i>Q.21a This can only happen when the developer themselves has the social obligation to do it, then they'll provide those spaces. Otherwise, it has to be made mandatory... part of the requirements. (SA-A:259-273)</i></p>	<p>local authorities' guideline – must be in a good location <b>R</b></p> <ul style="list-style-type: none"> <li>• Food court – must be in a good location <b>E</b></li> <li>• Can be balanced if the developer/owner has the social obligation to do it or make it mandatory</li> </ul>	<p>for mechanically ventilation</p> <ul style="list-style-type: none"> <li>• Cut-out spaces/voids – to promote interactions &amp; give a better sense of accessibility and visual connection between floors</li> <li>• Design in such a way that the lift lobby can be included as NFA – will become more private &amp; friendlier</li> <li>• Triple volumes connected with internal staircases &amp; definite break areas or social areas</li> <li>• Personal &amp; moderate scale of working environment instead personal &amp; isolated space – reflect the accents of Islamic values</li> </ul>	<p>interviewees)</p>
<p><i>...self-sustain working community whereby they have nursery, informal discussion area, nice cafeteria, gym and everything...Informal green area is good.</i></p> <p><i>Q.21a They must be a balanced. You still need to have those spaces because if you allow the occupants or office dwellers to have these spaces then perhaps they are mentally more relaxed then they can be more productive. These spaces can partly become stress-released spaces. (LCH-A:255-267)</i></p>	<ul style="list-style-type: none"> <li>• Nursery <b>N</b></li> <li>• Informal discussion area <b>C</b></li> <li>• Cafeteria <b>E</b></li> <li>• Gym <b>REC</b></li> <li>• Must be balanced to reduce stress and to produce more productive worker</li> </ul>	<ul style="list-style-type: none"> <li>• Recreational area</li> <li>• Recreation facilities e.g. game room, gym – rarely provided</li> <li>• Gym (3x)</li> <li>• Private gym &amp; pool</li> <li>• After office-hours recreational facilities</li> <li>• Recreational facilities to promote good health</li> <li>• Open space for recreational activities</li> <li>• More green and open areas on site</li> <li>• At least 15% of the site area is open or green spaces</li> <li>• <i>Does not support the provision of recreational facilities &amp; interaction areas</i></li> </ul>	<p><b>RECREATIONAL &amp; GREEN AREAS (11x)</b> (Mentioned by 10 interviewees)</p>
<p><i>Apart from facilities for prayer, eating is a Malaysian favourite... evergreen 'kopitiam' coffee... (NB-A:163-164)</i></p>	<ul style="list-style-type: none"> <li>• Prayer rooms <b>R</b></li> <li>• Coffee house <b>E</b></li> </ul>		

TEXT	CODE (INDIVIDUAL)
<b>ENGINEER &amp; ENVIRONMENTAL CONSULTANT:</b>	
<p><i>We've started banning smoking in a building which is good for health but when you say no smoking, people still smoke... Encourage them to have a proper smoking room if they need it. Ventilate it properly. Otherwise our staircase, our toilets will be full of smoke.</i></p> <p><i>...we should provide like surau or prayer area. Because productivity of staff is important. You must adapt to our culture. That is the reason why when we go for waterless urinal, we got problem... That's why we cannot just use LEED, Green Star. Localization is very important. (CTL-ME:409-419)</i></p>	<ul style="list-style-type: none"> <li>• Separately ventilated smoking room if needed</li> <li>• Prayer rooms <b>R</b></li> <li>• No waterless urinal</li> </ul>
<p><i>I think it is fair enough especially at the government office they provide the space for Muslims to pray. I think they also should provide the space for the Christians. Because the Chinese (Buddhists) is not so much, but I do know it is not good to share the same prayer rooms. (NYK-226-228)</i></p>	<ul style="list-style-type: none"> <li>• Prayer rooms <b>R</b></li> <li>• Facilities for Christians to perform spiritual quotient <b>R</b></li> </ul>
<p><i>...surau... maybe a special pantry for Malaysian food. We probably want to separate the smell because Malaysian food generally smells quite strong. If the air is recirculated back into the office, then the whole office could smell it. That will be quite particularly Malaysian. The pantry can be on every floor but the air for the pantry shouldn't be recirculated back to the office. (CKT-EC:266-271)</i></p>	<ul style="list-style-type: none"> <li>• Prayer rooms <b>R</b></li> <li>• Separately ventilated pantries to avoid the smell of strong Malaysian food to circulate in the office <b>E</b></li> </ul>
TEXT	CODE (INDIVIDUAL)
<b>BUILDER &amp; BUILDER-DEVELOPER:</b>	
<p><i>Maybe better surau facilities which are actually design for rather than an after thought that were the case for some buildings. (SA-B/D:129-130)</i></p>	<ul style="list-style-type: none"> <li>• Prayer rooms with better facilities <b>R</b></li> </ul>
<p><i>Surau should not be built as a small cubicle. It should be built in a more pleasing place with a fountain somewhere...with trees somewhere...not in the basement</i></p>	<ul style="list-style-type: none"> <li>• Prayer rooms with better facilities e.g. fountain, landscape <b>R</b></li> </ul>

CODE (GROUPED)	CATEGORY
<ul style="list-style-type: none"> <li>• Crèches (2x)</li> <li>• Eating outlets &amp; nursery – depend on size of the building and number of occupants</li> <li>• If the first few floors are car parks, solve the problem of emergency escape for children (from nursery on upper floor)</li> <li>• Mothers' room (2x)</li> <li>• Nursery (3x)</li> <li>• Nursery to cater for staff in the building and neighbouring blocks (2x)</li> <li>• Nursery – if the demand is sufficient – depending on the number and type of occupants</li> <li>• Nursery &amp; kindergarten</li> <li>• Nursery but depends on the office scale</li> </ul>	<p><b>FACILITIES FOR CHILDREN &amp; MOTHERS (14x)</b> (Mentioned by 12 interviewees)</p>
CODE (GROUPED)	CATEGORY
<ul style="list-style-type: none"> <li>• Café</li> <li>• Café on the ground floor accessible by the public</li> <li>• Cafeteria</li> <li>• Canteen</li> </ul>	<p><b>EATING FACILITIES (17x)</b> (Mentioned by 16 interviewees)</p>

<p><i>because it is a disregard. Just to comply with an authority requirement. Christians only go for Sunday prayers at the church. Muslims have 5 times prayers so they have to have a particular place for that. They should be given a place to relax at the same time wind out in a very conducive environment. With proper lounge for the Muslims to use after prayer... at the end of the day, other race will join in so they interact. Our culture is to mingle together. We should not segregate people with different culture and religious beliefs. Definitely the business will prosper. Their commitment to the company will be higher.</i></p> <p><i>Q.21a Yeah...that's why... still economic issue. They want more money. We must attend people's religion and needs. When people are happy and productive, it is a blessing for the organization. People will help during the company's hard times... So there should be a balance between work spaces and social spaces. (JD-B:281-299)</i></p>	<ul style="list-style-type: none"> <li>• Common area/lounge to relax and interact <b>C</b></li> <li>• Not to segregate people between culture and religious beliefs</li> <li>• Should be balanced because it will enhance staff productivity and intrinsic satisfaction</li> </ul>
<p><i>I think we should promote more natural ventilation in common areas... we should have more green areas, more open areas on site. Lounge that is accessible to the green area would be good. Traditional Malaysian features on or in the building would promote a Malaysian identity. Eating outlets &amp; nursery should be provided if the building is sizable enough with sizable number of occupants, I think that would cut away a lot of travelling for lunch and basic amenities. It could save a lot of petrol and time as well. Gym would promote good healthier lifestyle. (TYT-B:204-212)</i></p>	<ul style="list-style-type: none"> <li>• Promote the use of natural ventilation in common areas</li> <li>• More green and open areas on site <b>REC</b></li> <li>• Lounge accessible to the garden <b>C</b></li> <li>• Traditional Malaysian features on or in the building</li> <li>• Eating outlets &amp; nursery – depend on size of the building and number of occupants <b>E, N</b></li> <li>• Gym <b>REC</b></li> </ul>
<p><b>TEXT</b></p>	<p><b>CODE (INDIVIDUAL)</b></p>
<p><b>DEVELOPER, OWNER &amp; DEVELOPER-OWNER:</b></p>	
<p><i>Surau has to be provided at a very appropriate place, not at the basement. (NA-D:109)</i></p>	<ul style="list-style-type: none"> <li>• Prayer rooms at appropriate location <b>R</b></li> </ul>

<ul style="list-style-type: none"> <li>• Canteen or pantry facilities</li> <li>• Coffee house</li> <li>• Eating outlet</li> <li>• Eating outlet that is also accessible to the public</li> <li>• Eating outlets &amp; nursery – depend on size of the building and number of occupants</li> <li>• Eating place</li> <li>• Food court</li> <li>• Food court – must be in a good location</li> <li>• Food court at the top floor or podium with access to roof-top garden (e.g. food court with outdoor garden café)</li> <li>• Location of &amp; connection between toilets, prayer area &amp; food court – separated but next/near to each other</li> <li>• Pantry for breakfast (2x)</li> <li>• Separately ventilated pantries to avoid the smell of strong Malaysian food to circulate in the office</li> </ul>	
<p><b>CODE (GROUPED)</b></p>	<p><b>CATEGORY</b></p>
<ul style="list-style-type: none"> <li>• Separately ventilated smoking room if needed</li> <li>• Smoking room</li> </ul>	<p><b>FACILITY FOR SMOKERS</b></p>

<p><i>I think surau with ablution area, we already have it in our building guidelines but foreigners may not understand this. To enhance Malaysian culture, there are people who suggested having gyms and common spaces for more social interaction but I don't believe in that... For me, if you need to exercise you don't need to have a gym... Interaction in Malaysian culture is more like an empty talk. Nowadays nobody would force you to sit at your place quietly and do work. I think people don't think about that anymore. In this office at least if you talk, people know that you are doing work meaning that you don't have to have an area where you do that. Some of the tenants have got snooker room. I don't see that very important. (MM-D:234-252)</i></p>	<ul style="list-style-type: none"> <li>• Prayer rooms with ablution area (already in building guidelines) <b>R</b></li> <li>• Does not support the provision of recreational facilities &amp; interaction areas</li> </ul>	<ul style="list-style-type: none"> <li>• Naturally ventilated &amp; naturally lighted toilets</li> <li>• No waterless urinal</li> <li>• No waterless toilets, no urinals</li> </ul>	<p><b>NATURALLY VENTILATED TOILETS WITH NO WATERLESS TOILETS &amp; URINALS</b></p>
<p><i>The basic facilities should include prayer rooms, canteen, crèches, after-office-hours recreational facilities, and event halls. (BTC-D:143-144)</i></p>	<ul style="list-style-type: none"> <li>• Prayer rooms <b>R</b></li> <li>• Canteen <b>E</b></li> <li>• Crèches <b>N</b></li> <li>• After office-hours recreational facilities <b>REC</b></li> <li>• Event hall <b>C</b></li> </ul>	<ul style="list-style-type: none"> <li>• Own clinic</li> <li>• Reading area</li> <li>• Traditional Malaysian features on or in the building</li> <li>• Promote the use of <u>natural ventilation</u> in common areas</li> <li>• External lifts with daylight &amp; view</li> <li>• Capture the view outside (if any)</li> </ul>	<p><b>OTHER FEATURES/FACILITIES</b></p>
<p><i>So in office because we are more sociable... this is what our ID is promoting... we have 38 storeys, every 3 storeys they are connected by internal staircase and it becomes a vestibule. It is like a triple-volume with a lounge there. So every 3 storeys they have their definite break area, but they can meet other departments on the other 2 floors. It becomes a social area, everybody knows that they can go there from 1 to 2 or for informal discussions. We should encourage that. Because when you are relaxed at work, normally you love to come to work, but don't misuse. So you should have that break area instead of just cubicles.</i></p>	<ul style="list-style-type: none"> <li>• Triple volumes connected with internal staircases &amp; definite break areas or social areas <b>SP</b></li> <li>• Private gym &amp; pool <b>REC</b></li> <li>• Own clinic</li> <li>• Nursery &amp; kindergarten <b>N</b></li> <li>• Prayer rooms <b>R</b></li> <li>• Common spaces for social interactions give value to the building <b>C</b></li> </ul>	<ul style="list-style-type: none"> <li>• Cannot push to be balanced because of the net lettable area (Arch)</li> </ul>	<p><b>SOCIAL INTERACTION SPACES &amp; WORKSPACES CANNOT BE BALANCED</b></p>
		<ul style="list-style-type: none"> <li>• Must be balanced to reduce stress and to produce more productive worker (Arch)</li> <li>• Can be balanced if the developer/owner has the social obligation to do it or make it mandatory (Arch)</li> <li>• Should be balanced and should be one of the criteria to achieve a sustainable building (FM)</li> <li>• Should be balanced because this is</li> </ul>	<p><b>SOCIAL INTERACTION SPACES &amp; WORKSPACES CAN/SHOULD BE BALANCED</b></p>

<p><i>And the other thing that is good is when offices have their private gym, private pool... They even have their own clinic there... One more thing, you must have nursery or kindergarten...In our office building we have dedicated surau for 500 jemaah, you need that, that is part of communal space. (WR-D/O:407-444)</i></p> <p><i>Q.21a It is how you market it. My building...we are going for multimedia super-corridor equator status, so we are targeting foreign tenants. So I am talking about a different level of mentality, I'm not talking about the typical ones. So, for people like that, these spaces give value to the building. So it is not only sellable, for example – if you go to any high-rise, you have to go through a lift, and when you get out from the lift, you'll enter a lift lobby, likely you will see a fire door. It is after the fire door inside the office which is sellable. But in my office, we got rid of these fire doors. We considered our lift lobby as NFA [net floor area] as well because we designed it to make it more friendly corporate wise. So, although we took up any area to make a social area, actually we put it back. The lift lobby as part as NFA, because the lift lobby become private for whoever rent our floor. So you can put a signage there, greet people there. So immediately after you coming out from the lift lobby, you'll see the reception. So that is friendlier. (WR-D/O:448-458)</i></p>	<ul style="list-style-type: none"> <li>• Design in such a way that the lift lobby can be included as NFA – will become more private &amp; friendlier <b>SP</b></li> </ul>
TEXT	CODE (INDIVIDUAL)
FACILITY MANAGER:	
<p><i>...open verandahs, surau, pantries, sitting areas. (NM-FM:124)</i></p>	<ul style="list-style-type: none"> <li>• Open verandahs <b>C</b></li> <li>• Prayer rooms <b>R</b></li> <li>• Pantries for breakfast <b>E</b></li> <li>• Sitting areas <b>C</b></li> </ul>
<p><i>...prayer rooms for the Muslims. If you go to certain toilets, there are special areas with taps for ablution. Social wise of</i></p>	<ul style="list-style-type: none"> <li>• Prayer rooms <b>R</b></li> <li>• Nursery <b>N</b></li> </ul>

<p>a part of social obligation. These spaces help to create a livelier indoor environment and increase workers' productivity in a long run (PM)</p> <ul style="list-style-type: none"> <li>• Should be balanced because it will enhance staff productivity and intrinsic satisfaction (Bldr)</li> </ul>	
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<p><i>course in the UK and even Malaysia particularly in Putrajaya, they have the nursery... In many other buildings that we manage, they have their own cafeteria. They ensure that there is no smoking in the building... They have a spacious lounge for people to relax their brain after hectic work. I fully encourage them to exercise. Good health and healthy body is always the key to a healthy mind.</i></p> <p><i>Q.21a Yes, we should do that. In fact we should encourage that. This one should put under the GBI... if they want to go for Silver, Gold or Platinum, that should be one of the criteria. For example the renewable energy is one of the criteria under the energy efficiency for you to go for the Platinum. And you know at this point of time, renewable energy resources do not give you the monetary return. You don't get the ROI... It is very expensive. The payback period will be 15 or 20 years. When you've achieved the element of RE, you are doing the social responsibility requirement. (OCL-FM:250-281)</i></p>	<ul style="list-style-type: none"> <li>• Café <b>E</b></li> <li>• Lounge to relax <b>C</b></li> <li>• Recreational facilities to promote good health <b>REC</b></li> <li>• Should be balanced and should be one of the criteria to achieve a sustainable building</li> </ul>
<p><i>We have nursery in this ministry building. It caters for all the staff of ministries in this parcel. We have eating outlet also accessible to the public. Surau is a must. (KCD-FM:105-106)</i></p>	<ul style="list-style-type: none"> <li>• Nursery to cater for staff in the building and neighbouring blocks <b>N</b></li> <li>• Eating outlet that is also accessible to the public <b>E</b></li> <li>• Prayer rooms <b>R</b></li> </ul>
<p><i>Surau, eating outlets, smoking room, mothers' room... These spaces can attract and make your tenants happy (ZS-FM:131-133)</i></p>	<ul style="list-style-type: none"> <li>• Prayer rooms <b>R</b></li> <li>• Eating outlet <b>E</b></li> <li>• Smoking room</li> <li>• Mothers' room <b>N</b></li> </ul>
<b>TEXT</b>	<b>CODE (INDIVIDUAL)</b>
<b>REGULATOR, POLICY MAKER &amp; GOVERNMENT PROJECT IMPLEMENTOR</b>	
<p><i>In JKR HQ, it is our culture for the ladies to listen to 'ceramah' [religious talk] on Friday afternoon in the surau.</i></p>	<ul style="list-style-type: none"> <li>• Prayer rooms <b>R</b></li> <li>• Open space for recreational activities <b>REC</b></li> </ul>

<p>Sometimes we have 'aerobic' on open car park space. These activities make everybody meets and know each other. (CPK-PI:223-226)</p>	
<p>...prayer rooms. Open public lobbies where people can come and intermingle. It can even be patios for people to mingle around... some free space during break and lunch time instead of sitting in their room or workspace. Q.21a This is part of their social obligation. They have to do this. The environment inside the building would be nicer when we have those spaces. Sometimes when people are really bogged down with work, they can go down, relax their mind a bit and come back to work. I think these spaces make people more productive to work. Sometimes you need to see your senior person unofficially in a more amicable way you can chit chat in these spaces. Lots of things can be sorted out. Rather than go strictly to his office. It helps in the long run in terms of productivity. (KSK-PM:145-157)</p>	<ul style="list-style-type: none"> <li>• Prayer rooms <b>R</b></li> <li>• Open public lobbies, patios &amp; seating areas to intermingle during breaks and to conduct informal discussions <b>C</b></li> <li>• Should be balanced because this is a part of social obligation. These spaces help to create a livelier indoor environment and increase workers' productivity in a long run.</li> </ul>
<p>Whenever I look at building plans for approval, I always look at the location of surau. It must be in an appropriate location, not in the dark basement. Ground floor must have café for public use. That's why if you work or stay or a visitor in Putrajaya you can go and eat at any office buildings. We also ensure that 15% of the site area is for open or green spaces. I don't think Kuala Lumpur City Hall is doing the same. (AMN-R/PM:114-118)</p>	<ul style="list-style-type: none"> <li>• Prayer rooms – must be in a good location <b>R</b></li> <li>• Café on the ground floor accessible by the public <b>E</b></li> <li>• At least 15% of the site area is open or green spaces <b>REC</b></li> </ul>
<p>Facilities we control it in terms of the floor levels, in term of fulfilling the requirement for the handicapped, public spaces and connectivity is also important to us. And these are some technical requirements that we will look at when we approve any plans. Like the location of the praying area, food area facilities and how you connect them. Toilets, praying area and food area need to be separated but must be next/near to each other because we use them</p>	<ul style="list-style-type: none"> <li>• Location of &amp; connection between toilets, prayer area &amp; food court – separated but next/near to each other <b>R</b></li> <li>• If no food court on upper floor - prayer room is best at the podium/first floor <b>R</b></li> <li>• If the first few floors are car parks,</li> </ul>



<p><i>all together. And if there is a lookout point or view, how do they try to capture the view...</i></p> <p><i>Surau...the best is at the podium level. The highest you should go is at the first floor, unless there is a food court facilities on the higher level and surau should be near there... But we face a problem when they provide car park until the 6th floor of the podium. After the 6th floor, they start putting facilities so we are quite upset when the kids' nursery is on the higher level. Because, in case of emergency it is difficult for the children, but the problem is that the first few floors are always the car park.</i></p> <p><i>It [nursery] is already a requirement now to cater for the staff and neighbouring offices. We also have it in our building with proper interior, toys and fittings. It is easy for those whose working time is from 8 to 5. Not for people like us whose working time tend to drag. It is a good facility and we are doing it throughout the city. (NN-R/PM:272-292)</i></p>	<p>solve the problem of emergency escape for children (from nursery on upper floor) <b>N</b></p> <ul style="list-style-type: none"> <li>• Nursery to cater for staff in the building and neighbouring blocks <b>N</b></li> <li>• Capture the view outside (if any)</li> </ul>
<p><i>The first thing that comes to my mind is of course the surau. We have our own coffee corner, more like a pantry. We do have a gymnasium, but I rarely use it. The gymnasium was the idea of our CEO who concerns about our health. (MCA-FM:150-152)</i></p>	<ul style="list-style-type: none"> <li>• Prayer rooms <b>R</b></li> <li>• Pantries for breakfast <b>E</b></li> <li>• Gym <b>REC</b></li> </ul>
<p><i>Prayer rooms are already provided, but crèches should be provided in environments that can enhance worker "quality of life" (e.g. where the majority of staffs are mothers with small children who are often left poorly attended). Additionally, canteen or reasonable pantry facilities should be provided where it can help the lower income workers to manage their finances better. Unfortunately, the local environment on "religious segregation" militates against the socially beneficial option of providing common group cultural and community development/interaction features. (GL-PM:164-170)</i></p>	<ul style="list-style-type: none"> <li>• Prayer rooms <b>R</b></li> <li>• Crèches <b>N</b></li> <li>• Canteen or pantry facilities <b>E</b></li> <li>• Common areas to enhance cultural &amp; community development/interaction <b>C</b></li> </ul>

**Q.22 Do you think it is important for office space arrangements in Malaysia to reflect the hierarchy or structure of the organisation? Q.23a What are other parameters for arranging the office space in Malaysian office buildings?**

TEXT	CODE (INDIVIDUAL)
<b>ARCHITECT:</b>	
<p><i>Yes, we have to cater for that hierarchy but the space should be as open as possible. Top management people should be given their own room because they need their privacy and you don't want any leak of confidential information. Government employees always want a room for themselves. But below the level of big bosses, they should be in open space.</i></p> <p><i>In architects' offices or any design practice offices, the work spaces are usually very open with no group seatings. The bosses are in one corner together with the staffs. They work together. Firms like finance, banking, and insurance cannot be arranged like designers' office. (KK-A:125-131)</i></p>	<ul style="list-style-type: none"> <li>• Yes but the space should be as open as possible</li> <li>• For government office, only top management people should be given enclosed rooms. The rest should be in open spaces.</li> <li>• Only important for organizations with high security &amp; privacy level like banking, finance and insurance firms</li> <li>• Design practice offices usually are very open, regardless of hierarchy/status.</li> </ul>
<p><i>Not necessary, sometimes it is not good because that is social segregation. It should be separated by functions rather by hierarchy or status. (WS-A:134-135)</i></p>	<ul style="list-style-type: none"> <li>• No. That is social segregation. Spaces should be arranged by functions not hierarchy</li> </ul>
<p><i>...it depends on the culture of the organizations. I have seen some organizations whereby their managing directors do not ask for an enclosed office. They said that they can have an open plan office. They only close up their meeting rooms. The rest are all open. And there are the other extreme whereby they have all individual offices. In certain types of companies, the bosses with old-school-of-thoughts, they will require their own private offices... We have done some government offices before, except for the very senior officers, 1-2 of them get their enclosed office, and the rest are all open plans. (CSA-A:217-225)</i></p>	<ul style="list-style-type: none"> <li>• Depends on the culture of the organization</li> <li>• For government office, only top management people should be given enclosed rooms. The rest should be in open spaces</li> </ul>
<p><i>No. If it is a highly secretive business with tier hierarchy, then there needs to be privacy and security like banks. Every business is different. For design practices, open</i></p>	<ul style="list-style-type: none"> <li>• Only important for organizations with high security &amp; privacy level like</li> </ul>

CODE (GROUPED)	CATEGORY
<b>From all 30 interviewees</b>	
<p><b>General practice</b></p> <ul style="list-style-type: none"> <li>• Has become Malaysian practice</li> <li>• Malaysian culture still reflect the hierarchy/status especially the government.</li> <li>• Important to reflect hierarchy</li> <li>• Yes but the space should be as open as possible.</li> </ul> <p><b>Banking, finance and insurance &amp; other corporate firms</b></p> <ul style="list-style-type: none"> <li>• Only important for organizations with high security &amp; privacy level like banking, finance and insurance firms (2x)</li> <li>• Important for banks with VPs/CEOs on the top floors but the provision should not be excessive.</li> <li>• Through observation, provision for top management people is excessive which is wasteful.</li> <li>• The culture of Malaysian government &amp; corporate companies is still based on hierarchy/status. The higher is their status, the more respect is earned.</li> </ul> <p><b>Government buildings</b></p> <ul style="list-style-type: none"> <li>• Government buildings are still planned based on hierarchy/status.</li> </ul>	<p><b>Important to follow hierarchy especially government buildings, banks, finance &amp; insurance firms</b></p>

<p>environment is the best. (TLM-A:207-212)</p>	<p>banking, finance and insurance firms</p> <ul style="list-style-type: none"> <li>• It is best for design practice offices to have open environment.</li> </ul>	<ul style="list-style-type: none"> <li>• Government buildings are still planned based on hierarchy/status. The higher is their status, the bigger is their entitlement (4x).</li> <li>• Through observation, provision for top management people is excessive which is wasteful.</li> <li>• The culture of Malaysian government &amp; corporate companies is still based on hierarchy/status. The higher is their status, the more respect is earned.</li> <li>• Important for government buildings due to the compliance to EPU's guidelines (2x)</li> <li>• Important for government buildings due to the compliance to EPU's guidelines. The higher is their status, the bigger is their entitlement. Top management people are entitled for a room but many of those in the lower hierarchy manage to get their own room anyway.</li> </ul>	
<p><i>That is too deterministic, too authoritarian! Because most organisations have different organisation structure. Some can be hierarchical, some can be democratic. It depends on the business that is involving. The more routine work that needs to be done, the tenancy tends to be more hierarchical. Of course it can be argued to make people to enjoy routine work then you have a different strategy towards office planning.</i></p> <p><i>Open planning is not all good because it is difficult to have private conversation. And sometimes you need to have private conversations to talk about business, to talk about finance, staff and etc. Then when they want to have private conversation, they go to separate room. (KY-A:166-174)</i></p>	<ul style="list-style-type: none"> <li>• It depends on the organization structure and its business.</li> <li>• Total open plan has lack of privacy for private conversations/meetings. Need to solve this problem.</li> </ul>		
<p><i>In the American environment or in the English environment...even the English are further ahead of the game than the Europeans is that once you might be the top guy, it is a flat line, it is not so much a pyramid. It is more about the grouping...it's more about coming like that [showing a hand gesture indicating flat line] versus I am at the top and everybody is down [showing a hand gesture indicating pyramid]. So that reflects in their planning. I think this is idealist but I don't think culturally we are ready in Malaysia. We can go up to 3 or 4. In certain areas that is why only communications in IT companies and communications that have flat levels. Government status is felt by room sizes and what you get eg. chairs versus what pay you get! (SH-A:285-293)</i></p>	<ul style="list-style-type: none"> <li>• Malaysian culture still reflect the hierarchy/status especially the government.</li> <li>• Government buildings are still planned based on hierarchy/status. The higher is their status, the bigger is their entitlement.</li> </ul>	<ul style="list-style-type: none"> <li>• Design practice offices usually are very open, regardless of hierarchy/status.</li> </ul>	<p><b>Not important to follow hierarchy.</b></p>

<p>once you have a room, it is only for a one person. (SA-A:276-278)</p>	
<p><i>Let say you are designing for Japanese company. Japanese have their own culture, so that culture has been thousands of years; they respect their boss like their emperor. So the cultural aspects have to be cooperated in the design. As an architect you need to follow. But if you are talking about Malaysians, there is a lot like 3 races- Malay, Chinese and Indians. So it depends on their cultural values and how the top management interpret their management principles. Malaysian government still got the hierarchy, the Minister, the KSU, the directors of the departments. It cannot run away from that. (LCH-A:270-279)</i></p>	<ul style="list-style-type: none"> <li>• Depends on the organization's cultural value and how the top management interpret their management principles.</li> <li>• Government buildings are still planned based on hierarchy/status.</li> </ul>
<p><i>Not so. The more flexible the space, the more "creative configuration" is allowed for arrangement of office space. (NB-A:167-168)</i></p>	<ul style="list-style-type: none"> <li>• Not so. Space should be planned for maximum flexibility</li> </ul>
<b>TEXT</b>	<b>CODE (INDIVIDUAL)</b>
<b>ENGINEER &amp; ENVIRONMENTAL CONSULTANT:</b>	
<p><i>In green building and energy efficient building – because we talk about as much daylighting as possible, as much view as possible, the tendency now is to move enclosed office spaces into the internal part of the building rather than to the external [perimeter walls]. So there are more open spaces getting more daylighting and views in. We have moved towards that direction now... The government must change. One thing that I observe is that the moment you are at certain scale, you are entitled for split units. It is ridiculous! Same thing when you talk about government office building. They used to have some good standard buildings with verandah, corridor, shaded and so on. The damage is when it follows hierarchy, people say, "I want my room, I want my room! So I want my unit even though it is centralized." That's my observation. (CTL-ME:425-448)</i></p>	<ul style="list-style-type: none"> <li>• We move enclosed spaces towards the internal part of the building and open spaces around the perimeter walls so that more people/spaces receive daylight and view.</li> <li>• Government buildings are still planned based on hierarchy/status. The higher is their status, the bigger is their entitlement.</li> </ul>

<ul style="list-style-type: none"> <li>• It is best for design practice offices to have open environment.</li> <li>• No. A good office planning is an open concept.</li> <li>• For government office, only top management people should be given enclosed rooms. The rest should be in open spaces (3x)</li> <li>• No longer practiced. Only the top bosses should be given a higher quality space and better facilities. The rest should be open.</li> <li>• We move enclosed spaces towards the internal part of the building and open spaces around the perimeter walls so that more people/spaces receive daylight and view.</li> </ul>	
<b>CODE (GROUPED)</b>	<b>CATEGORY</b>
<ul style="list-style-type: none"> <li>• The current poor practice is to give daylight to enclosed offices occupied by those who are out of the offices most of the times. Should give daylight to the majority or people who occupy the building most of the time.</li> <li>• Open plan can be done as long as the boss(es) are at the far end away from the public side. Otherwise, promote ¾ enclosures to achieve semi private spaces.</li> <li>• No. That is social segregation. Spaces should be arranged by</li> </ul>	<p><b>Continued</b></p>

<p><i>For me, if I were the CEO of a 13th storey office building, I absolutely will look which floor is suitable for me. So I think it is not necessary for top bosses to occupy the top floor. If you mention about the sizes of the room area, the general perception normally if you are the CEO, you need a bigger room. But some CEO offices that I've seen are too spacious. And the CEOs are hardly there in their offices. So I think it is just a waste of an office space. (NYK-ME:238-243)</i></p>	<ul style="list-style-type: none"> <li>Through observation, provision for top management people is excessive which is wasteful.</li> </ul>
<p><i>The way we've been approaching this thing right now is that in our building design, normally we tell them that we need to give daylight to the people who are there most of the time. This will benefit the majority. If you are not there all the time, you can switch on the light every time you come. The senior people are the ones who are out of the office most of the times. So they can be given special rooms when daylight is actually further away. Just a little bit opposite of what we have been practicing right now where they are given rooms with windows but they are not there to benefit from the daylight all the time. (CKT-EC:276-282)</i></p>	<ul style="list-style-type: none"> <li>The current poor practice is to give daylight to enclosed offices occupied by those who are out of the offices most of the times. Should give daylight to the majority or people who occupy the building most of the time.</li> </ul>
<b>TEXT</b>	<b>CODE (INDIVIDUAL)</b>
<b>BUILDER &amp; BUILDER-DEVELOPER:</b>	
NA	<ul style="list-style-type: none"> <li>NA</li> </ul>
<b>TEXT</b>	<b>CODE (INDIVIDUAL)</b>
<b>DEVELOPER, OWNER &amp; DEVELOPER-OWNER:</b>	

<p>functions not hierarchy</p> <ul style="list-style-type: none"> <li>Not always. Spaces should be arranged according to the function/tasks of the users.</li> <li>Not so. Space should be planned for maximum flexibility</li> <li>Should not be practiced. This has nothing to do with the company's performance. Spaces should be arranged according to departments and working relationships and not on individuals.</li> <li>Total open plan has lack of privacy for private conversations/meetings. Need to solve this problem.</li> <li>Not so important. Mainly multinational companies have the culture of "flat" hierarchy. Common discussion rooms must be provided for adequate &amp; convenient client services &amp; relation building. Top management must be provided with facilities to conduct commercially sensitive or industrial relation activities. Bosses, staff and customers must be visually connected.</li> </ul>	
<b>CODE (GROUPED)</b>	<b>CATEGORY</b>

<p><i>I don't think it should be practised. But the government is practicing that. Every level of hierarchy has their own requirement in terms of room sq.ft. Staffs have only a certain size of cubicle. That is what I really disagree. But this is in the guideline. For me, space arrangement that reflect hierarchy has nothing to do with the performance of the company.</i></p> <p><i>Q.22a Spaces should be arranged according to departments and working relationships but not based on individuals. For example, one boss with his support teams all in one big space/ floor. Not in such a way that the whole space/floor are for the few bosses or individuals. (NA-R/PM:112-120)</i></p>	<ul style="list-style-type: none"> <li>• Should not be practiced. This has nothing to do with the company's performance. Spaces should be arranged according to departments and working relationships and not on individuals.</li> <li>• Government buildings are still planned based on hierarchy/status. The higher is their status, the bigger is their entitlement.</li> </ul>
<p><i>I think that is no longer being practised. Obviously if you are the boss i.e. no. 1 boss or no. 2 boss, you have to be given a higher quality space and better facilities. But I think it should stop there. The rest should be more open because I believe in interaction. (MM-D:270-273)</i></p>	<ul style="list-style-type: none"> <li>• No longer practiced. Only the top bosses should be given a higher quality space and better facilities. The rest should be open.</li> </ul>
<p>Yes (BTC-D:147)</p>	<ul style="list-style-type: none"> <li>• Important to reflect hierarchy</li> </ul>
<p><i>Speaking from the owner's point of view for a bank, yes they want that. Because all the Vice Presidents they put them at the top floors, the ones who deal a lot with vendors at the lowest floor. That is how it is. You should have that hierarchy in a way, because it is the culture of Malaysia, but not too much, not excessive. There are buildings that have CEO who occupies the whole floor, I think no, that is excessive. Yes we have the provision, they've got their entitlement for that, but it shouldn't be excessive. An excessive provision is a waste...</i></p> <p><i>Yes, for government buildings you have no choice, because there are a lot of confidential documents all around in government offices as well as corporate companies, so you need that kind of hierarchy. It also relates to respect. In our culture, we respect people</i></p>	<ul style="list-style-type: none"> <li>• Important for banks with VPs/CEOs on the top floors but the provision should not be excessive.</li> <li>• The culture of Malaysian government &amp; corporate companies is still based on hierarchy/status. The higher is their status, the more respect is earned.</li> <li>• Open plan can be done as long as the boss(es) are at the far end away from the public side. Otherwise, promote ¾ enclosure to achieve semi private spaces.</li> </ul>

<ul style="list-style-type: none"> <li>• Depends on the culture of the organization</li> <li>• It depends on the organization structure and its business.</li> <li>• Depends on the organization's cultural value and how the top management interpret their management principles.</li> <li>• Depends on the company itself</li> <li>• For private sector, it will depend on the management and the building condition.</li> </ul>	<p><b>Depends on the organization</b></p>
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<p><i>according to their status. So to gain that respect you need that kind of level...</i></p> <p><i>Actually, it doesn't mean that if you enclose it, it should be totally closed. Because I would promote for ¾ enclosure as well, that kind of privacy, semi privacy or semi private. And also when you have that open plan, when you intended to do that way, by all means, do it. But make sure that your bosses are at the far end because it still can be visually connected but at least far away from the public side. So at least nobody can come and easily meet up the boss without going through a certain procedure. (WR-D/O:477-507)</i></p>	
<b>TEXT</b>	<b>CODE (INDIVIDUAL)</b>
<b>FACILITY MANAGER:</b>	
<p><i>Yes for government buildings. We have to follow the guidelines issued by EPU [Economic Planning Unit, Prime Minister Department]. (KCD-FM:109-110)</i></p>	<ul style="list-style-type: none"> <li>• Important for government buildings due to the compliance to EPU's guidelines</li> </ul>
<p><i>This is the Malaysian practice I guess, but we are moving away from that. (ZS-FM:136)</i></p>	<ul style="list-style-type: none"> <li>• Has become Malaysian practice</li> </ul>
<b>TEXT</b>	<b>CODE (INDIVIDUAL)</b>
<b>REGULATOR, POLICY MAKER &amp; GOVERNMENT PROJECT IMPLEMENTOR</b>	
<p><i>For government buildings, we have to follow the EPU's guideline. People on a certain hierarchy are entitled to get a certain size of room. The guideline mentions that only the Head of Sections are entitled for a room because they keep secret and confidential documents. For people on the lower hierarchy, we were told to go for open planning. Somehow along the line, many of them get their own room! (CPK-PI:232-236)</i></p>	<ul style="list-style-type: none"> <li>• Important for government buildings due to the compliance to EPU's guidelines. The higher is their status, the bigger is their entitlement. Top management people are entitled for a room but many of those in the lower hierarchy manage to get their own room anyway.</li> </ul>
<p><i>For Government office buildings, architects have to follow the space area guidelines by Economic Planning Unit, Prime Minister Department. For private office buildings,</i></p>	<ul style="list-style-type: none"> <li>• Important for government buildings due to the compliance to EPU's guidelines</li> </ul>

<p><i>they are more flexible.</i></p> <p><i>Q.22a Definitely they [the senior staff] have to be in separate area but I don't feel it should be a secluded area. That area should be easily accessible because the common trend now is that the younger staffs have a more open area... The very senior staffs, of course they should have their own room but for the majority, it should be more open space. (KSK-R/PM:160-171)</i></p>	<ul style="list-style-type: none"> <li>• For government office, only top management people should be given enclosed rooms. The rest should be in open spaces.</li> </ul>
<p><i>Not always. Spaces should be arranged to give a sense of formality and privacy depending on the tasks of the users. (AMN-R/PM:121-125)</i></p>	<ul style="list-style-type: none"> <li>• Not always. Spaces should be arranged according to the function/tasks of the users.</li> </ul>
<p><i>That depends on the company itself. (NN-R/PM:295)</i></p>	<ul style="list-style-type: none"> <li>• Depends on the company itself</li> </ul>
<p><i>I think so especially in government offices, where the top hierarchy usually have bigger rooms, their own private restroom, which are convenient and comfortable to them. In the private sector, it depends on the management and the building condition itself. (MCA-PM:156-158)</i></p>	<ul style="list-style-type: none"> <li>• For private sector, it will depend on the management and the building condition.</li> <li>• Government buildings are still planned based on hierarchy/status. The higher is their status, the bigger is their entitlement.</li> </ul>
<p><i>Not so.</i></p> <p><i>Q.22a Some companies, mainly multinationals have replicated IBM's culture of "flat" hierarchy. Some discussion room facilities must of course be provided for adequate &amp; convenient client services &amp; relation building, and at least the top management needs facilities to cater for confidential work as needed, where commercially sensitive or industrial relations activities have to be conducted. Nevertheless, the "bosses" must be visible for customer interaction if necessary &amp; fro the bosses to see that customers are dealt with competently &amp; efficiently. (GL-PM:173-181)</i></p>	<ul style="list-style-type: none"> <li>• Not so important. Mainly multinational companies have the culture of "flat" hierarchy. Common discussion rooms must be provided for adequate &amp; convenient client services &amp; relation building. Top management must be provided with facilities to conduct commercially sensitive or industrial relation activities. Bosses, staff and customers must be visually connected.</li> </ul>



**Q.24 What is the place of education and training in order to increase knowledge and awareness in green/sustainable issues? Q.24a How do you achieve that in your organisation? Q.24b Does the organisation allocate annual budget for this?**

TEXT	CODE (INDIVIDUAL)
<p><b>ARCHITECT:</b></p> <p><i>Yes, very important.</i>  <i>Q.24a My boss doesn't care about this. As a designer, I'll do something about it. Sometimes, any seminars or conferences were asked by our clients for me to attend. Only then my boss will pay me to go. When most of us want to go a conference, my boss only sends one person. If I leave this company, I don't think there is anybody else who really go for green or sustainable design.</i>  <i>Q.24b I don't think so.</i>                      (KK-A:151-159)</p>	<ul style="list-style-type: none"> <li>• Very important</li> <li>• Employer doesn't care much. Employer only pays when clients ask to the architect to attend.</li> <li>• No annual budget allocated</li> </ul>
<p><i>Yes, it should start from all levels even in schools.</i>  <i>Q. 24a Actually we believe in self-training. So a thing like this is not alien and it is easily accessible. We can learn. It is a part of us to select materials as part of criteria that we normally asked. So it is more like a self-thought. And if you want to use rainwater harvesting, it is all available. You don't need to go for a formal training.</i>  <i>Q. 24b Yes, but not limited to sustainable issues.</i>                      (WS-A:194-201)</p>	<ul style="list-style-type: none"> <li>• Should start from schools</li> <li>• Believe more in self-training and self-thought.</li> <li>• Annual budget is allocated but not limited to green/sustainable issues</li> </ul>
<p><i>Because we are designers, so it is important.</i>  <i>Q. 24a In our company, we send them all for CPD. The senior staff will go for CPD then they come back and teach other junior technical staff.</i>  <i>Q. 24b Yeah, definitely.</i>                      (CSA-A:261-267)</p>	<ul style="list-style-type: none"> <li>• Important</li> <li>• Only senior architects are sent to attend for LAM/PAM CPD programmes.</li> <li>• Budget is allocated.</li> </ul>

CODE (GROUPED)	CATEGORY
<p><b>From all 30 interviewees</b></p> <ul style="list-style-type: none"> <li>• Very important (9x)</li> <li>• Important (3x)</li> <li>• Absolutely important.</li> <li>• Exceptionally important.</li> <li>• It is part and parcel of life</li> <li>• Should start from schools (2x)</li> <li>• It is the key component of raising awareness. Needs to be initiated at an early stage and must be sustained over time.</li> <li>• Environmental awareness should start from young.</li> <li>• Very important and should be emphasized in the universities</li> <li>• Important to be ecologically literate in order to know how to balance between biotic and abiotic components</li> <li>• Should be incorporated in architectural education and LAM/PAM CPD programmes.</li> <li>• Public awareness is very important. Collaborated with PAM to organized seminars related to green buildings but many were not interested or not considering this issue as their priority</li> </ul>	<p><b>SUPPORT THE IMPORTANCE OF EDUCATION &amp; TRAINING</b></p>

<p><i>Exceptionally!</i>                  Q. 24a Most of my staff go for CPD. PAM has a very very good CPD courses.                  Q. 24b Yes.</p> <p><b>I heard that PAM would make a certain CPD points compulsory for green/sustainable issues? Is it true?</b></p> <p><i>Not yet. Because we just came out with it. We think they will be over-subscribed so we can't make it compulsory. Nowadays, to book big halls are very expensive, so we are going to use out PAM premise and we can only take 150 people. If we make it compulsory, we have to go and rent space. But we run the thing every month. We are doing with MS1525 starting from next month for 2 half-days. There will be some exercises to do some calculations required by the standard. MS1525 is the benchmark. We are launching the GBI but to get to the GBI...we are down here [showing hand gesture at waist level], I need to pull all architects and engineers to the benchmark first. If we don't even know how to get to the benchmark, we will never be able to close the gap.</i>                  (TLC-A:229-244)</p>	<ul style="list-style-type: none"> <li>• Exceptionally important.</li> <li>• Most architects go for LAM/PAM CPD programmes.</li> <li>• Budget is allocated.</li> <li>• PAM is still not ready to make certain CPD credit hours compulsory for green/sustainable issues</li> <li>• PAM is currently conducting CPD seminars on MS1525 to raise the professionals' knowledge towards achieving the benchmark level. Later, CPD programmes will focus on achieving GBI ratings which is above the benchmark level.</li> <li>• Budget is allocated.</li> </ul>
<p><i>I think it is important to be ecologically literate...When you understand ecology then you realize the characteristics of ecosystem which are crucial to the well-being. So this differentiates our approach with other green architects. We start from ecological point of view. Because I am an ecologist. Most architects and engineers think green buildings are eco-engineering. You start with photovoltaic,</i></p>	<ul style="list-style-type: none"> <li>• Important to be ecologically literate.</li> <li>• Staffs learn from internal lectures &amp; training conducted by employer</li> </ul>

<ul style="list-style-type: none"> <li>• The industry must take the lead</li> <li>• We have to increase our knowledge and awareness</li> </ul>	
<ul style="list-style-type: none"> <li>• Only senior architects are sent to attend for LAM/PAM CPD (Continuing Professional Development) programmes.</li> <li>• Most architects go for LAM/PAM CPD programmes.</li> <li>• Only the associate level go to conferences and seminars</li> <li>• Attend one international conference overseas on green/sustainable issues every year to learn from others – because what is offered in Malaysia is still in infancy level.</li> <li>• Training and education is encouraged among staffs.</li> <li>• Staffs are encouraged to attend conferences and seminars (2x)</li> <li>• Attend seminars, forums conducted by the qualified experts and recognised organisations.</li> <li>• Attend conferences and forums</li> <li>• Attend exhibitions to keep abreast with the latest available green/sustainable products</li> <li>• Further knowledge via training or education at university by attending night classes</li> <li>• On-going training to keep updated</li> </ul>	<p><b>EMPHASIS ON ATTENDING/ ORGANIZING FORMAL EDUCATION &amp; TRAINING OUTSIDE</b></p>

<p><i>recycled systems, you have CHP, you have co-generation, recycled materials and that's green! But no. Green buildings means you have to have a balance between biotic and abiotic components. Ecosystem has both. One is organic and another one is inorganic. If you don't acknowledge this, then it is just engineering.</i></p> <p><i>Q. 24a My staff learn from me.</i> (KY-A:202-214)</p>		<p>with the current technologies</p> <ul style="list-style-type: none"> <li>• Staffs have to be trained for a minimum of 40hrs/yr because the company is ISO 9000 certified</li> <li>• Every year, senior managers and engineers are sent to attend a conference overseas</li> <li>• Attend trainings and education programs</li> <li>• Organise workshops and seminars.</li> <li>• Organize conferences on green issues every two years. Staffs are encouraged to participate.</li> <li>• Attend and give trainings &amp; awareness programs</li> </ul>	
<p><i>It's been part and parcel but as I said not any job can take the same amount of emphasis because of the clients that you get. Not all clients buy it.</i></p> <p><i>Q. 24a They only get it [education and training] because of the way in certain jobs that they practice that they put an emphasis on that. But they don't get training. This year I am thinking to give some training because they need to know about the OTTVs, they need to know what kind of checklist and what sort of things to look at. Because we have the Green Building Index, maybe we'll train them. Associate level goes to conferences and seminars but not...</i></p> <p><i>Q. 24b Yes</i> (SH-A:314-323)</p>	<ul style="list-style-type: none"> <li>• It is part and parcel of life</li> <li>• Architects are given the necessary in-house trainings when the clients of their projects emphasize on green/energy efficiency.</li> <li>• Only the associate level go to conferences and seminars</li> <li>• Budget is allocated.</li> </ul>		
<p><i>Educating these issues and creating awareness should even start from school.</i></p> <p><i>Q. 24a Yeah, some of them do. It all depends on the company. Big corporate companies are able to do that but sometimes it all goes back to the attitude of the staffs themselves. People working in big organizations have the opportunity to move up the ladder but for small companies like ours, it is hard. Sometimes, we don't even know whether they will be loyal or not after all the investments. The Japanese and the Koreans are known since the ancient times for their loyalty. That's why people over there stay in the company until they retire and we don't have</i></p>	<ul style="list-style-type: none"> <li>• Should start from schools</li> <li>• Unlike big corporate companies, it is difficult for small companies to invest on education and trainings because staffs can easily leave to search for higher position/pay outside.</li> <li>• No annual budget allocated.</li> </ul>	<ul style="list-style-type: none"> <li>• Staffs learn from internal lectures &amp; training conducted by employer (2x)</li> <li>• Architects are given the necessary in-house trainings when the clients of their projects emphasize on green/energy efficiency.</li> <li>• Do in-house trainings and knowledge- and information-sharing every week.</li> <li>• Related editorials and magazines are subscribed for staffs to increase</li> </ul>	<p><b>EMPHASIS ON IN-HOUSE TALKS/LECTURES AND INFORMAL/SELF-TRAINING/SELF-THOUGHT</b></p>

<p>that. (SA-A:304-314)</p>	
<p>Architectural programmes should incorporate all the sustainable courses and subjects. After university it should be handled by the Board of Architects or Architects Association because they have the CPD. Q. 24a The CPD in Malaysia for architects usually is compulsory. So every architect has to accumulate at least 10 CPD points. So if they incorporate sustainability awareness &amp; education, introducing new sustainable or green technologies in CPD programmes, indirectly they disseminate all the information into the architectural profession. Maybe 50% out of 10 CPD points, are made compulsory for sustainability seminars and conferences. Q. 24b Currently, no. (LCH-A:292-303)</p>	<ul style="list-style-type: none"> <li>• Should be incorporated in architectural education and LAM/PAM CPD programmes.</li> <li>• Suggest for 50% out of 10 CPD credit hours to be made compulsory for education &amp; trainings related to green/sustainable issues.</li> <li>• No annual budget allocated.</li> </ul>
<p>Very important, highly supported. Q. 24a Our corporate philosophy is 'Architecture for a Sustainable Future'. Q. 24b Indirectly through all our projects. (NB-A:181-185)</p>	<ul style="list-style-type: none"> <li>• Very important.</li> <li>• Budget is allocated.</li> </ul>
TEXT	CODE (INDIVIDUAL)
ENGINEER & ENVIRONMENTAL CONSULTANT:	
<p>Education and awareness is absolutely important... Architects require 10 CPD points a year. I requested from the Board of Architects' President, out of these 10 points, make 2 compulsory: 1 for fire safety and 1 for green. The other 8, they can take anything. I am still requesting. Engineers' are a bit haywire. They have 50 points all over the place, we have to revamp it and get it right.</p>	<ul style="list-style-type: none"> <li>• Absolutely important.</li> <li>• Requested LAM to make 2 out of 10 CPD credit hours compulsory for fire safety and green issues.</li> <li>• Staffs learn from internal lectures &amp; training conducted by employer</li> </ul>

<p>their knowledge and awareness on green products</p> <ul style="list-style-type: none"> <li>• It is useless to spend for education &amp; trainings because staffs won't practice if they do not understand the importance of these issues. Need to inculcate the culture and enthusiasm first. Conduct morning talks on environmental issues to supervisors to create awareness and to build their interest and enthusiasm to change</li> <li>• Invite speakers to give talks to staffs</li> <li>• Conduct internal discussions on green/sustainable issues</li> <li>• Conduct in-house green awareness programmes every year.</li> </ul>	
<ul style="list-style-type: none"> <li>• Believe more in self-training and self-thought.</li> <li>• Give internet access to all staffs to gain knowledge and information by browsing</li> <li>• Information can be obtained through readings and discussions</li> </ul>	
CODE (GROUPED)	CATEGORY
<ul style="list-style-type: none"> <li>• Employer doesn't care much. Employer only pays when clients ask to the architect to attend.</li> <li>• Unlike big corporate companies, it is difficult for small companies to invest on education and trainings because</li> </ul>	<p><b>NO EMPHASIS ON EDUCATION AND TRAININGS</b></p>

<p>Q. 24a I give internal lectures...</p> <p>Q. 24b I don't actually give an annual budget. Any staff request, I give. (CTL-ME: 484-493)</p>	<ul style="list-style-type: none"> <li>Budget is given based on request.</li> </ul>	<p>staffs can easily leave to search for higher position/pay outside.</p> <ul style="list-style-type: none"> <li>Small supplier – training for staffs is not really needed</li> <li>Certain designers in the government sector are not enthusiastic to attend any education and trainings in this issue</li> </ul>	
<p><i>I would say giving a public awareness is very important. But I think it is more on the attitudes also. I think there has been so much publicity on newspapers regarding green and sustainability issues. Yet no many people take these seriously. They have too many excuses. For example, Institute of Architects including myself even organized free seminars related to green issues in the building industry during weekends but people just said they have no time. They think it is not a priority in practicing it as an engineer. They are not interested. There are some people who are like that. But we also do have others that really care.</i></p> <p>Q. 24a My company is just a small set up. We are supplying products, so training is not so really needed.</p> <p>Q. 24b Honestly , we don't have it (NYK-ME:261-272)</p>	<ul style="list-style-type: none"> <li>Public awareness is very important. Collaborated with PAM to organized seminars related to green buildings but many were not interested or not considering this issue as their priority</li> <li>Small supplier – training for staffs is not really needed</li> <li>No annual budget allocated</li> </ul>	<p><b>The budget is allocated</b></p> <ul style="list-style-type: none"> <li>Annual budget is allocated but not limited to green/sustainable issues (2x)</li> <li>Budget is allocated (16x)</li> <li>Budget is given based on request.</li> </ul> <p><b>No budget is allocated</b></p> <ul style="list-style-type: none"> <li>No annual budget allocated (7x)</li> </ul>	<p><b>ANNUAL BUDGET ALLOCATION</b></p>
<p><i>It is very important in this organization.</i></p> <p>Q. 24a We do trainings almost every week. We are conducting them ourselves. We share knowledge among each other, each of us have our own expertise. We sit together every Friday where we share information and learn from each other. At least once a year, we attend one big international conference overseas on different issues. What is being offered in Malaysia is in infancy level. So what we've been doing in this company is a lot more than that. We need to see more advanced thing so we need to</p>	<ul style="list-style-type: none"> <li>Very important.</li> <li>Do in-house trainings and knowledge- and information-sharing every week.</li> <li>Attend one international conference overseas on green/sustainable issues every year to learn from others – because what is offered in Malaysia is still in infancy level.</li> <li>Budget is allocated.</li> </ul>	<ul style="list-style-type: none"> <li>PAM is still not ready to make certain CPD credit hours compulsory for green/sustainable issues</li> <li>Suggest for 50% out of 10 CPD credit hours to be made compulsory for education &amp; trainings related to green/sustainable issues.</li> <li>Requested LAM to make 2 out of 10 CPD credit hours compulsory for fire safety and green issues.</li> </ul>	<p><b>ABOUT LAM/PAM CPD (Continuing Professional Development) CREDIT HOURS</b></p>

<p><i>see what the world is doing now. In Malaysia we haven't hosted any world kind of seminars. At this moment, we still need to go overseas to learn from others.</i></p> <p>Q. 24b Yes. (CKT-EC:307-322)</p>	
<b>TEXT</b>	<b>CODE (INDIVIDUAL)</b>
<b>BUILDER &amp; BUILDER-DEVELOPER:</b>	
<p><i>The industry must take the lead as if there are no products marketable in Malaysia how can the knowledge be expanded?</i></p> <p>Q. 24a Product and knowledge awareness must be cultivated among the technical staffs. Subscribe to editorials and magazines that promote such products and knowledge.</p> <p>Q. 24b No (SA-B/D:134-140)</p>	<ul style="list-style-type: none"> <li>• The industry must take the lead</li> <li>• Related editorials and magazines are subscribed for staffs to increase their knowledge and awareness on green products</li> <li>• No annual budget allocated</li> </ul>
<p><i>Very important.</i></p> <p>Q. 24a <i>In my case, I have the interest. No point in instilling this subject matter to my supervisors or my staff at large because the boss says so. When I just tell them, go for this training but they don't have the heart and just go for it because I've paid for it. They'll go and listen and they'll come back and not practicing it, they'll waste my money. We need to inculcate the culture and enthusiasm. Must make them understand the importance because we need people who really want to implement. So everyday in the morning, I spend some time with my supervisors sort of like a morning talk session about environmental issues. I make sure they show me their daily report, doesn't matter how poor their English is, as long as I can understand. We talk about the environment so that they will build their interest</i></p>	<ul style="list-style-type: none"> <li>• Very important</li> <li>• It is useless to spend for education &amp; trainings because staffs won't practice if they do not understand the importance of these issues. Need to inculcate the culture and enthusiasm first.</li> <li>• Conduct morning talks on environmental issues to supervisors to create awareness and to build their interest and enthusiasm to change</li> <li>• In Malaysia, green/sustainability remains discussion agenda and lack of implementation. If introduced, it is not monitored and enforced.</li> </ul>

<ul style="list-style-type: none"> <li>• PAM is currently conducting CPD seminars on MS1525 to raise the professionals' knowledge towards achieving the benchmark level. Later, CPD programmes will focus on achieving GBI ratings which is above the benchmark level.</li> </ul>	
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<p><i>and enthusiasm and the urge to change. The only problem is that there is no opportunity in Malaysia...people are just talking about it, but how many of them are practicing it? In seminars, everybody says we should do this, we should do that but at the end of the day they just do it to meet the minimum requirements only... We can have any kinds of plan, but the implementers are useless. A lot of cases here are “hangat-hangat tahi ayam” – they introduced things, then they didn’t follow up, then the things become white elephant or the things just left to rot. (JD-B:303-324)</i></p>	<ul style="list-style-type: none"> <li>• No annual budget allocated</li> </ul>
<p><i>Training should be at the office and home but not at institution. Institutions are more to groom future professionals but if we want people who are more environmentally conscious, we have to start from home...from young. At the office we have to cultivate that kind of culture.</i>  <i>Q. 24a We do encourage staff to go for training.</i>  <i>Q. 24b Yes</i>                  (TYT-B:216-222)</p>	<ul style="list-style-type: none"> <li>• Environmental awareness should start from young.</li> <li>• Training and education is encouraged among staffs.</li> <li>• Budget is allocated</li> </ul>
<p><b>TEXT</b></p>	<p><b>CODE (INDIVIDUAL)</b></p>
<p><b>DEVELOPER, OWNER &amp; DEVELOPER-OWNER:</b></p>	
<p><i>It’s important.</i>  <i>Q. 24a We give green awareness and some activities a few times a year.</i>  <i>Q. 24b Yes. We have budget for each staff for trainings on anything but not necessarily on green issues.</i>                  (NA-D:134-139)</p>	<ul style="list-style-type: none"> <li>• Important.</li> <li>• Conduct in-house green awareness programmes every year.</li> <li>• Annual budget is allocated but not limited to green/sustainable issues</li> </ul>
<p><i>I think yes, we have got to increase our knowledge and awareness.</i>  <i>Q. 24a We do have conferences and sometimes Cyberjaya as a whole, as a community, we do organize conferences on green issues every 2 years or something. So my staffs are encouraged to join.</i></p>	<ul style="list-style-type: none"> <li>• We have to increase our knowledge and awareness</li> <li>• Organize conferences on green issues every two years. Staffs are encouraged to participate.</li> </ul>

<p>Q.24b Yes (MM-D:293-300)</p>	<ul style="list-style-type: none"> <li>Budget is allocated</li> </ul>
<p><i>It's important.</i> Q. 24a <i>By attending seminars, forums conducted by the qualified experts and recognised organisations. Keeping abreast with the latest available green/sustainable products by attending exhibitions. All information gathered will be disseminated via circulation.</i> Q. 24b No (BTC-D:164-170)</p>	<ul style="list-style-type: none"> <li>Important</li> <li>Attend seminars, forums conducted by the qualified experts and recognised organisations.</li> <li>Attend exhibitions to keep abreast with the latest available green/sustainable products</li> <li>No annual budget allocated.</li> </ul>
<p><i>... you need to replenish your knowledge... after 10 or 15 years, the last formal education they had was dated 10 or 15 years ago. It has always been the Degree that they have got... No doubt that they accumulate experience, but experience is only within their reach or scope of work. But when you go and further your knowledge via training or via universities by attending night classes, the reach of the knowledge is longer... By giving the internet access for all staff, they can actually get knowledge through it. And as a boss, you also must encourage your staffs to do research.</i> Q. 24a <i>Yes, they're encouraged to attend conferences and seminars.</i> Q. 24b <i>I've the budget for it, every staff I budget around RM2000. There are a lot of not-that-expensive courses by PAM or CIDB which they can go on 1-day course.</i> (WR-D/O: 573-605)</p>	<ul style="list-style-type: none"> <li>Further knowledge via training or education at university by attending night classes</li> <li>Staffs are encouraged to attend conferences and seminars</li> <li>Give internet access to all staffs to gain knowledge and information by browsing</li> <li>Budget is allocated</li> </ul>
<p><b>TEXT</b></p>	<p><b>CODE (INDIVIDUAL)</b></p>
<p><b>FACILITY MANAGER:</b></p>	
<p><i>Very important.</i> Q. 24a <i>Training has to be ongoing. We have to keep updated with the current technologies. We can get information through training, reading or through circles of friends which already been created. Seminar or</i></p>	<ul style="list-style-type: none"> <li>Very important</li> <li>On-going training to keep updated with the current technologies</li> <li>Information can be obtained through</li> </ul>



<p><i>conferences are very specific for you to enhance your existing knowledge or learn new tools you can incorporate in your organization.</i></p> <p><i>Q. 24b Budget is there.</i> (NB-FM:135-142)</p>	<p>readings and discussions</p> <ul style="list-style-type: none"> <li>• Budget is allocated</li> </ul>
<p><i>Very important.</i></p> <p><i>Q. 24a I have to send my staff for education and training because we are ISO certified company. We have ISO 9000, we have OSHA. We have had ISO since 1996, so we are ensuring that the staff will be trained for a minimum of 40 hours per year. We also send staff to the overseas. Every year we send managers, engineers to US to attend conferences. Apart from getting new knowledge or something new, they can have a break. They need to gain new knowledge but at the same time I reward them.</i></p> <p><i>For the last 7 years, every year we sent 4, 5 or 6 managers, engineers for training. It is very important, you need to upgrade the knowledge at the same times I reward them. For the senior managers and general managers, they got to bring their spouses.</i></p> <p><i>Q. 24b Yes</i> (OCL-FM:299-313)</p>	<ul style="list-style-type: none"> <li>• Very important</li> <li>• Staffs have to be trained for a minimum of 40hrs/yr because the company is ISO 9000 certified</li> <li>• Every year, senior managers and engineers are sent to attend a conference overseas</li> <li>• Budget is allocated</li> </ul>
<p><b>TEXT</b></p>	<p><b>CODE (INDIVIDUAL)</b></p>
<p><b>REGULATOR, POLICY MAKER &amp; GOVERNMENT PROJECT IMPLEMENTOR</b></p>	
<p><i>Very important.</i></p> <p><i>Q. 24a We attend trainings and other informal education programs. But sometimes, JKR's designers feel that they are good enough and don't have to attend any trainings or seminars to increase their knowledge on green or sustainable buildings.</i></p> <p><i>Q. 24b Yes.</i> (CPK-PI:255-261)</p>	<ul style="list-style-type: none"> <li>• Very important</li> <li>• Attend trainings and education programs</li> <li>• Certain designers in the government sector are not enthusiastic to attend any education and trainings in this issue</li> <li>• Budget is allocated</li> </ul>

<p><i>Very important and maybe it should be more emphasized in the university level through projects, research, talks and so on.</i></p> <p><i>Q. 24a We get permanent people to give talks. We also have internal discussions on green and sustainability. It is a basic concept and so much technical thing. It is like a morning prayer. If you tell them again and again, they'll adopt it. They find it beneficial to them. Make them more cosy and productive. They are also encouraged to go and attend seminars and conferences. But internally, they can gain a lot.</i></p> <p><i>Q. 24b Yes. Part of training budget.</i> (KSK-R/PM:187-196)</p>	<ul style="list-style-type: none"> <li>• Very important and should be emphasized in the universities</li> <li>• Invite speakers to give talks to staffs</li> <li>• Conduct internal discussions on green/sustainable issues</li> <li>• Staffs are encouraged to attend conferences and seminars</li> <li>• Budget is allocated</li> </ul>
<p><i>Very important, of course.</i></p> <p><i>Q. 24a We organise workshops and seminars.</i></p> <p><i>Q. 24b Yes</i> (AMN-R/PM:143-147)</p>	<ul style="list-style-type: none"> <li>• Very important</li> <li>• Organise workshops and seminars.</li> <li>• Budget is allocated</li> </ul>
<p><i>It is very important, and that is the only way to go. Two things need to be taught to our students: the green, sustainability issues in design and the heritage. So one, you have to preserve and the other one is for you to look forward in designing.</i></p> <p><i>Q. 24a We attend any conferences that concern sustainability. We also joined the World Urban Design Forum where they talks were about sustainability.</i></p> <p><i>Q. 24b Yes.</i> (NN-R/PM:327-347)</p>	<ul style="list-style-type: none"> <li>• Very important</li> <li>• Attend conferences and forums</li> <li>• Budget is allocated</li> </ul>
<p><i>It is very important</i></p> <p><i>Q.24a...CIDB involves is giving training, awareness in terms of environmental friendly construction methods or technologies... (MCA-PM:49-59)</i></p>	<ul style="list-style-type: none"> <li>• Attend and give trainings &amp; awareness programs</li> </ul>
<p><i>Education is a key component of raising awareness for</i></p>	<ul style="list-style-type: none"> <li>• It is the key component of raising</li> </ul>

*green/sustainability issues, especially for what can be considered an abstract subject. Such education needs to be initiated at an early stage & must be sustained over time to be inculcated as a cultural norm.*

*At the same time the professional involved in the respective development fields, especially architects & engineers, also need to be educated to adopt desired parameters in discharging their professional duties, including convincing their clients to adopt the concepts for the overall economic justifications involved.*

*Q. 24a Our organisation, PTM is directly involved in Clean Development Mechanism (CDM), Energy Efficiency (EE) & Renewable Energy (RE) issues & has been a promoter of the concepts.*

*Q. 24b Yes. PTM conducts internationally funded projects on EE & RE and is the national secretariat for CDM. While there is no specific budget for such education & training, it forms a part of normal operations as an "OJT" exercise.*

*(GL-PM:203-216)*

awareness. Needs to be initiated at an early stage and must be sustained over time.

- The organisation is directly involved with and the promoter of Clean Development Mechanism, Energy Efficiency and Renewable Energy concepts
- Budget is allocated

**Q.26 Do you use any design tool i.e. software, guidelines to help you designing/ constructing/ developing/operating and maintaining a green/sustainable building? Which tool(s)? Or Q.26 Does the Ministry play any role to educate the public in general or the building industry in particular in sustainability issues?**

TEXT	CODE (INDIVIDUAL)
<b>ARCHITECT:</b>	
<i>I am not using any software at the moment but I really want to learn using those softwares like EcoTech and IES. (KK-A:162-163)</i>	<ul style="list-style-type: none"> <li>None but really wants to learn</li> </ul>
<i>No. (WS-A:204)</i>	<ul style="list-style-type: none"> <li>None</li> </ul>
<i>Myself and one or two other architects are using 'Energy10'. We are not using Ecotech but we are looking at it seriously. I think a lot of the time we use spreadsheets. When you are putting the data, you are aware of what you are doing. We are using chart and spreadsheet. For example, when you are designing windows, how much shading do you want? So we have charts and tables, we calculate how much heat gain into the windows and from the chart we can get the shading coefficient. (CSA-A:270-274)</i>	<ul style="list-style-type: none"> <li>Only 3 persons in the company use 'Energy10'. Nobody uses Ecotech. Mostly use charts and spreadsheets to calculate heat gain and shading coefficient</li> </ul>
<i>Because of the MS1525, there is OTTV, we are going to commission somebody to write a formula for that. Because I think architects are just too lazy to do it. So if I can have a spreadsheet to input the height of building, the floor-to-floor. I am sure there are only a few parameters, the type of materials, U-values, it will generate it up for you rather than having somebody keeps writing it again and again. That's something we want to do. I hear that someone else has offered their software for us to use but I think we can do our own. (TLM-A:247-253)</i>	<ul style="list-style-type: none"> <li>Interested in having a software to generate the OTTV</li> </ul>
<i>Autodesk for instance has developed a whole bunch of softwares... We use them. But because every site is different, then you need software for different site. So I would propose that the same way you have Wikipedia, we</i>	<ul style="list-style-type: none"> <li>Use Autodesk softwares e.g. AutoCad and 3ds Max for drafting, animation, modelling and rendering</li> <li>Should develop Eco-Wikipedia</li> </ul>

CODE (GROUPED)	CATEGORY
<ul style="list-style-type: none"> <li>None (8x)</li> <li>None but pester consultants to use IES or Ecotech</li> <li>Use passive design strategies based on intuition. No scientific simulation has been conducted. Will get somebody to conduct the simulations if requested by the client</li> <li>Use passive design strategies based on intuition. No scientific simulation has been conducted. Willing to use building energy simulation tool when work on international projects</li> <li>None but really want to learn</li> <li>Interested in having a software to generate the OTTV</li> </ul>	<b>NOT USING ANY DESIGN TOOL</b>
<ul style="list-style-type: none"> <li>Only 3 persons in the company use 'Energy10'</li> <li>Mostly use charts and spreadsheets to calculate heat gain and shading</li> </ul>	<b>USE BUILDING SIMULATION TOOLS</b>

<i>should have Eco-Wikipedia. That means if you look at sites from different part of the world, you can get information on its climate, vegetation, soil, hydrology. And that changes over time. Once it's changed, it's updated. I also use Green Mark. (KY-A:218-224)</i>	(similar to Wikipedia but gives updated information to designers on climate, vegetation, soil, hydrology on different parts of the world) <ul style="list-style-type: none"> <li>Use Singapore Green Mark</li> </ul>
No.(SH-A:326)	<ul style="list-style-type: none"> <li>None</li> </ul>
<i>At the moment, after doing the LEO building, I've never pursued doing the simulations for lighting, thermal or whatever. To me what I've done now is I just get my passive factors right and the orientation right. If the site happens to be east or west, we design the sun shadings or have the windows recessed or whatever. But if the client is willing to go further than that, then I'll get somebody to do the simulations or else what's the point. (SA-A:317-321)</i>	<ul style="list-style-type: none"> <li>Use passive design strategies based on intuition. No scientific simulation has been conducted. Will get somebody to conduct the simulations if requested by the client</li> </ul>
MS1525 and Ecotech software. (LCH-A:306)	<ul style="list-style-type: none"> <li>Use MS1525 standards</li> <li>Use Ecotech software</li> </ul>
<i>No. We go for simple, low tech and inexpensive solutions. Last year I went to Stuttgart, German. These Germans, they have developed a set of softwares which are able to calculate the exact amount of heat loss or energy saved by merely orientation. By tilting orientation, the software knows how much your energy consumption is. If you place your building in a certain location where you can harness wind of example, and use that to ventilate your interior, the program can calculate the amount of energy saved and cost you save in a year. That is good because clients at the end of the day, they want to see the bottom line figures. But we don't have those softwares here. We can use this when we work together on international projects in the</i>	<ul style="list-style-type: none"> <li>Use passive design strategies based on intuition. No scientific simulation has been conducted. Willing to use building energy simulation tool when work on international projects</li> </ul>

<ul style="list-style-type: none"> <li>coefficient</li> <li>Use Ecotech software</li> <li>Use Autodesk softwares e.g. AutoCad and 3ds Max for drafting, animation, modelling and rendering. Should develop Eco-Wikipedia (similar to Wikipedia but gives updated information to designers on climate, vegetation, soil, hydrology on different parts of the world)</li> <li>The most used one is IES. Exploring Energy Plus, Ecotech and Design Builders. Developed own tools i.e. Ray Trace, Rain Harvest, CFD Codes, BIT. Use ASHRAE guidelines.</li> <li>Have 16 sets of energy loggers for concurrent monitoring</li> </ul>	
<ul style="list-style-type: none"> <li>Use Singapore Green Mark (3x)</li> </ul>	<b>USE BUILDING RATING SYSTEM</b>
<ul style="list-style-type: none"> <li>Use MS1525 standards</li> <li>Use ASHRAE guidelines and MS1525</li> <li>Use ASHRAE guidelines and Malaysian standards</li> <li>The most used one is IES. Exploring Energy Plus, Ecotech and Design Builders. Developed own tools i.e. Ray Trace, Rain Harvest, CFD Codes, BIT. Use ASHRAE guidelines.</li> <li>Follow OSHA and ISO14000</li> </ul>	<b>USE DESIGN GUIDELINES/ STANDARDS/ PROCEDURES/ CHECKLIST</b>

<i>future. At the moment, we just tell our clients that we give them low energy solutions but we cannot give you the figures, they just have to abide with our words. But clients realize that it doesn't take a rocket scientist to understand that windows facing east-west are no better than windows facing north-south. (NB-A:188-199)</i>	
<b>TEXT</b>	<b>CODE (INDIVIDUAL)</b>
<b>ENGINEER &amp; ENVIRONMENTAL CONSULTANT:</b>	
<i>In this office, we must have lots of standards around, or else they won't be designing anything. (CTL-ME:496)</i>	<ul style="list-style-type: none"> <li>• Use ASHRAE guidelines and Malaysian standards</li> </ul>
<i>I do use a lot of ASHRAE guidelines. I used them to convince others to use my systems. I've solved a lot of cases using the MS 1525 in my practices. (NYK-ME:275-276)</i>	<ul style="list-style-type: none"> <li>• Use ASHRAE guidelines and MS1525</li> </ul>
<i>A lot. The most used one is IES. Now we are exploring "Energy Plus" and "Ecotech" as well as "Design Builders". We developed our own tools as well called "Ray Trace" which traces the daylight. It is 2D tries to optimise daylighting. Then we have "Rain Harvest" to optimise rainwater harvesting tank. Currently we still developing "CFD Codes", compilation of few dynamic flow models and we are also develop "BIT" right now which is going to be used by MGBC for solar which will given free to everyone. But MGBC will be going to copy it as "Building Energy Index Tool" (BEIT). (CKT-EC:325-331)</i>	<ul style="list-style-type: none"> <li>• The most used one is IES. Exploring Energy Plus, Ecotech and Design Builders. Developed own tools i.e. Ray Trace, Rain Harvest, CFD Codes, BIT. Use ASHRAE guidelines.</li> </ul>
<b>TEXT</b>	<b>CODE (INDIVIDUAL)</b>
<b>BUILDER &amp; BUILDER-DEVELOPER:</b>	
<i>Green building is still an alien concept here, so forget about the tools. (SA-B/D:143)</i>	<ul style="list-style-type: none"> <li>• None</li> </ul>
<i>No. Once the interest is built up, automatically they themselves will go for soul searching. Then they will get</i>	<ul style="list-style-type: none"> <li>• None</li> </ul>

<p>guidelines</p> <ul style="list-style-type: none"> <li>• Use standard operation procedure</li> <li>• Have 300 sets of guidelines, checklists, procedures and work instructions to ensure repeated jobs are being guided and to train unskilled workers.</li> </ul>	
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<i>more information on how to pursue things. (JD-B:328-329)</i>	
<i>We do save our guidelines in softcopy. We follow OSHA and ISO14000 guidelines. (TYT-B:225)</i>	<ul style="list-style-type: none"> <li>Follow OSHA and ISO14000 guidelines</li> </ul>
<b>TEXT</b>	<b>CODE (INDIVIDUAL)</b>
<b>DEVELOPER, OWNER &amp; DEVELOPER-OWNER:</b>	
<i>No. (NA-D:142)</i>	<ul style="list-style-type: none"> <li>None</li> </ul>
<i>Architects and engineers would know about it...(MM-D:304)</i>	<ul style="list-style-type: none"> <li>None</li> </ul>
<i>Yes. BCA Green Mark rating system. (BtC-D:173)</i>	<ul style="list-style-type: none"> <li>Singapore Green Mark</li> </ul>
<i>That question I must say no because it should be the consultants. But being an energy-oriented owner, I kind of pester my consultants to get IES or at least Ecotech software. I want to see the results because there is a dispute about sun shading devices on our building, whether it is adequate or not. (WR-D/O:611-614)</i>	<ul style="list-style-type: none"> <li>None but pester consultants to use IES or Ecotech</li> </ul>
<i>Green Mark rating system. (CN-D/O:295)</i>	<ul style="list-style-type: none"> <li>Singapore Green Mark</li> </ul>
<b>TEXT</b>	<b>CODE (INDIVIDUAL)</b>
<b>FACILITY MANAGER:</b>	
<i>No. (NB-FM)</i>	<ul style="list-style-type: none"> <li>None</li> </ul>
<i>We have tremendous processors. In fact the last time we have more than 300 sets of guidelines, checklists, procedures and work instructions. It is very important. The reason is... we want to ensure jobs here are being guided and we want to train people who are not so skilled. If I am able to train a non-senior engineer and technicians to do the same work repeatedly, they will be able to be good at it. So you must have a certain guideline and checklist and procedures and that are very important. We have a lot of tools and we are probably the only company in Malaysia having the most loggers, energy loggers. We have 16 sets of loggers that designers can log concurrently not</i>	<ul style="list-style-type: none"> <li>Have 300 sets of guidelines, checklists, procedures and work instructions to ensure repeated jobs are being guided and to train unskilled workers.</li> <li>Have 16 sets of energy loggers for concurrent monitoring</li> </ul>

<p><i>consecutively. Why is it important? Because if I were to monitor the same air-cond, lighting, lift, fire and also plumbing concurrently, I have to monitor under same environment within the same day at the same time and hour. If I cannot do that or if I do consecutively, business environment and external environment will change. So you can run them at the same time and you can monitor the same, your controlled environment is the same. (OCL-FM:326-338)</i></p>	
<p><i>We use our SOP [Standard Operation Procedure]. (KCD-FM:129)</i></p>	<ul style="list-style-type: none"> <li>• Use standard operation procedure</li> </ul>
<p><i>We don't have any Malaysian Standard on Indoor Environmental Quality [IEQ]. DOSH relates mostly on construction safety but not on IEQ. (ZS-FM:161-162)</i></p>	<ul style="list-style-type: none"> <li>• None</li> </ul>
<p><b>TEXT</b></p>	<p><b>CODE (INDIVIDUAL)</b></p>
<p><b>REGULATOR, POLICY MAKER &amp; GOVERNMENT PROJECT IMPLEMENTOR</b></p>	<p><b>From this group only</b></p>
<p><i>We are retrofitting existing office buildings to improve the building's energy index. We have started doing it with the Prime Minister Office Complex in Putrajaya and our HQ Block F. We do not have specific allocation to carry out this program... Since 2 days ago, we've been giving awareness programs to JKR staffs. In Block F, we are telling people not open windows, what do you do when the air-cond is too cold, that kind of things. They always like to open windows because it is too cold so infiltration occurs. We want them to switch off all the plug loads at the socket outlets for printer, computer... CK Tang [Director of IEN Sdn Bhd – environmental consultant] told us to concentrate on 3 strategies: switch off the plug loads, avoid infiltration by not opening doors and windows, and utilize daylighting. These are the measures that they can take without incurring any cost. Measures which would incur a lot of cost may be difficult because we need to request for a budget. To obtain</i></p>	<ul style="list-style-type: none"> <li>• Energy Division of PWD has been giving energy conservation awareness programmes to government officials. Problems encountered to continue the programmes are lack of manpower, budget and interest/participation among government officials</li> </ul>

CODE (GROUPED)	CATEGORY



<p><i>the budget from the government takes a long time, sometimes you won't get it.</i></p> <p><b>Do you do this to other government buildings apart from JKR's?</b></p> <p><i>Our scope is only for government buildings. Our manpower is not enough. JKR offices are scattered around the country. We have HQ building in KL, state level offices, and district level offices. We targeted the district level for our road show because they are the ones who implement the projects. But we have not enough manpower. We did a lot of research on EE and we asked a few consultants to help us. In 2006, we invited JKR staffs from the state level to listen to our seminar on EE, what they have done and what are our findings. We recommended ways for JKR to improve their performance. The problem we face right now is that we have not enough manpower and we are not given any budget to continue. Another obstacle is that some people find it not important to them.</i></p> <p>(CPK-PI:264-301)</p>			
<p><i>Our role is more towards supporting seminars conducted by other bodies. But not directly. Only supporting role.</i></p> <p>(KSK-PM:199-200)</p>	<ul style="list-style-type: none"> <li>• Indirectly support seminars on green/sustainable issues conducted by other bodies.</li> </ul>		
<p><i>Occasionally, we organise workshops and seminars for government officials and industry players on sustainability issues. We also seek feedbacks from the public.</i></p> <p>(AMN-R/PM:150-151)</p>	<ul style="list-style-type: none"> <li>• Organize workshops and seminars for government officials and industry players on sustainability issues.</li> <li>• Seek feedbacks from the public.</li> </ul>		
<p><i>If you read our Structure Plan and our Draft City Plan, it is all about sustainable development, about people, urban poor and all that. Especially with our new Mayor, we are restructuring our Branch Office to become a major public education centre – giving awareness about saving electricity, vandalism, loitering and so on.</i></p> <p>(NN-R/PM:350-353)</p>	<ul style="list-style-type: none"> <li>• Published issues on sustainability in the Structure Plan and Draft City Plan</li> <li>• Restructure KLCH's Branch Office to become a major public education centre to disseminate information and give awareness on green/sustainability issues.</li> </ul>		

*PTM has been charged with promoting EE & RE as well as processing CDM application in the country. It has also hosted & given appropriate briefings to over 1,000 visitors to its ZEO building since moving to the facilities in October 2007, besides participating as an “expert” resource in related seminars, exhibitions & industry forums.*  
(GL-PM:219-222)

- Promote CDM, EE & RE application in the country.
- Give briefings on ZEO building to the public and industry players.
- Participate as an “expert” resource in related seminars, exhibitions & industry forums.

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**Q.27 In your opinion, is it important for you to know how the building that you have designed/ built/ developed performs during its occupancy period or how satisfied occupants are with the building's IEQ? Q.27a Could this be widely practiced in the Malaysian building industry?**

TEXT	CODE (INDIVIDUAL)
<p><b>ARCHITECT:</b></p> <p><i>Yes, this is a part of green building criteria. You must evaluate the performance of the building during operation stage. What happen in JKR, they have set up an Asset Management Department to maintain and track down the performance of the buildings. To handle themselves is difficult because they have not enough staff so they outsource this service.</i></p> <p><i>Q. 27a This is something new. Even green concept is something new. Usually, once the building is handed over, the building is only looked after for 2 years i.e. during Defect Liability Period. Beyond that, nothing.</i> (KK-A:168-175)</p>	<ul style="list-style-type: none"> <li>• Important, it is a must.</li> <li>• Normally, buildings are only looked after for 2 years after hand-over i.e. during DLP.</li> </ul>
<p>Yes.</p> <p><i>Q. 27a Yes, but normally we don't do that formally like taking some interview or statistic. We ask the user. If there is a problem, it becomes as our learning experience. We don't do it officially, we do it casually because after the building is completed, we still need the users or the owner for 1-2 years. The role of an architect doesn't stop once the building is handed over. At least you still have a close relationship for the first one year or two years. And then even after the defect liability period, when the owner of the building comes to you and says that they have problems or need advice or what so ever, I don't know there is any architect who would say – no, this is not my problem. I think a part of architects' training is that you have that sense of connection with the building that you've created. Except maybe they don't go to the extent of let say if the client saying that the building is too costly to maintain because of the air-cond usage. They [architects] want to</i></p>	<ul style="list-style-type: none"> <li>• Important, it will become our learning experience.</li> <li>• Only ask users or owner casually about any problems with their building. Architects maintain close relationship with users/owner during DLP. Architects still give advice to owner (if requested) after DLP but architects don't take the liability/responsibility if the owner's complaints are about the cost of maintaining the building.</li> </ul>

CODE (GROUPED)	CATEGORY
<p>From all 30 interviewees</p> <p><b>Facility Managers' actions</b></p> <ul style="list-style-type: none"> <li>• Very important. FM conducts customer survey every 6 months and quality inspection every 3 months.</li> <li>• Very important but only measurements are taken and recorded. Occupant survey has never been done.</li> </ul> <p><b>Government's actions</b></p> <ul style="list-style-type: none"> <li>• Very important. PWD follows ISO9000 requirement to conduct POE on government hospital buildings by seeking occupants' satisfaction level via survey.</li> </ul> <p><b>Architect's actions</b></p> <ul style="list-style-type: none"> <li>• Government's Low Energy Office building is consistently monitored in terms of its operational performance and users' satisfaction.</li> <li>• Only ask users or owner casually about any problems with their building. Architects maintain close relationship with users/owner during DLP. Architects still give advice to owner (if requested) after DLP but architects don't take the liability/responsibility if the owner's complaints are about the cost of</li> </ul>	<p><b>IMPORTANT (all 30) CURRENT PRACTICE</b></p>

<p>know about it but they [architects] don't take the liability and it is true that it is not their responsibility. (WS-A:209-222)</p>	
<p><i>It is, but we don't have the mechanism to test it out yet. I wish we can afford to buy those data loggers. Maybe a few weeks before they get the CF [Certificate of Fitness] we put the data loggers, running for a week without the air-cond, then running it with the air-cond, and then running with the occupants. I wish we can do that. We tend to buy it. If you are talking about temperature and humidity, I think \$70-\$100 a piece. But if you are talking about CO2 analyser, that one is very expensive. Maybe when our Green Building Council starts moving and starts buying those instruments, then maybe they will rent them to our members. To me, if you started to measure what you have designed, it will be a very important learning process. You will know whether your design is working or not. Right now we still based on theory.</i></p> <p><i>Q. 27a The problem is that our Malaysian publics are not very knowledgeable about this kind of things. So you know the centralized air-cond is quite okay, but with the split unit air-cond, IAQ can become very poor after end of the week. If you have an enclosed space, they just cool the air. If the office is quite well-designed and there is not much air leakage, then you can see the level of dust and CO2 will be very high towards the end of the week. They don't make it a practice of...like for example, when you see temperature outside is below 25, in the evening we can open the windows for an hour then you flush out the air already then you close it back so the next morning it will be okay.</i> (CSA-A:285-302)</p>	<ul style="list-style-type: none"> <li>• Important, it will be a very important learning process.</li> <li>• Can't afford to own data loggers to test it out</li> <li>• Suggestion: To run data loggers a few weeks before building CF is awarded. Obtain readings of IAQ without air-conditioning, then with air-conditioning, then with the occupants.</li> <li>• <b>Public are not knowledgeable about POE. They don't practice building flush-out to maintain good IAQ during occupancy.</b></li> </ul>

<p>maintaining the building.</p> <p><b><u>Engineers' actions</u></b></p> <ul style="list-style-type: none"> <li>• Engineer has been monitoring the energy index of Securities Commission energy index since its completion in 1989. For other buildings, clients are visited once in a while but problems on IEQ are not given much emphasis due to non-existence of laws and regulations.</li> <li>• Owner did a questionnaire survey among occupants to verify the improvement on IAQ after new system been installed.</li> </ul> <p><b><u>Developers' and owners' actions</u></b></p> <ul style="list-style-type: none"> <li>• Developer carried out "Client Satisfaction Survey" as part of their ISO procedures. Feedbacks will determine the future market trend and demand for similar development.</li> <li>• Developer doesn't do monitoring or survey. Has a "Customer Service Unit" to conduct monthly meetings with tenants to discuss any complaints/issues.</li> </ul> <p><b><u>Environmental Consultants' actions</u></b></p> <ul style="list-style-type: none"> <li>• ECs are hired by the clients to conduct studies (questionnaires/ interviews) and measurements on the level of daylight, glare, air quality, temperature, and humidity after the buildings have been occupied.</li> </ul>	
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<p><i>It is very important to us but it depends whether it is an owner occupied building or it is for sale. For sale buildings, we also monitor because we want to know the faults. But there is a rising problem in Malaysia where some people love to complaint for complaint sake. They want something back from the developer like free alarm system etc. They are very small minority, maybe 5%. But interestingly, this 5% take up the most of their time. So we are wary of this type of things. That's what happening in the industry at the moment. Because there is a large stakeholder funds still held back until end of defect period. So they kept writing to their lawyers don't release it for all these defects but actually they are not real defects.</i></p> <p><i>For owner-occupied buildings, usually there is a cheating problem at start but our contractors are quite good. So they tied it up. It takes about 5-10 months to get the building fully operational. Architects help the owners until final cert. (TLM-A:258-269)</i></p>	<ul style="list-style-type: none"> <li>• Very important but for rental/sale buildings, there are 5% of the buyers who are dishonest and tend to complaint for the sake of getting compensation from developers.</li> </ul>	<p><b><u>About developers, owners &amp; tenants</u></b></p> <p><b><u>Financial matters:</u></b></p> <ul style="list-style-type: none"> <li>• Very important but for rental/sale buildings, there are 5% of the buyers who are dishonest and tend to complaint for the sake of getting compensation from developers.</li> <li>• Very important but owners /tenants should be convinced with net gain figures in energy savings before they could take measures to achieve it.</li> <li>• In Malaysia, no tenants/owners would ask for POE. Usually they are persuaded by the EC for POE to be conducted so the building could be finetuned for 1 year.</li> <li>• Only multinational companies would request and pay for POE to be conducted on their buildings to recognize any rectification required. Local owners/tenants are not aware of the importance of POE.</li> <li>• Local expertise exists but there is little desire or incentive for building owners to do POE</li> <li>• POE has not been widely practiced in the country due to cost</li> <li>• Developers/Investors who have spent money for a green building would look for their monetary returns.</li> <li>• Consultant can't afford to own data loggers to test it out</li> </ul>	<p><b>IMPORTANT BUT DIFFICULT TO PRACTICE</b></p>
<p><i>Oh absolutely. Some people do post-occupancy evaluation on the building and its system. Some people don't. But people usually do it for me. For instance, when we finished doing National Library in Singapore, the people who helped me with the Green Mark, after the building was completed, were commissioned by the client to do post-occupancy studies. The Total Building Performance Team in Singapore was able to persuade the client to do it. So the team got paid by the client.</i></p> <p><i>Q. 27a Yeah. A lecturer from IIUM is doing POE for my buildings in Malaysia. (KY-A:229-237)</i></p>	<ul style="list-style-type: none"> <li>• Absolutely important. There is an expert team who persuade and get paid by the client to conduct POE on his building &amp; its system in Singapore.</li> <li>• <i>The architect relies on university researchers to conduct the POE on his buildings in Malaysia.</i></li> </ul>		
<p><i>Yeah, it is because you've certain targets and you want to know whether you've met them. But it also goes to the practice of the corporation whether they maintain the building well enough. Post occupancy that's where GBI is</i></p>	<ul style="list-style-type: none"> <li>• Important to know whether the targets are met and whether the building is maintained well enough. 80% of the buildings in Malaysia are</li> </ul>		

<p><i>also emphasizing after one year only we will take the readings because (a) there is a balancing to do (b) whether you are keeping it up. And after 3 years whether you still want to be able to say that you have got a GBI on your building, you have to renew it. More than 80% of buildings in Malaysia are not well maintained.</i> (SH-A:332-337)</p>	<p>not well maintained.</p> <ul style="list-style-type: none"> <li>• Important to conduct POE a year after occupancy and then every 3 years during the operational life of the building.</li> </ul>
<p><i>For LEO building, they do some monitoring. But when it takes a normal building that's why we have Defects Liability Period. So during this period, you'll know whether your designs work or not, there may be design faults and even complaints. Sometimes the complaint is about deflected rainwater, leakages, so you check your building or the materials that you use... whether it's painted, whether it's composite panels. From there you know...it is part of learning.</i> (SA-A:326-330)</p>	<ul style="list-style-type: none"> <li>• Important, it is part of learning process. Government's Low Energy Office building is consistently monitored in terms of its operational performance and users' satisfaction.</li> <li>• For normal office buildings, design defaults and complaints are made known during DLP.</li> </ul>
<p><i>It is very important.</i> <i>Q. 27a Currently there is no mechanism available to monitor post occupancy. And I would like to suggest that local authorities should implement it. They should have the mechanism to monitor to find out how the occupants really experience working in the office building. The local authorities should enforce this and then perhaps they can appoint consultants to evaluate most of the occupancies not only for defects but also the environmental quality – whether the building is operated according to what it had purposely been designed for.</i> (LCH-A:311-318)</p>	<ul style="list-style-type: none"> <li>• Very important but currently there is no mechanism available to monitor buildings' performance and users' satisfaction.</li> <li>• Local authorities should appoint consultants to conduct POE</li> <li>• The practice of POE should be enforced.</li> </ul>
<p><i>It is very important.</i> <i>Q. 27a Perhaps, someone could create softwares to measure net gains in energy savings in green buildings first.</i></p>	<ul style="list-style-type: none"> <li>• Very important but owners /tenants should be convinced with net gain figures in energy savings before they could take measures to achieve it.</li> </ul>

<p><b><u>Knowledge &amp; attitude</u></b></p> <ul style="list-style-type: none"> <li>• Depends on the developers. They would care if they are educated about sustainable development and not totally money-minded.</li> <li>• Public are not knowledgeable about POE. They don't practice building flush-out to maintain good IAQ during occupancy.</li> </ul> <p><b><u>About builders</u></b></p> <ul style="list-style-type: none"> <li>• Important but our builders' only concerns are handing-over the building, surviving the DLP and getting their retention or bank guarantee back.</li> </ul> <p><b><u>About consultants' attitude</u></b></p> <ul style="list-style-type: none"> <li>• Certain design consultants have a self-denial syndrome of which they feel their pride and prestige is affected when their design defective issues are made known.</li> </ul> <p><b><u>About government</u></b></p> <ul style="list-style-type: none"> <li>• Builders would like to know the level of occupants' satisfaction but some of the government buildings are difficult to get access.</li> <li>• Budget for the maintenance of government buildings have not always been allocated. Ad-hoc emergency budget is used when rectification/repair is needed.</li> <li>• For other buildings, clients are visited once in a while but problems</li> </ul>	
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(NB-A:204-207)	
TEXT	CODE (INDIVIDUAL)
<p><b>ENGINEER &amp; ENVIRONMENTAL CONSULTANT:</b></p> <p><i>Yes, absolutely. Important to see how your designs work and continue to work. SC [Securities Commission] finished in 1989, until now I am monitoring it. One call, what's the energy index lately? Any problem? Then I come. For other buildings, I like to visit the clients once a while. IEQ is not given much emphasis because we need to measure that.</i></p> <p><b>Is it because we don't have the monitoring equipment?</b></p> <p><i>Not the monitoring equipment. Our laws are not there yet. You go to any office building or shopping complex, you go in and look at the air-cond diffusers, you see all the black strips, then big problem! You never even clean it up or replace it. So IEQ goes down, productivity goes down. Our buildings have horrible air quality. The design allows to make sure that you don't go and shut off the fresh air to save energy. That is not the correct way. Fresh air must be there. We design something in Malaysia in a way that we know labour cost is cheap so we go for washable filters. But even washable filters have a life-span. Recommended after 8 washes, you must replace it. Not forever until they bust and all the outside air coming in are not filtered then all dirt starts coming in.</i></p> <p><b>In monitoring the building's performance, is it based</b></p>	<ul style="list-style-type: none"> <li>Absolutely important to see whether the designs work and continue to work. Engineer has been monitoring the energy index of Securities Commission energy index since its completion in 1989. For other buildings, clients are visited once in a while but problems on IEQ are not given much emphasis due to non-existence of laws and regulations.</li> <li>The IEQ of Malaysian office buildings are not well-monitored and maintained</li> <li>Only multinational companies would request and pay for POE to be conducted on their buildings to recognize any rectification required. Local owners/tenants are not aware of the importance of POE</li> <li>For existing buildings, only IEQ, water and energy are required to be audited.</li> </ul>

<p>on IEQ are not given much emphasis due to non-existence of laws and regulations.</p> <ul style="list-style-type: none"> <li>No legislation or mandatory need for POE</li> <li>Very important but currently there is no mechanism available to monitor buildings' performance and users' satisfaction.</li> </ul>	
CODE (GROUPED)	CATEGORY
<p><b><u>Continuous monitoring</u></b></p> <ul style="list-style-type: none"> <li>Important to conduct POE a year after occupancy and then every 3 years during the operational life of the building.</li> <li>Usually, POE results are only for EC to concern and take action. Architects and other consultants are interested to know the results (but not all and at all times) but they have moved on to other projects. EC usually request for additional fees from the clients for the 1 year monitoring &amp; finetuning period.</li> <li>Suggestion: To run data loggers a few weeks before building CF is awarded. Obtain readings of IAQ without air-conditioning, then with air-conditioning, then with the occupants.</li> </ul> <p><b><u>During Defect Liability Period</u></b></p> <ul style="list-style-type: none"> <li>Normally, buildings are only looked</li> </ul>	<p><b>WHEN POE IS OR SHOULD BE CONDUCTED</b></p>

<p><b>on your own initiative or requested by the client.</b></p> <p><i>Only multinational companies would request and they pay for it. I did a lot of troubleshooting all over the world. Then they would know how and what to rectify. Locally, not so many. The awareness is not here. But with green building movement, it [monitoring] should come in. In new buildings you audit everything. But in existing buildings, 3 things that you have to audit: IEQ, water and energy because the construction site plans are all done already. Materials resources – too late. (CTL-ME:502-523)</i></p>		<p>after for 2 years after hand-over i.e. during DLP.</p> <ul style="list-style-type: none"> <li>For normal office buildings, design defaults and complaints are made known during DLP.</li> <li>For government buildings, any rectifications needed after POE are done by the contractors within DLP i.e. 1 year for office buildings.</li> </ul>	
<p><i>Yes, in one of the jobs that I've done, the building owner did a questionnaire survey among occupants. And the perception was better than it was before. To be honest, the building owner wanted to verify the improvement in the building condition after installing my system. They did it using their own people. It is just to show whether they've made the right decision or not.</i></p> <p><i>Q. 27a It can be. In Malaysia, we do not so care about testing and commissioning. We have not paid enough attention to testing and commissioning although it is compulsory... Whether it is good or no good, whether they need to rectify or not, they just continue with the operation. They don't give a damn here. So we don't place such priority on testing and commissioning. That is why in the Green Building Index, it emphasizes on the post-commissioning. I hope this will be enforced by the government. (NYK-ME:281-295)</i></p>	<ul style="list-style-type: none"> <li>Important. Owner did a questionnaire survey among occupants to verify the improvement on IAQ after new system been installed.</li> <li>Testing and commissioning are not given a priority even though they are compulsory.</li> <li>POE can be widely practiced in Malaysia. Hope that post-commissioning will be enforced by the government.</li> </ul>	<p><b>Environmental Consultants</b></p> <ul style="list-style-type: none"> <li>Local authorities should appoint consultants to conduct POE</li> <li>Environmental consultants are hired by the clients to conduct studies (questionnaires/ interviews) and measurements on the level of daylight, glare, air quality, temperature, and humidity after the buildings have been occupied.</li> <li>Usually, POE results are only for EC to concern and take action. Architects and other consultants are interested to know the results (but not all and at all times) but they have moved on to other projects. EC usually request for additional fees from the clients for the 1 year monitoring &amp; finetuning period.</li> <li>There is an expert team who persuade and get paid by the client to conduct POE on his building &amp; its system in Singapore.</li> <li>In Malaysia, no tenants/owners</li> </ul>	<p><b>WHO ARE CONDUCTING OR SHOULD CONDUCT POE</b></p>
<p><i>Very important, it is one of the most important things. That is why once we've finished our work, we do a lot of studies and measurements in the buildings in terms of daylight levels, glare levels, air qualities, temperature, humidity, after the buildings have been occupied.</i></p> <p><b>So usually you do that because of your own initiative</b></p>	<ul style="list-style-type: none"> <li>Very important to ensure users' satisfaction, health &amp; well-being.</li> <li>Environmental consultants are hired by the clients to conduct studies (questionnaires/ interviews) and measurements on the level of</li> </ul>		



<p><b>or required by the tenants?</b></p> <p><i>No tenants will ask for it. It is purely our own initiative and the way we argue it to our client that they should at least pay us to do this is because we need to finetune their building. We need to confirm that this building is working, we need to finetune it for 1 year. From there we do all the measurements. The most important to us is when people walk into the building, do they feel nice about it? If they feel nice about it, then we have done a good job. In LEO building, we interviewed the tenants, the temperature comfortable, and the light level, too bright or too dim and etc.</i></p> <p><b>Then when you have done then you'll recommend to the organization what thing should be done, how to improve it?</b></p> <p><i>Yeah, usually we are the one who are in charged in the building. So as the results come in and if is not good, then we try to solve it. We don't try to blame anyone. It is a good lesson learned. Normally architects will not come in anymore; we are the one who's left. Architects already moved to the next project. Architects and most of the consultants... their fees are locked into one job. When it is completed then they move on. But for us, we actually ask for a little bit more fees for the 1 year finetuning period. The architects love to know my results so we do it sometimes they are interested and sometimes they don't interested. Normally once it is done [monitoring and finetuning], we normally call for seminars to educate people that this is the result of this building, what is good about it, what is bad about it, what we have missed out and lessons to be learned. (CKT-EC:338-360)</i></p>	<p>daylight, glare, air quality, temperature, and humidity after the buildings have been occupied.</p> <ul style="list-style-type: none"> <li>• In Malaysia, no tenants/owners would ask for POE. Usually they are persuaded by the EC for POE to be conducted so the building could be finetuned for 1 year.</li> <li>• Usually, POE results are only for EC to concern and take action. Architects and other consultants are interested to know the results (but not all and at all times) but they have moved on to other projects. EC usually request for additional fees from the clients for the 1 year monitoring &amp; finetuning period.</li> <li>• Once the finetuning has been completed, EC normally call for seminars to educate the industry players on the results and the lessons learned.</li> </ul>
<p><b>TEXT</b></p> <p><b>BUILDER &amp; BUILDER-DEVELOPER:</b></p>	<p><b>CODE (INDIVIDUAL)</b></p>

<p>would ask for POE. Usually they are persuaded by the EC for POE to be conducted so the building could be finetuned for 1 year.</p> <p><b>Public Works Department</b></p> <ul style="list-style-type: none"> <li>• POE for government buildings should be conducted by PWD or outsourced companies.</li> </ul> <p><b>Researchers</b></p> <ul style="list-style-type: none"> <li>• The architect relies on university researchers to conduct the POE on his buildings in Malaysia.</li> </ul> <p><b>Facility/Property Manager</b></p> <ul style="list-style-type: none"> <li>• Normally, it is the responsibility of the property manager to find out the level of occupants' satisfaction.</li> <li>• Should be practiced by building owners or FM.</li> <li>• POE is either requested by the clients or proposed by the FM. Clients normally have not enough in-house expertise i.e. ranging from technicians to engineers to do it themselves.</li> </ul>	
<ul style="list-style-type: none"> <li>•</li> </ul>	

<p><i>The builder here is only thinking of handing over the building and surviving the defects liability period and getting their retention money or bank guarantee back. Once they have got it, they will be satisfied. If they cannot get their money then the owner will be satisfied [laughing]. I know it's sad but it's the reality. But of course we would always be satisfied when the building is properly delivered and handed-over and performs as intended.</i></p> <p>(SA-B/D:150-154)</p>	<ul style="list-style-type: none"> <li>• Important but our builders' only concerns are handing-over the building, surviving the DLP and getting their retention or bank guarantee back.</li> </ul>	<p><b>Poor practices</b></p> <ul style="list-style-type: none"> <li>• Government only practices corrective maintenance which is more costly than preventive maintenance</li> <li>• Important to know whether the targets are met and whether the building is maintained well enough. 80% of the buildings in Malaysia are not well maintained.</li> <li>• The buildings are poorly operated and maintained; hence do not perform as intended.</li> <li>• Local green buildings become the nation's pride during launchings but the way the buildings are operated and maintained during occupancy stage is not given attention.</li> <li>• Building maintenance issues are rarely considered as part of a development especially for government buildings.</li> </ul> <p><b>Sick Building Syndrome</b></p> <ul style="list-style-type: none"> <li>• SBS is among the major concerns in Malaysia</li> <li>• Concern about SBS</li> <li>• The IEQ of Malaysian office buildings are not well-monitored and maintained</li> </ul> <p><b>Lack of awareness among tenants</b></p> <ul style="list-style-type: none"> <li>• The occupants of green/sustainable office buildings in Malaysia have low level of awareness on consumption</li> </ul>	<p><b>POOR MAINTENANCE AND SICK BUILDING SYNDROME</b></p>
<p><i>It is all depending on the developer because most of the developers are looking into long term... A lot of developers now have actually changed their mindset for better buildability and etc. but not 100% though. This sustainable development thing must thoroughly be injected. People must be very educated and they must know that money is not everything in the country's development.</i></p> <p>(JD-B:335-341)</p>	<ul style="list-style-type: none"> <li>• Important but depends on the developers. They would care if they are educated about sustainable development and not totally money-minded.</li> </ul>		
<p><i>We would like to know whether occupants are satisfied or not. Offices we did like PTM and LEO, unfortunately we can't get access. It is always a little problem in the beginning because people are so used to very wasteful energy practices. In LEO building, people just changed their poor habits only for the last 6 months. Initially LEO building was designed for 100kwh/m2/year but it went to 130-140kwh/m2/year because people didn't use daylight. They drew the blinds and switched on the artificial lightings, they opened the windows when the air-conditioning was running. People take time to adjust. For residential even tougher. Offices are easier to control. We can build smart building but if the occupants cannot be bothered, there is no point. I think in the Malaysian context, we are proud that we can build energy efficient, green or sustainable buildings but the operation and maintenance wise is not green or sustainable at all.</i></p>	<ul style="list-style-type: none"> <li>• Important because builders would like to know the level of occupants' satisfaction but some of the government buildings are difficult to get access.</li> <li>• The occupants of green/sustainable office buildings in Malaysia have low level of awareness on consumption and waste production.</li> <li>• The buildings are poorly operated and maintained; hence do not perform as intended.</li> <li>• POE can be widely practiced if rating systems emphasize on revisiting the operation stage.</li> </ul>		

<p>Q. 27a When GBI [Green Building Index] comes about, we emphasized on revisiting the operating stage. I think that would encourage the practice of post occupancy evaluation in the industry. (TYT-B:230-243)</p>	
TEXT	CODE (INDIVIDUAL)
DEVELOPER, OWNER & DEVELOPER-OWNER:	
<p>Yes, it is very important. We don't do any monitoring/survey but we accept complaints and we rectify accordingly. We have a unit called "Customer Service Unit". After we handover the building, this unit will start to have monthly meetings with the tenants to discuss any complaints/issues.</p> <p>Q. 27a It is there. Developers and architects know that their work doesn't stop when the building is handed over. They know that after that there would be feedbacks from the tenants. The important thing for me is to learn from these feedbacks. There is no 100% perfect building. Any lessons learned should be brought into the next projects for further improvements. That is not happening nowadays. People just rectify based on complaints, that's all. (NA-D:147-156)</p>	<ul style="list-style-type: none"> <li>• Very important. Developer doesn't do monitoring or survey. Has a "Customer Service Unit" to conduct monthly meetings with tenants to discuss any complaints/issues.</li> <li>• Typically, developers and architects just rectify based on complaints. They don't treat the feedbacks given by tenants as lessons learnt to be brought into the next projects.</li> </ul>
<p>Of course, because if you are an investor, you are going to build again. If your building is very good, people would like to occupy your building. That's your reputation. Especially if you spend money to ensure that your building is green,</p>	<ul style="list-style-type: none"> <li>• Important because investors would want to maintain their good reputation by offering buildings which would satisfy the users</li> </ul>

<p>and waste production.</p> <p><b>Lack of government budget</b></p> <ul style="list-style-type: none"> <li>• Budget for the maintenance of government buildings have not always been allocated. Ad-hoc emergency budget is used when rectification/repair is needed.</li> </ul> <p><b>Government's actions</b></p> <ul style="list-style-type: none"> <li>• Local authority will have scheduled auditing to improve the building industry at large, workers population, occupants' productivity, and the quality of building maintenance.</li> </ul>	
CODE (GROUPED)	CATEGORY
<p><b>Emphasis of the importance</b></p> <ul style="list-style-type: none"> <li>• Absolutely important to see whether the designs work and continue to work</li> <li>• Important and must be made mandatory to ensure a continuous learning process.</li> <li>• Important, it is part of learning process</li> <li>• Important, it will be a very important learning process.</li> <li>• Important, it will become our learning experience.</li> <li>• Important to know whether the targets are met and whether the building is maintained well enough. 80% of the buildings in Malaysia are not well maintained.</li> </ul>	<p><b>CONTINUOUS LEARNING PROCESS</b></p>

<p>increase the occupants' comfort level, of course you want to see the returns.</p> <p><b>Do you ask the consultants to go and check whether the occupants are happy or not?</b></p> <p><i>Normally, it is the property manager who will do that – the management company – because they are the people who deal with building operation. They will contact the tenants on a daily basis and obviously the tenants will contact them. The tenants will not know who the architects were.</i> (MM-D:310-319)</p>	<ul style="list-style-type: none"> <li>• Developers/Investors who have spent money for a green building would look for their monetary returns.</li> <li>• Normally, it is the responsibility of the property manager to find out the level of occupants' satisfaction.</li> </ul>	<ul style="list-style-type: none"> <li>• Very important to ensure users' satisfaction, health &amp; well-being.</li> </ul> <p><b><u>Lack of attitude</u></b></p> <ul style="list-style-type: none"> <li>• Typically, developers and architects just rectify based on complaints. They don't treat the feedbacks given by tenants as lessons learnt to be brought into the next projects.</li> </ul> <p><b><u>Lack of data</u></b></p> <ul style="list-style-type: none"> <li>• Developer/owner complaint that the lack of detailed case studies makes it hard to pass on lessons learned.</li> </ul>	
<p>Yeah.</p> <p><i>Q. 27a Client Satisfaction survey is carried out as part of our ISO procedures. The feed-back offer valuable information to gauge if the building designs and quality of finishes measures up to the expectation of the occupants. All these data will determine the future market trend and demand for similar development.</i> (BTC-D:179-184)</p>	<ul style="list-style-type: none"> <li>• Important. Developer carried out "Client Satisfaction Survey" as part of their ISO procedures. Feedbacks will determine the future market trend and demand for similar development.</li> </ul>	<p><b><u>Seminar</u></b></p> <ul style="list-style-type: none"> <li>• Once the finetuning has been completed, EC normally call for seminars to educate the industry players on the results and the lessons learned.</li> </ul> <p><b><u>Research collaboration</u></b></p> <ul style="list-style-type: none"> <li>• There is a lack of university-industry collaboration to research on the actual performances of local case study buildings.</li> </ul>	<p><b>METHODS TO DISSEMINATE KNOWLEDGE &amp; INFORMATION</b></p>
<p><i>Yes, because I think industry must make it mandatory, because there will be no lessons learned. Everybody brags about it being green or etc during the launching or soft opening, but after that what is it? I look forward for any kind of data from the Mesiniaga for example, which is not available. We are talking about the Telekom Tower, I want that (data) because that is the thing. The owner or what so ever has no collaboration with the universities - we got a lot of researchers, with a lot of high-end equipments but it stock short. It is good to know that because we must</i></p>	<ul style="list-style-type: none"> <li>• Important and must be made mandatory to ensure a continuous learning process.</li> <li>• Local green buildings become the nation's pride during launchings but the way the buildings are operated and maintained during occupancy stage is not given attention.</li> <li>• Developer/owner complaint about the lack of data on local case study</li> </ul>	<ul style="list-style-type: none"> <li>• The practice of POE should be enforced.</li> <li>• POE can be widely practiced in Malaysia. Hope that post-commissioning will be enforced by the government.</li> <li>• For other buildings, clients are visited once in a while but problems on IEQ are not given much emphasis due to non-existence of</li> </ul>	<p><b>ABOUT LEGISLATION &amp; ENFORCEMENT</b></p>

<p><i>collectively as an industry, learn from what we have done, learn from each other and then we move on from there... Otherwise, the 2 years of designing and the 2 years of construction period knowledge will be wasted for the next 30 years.</i> (WR-D/O:628-651)</p>	<p>buildings, hence lessons are not well disseminated for others to learn from.</p> <ul style="list-style-type: none"> <li>• There is a lack of university-industry collaboration to research on the actual performances of local case study buildings.</li> </ul>	<p>laws and regulations.</p> <ul style="list-style-type: none"> <li>• No legislation or mandatory need for POE</li> <li>• Consultants must seek local authority's approval to rectify or change any part of the building.</li> </ul>	
TEXT		CODE (GROUPED)	
FACILITY MANAGER:		CATEGORY	
<p><i>Very important, we have a customer survey every six months. We have a department called QIMSY - quality safety health and environment department. Every six month they will go for the customer survey, internal quality audit. Every three months for quality inspection by different set of people. So my cost is very high.</i></p> <p><b>Q.27a Do you think post occupancy evaluation is widely practiced in the Malaysian building industry?</b></p> <p><i>No, I don't so. This is not widely practiced. We've been doing this for the past 10 years. We started with ISO9002 in 1996, then converted to ISO9001 in the year 2001. There is no turning back. So the procedures need to be</i></p>	<ul style="list-style-type: none"> <li>• Very important. FM conducts customer survey every 6 months and quality inspection every 3 months.</li> <li>• FM believes that POE has not been widely practiced in the country for the past 10 years.</li> <li>• Certain design consultants have a self-denial syndrome of which they feel their pride and prestige is affected when their design defective issues are made known.</li> <li>• POE is either requested by the clients</li> </ul>	<ul style="list-style-type: none"> <li>• POE can be widely practiced if rating systems emphasize on revisiting the operation stage.</li> <li>• Local authority believes that the implementation of GBI will be impractical unless the completed/ occupied buildings are audited.</li> <li>• For existing buildings, only IEQ, water and energy are required to be audited.</li> </ul>	<p><b>ABOUT POE IN BUILDING RATING SYSTEM</b></p>

<p><i>improved, revealed, changed to meet the changing environment.</i></p> <p><b>Do you provide the responses or whatever rectifications that you've done to the consultants who designed the buildings?</b></p> <p><i>No. Consultants would say..."I've already lost the drawings so long ago..." [laughing]. Consultants will not be interested to know defective issues.</i></p> <p><b>Won't they?</b></p> <p><i>I do not blame them. Some of them have this self-denial syndrome. Can you imagine... when we take over a new building we usually help them to compile a lot of defects. We sit down and discuss. Consultants will say "Aiya, no la". You can understand that their pride, their prestige will be affected when somebody point it up. Unless it's been asked by the clients when we do help them to do the warranty, a check, then they will compile all the defects and we sit down.</i></p> <p><i>That service, the post evaluation is actually required by the clients for us to do it and sometime we proposed to them. That is one of the starting points. The clients won't have enough manpower; from C&amp;S, M&amp;E engineers to help them to do it. And when we're talking about taking over a new building, so many expertises are required. We need that team, that pool of resources. That's why I put all the</i></p>	<p>or proposed by the FM. Clients normally have not enough in-house expertise i.e. ranging from technicians to engineers to do it themselves.</p> <ul style="list-style-type: none"> <li>• FM scope of work includes commissioning &amp; post commissioning, warranty and defects check. Typical local practice, FM rarely involved during testing and commissioning.</li> </ul>	<ul style="list-style-type: none"> <li>• Testing and commissioning are not given a priority even though they are compulsory.</li> <li>• FM scope of work includes commissioning &amp; post commissioning, warranty and defects check. Typical local practice, FM rarely involved during testing and commissioning.</li> </ul>	<p><b>ABOUT TESTING &amp; COMMISSIONING ISSUES</b></p>
		<ul style="list-style-type: none"> <li>• Important because investors would want to maintain their good reputation by offering buildings which would satisfy the users</li> </ul>	<p><b>ABOUT REPUTATION</b></p>

<p><i>technicians and engineers in the company. Each of them has different specialization. And in the absence of the employer or the owner having those different specialisations, then we're able to come to support them. One of the things that can improve the new building, we'll tell them that we can help to do the commissioning or the warranty check. If the commission had been done and handed over to them, we help them to do the post commissioning. Definitely we help them to do a warranty and defects check.</i></p> <p><b>Typical practice, facilities managers seldom involved during the testing and commissioning?</b></p> <p>No . (OCL-FM:344-376)</p>	
<p><i>Very important but we are not doing any survey among users in this building. We just measure and record our measurements based on the set procedures.</i> (KCD-FM:134-135)</p>	<ul style="list-style-type: none"> <li>• Very important but only measurements are taken and recorded. Occupant survey has never been done.</li> </ul>
<p><b>TEXT</b></p> <p><b>REGULATOR, POLICY MAKER &amp; GOVERNMENT PROJECT IMPLEMENTOR</b></p>	<p><b>CODE (INDIVIDUAL)</b></p>
<p><i>Very important.</i> <i>Q. 27a It should be the practice of building owners or facility managers to conduct surveys among tenants to gauge their level of satisfaction and to identify the major areas of complaints or concerns so the work can be focused. The problem of Sick Building Syndrome should be tackled as well. For government buildings, JKR or outsourced companies should be doing this.</i> (ZS-FM:167-173)</p>	<ul style="list-style-type: none"> <li>• Very important. Should be practiced by building owners or FM to identify the major areas of complaints so works can be focused. Concern about SBS.</li> <li>• POE for government buildings should be conducted by PWD or outsourced companies.</li> </ul>
<p><i>Very important. JKR handles public buildings, so we conduct post occupancy evaluation. For our hospital</i></p>	<ul style="list-style-type: none"> <li>• Very important. PWD follows ISO9000 requirement to conduct</li> </ul>

<ul style="list-style-type: none"> <li>• Important (6x)</li> <li>• Very important (4x)</li> <li>• Absolutely important.</li> <li>• Important, it is a must.</li> </ul>	<p><b>IMPORTANT BUT NO REASONS GIVEN</b></p>
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<p><i>projects, we include our requirements on IEQ in our statement for the consultants to follow. When the building has been completed and occupied, we distribute our survey forms to occupants to seek their comments. That is required by ISO9000. What ever rectifications that need to be done are covered within "Defect Liability Period".</i></p> <p><b>Who does the monitoring of your hospital projects after occupation?</b></p> <p><i>Contractors do it within 2 years of DLP. But for office buildings, DLP is only 1 year.</i> (CPK-PI:305-311)</p>	<p>POE on government hospital buildings by seeking occupants' satisfaction level via survey.</p> <ul style="list-style-type: none"> <li>• For government buildings, any rectifications needed after POE are done by the contractors within DLP i.e. 1 year for office buildings.</li> </ul>
<p><i>Yes. If occupants make complaints on anything due to design faulty, consultants must seek approval from us to rectify or make any changes to the building.</i> (AMN-R/PM:156-157)</p>	<ul style="list-style-type: none"> <li>• Important</li> <li>• Consultants must seek local authority's approval to rectify or change any part of the building.</li> </ul>
<p><i>Yes, we're asked to look into that already. Because when PAM wants to implement GBI, it won't work unless the buildings are audited. So we are looking into ways where we can actually not only audit a green building but audit everything including the structure, services and etc. We'll have scheduled auditing so we can ensure the quality of the building and it will help to improve everything e.g. the building industry, workers population, productivity, ensure that buildings are properly maintained. The problem with us is that whenever we build something, we never maintain it. We always ignore the maintenance. Maintenance should be part of development. Especially DBKL, after building it, then we start to realize that it needs to be maintained. It is the government...not just DBKL. DBKL is a small organization, we can manage to maintain our own buildings. The government itself...maintenance has always zero budget until something happen then we use our emergency budget to counter-back which is expensive. There is no preventive maintenance. We wait until the parts</i></p>	<ul style="list-style-type: none"> <li>• Important because LA believes that the implementation of GBI will be impractical unless the completed/ occupied buildings are audited.</li> <li>• Local authority will have scheduled auditing to improve the building industry at large, workers population, occupants' productivity, and the quality of building maintenance.</li> <li>• Building maintenance issues are rarely considered as part of a development especially for government buildings.</li> <li>• Budget for the maintenance of government buildings have not always been allocated. Ad-hoc emergency budget is used when rectification/repair is needed.</li> </ul>



<p><i>go rotten or broken first. Actually that causes more money to rectify later. I think our government should think it as an emergency to having somebody taking charged of the maintenance of government buildings and infrastructures.</i> (NN-R/PM:364-378)</p>	<ul style="list-style-type: none"> <li>• Government only practices corrective maintenance which is more costly than preventive maintenance</li> </ul>
<p><i>Yes, of course. Firstly, I think it is to see if there is a room for improvement. After they make an adjustment and make their obligation to improve the situation. I think of course we should do. Otherwise it can become a lesson learned for the next activities.</i> <i>Q. 27a I don't think it has been widely practiced, because people are concerned about cost.</i> (MCA-PM:193-200)</p>	<ul style="list-style-type: none"> <li>• Important</li> <li>• POE has not been widely practiced in the country due to cost</li> </ul>
<p><i>Yes.</i> <i>Q. 27a Malaysia has experienced SBS issues in some buildings &amp; the problem is quite well known in the public domain. IEQ has thus been addressed for specific cases. Even in the PTM's ZEO building, IEQ has been an issue &amp; it has been assessed to verify user comfort. Local expertise exists to do so but there is little desire or incentive for building owners to do so. There is also no legislation or mandatory need to do so.</i> (GL-PM:227-233)</p>	<ul style="list-style-type: none"> <li>• Important because SBS is among the major concerns in Malaysia</li> <li>• Local expertise exists but there is little desire or incentive for building owners to do POE</li> <li>• No legislation or mandatory need for POE</li> </ul>

**Q.28 Are there any regulatory requirements to ensure good IEQ of office buildings?**

TEXT	CODE (INDIVIDUAL)
<b>REGULATOR, POLICY MAKER &amp; GOVERNMENT PROJECT IMPLEMENTOR</b>	
<i>No. I've seen OSHA requirements, but it only covers aspects like safety, noise, dust and etc. but not on the use of low-VOC materials and building's level of IEQ. Even the acceptable concentration level of CO2 ppm [parts per million] is not stated in OSHA. Our UBBL covers more on the basics.</i> (CPK-PI:314-317)	• No
<i>I am not sure about that. People are doing that because they want to. I think there is no regulatory requirement from the government.</i> (NN-R/PM:380-381)	• No
<i>To my knowledge, there is no such regulation at the moment. Maybe you can request further advice from DOSH [Department of Safety &amp; Health].</i> (MCA-PM:199-200)	• No
<i>No. As far as I'm aware there is no regulatory need to ensure good IEQ although general guidelines exist under some documents.</i> (GL-PM:235-236)	• No

CODE (GROUPED)	CATEGORY

**Q.29 What is the place of health & safety planning in construction operations as a means to address the health of workers on site and the health of the building's future occupants? Q.29a If important, what are the measures that have been taken by your company to address this issue?**

TEXT		CODE (INDIVIDUAL)	CODE (GROUPED)	CATEGORY
<b>BUILDER &amp; BUILDER-DEVELOPER:</b>				
<p><i>Safety and health cost element is priced in the preliminaries and it is imperative that any project more than 20million need a safety officer on board but lack of qualified personnel will see this aspect of operation sometimes downgraded. Most of the time is more of penalising the workers in monetary terms of not wearing helmet and safety boots. But I do see some improvements in this area. The issues have been addressed and the governing body like NIOSH and DOSH need to create more awareness and assistance in this aspects.</i></p> <p><i>Q. 29a Normally there is a safety and health manual prepared by the safety officer by whom he will conduct safety talks and measures on site. Most of the time, the items are fairly standard measures and did not evolve to that degree yet. They are more concern at this moment to prevent death from falling bricks rather than some microbes lurking in the moist ducting vents...</i></p> <p>(SA-B:160-171)</p>	<ul style="list-style-type: none"> <li>• The issues have been addressed by the governing body i.e. NIOSH</li> <li>• DOSH needs to create more awareness and give assistance</li> <li>• It is imperative for any projects worth more than RM20million to have a safety officer on board.</li> <li>• Certain safety officers are unqualified</li> <li>• Safety officer prepare safe &amp; health manual, conduct safety talks and measures on site. However, items and measures are fairly standard.</li> </ul>			
<p><i>Very important.</i></p> <p><i>Q. 29a That's why I always appreciate CDM, Construction Design Management. What they do is that they emphasize more on the safety aspects before any work even small little work start. They must see the strategic project plan is submitted. A strategic project plan encompasses the safety and health aspects, and also the method statements on how you're going to do the work, how are you going to demolish the building or part of the building, what are the measures you're going to take if there'll so much dust. All</i></p>	<ul style="list-style-type: none"> <li>• Appreciate the implementation of Construction Design Management (CDM). Prepare and submit strategic project plan to ensure the safety &amp; health of workers, future tenants and the general public; and method statements showing how the work is going to be carried out.</li> <li>• In Malaysia, CDM is only practiced in the refinery oil &amp; gas industry due to</li> </ul>			

<p><i>these things are spelt out.</i></p> <p><b>Is CDM widely practiced in Malaysia?</b></p> <p><i>No, only in the refinery oil and gas industry. That is because of the obvious danger. Otherwise, people would not bother. When I was in the UK or even Germany and Australia, they planned their construction safety like a surgeon. They do proper job, when they go there, they meticulously ensure safety and security of the workers, future tenants and the general public. Unfortunately, we are not even up to 1% yet. Everything we do is to meet the minimum requirement.</i></p> <p>(JD-B:347-367)</p>	<p>the obvious danger. In construction industry, everything is done to meet the minimum requirement.</p>
<p><i>Very important.</i></p> <p><i>Q. 29a For dust, what is commonly practiced is the use of water browsing. That is not 100% and that is not unavoidable. If we do earthwork in a big area, how often can we browse it? When there is no vehicle running through and there is no wind blowing, there is no dust problem. It is hard to control but we do frequent browsing. Highly toxic chemical like adhesive used to lay carpets, we ensure our specialist contractors to put on their masks. When ensure all the windows are open during that process to encourage natural ventilation. Hardhats and safety boots are normal but it is very difficult to enforce especially to sub-contractors because they want to save costs. I think that aspect has been improving over the years.</i></p> <p>(TYT-B:248-258)</p>	<ul style="list-style-type: none"> <li>• Use water browsing to reduce dust on air</li> <li>• Ensure workers put on their masks and open all windows when laying carpets using highly toxic chemical e.g. adhesive.</li> </ul>
<p><b>TEXT</b></p> <p><b>REGULATOR, POLICY MAKER &amp; GOVERNMENT PROJECT IMPLEMENTOR</b></p>	<p><b>CODE (INDIVIDUAL)</b></p>
<p><i>Very important.</i></p> <p><i>Q. 29a Health &amp; safety for the workers on site are covered in ISO14000. For future building occupants, we make sure</i></p>	<ul style="list-style-type: none"> <li>• Aspects are covered in ISO14000</li> <li>• Make sure designers specify non-toxic or non-hazardous products and</li> </ul>

<p><b>CODE (GROUPED)</b></p>	<p><b>CATEGORY</b></p>

*that designers specify non-toxic or non-hazardous products and materials. We only use materials which are approved by EPU depending on the categories/classification of building. (CPK-PI:322-328)*

- materials
- Only use materials approved by EPU

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**Q.30 What is your view of designing an office block to accommodate disabled people?**

TEXT	CODE (INDIVIDUAL)
<b>ARCHITECT:</b>	
<i>I think Malaysia has a standard on this... I think it is mandatory for government buildings. (KK-A:178-179)</i>	<ul style="list-style-type: none"> <li>Standard is available</li> <li>Think it is mandatory for government buildings</li> </ul>
<i>It's good, it is important to consider but you don't need to compromise the whole building or the whole complex for the disabled. It has to be specifically designed and located. I don't agree that handicap should have access anywhere or everywhere or you have to spread car parks for handicap all over the place. I don't agree with general rules. It has to be specific for example let say that if you are disabled, there is a certain area allocated for you which from that point you can access anywhere but not every lift core can be accessible. (WS-A:225-230)</i>	<ul style="list-style-type: none"> <li>Good &amp; important to consider</li> <li>Don't have to compromise the whole building/complex for the disabled i.e. only specifically designed &amp; located</li> </ul>
<i>Currently we have the disable guideline. It is a must. It is already included in the planning approval process. All public buildings that include all office buildings have to be designed to comply with "Malaysian Standard on Access for Disabled People". Those include toilets, ramps for entrance, public spaces; all have to be designed to the disabled accordance. The guidelines are produced by SIRIM. (CSA-A:305-309)</i>	<ul style="list-style-type: none"> <li>Must comply MS 1184 which is the Code of Practice on Access for Disabled People to Public Buildings</li> <li>Must be considered. Included in the planning approval process.</li> </ul>
<i>Essential. For privately owned buildings, we are not governed by law to do it. But for public buildings, yes. (TLM-A:273-274)</i>	<ul style="list-style-type: none"> <li>Essential provision</li> <li>Only mandatory for public buildings</li> </ul>
<i>It is very important but nothing much to do with green. (KY-</i>	<ul style="list-style-type: none"> <li>Very important but not related to</li> </ul>

CODE (GROUPED)	CATEGORY
<b>From all 30 interviewees</b>	
<ul style="list-style-type: none"> <li>Standard is available <b>KK</b></li> <li>Must comply MS 1184 which is the Code of Practice on Access for Disabled People to Public Buildings <b>CSA</b></li> <li>Minimum requirements are spelt out in UBBL and Malaysian Standard <b>CTL</b></li> <li>The requirements are indicated in UBBL <b>CKT</b></li> <li>Already part of regulation <b>WR</b></li> <li>Malaysian Standard shows good practice only and not compulsory to be followed. <b>CPK</b></li> <li>Not sure whether it is a law and haven't seen it in UBBL <b>KSK</b></li> </ul>	<b>MS 1184: CODE OF PRACTICE ON ACCESS FOR DISABLED PEOPLE TO PUBLIC BUILDINGS &amp; UNIFORM BUILDING BYLAW</b>
<ul style="list-style-type: none"> <li>Only mandatory for public buildings <b>TLM</b></li> <li>Compulsory for government and semi-government buildings <b>SH</b></li> <li>Think it is mandatory for government buildings <b>KK</b></li> </ul>	<b>ONLY MANDATORY FOR PUBLIC BUILDINGS</b>
<ul style="list-style-type: none"> <li>Must be considered. Included in the planning approval process. <b>CSA</b></li> <li>Mandatory or not, depends on the LA <b>SA</b></li> </ul>	<b>ENFORCEMENT BY LOCAL AUTHORITIES</b>

A:240)	green building
<i>...depending on the corporation and their social responsibility, they'll adopt it. I am sure in Government buildings is now made compulsory. Semi-government also. In the private sector, only to a certain limit. (SH-A:343-345)</i>	<ul style="list-style-type: none"> <li>• Compulsory for government and semi-government buildings</li> <li>• For privately owned buildings – depends on the corporation and their social responsibility.</li> </ul>
<i>I think it is very important but of course again it all goes back to the client whether it is social obligation. Whether it is mandatory or not, that depends on the local authority. (SA-A:333-334)</i>	<ul style="list-style-type: none"> <li>• Very important but depends on the clients' social obligation.</li> <li>• Mandatory or not, depends on the LA</li> </ul>
<i>Disability is already a part of local authorities' requirements for building design. (LCH-A:321)</i>	<ul style="list-style-type: none"> <li>• Already part of LA's requirements</li> </ul>
<i>Obviously important but with advanced IT development, this is becoming secondary. (NB-A:210)</i>	<ul style="list-style-type: none"> <li>• Important but becoming secondary</li> </ul>
TEXT	CODE (INDIVIDUAL)
ENGINEER & ENVIRONMENTAL CONSULTANT:	
<i>You see requirement for disability is in our law but people are not pushing for it. We already amended our building bylaw to allow for that but we need to do beyond that. Disability is not making ramps only you know? It includes all the services. Even for fire escape, staircase you have a holding area. Some of them are not required by law yet, but it is up to you to push it. If the building owner wants it, we can push it. Bylaw cannot spell out everything, only minimum requirements. You exceed minimum requirements. (CTL-ME:527-532)</i>	<ul style="list-style-type: none"> <li>• Minimum requirements are spelt out in UBBL and Malaysian Standard</li> <li>• Designers only comply the minimum requirements without the initiative to go beyond the set requirements.</li> </ul>
<i>I think we should make an effort to go for it. But I think other countries have gone far on this. But I don't know how advanced we have it in Malaysia. (NYK-ME:300-301)</i>	<ul style="list-style-type: none"> <li>• Other countries have gone further than Malaysia.</li> </ul>
<i>Do you know that Bylaw actually requires that, accessible for the handicaps? But you can see there are a lot of</i>	<ul style="list-style-type: none"> <li>• The requirements are indicated in UBBL</li> </ul>

<ul style="list-style-type: none"> <li>• Already part of LA's requirements <b>LCH</b></li> <li>• Lots of development have been approved without considering accessibility <b>CKT</b></li> <li>• Emphasized by LA <b>NA</b></li> <li>• LA enforces the compliance of MS1184 among designers <b>AMN</b></li> </ul>	
<ul style="list-style-type: none"> <li>• KL is preparing for becoming a barrier free city by 2015</li> <li>• Developer has its own guidelines</li> <li>• Existing buildings need to be retro-fitted for accessibility</li> </ul>	<b>INITIATIVES</b>
CODE (GROUPED)	CATEGORY
<ul style="list-style-type: none"> <li>• For privately owned buildings – depends on the corporation and their social responsibility.</li> <li>• Very important but depends on the clients' social obligation.</li> <li>• It is the company's social responsibility, culture and policy to instil a caring society for the less fortunate.</li> <li>• It is a social obligation</li> <li>• Become a desired feature especially for owners who wish to project a positive corporate image</li> <li>• Important for Corporate Social Responsibility to cater for disabled</li> </ul>	<b>CORPORATE IMAGE &amp; SOCIAL RESPONSIBILITY</b>

<i>buildings been approved without this accessibility. (CKT-EC:363-364)</i>	<ul style="list-style-type: none"> <li>Lots of development have been approved without considering accessibility</li> </ul>
<b>TEXT</b>	<b>CODE (INDIVIDUAL)</b>
<b>BUILDER &amp; BUILDER-DEVELOPER:</b>	
NA	<ul style="list-style-type: none"> <li>NA</li> </ul>
<b>TEXT</b>	<b>CODE (INDIVIDUAL)</b>
<b>DEVELOPER, OWNER &amp; DEVELOPER-OWNER:</b>	
<i>We have designed guidelines for this. Even Putrajaya Corporation (local authority) insists for buildings to have facilities for disabled people. As far as I am concern, Putrajaya has complied this requirement. However, I think we need feedbacks from these people to see whether the provisions really work or not. (NA-D:165-168)</i>	<ul style="list-style-type: none"> <li>Developer has its own guidelines</li> <li>Emphasized by LA</li> <li>Need feedback to learn the practicability of the provisions</li> </ul>
<i>Yes. Previously our buildings didn't care about this so much...But I think after a while, we were somehow embarrassed by the foreigners when they asked why we don't provide toilets for the disabled. Even if provided, they are useless due to poor maintenance. Even when nobody is using them, they are not maintained properly. I think we have learned from our mistakes. Now, architects include this in their designs. (MM-D:324-329)</i>	<ul style="list-style-type: none"> <li>Local private developments neglected this aspect.</li> <li>Developer's negligence was faced by the foreign investors/tenants</li> <li>Developer believed that the provision is useless due to underutilization and maintenance issues.</li> <li>Developer learned their mistakes and ensure the provision is given a priority</li> </ul>
<i>We strongly believe a well designed office block should also cater to facilitate the access for the disabled or physically challenged public whom may form part of the working community within the building. It is the company's social responsibility, culture and policy to instil a caring society for the less fortunate.(BTC-D199-202)</i>	<ul style="list-style-type: none"> <li>It is the company's social responsibility, culture and policy to instil a caring society for the less fortunate.</li> </ul>
<i>But it is a regulation to design for disabled. Regulation is one thing but you have to be realistic and compassionate in</i>	<ul style="list-style-type: none"> <li>Already part of regulation</li> <li>Designers must be realistic and</li> </ul>

public and/or workforce.	
<b>CODE (GROUPED)</b>	<b>CATEGORY</b>
<b>CODE (GROUPED)</b>	<b>CATEGORY</b>
<p><b>About clients/owners</b></p> <ul style="list-style-type: none"> <li>Local private developments neglected this aspect.</li> <li>Developer's negligence was faced by the foreign investors/tenants</li> <li>Developer believed that the provision is useless due to underutilization and maintenance issues.</li> </ul> <p><b>About designers &amp; tenants</b></p> <ul style="list-style-type: none"> <li>Toilets for disabled are not utilized and appliances are deteriorated. Hence, become store for cleaners.</li> </ul> <p><b>About designers</b></p> <ul style="list-style-type: none"> <li>Designers only comply the <u>minimum requirements</u> without the initiative to go beyond the set requirements. <b>CTL</b></li> <li>Designers must be creative to ensure access and facilities are friendly to both disabled and 'abled' i.e. not segregated. This is not mentioned in the Malaysian Standard. <b>WR, NN</b></li> </ul>	<b>NEGLIGENCE/ IGNORANCE</b>



<i>doing it... Because it just sickening when you designed for disable but actually the ramp is just too steep, without help the disabled can't get onto that. Yes you should encourage that because they are people as well, but when I say the economic waste is when people cannot use it. That's what I meant. Be compassionate about it. But sometimes you don't need to follow the regulation all out if you think that it couldn't work. You can bend the rules but still it is nicely designed. When you design, don't give just a damn ramp. You can have a very nice sloping, levelling...not just a narrow ramp that you have to give 1 to 5 meter, and everybody will go through it. (WR-D/O:663-675)</i>	<p>compassionate in providing the access and facilities.</p> <ul style="list-style-type: none"> <li>Designers must be creative to ensure access and facilities are friendly to both disabled and 'abled' i.e. not segregated. This is not mentioned in the Malaysian Standard.</li> </ul>
TEXT	CODE (INDIVIDUAL)
<b>FACILITY MANAGER:</b>	
<i>Very important, obviously. (OCL-FM:378)</i>	<ul style="list-style-type: none"> <li>Very important</li> </ul>
<i>It should be emphasized. This building is disable people friendly. But our toilets for disabled are not being used. The appliances have been deteriorated. So these toilets become store for the cleaners. (KCD-FM:140-142)</i>	<ul style="list-style-type: none"> <li>Should be emphasized</li> <li>Toilets for disabled are not utilized and appliances are deteriorated. Hence, become store for cleaners.</li> </ul>
<i>Very important, obviously. (ZS-FM:176)</i>	<ul style="list-style-type: none"> <li>Very important</li> </ul>
TEXT	CODE (INDIVIDUAL)
<b>REGULATOR, POLICY MAKER &amp; GOVERNMENT PROJECT IMPLEMENTOR</b>	
<i>JKR buildings provide the facilities for disabled people but</i>	<ul style="list-style-type: none"> <li>Universal access is usually neglected</li> </ul>

<ul style="list-style-type: none"> <li>Facilities in some public buildings e.g. public transportation &amp; office buildings are <u>disjointed</u> i.e. not covered throughout the building. Good examples are in hospitals. <b>CPK</b></li> <li>Local designers are <u>ignorant</u> in the compliance of MS1184 <b>AMN</b></li> <li>Designers must be <u>realistic and compassionate</u> in providing the access and facilities. <b>WR</b></li> <li>Don't have to compromise the whole building/complex for the disabled i.e. only specifically designed &amp; located. <b>WS</b></li> </ul> <p><b>General</b></p> <ul style="list-style-type: none"> <li>Universal access is usually neglected.</li> <li>Important but becoming secondary</li> </ul>	
CODE (GROUPED)	CATEGORY
<ul style="list-style-type: none"> <li>Need feedback to learn the practicability of the provisions</li> <li>Developer learned their mistakes and ensure the provision is given a priority</li> <li>Other countries have gone further than Malaysia.</li> </ul>	<b>LESSONS LEARNED</b>
CODE (GROUPED)	CATEGORY
<ul style="list-style-type: none"> <li>Very important (3X)</li> </ul>	<b>IMPORTANT</b>

<p><i>somehow disjointed, not covered throughout the building. You look at our LRT stations which are supposed to serve for the mass. Yet they forgot about universal design. People with disability have been marginalized. Let alone office buildings where mostly all are 'abled' people. I think these facilities are superb in hospitals... We have Malaysian Standard which shows good practice only. It illustrates how we should do it but it is not compulsory or mandatory. Just like our MS1525, it is up for people to follow. (CPK-PI:331-339)</i></p>	<ul style="list-style-type: none"> <li>• Facilities in some public buildings e.g. public transportation &amp; office buildings are disjointed i.e. not covered throughout the building. Good examples are in hospitals.</li> <li>• Malaysian Standard shows good practice only and not compulsory to be followed.</li> </ul>	<ul style="list-style-type: none"> <li>• Should be emphasized</li> <li>• Very important but not related to green building</li> <li>• Essential provision</li> <li>• Good &amp; important to consider</li> </ul>	<p><b>PROVISION</b></p>		
<p><i>I suppose, every new office now should have provision for access disabled people. Like sufficient pathways, sufficient lifts, parking and so on. It is a social obligation. I am not sure whether it is a law. I haven't seen in our UBBL as such. (KSK-R/PM:203-205)</i></p>	<ul style="list-style-type: none"> <li>• It is a social obligation</li> <li>• Not sure whether it is a law and stated in UBBL</li> </ul>				
<p><i>Very important. We enforce on the compliance of MS1184 among designers. However, one of the biggest challenges we are facing is the ignorance among local designers to comply this standard. (AMN-R/PM:163-165)</i></p>	<ul style="list-style-type: none"> <li>• Very important</li> <li>• LA enforces the compliance of MS1184 among designers</li> <li>• Local designers are ignorant in the compliance of MS1184</li> </ul>				
<p><i>...KL wants it to be ready by 2015 – a barrier free city. So the new developments are okay. We are even going further from the requirement of our 3MS. Where, we want them to design not only to follow the requirements but also to make it a barrier free in term of, not to segregate the disabled and the abled facilities. So it is a facility for everybody, which is not mentioned in the MS. We have all the standards in the MS saying they have to provide but it doesn't say you must provide it together... In government buildings, we have been allocated and required to provide ramps and etc. But..., it has been segregated.... We should re-design it to be on the right level, and then our toilets should be friendly for the disabled rather than put one cubicle just for them. Especially on the ground level, it</i></p>	<ul style="list-style-type: none"> <li>• KL is preparing for becoming a barrier free city by 2015</li> <li>• Designers must be creative to ensure access and facilities are friendly to both disabled and 'abled' i.e. not segregated. This is not mentioned in the Malaysian Standard.</li> </ul>				

<p><i>should be accessible to everybody. (NN-R/PM:386-401)</i></p>	
<p><i>Yes, I think we should. We should provide the facilities for the disable. I mean for their accessibility. I think it's important for Corporate Social Responsibilities (CSR). Because companies with strong CSR, they have to employ disabled people as part for their workforce. So they need to provide the facilities. Public buildings like banks also need to accommodate disabled people even though none of their staffs is disabled. Even, the government now is trying to assist the disabled people in the public transportation. (MCA-PM:204-209)</i></p>	<ul style="list-style-type: none"> <li>• Important for Corporate Social Responsibility to cater for disabled public and/or workforce</li> </ul>
<p><i>Facilities to make offices disabled-friendly are becoming a desired feature, especially for owners who wish to project a positive corporate image. I believe that all buildings which the public need to access must be made disabled-friendly, even if needs retro-fitting of such features in existing buildings. (GL-PM:239-242)</i></p>	<ul style="list-style-type: none"> <li>• Become a desired feature especially for owners who wish to project a positive corporate image</li> <li>• Existing buildings need to be retro-fitted for accessibility</li> </ul>


## F. CURRENT ECONOMIC PRACTICES

**Q.31 Based on your experience, have economic issues always been the first priority in any decision-makings for office building projects? Q.31a If not so, what issues have been the first priority?**

TEXT	CODE (INDIVIDUAL)
<b>ARCHITECT:</b>	
<i>Definitely because they want to know what the return is after the building is built. If they are going to rent it out, how much return they will get out of that building. How much are they going to spend on the operation cost? The operation cost against rental, is it a minus or is it a plus? The main objective of constructing a building is to make money, so economic issue is the first priority. (KK-A:184-188)</i>	<ul style="list-style-type: none"> <li>• Yes for clients (architect)</li> <li>• Economic return</li> <li>• Operation cost against rental income</li> </ul>
<i>Yes. Normally they go for investment cost as low as possible. It very difficult to educate client that cost of the building is not for the first 3 years – if the building takes 3 years to build. At least the first 5 years after building is completed is also important. If a building can sustain by itself for the first 5 years, so that should be okay. If after 5 years, the building has to go through renovations or anything, it is considered fair. (WS-A:238-245)</i>	<ul style="list-style-type: none"> <li>• Yes for clients (architect)</li> <li>• Minimum investment cost</li> <li>• Clients normally do not prioritize the need to make sure the building is self-sustained for the first 5 years after completion.</li> </ul>
<i>No. Q. 31a The goal of the company usually is the priority. <b>No matter how expensive the building would be as long as it reaches their goal, that's fine?</b> Yeah. (CSA-A:314-319)</i>	<ul style="list-style-type: none"> <li>• No (architect)</li> <li>• The company's goals</li> </ul>
<i>Yes, mostly on the return. (TLM-A:279)</i>	<ul style="list-style-type: none"> <li>• Yes (architect)</li> <li>• Economic return</li> </ul>
<i>Economic issues is not the first priority. Q. 31a It is equal to 2 others: environment and social. (KY-A:246-248)</i>	<ul style="list-style-type: none"> <li>• No (architect)</li> <li>• Social &amp; Environmental are equally important as Economic</li> </ul>

CODE (GROUPED)	CATEGORY
<b>From all 30 interviewees</b>	
<p><b>From Consultants</b></p> <ul style="list-style-type: none"> <li>• No (architect) (3x)</li> <li>• Yes (architect) (2x)</li> <li>• Yes for clients (architect) (3x)</li> <li>• Yes. It is the bottom line for clients (architect)</li> <li>• Yes for the clients (engineer)</li> <li>• Has always been for a long time for clients (engineer)</li> <li>• Yes for developers (environmental consultant)</li> </ul> <p><b>From Builders</b></p> <ul style="list-style-type: none"> <li>• Yes for builders (builder) (2x)</li> <li>• Not necessarily for builders (builder)</li> </ul> <p><b>From Developers/owners</b></p> <ul style="list-style-type: none"> <li>• Yes for developers (developer) (3x)</li> <li>• Yes – owner has to make money after all (developer/owner)</li> </ul> <p><b>From Facility Managers</b></p> <ul style="list-style-type: none"> <li>• Yes (FM) (2x)</li> <li>• No for government projects (FM)</li> <li>• Yes for private projects (FM)</li> <li>• No (Government FM)</li> </ul> <p><b>From Government</b></p>	<b>ECONOMIC ISSUE HAS BEEN THE PRIORITY</b>

Not all. (SH-A:350)	<ul style="list-style-type: none"> <li>No (architect)</li> </ul>
<p>Yes. Not many people get the opportunities like Hijjaz and Ken Yeang to get good clients doing iconic buildings which are expensive. But you have to question whether their buildings are showbiz or they are some social obligations that they could have done.</p> <p>A good example is sun shading device. If let say there is a cost cutting exercise, which items do you think will be first omitted? Of course the sun shading devices! This is the reality in our industry. (SA-A:342-347)</p>	<ul style="list-style-type: none"> <li>Yes for clients (architect)</li> <li>Minimum investment cost</li> </ul>
<p>Yes. Of course the bottom line is still the dollars and cent, but I think as far as the development of office building is concern, the clients now are beginning to aware of like. As we have discussed just now to incorporate informal spaces because these spaces can affect the people who occupy the office buildings. 10 years ago, clients didn't realize this. But now they can see the difference where office can be livelier and people are more productive although they lost some workspaces in the building.</p> <p><b>Are you saying economic issues are not your priority?</b></p> <p>It is a priority because at the end of the day it will increase the productivity. The office production is better. So you let go some office spaces to become an informal area but somehow rather increase the income. So it balances off. Nowadays the clients are more aware of this.</p> <p>(LCH-A:326-336)</p>	<ul style="list-style-type: none"> <li>Yes. It is the bottom line for clients (architect)</li> <li>Clients are beginning to consider the long term gain from increased workers' satisfaction and productivity</li> <li>Clients are willing to sacrifice some workspaces to accommodate social/informal areas.</li> </ul>
Yes. More often than not, considerations to green design have direct impact on economic issues. (NB-A:216-217)	<ul style="list-style-type: none"> <li>Yes (architect)</li> </ul>
<b>TEXT</b>	<b>CODE (INDIVIDUAL)</b>
<b>ENGINEER &amp; ENVIRONMENTAL CONSULTANT:</b>	

<ul style="list-style-type: none"> <li>Important but not the priority (Gov)</li> <li>Yes (Gov) (3x)</li> </ul>	
<p><b>From Consultants</b></p> <ul style="list-style-type: none"> <li>Economic return (2x)</li> <li>Minimum investment cost (2x)</li> <li>Operation cost against rental income</li> <li>Budget constraints for operation and maintenance especially for government projects</li> <li>Economic return for clients</li> <li>Economic return for clients who build to sell</li> <li>Minimum Payback Period</li> <li>Clients are beginning to consider the long term gain from increased workers' satisfaction and productivity</li> <li>Major decision for developers: long term benefits. Not necessarily minimum Payback Period</li> </ul> <p><b>From Builders</b></p> <ul style="list-style-type: none"> <li>Minimum construction cost with maximum profitability (builders)</li> </ul> <p><b>From Developers/owners</b></p> <ul style="list-style-type: none"> <li>Maximum profit. Developer establishes targeted profit before expenses are known.</li> <li>More concern in maximizing profit than minimizing construction cost (developer).</li> </ul>	<b>PRIORITIZED ECONOMIC ISSUES</b>
<b>CODE (GROUPED)</b>	<b>CATEGORY</b>

<p><i>It has always been for long time but more and more clients are more informed now. They want to look beyond that. Budget is always a big constraint in Malaysia. If the clients are inflexible on that then you got stuck. Then you have to be more innovative to explain to the client. Even the best clients would have a budget limit.</i></p> <p><b>And they want to maximize their return?</b></p> <p><i>So it depends on who handles the building. Who the client's representatives as well. If the government, then it becomes very fixed. Just like maintenance, why I make noise. They tender out the air-conditioning maintenance. The engineers, the lowest one, bid to them. You want to give to the second lowest one where you need to put a lot of report, what for? But lowest one cannot perform. Developers are very conscious like One Utama Shopping Complex is run by engineers. They want to look beyond economic returns. (CTL-ME:537-547)</i></p>	<ul style="list-style-type: none"> <li>• Has always been for a long time for clients (engineer)</li> <li>• Budget constraints for operation and maintenance especially for government projects</li> </ul>
<p><i>From my experience, I would say 99 out of 100, economic has always been the priority. It is up to us to convince whoever the owner or the developer on the ROI. For me I always convince them sometimes 10 months, less than 3 years, yes... we have to do that. Because the owners usually want to know how they can recover their money back. They don't care so much about the IEQ. But they forgot the fact that they are also among the occupants in the building. If the IEQ is not good, they will get sick, they won't get productive! You talked about economy...in most cases, yes, economic is priority. (NYK-ME:310-316)</i></p>	<ul style="list-style-type: none"> <li>• Yes for the clients (engineer)</li> <li>• Economic return for clients</li> <li>• Minimum Payback Period</li> <li>• Good IEQ for better health and productivity is not the owners' priority.</li> </ul>
<p><i>On the developer's side, yes. It is so much on how much the return would be. If they put in these features, can they get anything out of it? Not necessarily a minimum payback period. If I do this, would it benefit me in the long run or not? I think that is a major decision for developers. So the</i></p>	<ul style="list-style-type: none"> <li>• Yes for developers (environmental consultant)</li> <li>• Economic return for clients who build to sell</li> </ul>

<ul style="list-style-type: none"> <li>• Economic return (developer) (2x)</li> <li>• Low running cost for the potential investors/tenants (developer)</li> <li>• Maximize targeted profit by controlling and minimizing construction cost (developer)</li> <li>• Clients become more concern on minimizing capital cost especially when consultants fail to present the long term benefits of green technologies i.e. minimum running cost.</li> </ul> <p><b><u>From Facility Managers</u></b></p> <ul style="list-style-type: none"> <li>• Government may prioritize on the green technologies and not the capital cost</li> <li>• Both public and private entities are equally failing with regard to maintenance because of insufficient budget.</li> <li>• Government buildings have always been having sufficient budget for maintenance budget.</li> <li>• Minimum running cost (FM)</li> </ul> <p><b><u>From Government</u></b></p> <ul style="list-style-type: none"> <li>• Economic return is important for government projects to be approved by the EPU</li> <li>• Economic return is no longer important issue for government projects implementor (who carries out approved projects)</li> <li>• Government project implementor</li> </ul>	<p><b>CONTINUED</b></p>
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<p><i>way we sell this service right now is to make them see the picture in a long run because in short term I think it is difficult to prove anything where you can get higher rental because there is no building to set any examples yet. On that point, yes, I think our 348 Central is getting a higher rental.</i></p> <p><b>What if the client is actually the tenant of the building?</b></p> <p><i>It depends on the tenants like Sime Darby would be their CSR. They need to show that they are socially responsible. That would be driving it. But in general, as oppose to those who build to sell it, would be the returns.</i></p> <p>(CKT-EC:373-383)</p>	<ul style="list-style-type: none"> <li>• Major decision for developers: long term benefits. Not necessarily minimum Payback Period</li> <li>• EC sell their service by convincing clients on the long term economic gain.</li> <li>• There isn't any local green buildings that have demonstrated higher rental value in a short term</li> <li>• Corporate Social Responsibility for owner-occupied clients</li> </ul>
<b>TEXT</b>	<b>CODE (INDIVIDUAL)</b>
<b>BUILDER &amp; BUILDER-DEVELOPER:</b>	
<p>Yes.</p> <p>(SA-B/D:177)</p>	<ul style="list-style-type: none"> <li>• Yes for builders (builder)</li> </ul>
<p>Yes. <i>Minimum construction cost with maximum profitability.</i></p> <p>(JD-B:372-375)</p>	<ul style="list-style-type: none"> <li>• Yes for builders (builder)</li> <li>• Minimum construction cost with maximum profitability (builders)</li> </ul>
<p><i>Not necessarily. In construction, the priority is always to deliver on time, good quality. By doing that the cost saving would not be affected. In our practice, we don't so much concern on the cost savings. Some people would maximize the cost savings and compromise the quality. But we are more concerned on the quality of our products.</i></p> <p>(TYT-B:263-266)</p>	<ul style="list-style-type: none"> <li>• Not necessarily for builders (builder)</li> <li>• Deliver on time and in good quality (builders)</li> <li>• Cost savings are not the builder's priority</li> </ul>
<b>TEXT</b>	<b>CODE (INDIVIDUAL)</b>
<b>DEVELOPER, OWNER &amp; DEVELOPER-OWNER:</b>	
<p><i>As a developer, yes. We always have to concern our maximum profit. The target for the profit is established before looking at the expenses. That is the problem. That is when you start to cut corners, manipulate the design so</i></p>	<ul style="list-style-type: none"> <li>• Yes for developers (developer)</li> <li>• Maximum profit. Developer establishes targeted profit before</li> </ul>

<ul style="list-style-type: none"> <li>• has to stick to the allocated budget.</li> <li>• Minimum capital cost - for public clients</li> <li>• Quick Return on Investment (Gov)</li> </ul>	
<b>CODE (GROUPED)</b>	<b>CATEGORY</b>
<ul style="list-style-type: none"> <li>• The company's goals</li> <li>• Social &amp; Environmental are equally important as Economic</li> <li>• Building users</li> <li>• Clients are willing to sacrifice some workspaces to accommodate social/informal areas.</li> <li>• Corporate Social Responsibility for owner-occupied clients</li> <li>• Deliver on time and in good quality (builders)</li> </ul>	<b>OTHER PRIORITIZED ISSUES</b>
<b>CODE (GROUPED)</b>	<b>CATEGORY</b>
<ul style="list-style-type: none"> <li>• Clients normally do not prioritize the need to make sure the building is self-sustained for the first 5 years</li> </ul>	<b>NON-PRIORITIZED ISSUES</b>

<p><i>you could reduce your construction cost. Not many developers would sacrifice their targeted profit. Minimum construction is not an issue. We do not dictate that. We're more concern with maximum profit. (NA-D:178-182)</i></p>	<p>expenses are known.</p> <ul style="list-style-type: none"> <li>• More concern in maximizing profit than minimizing construction cost (developer).</li> </ul>
<p><i>Yes, without achieving our economic target or returns, how could we think about being green? Green buildings are normally more expensive. It takes more effort. So you need to reach the economic target first. It is not like a social obligation. We are doing business. We are dealing with private funds. We are dealing with private companies. Even government may build building for their own use, that one may be different. (MM-D:342-346)</i></p>	<ul style="list-style-type: none"> <li>• Yes for developers (developer)</li> <li>• Economic return (developer)</li> <li>• Green buildings are expensive and take more effort (developer)</li> </ul>
<p><i>Yes. Economic return is the fundamental consideration for the implementation for office building projects. Low running cost is one of the benefits that will attract potential investors/businessmen on the property. Targeted profit in the business plan can be surpassed by controlling and minimising construction cost. (BTC-D:208-213)</i></p>	<ul style="list-style-type: none"> <li>• Yes for developers (developer)</li> <li>• Economic return (developer)</li> <li>• Low running cost for the potential investors/tenants (developer)</li> <li>• Maximize targeted profit by controlling and minimizing construction cost (developer)</li> </ul>

<p>after completion.</p> <ul style="list-style-type: none"> <li>• Good IEQ for better health and productivity is not the owners' priority</li> <li>• Cost savings are not the builder's priority</li> </ul>	
<ul style="list-style-type: none"> <li>• Until about 5 years ago, most owners and developers             <ul style="list-style-type: none"> <li>- only concerned with meeting the minimum standards enforced by the approving local authorities</li> <li>- built at the lowest cost.</li> <li>- green or sustainability concepts are considered as a waste of financial resources - reinforced by the highly subsidized electricity tariff rates.</li> </ul> </li> <li>• Since 5 years ago             <ul style="list-style-type: none"> <li>- Env. concerns have gained some purchases</li> <li>- with the increased electricity tariffs from 2006, energy costs have gained some weight particularly for owner-occupied buildings</li> </ul> </li> </ul>	<p><b>ABOUT DEVELOPERS/ OWNERS</b></p>



*It became a first priority when the consultants fail to present the whole idea nicely, for example the rainwater harvesting. After the presentation I asked how many extra tanks that I have to buy? Because I still have to provide a tank [for water] from the main supplies in case there is a rainwater shortage but I have to provide another tank for rainwater harvesting. But actually the approach should be from the operational maintenance point of view first. If you do rainwater harvesting, you will save the operational cost like 'this much this much' because the commercial water rate is not the same like the residential. The residential water rate, you pay 0.57 cent per cubic meter, the commercial water rate you pay 2.07 cent per cubic meter. So it's a lot of savings...4 times money there. So it was presented that way. That's why people asked 'how much how much?' If you've cleverly presented it, then you'll get it. For example I'll give you another thing. We are trying to promote thermal energy storage. Thermal energy storage is basically using chilled water to serve the air-cond but we have an ice storage tank that has ice walls. We use the electricity tariff at night which is much cheaper to make the ice walls. In the morning we release the chilled gas from the ice wall to chill the water and run our air-cond. So we are actually not using the peak hours day-time electricity rate. So the owner will be paying the lower tariff electricity.*

- Yes – owner has to make money after all (developer/owner)
- Clients become more concern on minimizing capital cost especially when consultants fail to present the long term benefits of green technologies i.e. minimum running cost.
- Normally, consultants aren't able to convince clients to invest on green building/technologies due to wrong approach in their presentation.
- For some sustainable products/materials, using Life Cycle Cost is more appropriate than Return on Investment or Payback Period.

- Rainwater harvesting is difficult to be implemented in government projects due to non-existence of the relevant policy by MECW.
- Discontinuity of government's top personnel contributes to the discontinuity of interest in the investment of green/sustainable building.
- Generally, government top personnel are sceptical about and not interested in green/sustainability.
- Imperative for MECW to conduct green/sustainability awareness programs to all other ministries.
- LA has started to work more efficiently and avoid delays in processing applications – to enhance local economy.

**ABOUT GOVERNMENT**

<p><i>But when this was presented, the operation part had not been stressed. It was not nicely presented that the client asked “How much is the cost of the storage tank? Can it be embedded under ground?” In long term you’ll save because when ever the price increases you will always be using the low tariff electricity. The day tariff and night tariff, they increase together. But there is always a saving there. So now we are revisiting the method again.</i></p> <p><i>Architect must be clever at presenting things, not just about the design. Don’t present just the particular issue that costs a lot of money but present the overall. Present the value of the building, when you promote the building, you can tell the future tenants that you will pay half of the electricity compared to the one that is in the KL Sentral. So everybody will say “Yes, why not I rent this building?” So the economic issue will always be the first priority because the owner has to make money after all. But it fails to convey the message and makes it look like terribly to be rejected because not making money because it was wrongly presented. Some of the sustainable products or materials, you cannot use the Return on Investment, the way you calculate it. Maybe you use Life Cycle Cost, you maybe has to use life cycle assessment – well that’s too broad. You cannot use the Payback Period but it was presented that way. So when you use the wrong formula, then they [clients] reject it. (WR-D/O:681-712)</i></p>	
<b>TEXT</b>	<b>CODE (INDIVIDUAL)</b>
<b>FACILITY MANAGER:</b>	
Yes. (NM-FM:156)	<ul style="list-style-type: none"> <li>• Yes (FM)</li> </ul>
<p><i>Yeah, definitely. With the exception on the government buildings. Government may not be looking at the cost of the project. They are looking at the technology sometime. Private sector definitely very subconscious in term of a new building design. But when it comes to the maintenance,</i></p>	<ul style="list-style-type: none"> <li>• No for government projects (FM)</li> <li>• Yes for private projects (FM)</li> <li>• Government may prioritize on the green technologies and not the cost</li> <li>• Both public and private entities are</li> </ul>

<p><i>government is equally failing like the private entity because the budget is too low. (OCL-FM:385-389)</i></p>	<p>equally failing with regard to maintenance because of insufficient budget.</p>
<p><i>Not really. Government buildings have always been having proper allocations or budget for maintenance. Money has not been an issue. Q. 31a Users are the first priority. (KCD-FM:147-150)</i></p>	<ul style="list-style-type: none"> <li>• No (Gov FM)</li> <li>• Government buildings have always been having sufficient budget for maintenance</li> <li>• Building users</li> </ul>
<p><i>Yeah. In terms of energy savings, when we are doing budgeting, we really want to cut our cost in terms of operational expenditure. To reduce our energy usage, we revise the timing for switching on and off our lightings and AHU every now and then on. (ZS-FM:182-184)</i></p>	<ul style="list-style-type: none"> <li>• Yes (FM)</li> <li>• Minimum running cost (FM)</li> </ul>
<p><b>TEXT</b></p>	<p><b>CODE (INDIVIDUAL)</b></p>
<p><b>REGULATOR, POLICY MAKER &amp; GOVERNMENT PROJECT IMPLEMENTOR</b></p>	
<p><i>Not really but that is an important criteria. Q. 31a We don't place so much importance on economic return because we are implementing government projects. Economic return is only at the planning stage where the project is still at the client's department. To get the approval from the EPU, they have to talk about economic return. At JKR level, we are implementing all the projects that are approved to be carried out. We don't deal with that issue directly. We are given a certain budget for the project, so we have to stick to it and not to go overboard. Our VOs are also not so much. Previously I was scolded. The former Director [Dato' Puteh] told me to go forward with the green building. When she retired and replaced by a new Director, the new Director doesn't understand the importance and benefits of green building. The new Director told me off because the prices of the tender for our hospital project was quite high because I requested for EE features, IEQ related</i></p>	<ul style="list-style-type: none"> <li>• Important but not the priority (Gov)</li> <li>• Economic return is important for government projects to be approved by the EPU</li> <li>• Economic return is no longer important issue for government projects implementor (who carries out approved projects)</li> <li>• Government project implementor has to stick to the allocated budget.</li> <li>• Discontinuity of government's top personnel contributes to the discontinuity of interest in the investment of green/sustainable building.</li> <li>• Minimum capital cost - for public clients</li> <li>• Green/sustainable</li> </ul>

<p><i>equipment, rainwater harvesting and etc. So the Ministry of Health said we couldn't do it because we exceeded the budget. The first thing that was scrapped is rainwater harvesting system. For them rainwater harvesting system creates extra piping, extra tank and extra burden for maintenance. Initially, they even didn't want any EE features. But I fought for EE and I got it. Another thing is that Ministry of Health has targets of how many hospitals and clinics they have to build, so they rush. We have not enough time to prepare EE program or request for extra budget. For them, all those delay the commencement of the project. Whatever estimates they prepared, was submitted a few years earlier but it only got approved this year. That is the shortcomings.</i></p> <p><i>When I attended a meeting in MECW, I told them that they need to go for road shows to all other ministries and tell them about the importance of green/sustainability. It is now beyond JKR's capacity to handle. We want the top management people to be aware of this issue so that whenever we suggest something, they will become more open to it. MECW is the policy maker but they don't have any policy with regard to rainwater harvesting. So JKR as an implementor, cannot implement that. But they are not interested and gave 'money' as one of their excuses.</i></p> <p><i>(CPK-PI:344-373)</i></p>	<p>features/technologies are considered as a waste of financial resources.</p> <ul style="list-style-type: none"> <li>• Generally, government top personnel are sceptical about and not interested in green/sustainability.</li> <li>• Imperative for MECW to conduct green/sustainability awareness programs to all other ministries.</li> <li>• Rainwater harvesting is difficult to be implemented in government projects due to non-existence of the relevant policy by MECW.</li> </ul>
<p><i>Yes, it has always been. We cannot take away economy from planning, designing, providing...everything. As a developing city that is as small as ours, we are still trying to invite investors to invest in the city; economy is the basic. Small little things like delaying the process of accessing and delaying in giving their licences really will definitely affect their economy tremendously. That was not our priority before... in supporting people and assisting them in their development. Thinking of how difficult it is for people to get money, investment, loan and etc. But, recently we've</i></p>	<ul style="list-style-type: none"> <li>• Yes (Gov)</li> <li>• LA has started to work more efficiently and avoid delays in processing applications – to enhance local economy.</li> </ul>

<p><i>been changing; we are now faster in our work and more willing to assist rather than just follow simple regulations, prolong the submission and approval and that kind of errors is an awful thing. We actually thought that if it was us who delay... and the country were to flop and delay, it would be us in the first liner of this government servants who contribute to it. (NN-R/PM:406-416)</i></p>	
<p><i>Yes of course, definitely.</i>  <i>Q. 31a It is always the ROI. If you do anything, you can give a very quick ROI, it doesn't matter. It can be cheap or it can be expensive. (MCA-PM:213-218)</i></p>	<ul style="list-style-type: none"> <li>• Yes (Gov)</li> <li>• Quick Return on Investment (Gov)</li> </ul>
<p><i>Yes.</i>  <i>Q. 31a Until recently (say about half a decade ago), most building owners &amp; developers wanted their building designs to meet the minimum mandatory standards enforced by the approving local authorities, and to be built at the lowest cost. They had little concern for the environment or sustainability as these concepts were considered as a waste of (financial) resources. This situation was reinforced by the heavily subsidised low electricity tariffs.</i>  <i>More recently environmental concerns have gained some purchase &amp; with the increase in electricity tariffs from 2006, energy costs have gained some weight for the building developers, particularly for owner-occupied buildings. Serious climate change issues since the advent of "An Inconvenient Truth" (Al Gore) &amp; the Stern Report have raised concerns over GHGs emissions &amp; the need to curtail energy waste. With increasing energy prices, green / sustainability concerns also become economic issues which dovetail well with the business priorities of the developers.(GL-PM:247-262)</i></p>	<ul style="list-style-type: none"> <li>• Yes (Gov)</li> <li>• With increasing energy prices, green/sustainability become economic issues among developers</li> <li>• Until about 5 years ago, most owners and developers <ul style="list-style-type: none"> <li>- only concerned with meeting the minimum standards enforced by the approving local authorities</li> <li>- built at the lowest cost.</li> <li>- green or sustainability concepts are considered as a waste of financial resources - reinforced by the highly subsidized low electricity tariffs.</li> </ul> </li> <li>• Since 5 years ago <ul style="list-style-type: none"> <li>- Env. concerns have gained some purchases</li> <li>- with the increased electricity tariffs from 2006, energy costs have gained some weight particularly for owner-occupied buildings</li> </ul> </li> </ul>

**Q.32 Has minimising the capital or construction cost always been considered more important than minimising the long-term operational costs (utilities & maintenance) of the building? Or both have been considered equally important?**

TEXT	CODE (INDIVIDUAL)
<b>ARCHITECT:</b>	
Yes. The people who build are not necessarily the people who are going to occupy the building. Somebody else will buy over the place. So that is why the capital cost is considered more important than operation costs. (KK-A:192-194)	<ul style="list-style-type: none"> <li>Minimize capital cost &gt;</li> <li>The clients are not necessarily the tenants</li> </ul>
The investment is more important. The main reason is that they have a budget for investment; they are not given a budget for operation. So when they want a building especially a corporate office, they are given the budget to build the building. They are not given the budget to maintain. They are not given the idea "okay, you have to design a building whereby the maintenance of the building should achieve certain criteria"... Yes, especially in Malaysia whereby our utility cost is relatively low. If you study on solar panels cost and electricity usage, it is extremely long to get reach your payback because our electricity tariff in Malaysia is extremely cheap. The payback period is about 15 years? (WS-A:253-265)	<ul style="list-style-type: none"> <li>Minimize capital cost &gt;</li> <li>Clients have budget for investment but not for operation &amp; maintenance</li> <li>Clients are not well-informed about the long term operation &amp; maintenance issues during design stage.</li> <li>Utility cost is relatively low in Malaysia</li> <li>BIPV is still not viable</li> </ul>
If the owner-occupied building, then the owner normally would want as low running and maintenance cost as possible. But for build-and-sell office spaces, the owners normally cut down to the bare minimal construction cost and they even refuse to put roof insulation. That is how it is in Malaysia. So if you talk about office spaces, a lot of architects like us, we don't get to do the high rise office buildings, but we do get to do a lot of shop offices. There are a lot of them – 4 to 6 storeys. Because of their shear numbers, they are actually out-numbered the high rise buildings in term of total floor area. This is something that	<ul style="list-style-type: none"> <li>Minimize operational costs &gt; for the clients of owner-occupied buildings</li> <li>Minimize capital cost &gt; for the clients of build-and-sell office spaces esp. for shop-offices less than 4000sq.ft.</li> <li>Minimize capital cost is always associated with cost-cutting exercises, so some green features are omitted during design stage.</li> <li>Need clauses in UBBL to ensure</li> </ul>

CODE (GROUPED)	CATEGORY
<b>From all 30 interviewees</b>	
<p><b>General</b></p> <ul style="list-style-type: none"> <li>Minimize capital cost &gt; 70% of the market</li> <li>Minimize capital cost &gt; (8x)</li> <li>Minimize capital cost &gt; building industry in general</li> </ul> <p><b>About builders</b></p> <ul style="list-style-type: none"> <li>Minimize capital cost &gt; for builders</li> </ul> <p><b>About developers/owners</b></p> <ul style="list-style-type: none"> <li>Minimize capital cost &gt; for developers</li> <li>Minimize capital costs &gt; for developers who build to sell cheap</li> <li>Minimize capital cost &gt; for most owners</li> <li>Minimize capital cost &gt; but not to loose sight of the long term costs – for clients who build to occupy and/or rent/lease</li> <li>Minimize capital cost &gt; for the clients of build-and-sell office spaces esp. for shop-offices less than 4000sq.ft.</li> <li>Minimize capital cost &gt; for the clients who build to sell – to maximize profit. The operational costs are borne by the tenants. (2x)</li> </ul> <p><b>About Government</b></p> <ul style="list-style-type: none"> <li>Minimize capital cost &gt; for</li> </ul>	<b>MINIMIZE CAPITAL COST &gt; MINIMIZE OPERATION COSTS</b>

<p><i>we need to put in some bylaws to control this kind of things. If there is totally no insulation at all; and they put in metal deck roof, they guys on the top floor are dead! The air-cond they put in will leak through the roof all the way. That is how it is now; even our new MS1525 doesn't cover this, because they are less than 4000sqft.</i> (CSA-A:323-333)</p>	<p>certain green criteria for shop-offices are integrated.</p>
<p><i>Minimizing the capital cost. Most people don't think the long term cost. In fact most of our clients don't ask us what are the operational costs. So sad! But that will change because GBI requires it.</i> (TLM-A:282-284)</p>	<ul style="list-style-type: none"> <li>Minimize capital cost &gt;</li> <li>Clients normally do not concern about the operation costs</li> </ul>
<p><i>Long-term operation cost is more important than capital cost because it is more.</i> (KY-A:252)</p>	<ul style="list-style-type: none"> <li>Minimize operational costs &gt;</li> <li>Operational costs are more expensive</li> </ul>
<p><i>Both are presented to the client. It is purely based on M&amp;E and selections on your active systems if you like except for the building façade. Because the building façade is the only other ...value number. We still cannot do solar PV because the payback is 15-20 years. 5 years is okay but not 15-20 years.</i> (SH-A:355-358)</p>	<ul style="list-style-type: none"> <li>Minimize capital cost = Minimize operational cost</li> <li>Architect presents both costs to the client – for M&amp;E and selection of active systems</li> <li>BIPV is still not viable</li> </ul>
<p><i>That's has always been the motto of all developers – "Minimize Construction Cost". Long-term operational costs are rarely considered. Our buildings are poorly maintained.</i> (SA-A:358-359)</p>	<ul style="list-style-type: none"> <li>Minimize capital cost &gt; for developers</li> <li>Long term operational costs are rarely considered by developers</li> <li>Most buildings are poorly maintained</li> </ul>
<p><i>Every technology that has been incorporated into the design, the client of course, they have to do the cost analysis, cost benefit and life cycle cost. I think in the future, that is the trend because we have seen in overseas they have been doing that. So life cycle cost it is not very difficult. You can actually do it and they have the software that can do it like LCC. But the only thing is that lots of consultants don't have the knowledge to execute this LCC</i></p>	<ul style="list-style-type: none"> <li>Minimize capital cost = Minimize operational cost</li> <li>Cost analysis, cost benefits and LCC have to be done for every technology incorporated into the design</li> <li>Most consultants neglect LCC and/or don't have the knowledge to execute</li> </ul>

<p>government project implementor</p> <ul style="list-style-type: none"> <li>Minimize capital costs &gt; especially for government buildings</li> </ul>	
<p><b>From Consultants</b></p> <ul style="list-style-type: none"> <li>The clients are not necessarily the tenants</li> <li>Clients have budget for investment but not for operation &amp; maintenance</li> <li>Minimize capital cost is always associated with cost-cutting exercises, so some green features are omitted during design stage.</li> <li>Clients are not well-informed about the long term operation &amp; maintenance issues during design stage.</li> <li>Utility costs are relatively low in Malaysia</li> <li>Clients normally do not concern about the operation costs</li> <li>Long term operational costs are rarely considered by developers</li> <li>Clients rarely state green design criteria e.g. EE in their project brief</li> <li>Government is interested to have a green/sustainable building but the budget is rarely sufficient.</li> </ul> <p><b>From Builders</b></p>	<p><b>COMMENTS/ REASONS FOR THEIR ANSWER</b></p>

<i>analysis. LCC should be thought in CPD programmes. (LCH-A:340-345)</i>	<p>LCC analysis</p> <ul style="list-style-type: none"> <li>LCC should be thought in CPD programmes.</li> </ul>
<i>Both are considered equally important. Green solutions don't have to cost a bomb in most situations. (NB-A:221-222)</i>	<ul style="list-style-type: none"> <li>Minimize capital cost = Minimize operational cost</li> <li>Green solutions are not necessarily expensive</li> </ul>
<b>TEXT</b>	<b>CODE (INDIVIDUAL)</b>
<b>ENGINEER &amp; ENVIRONMENTAL CONSULTANT:</b>	
<i>I would say that if you want to access to this market, I think it would be more 70-30. 70 for straight away capital cost. 30% would be more interested to look at the long term costs. I don't think we have reached 50-50 yet. (CTL-ME:551-553)</i>	<ul style="list-style-type: none"> <li>70% of the market – minimize capital cost &gt;</li> <li>30% of the market – minimize operational costs &gt;</li> </ul>
<i>If you ask me, I would say the long term operation cost is more important, because I can see it. But those who cannot see it, they don't care. Because some people like developers, they just build to sell it cheap. And they don't care about the operation cost. When the owners are really concern, they make sure that energy efficiency or whatever is stated clearly in the project brief. But this is seldom happening. Most of the time, we have to convince the owners. (NYK-ME:322-326)</i>	<ul style="list-style-type: none"> <li>Minimize operational costs &gt; engineer's personal belief</li> <li>Minimize capital costs &gt; for developers who build to sell cheap</li> <li>Clients rarely state green design criteria e.g. EE in their project brief</li> <li>Consultants normally have to convince the clients on the importance of operational costs</li> </ul>
<i>I think minimizing the construction cost is much more important than long term operation cost. Even in government buildings we are facing that problem all the time. We have a few hospital projects where the government says "okay, we want it to be green, we want it sustainable" and they put in their specs but at the end of the day, the budget is only so much. They want to look for groups to be cut and the first thing that they cut would be the sustainability issues and energy efficiency.</i>	<ul style="list-style-type: none"> <li>Minimize capital costs &gt; especially for government buildings</li> <li>Government is interested to have a green/sustainable building but the budget is rarely sufficient.</li> <li>Government normally omit EE and other green criteria to meet the budget constraints. Total floor area is more important for government</li> </ul>

<ul style="list-style-type: none"> <li>The clients are not necessarily the tenants</li> <li>Most owners are not aware of or well-informed about the benefits of using green technologies in the long run</li> </ul>	
<b>CODE (GROUPED)</b>	<b>CATEGORY</b>
<b>From Developers &amp; Owners</b>	<b>CONTINUED</b>
<ul style="list-style-type: none"> <li>Developers are aware of the benefits of using green technologies in the long run.</li> <li>Developers are not properly advised by consultants in terms of the long term benefits of using green/sustainable technologies</li> <li>Consultants discourage developers to use green/sustainable technologies due to high capital costs.</li> <li>Decision to prioritize capital cost or long term operation costs depends on 2 situations:             <ul style="list-style-type: none"> <li>Owners may have insufficient budget to ensure minimum operational costs. They believe that operational costs can be covered by future generated income.</li> <li>Owners maximize capital cost if higher rental values in the future</li> </ul> </li> </ul>	



<p><b>They won't buy the idea of investing into green technologies for lowering their long term costs?</b></p> <p><i>If they want to have it then they have to cut off floor space because this is the budget that they have. It is impossible to cut off floor space because all these people say "I need so much space for this and this and that." So that is the more important criteria at this moment. (CKT-EC:387-397)</i></p>	<p>buildings</p>
<p><b>TEXT</b></p>	<p><b>CODE (INDIVIDUAL)</b></p>
<p><b>BUILDER &amp; BUILDER-DEVELOPER:</b></p>	
<p>Yes. (SA-B/D:181)</p>	<ul style="list-style-type: none"> <li>Minimize capital cost &gt;</li> </ul>
<p><i>You see here...minimum construction cost has always been absorbed by somebody else. Once the building is handed-over, somebody else is going to run it. So they are not bothered about operation cost. The minimum is state in the contract. We find that they do well and good until the end of Defect Liability Period (DLP). The minute DLP ends, you'll find cracks everywhere. Somehow God knows how they did it. During the DLP nothing happens, everything is still perfect not even a single crack. But after DLP you can even find structural cracks. So how do you end this problem? It is an issue that is difficult to answer but if you tell me...in the current situation, the economic issues are directly related or directly proportionate to the profitability. In a good project management practice is that you must keep your schedule, quality and cost in an equilibrium. It should be all balanced. Anything of this which is not in equilibrium will give cost rise at the end of the day. Unfortunately what they do in most of the time, they always talk about quality but they don't practice. Because of that</i></p>	<ul style="list-style-type: none"> <li>Minimize capital cost &gt;</li> <li>The clients are not necessarily the tenants</li> <li>In the current situation, economic issues are directly related to profitability (builder).</li> <li>Schedule, quality and cost must be in equilibrium. Otherwise, cost will definitely rise.</li> </ul>

<p>are certain.</p> <p><b>From Government</b></p> <ul style="list-style-type: none"> <li>Lack of knowledge and awareness among government officials</li> </ul> <p>Most builders are unconcerned about the environment and long term operational costs.</p>	
<p><b>CODE (GROUPED)</b></p>	<p><b>CATEGORY</b></p>
<ul style="list-style-type: none"> <li>Minimize capital cost = Minimize operational cost (6X)</li> <li>Minimize capital cost = Minimize operational cost – for LA</li> <li>Minimize capital cost = minimize operational costs – for FM</li> </ul>	<p><b>MINIMIZE CAPITAL COST = MINIMIZE OPERATION COSTS</b></p>
<p><b>From Consultants</b></p> <ul style="list-style-type: none"> <li>Architect presents both costs to the client – for M&amp;E and selection of active systems</li> <li>Cost analysis, cost benefits and LCC have to be done for every technology incorporated into the design</li> <li>Green solutions are not necessarily expensive</li> </ul> <p><b>From Builders</b></p> <ul style="list-style-type: none"> <li>Builders want to maximize profits. Shortcuts to minimize construction costs might incur higher costs for repair and maintenance during LDP</li> <li>Shortcuts to minimize construction costs might affect builders' good</li> </ul> <p><b>COMMENTS/ REASONS FOR THEIR ANSWER</b></p>	

<p><i>you'll find that they can get more than their profit margin. But the one they are worried most is the schedule. The minute the schedule overruns both the quality and the cost are affected. So the most important thing for them is to control the schedule. They can shrink the schedule and then the quality fellow will suffer. (JD-B:379-394)</i></p>	
<p><i>Both are equally important. If you don't make money, why should you go and do it. Nobody wants to do a losing project. But if you prolong, it is also cost. Sometimes if you try to do shortcuts, it might end up costs you more to maintain or the defects surface earlier. You have to do a proper budgeting and planning. If you do shortcuts you're lucky if you got away, but most of the time defects come even before you get away. You got away your reputation will not be good. Of course it is important to minimize capital cost so you can maximize your profit but you cannot do shortcuts. A lot of owners are not well-informed about the benefits of using green technologies in the long run even though the capital cost of these technologies is high. So they worry more on the capital cost and not the long-term operation costs. People say energy efficient building is expensive. As a matter of fact, it would cost less because it uses efficient motor, efficient air-cond system... the size of all these systems are smaller, then you have more usable floor space. The operation of your building is also cheaper. Maybe you spend a little bit more in the beginning but in the long term you save a lot. I believe Malaysia always have that problem. (TYT-B:270-283)</i></p>	<ul style="list-style-type: none"> <li>Minimize capital cost = Minimize operational cost</li> <li>Builders want to maximize profits. Shortcuts to minimize construction costs might incur higher costs for repair and maintenance during LDP</li> <li>Shortcuts to minimize construction costs might affect builders' good reputation in the future</li> <li>Minimize capital cost &gt; for most owners</li> <li>Most owners are not aware of or well-informed about the benefits of using green technologies in the long run</li> </ul>
TEXT	CODE (INDIVIDUAL)
DEVELOPER, OWNER & DEVELOPER-OWNER:	
<p><i>It depends on the building. If I build a building to sell, then of course the minimum construction cost would be more important because I get more profit when I sell it. If I build a building to rent/lease and maintain, then I would</i></p>	<ul style="list-style-type: none"> <li>Minimize capital cost &gt; for the clients who build to sell – to maximize profit. The operational costs are beared by the tenants.</li> </ul>

<p>reputation in the future</p> <p><b>From Facility Managers</b></p> <ul style="list-style-type: none"> <li>FM plays a role to improve the operation &amp; maintenance quality of existing buildings</li> <li>FM offers owners to finance the CapEx for improving the energy performance of existing buildings. Any savings are paid to FM to cover the CapEx given until they are fully repaid. Owner also pays interest cost and profit to FM. Owner then enjoy savings till the end of the building's useful life.</li> </ul> <p><b>From Government</b></p> <ul style="list-style-type: none"> <li>LA ensures certain green design criteria are integrated for the purpose of development approval.</li> <li>LA would consider giving waivers (if requested due to cost) to certain green features if it only affects the aesthetic values</li> </ul>	
CODE (GROUPED)	CATEGORY
<ul style="list-style-type: none"> <li>Minimize operational costs &gt; for the clients of owner-occupied buildings</li> <li>Minimize operational costs &gt;</li> <li>30% of the market – minimize</li> </ul>	<p><b>MINIMIZE OPERATION COSTS &gt; MINIMIZE CAPITAL COST</b></p>

<p>worry about the minimum long-term maintenance cost. I wouldn't mind higher construction cost if in 20-30 years my operation cost is minimum...if that would give me less headache to maintain it later.</p> <p>If the building is developed to be sold to a big multinational company, the building would become theirs. I would not be the one who maintain it. Of course I would go for minimum construction cost so I could have more profit. The maintenance cost will be beared by the tenants. (NA-D:187-195)</p>	<ul style="list-style-type: none"> <li>Minimize operational costs &gt; for the clients who build to rent/lease and maintain</li> </ul>
<p>Sometimes we've got to think of the long term. Ok...may be when we install one equipment which cost us an X amount of money which will affect our cost. But in the long term, we can save a lot of energy. But there must be someone who can advise us on that issue. Consultants just said, "No need...those equipments would cost you millions. You won't get your profit. Your payback would be 20 years, bla...bla...bla." They don't brief us on the long term benefits. So we ended up considering capital cost only.</p> <p><b>So you're not being briefed properly?</b></p> <p>Sometimes I feel that way. I think we are not at that stage yet. Lots of the energy saving technologies are expensive because you know why? Because of the lack of demand. To answer your question, yes, we cannot only look at the short term benefits. If we sell, then we can look at the short term benefits.</p> <p><b>But you are the one who is managing the property...</b></p> <p>I know, we are the one who got the hit! Those people [consultants] just said "Bye! Bye!" to us. [Laughing]. (MM-D:353-365)</p>	<ul style="list-style-type: none"> <li>Minimize capital cost &gt;</li> <li>Developers are aware of the benefits of using green technologies in the long run.</li> <li>Developers are not properly advised by consultants in terms of the long term benefits of using green/sustainable technologies</li> <li>Consultants discourage developers to use green/sustainable technologies due to high capital costs.</li> <li>Developer believes the high cost of green technologies is due to lack of demand.</li> </ul>
<p>Equally important. (BTC-D:218)</p>	<ul style="list-style-type: none"> <li>Minimize capital cost = Minimize operational cost</li> </ul>

<p>operational costs &gt;</p> <ul style="list-style-type: none"> <li>Minimize operational costs &gt; engineer's personal belief</li> <li>Minimize operational costs &gt; for the clients who build to rent/lease and maintain</li> </ul>	
<ul style="list-style-type: none"> <li>Operational costs are expensive</li> </ul>	<p><b>COMMENTS/ COMMENTS/ REASONS FOR THEIR ANSWER</b></p>
<p><b>About Consultants</b></p> <ul style="list-style-type: none"> <li>Most consultants neglect LCC and/or don't have the knowledge to execute LCC analysis (2X)</li> <li>LCC has always been ignored</li> <li>Consultants normally have to convince the clients on the importance of operational costs</li> <li>Consultants who were educated from and experienced working with green/sustainable buildings overseas are reluctant to practice them locally.</li> </ul> <p><b>About Government</b></p> <ul style="list-style-type: none"> <li>Government normally omit EE and other green criteria to meet the budget constraints. Total floor area is more important for government</li> </ul>	<p><b>CURRENT SITUATIONS</b></p>

<p><i>Yes, I must agree with the former...minimizing the capital cost. It relates to the money that you have now. So it is important to reduce the capital cost now and have to work within your means at the same time but not to lose sight of the long term. For example a growing company like Bank Rakyat, given 2 choices, there are situations whereby we look at the capital cost first, because we thought that we don't have money now yet we have to spend this much only but in a long term we have to pay a lot. Never mind we can generate more income later. It depends on what you have at the moment. But in another situation, when we decide to be Multimedia Super corridor, we have to add close to RM35 millions to make it Multimedia Super corridor. That would mean adding to the capital cost. We said we don't mind, because we know that we will get the cash from the rental in 10 years to come. So it depends on the situations. It is always a change of view. I suppose it is like the worthiness of it. Sometimes you think it is worth it to increase the capital cost now, sometimes there're methods that you think are not worth it. (WR-D/O:717-729)</i></p>	<ul style="list-style-type: none"> <li>• Minimize capital cost &gt; but not to lose sight of the long term costs – for clients who build to occupy and/or rent/lease</li> <li>• Decision to prioritize capital cost or long term operation costs depends on 2 situations:             <ul style="list-style-type: none"> <li>○ Owners may have insufficient budget to ensure minimum operational costs. They believe that operational costs can be covered by future generated income.</li> <li>○ Owners maximize capital cost if higher rental values in the future are certain.</li> </ul> </li> </ul>	<p>buildings</p> <ul style="list-style-type: none"> <li>• Most buildings are poorly maintained</li> <li>• Policy on rainwater harvesting on residential projects by MHLG is not effective.</li> </ul> <p><b><u>About Builders</u></b></p> <ul style="list-style-type: none"> <li>• In the current situation, economic issues are directly related to profitability (builder).</li> </ul> <p><b><u>About Developers/Owners</u></b></p> <ul style="list-style-type: none"> <li>• Developer believes the high cost of green technologies is due to lack of demand.</li> <li>• Most buildings are poorly maintained</li> </ul> <p><b><u>Green options not viable</u></b></p> <ul style="list-style-type: none"> <li>• BIPV is still not viable (2X)</li> <li>• Rainwater harvesting is viable</li> </ul> <p><b><u>Lack of awareness</u></b></p> <ul style="list-style-type: none"> <li>• Lack of awareness among residents on rainwater harvesting</li> </ul>	
<p><i>A lot of developers actually build to sell, so the operation and maintenance are not something that these developers would care about. These become the occupants' problem not theirs. This kind of developers mainly concerns more on the capital cost. (CN-D/O:311-313)</i></p>	<ul style="list-style-type: none"> <li>• Minimize capital cost &gt; for the clients who build to sell – to maximize profit. The operational costs are borne by the tenants.</li> </ul>	<ul style="list-style-type: none"> <li>• Need clauses in UBBL to ensure certain green criteria for shop-offices are integrated.</li> <li>• LCC should be thought in CPD programmes.</li> <li>• Building industry can only be improved if regulatory bodies provide rules and regulations</li> <li>• Can provide incentives and educational programs to create awareness but only law can make a difference</li> </ul>	<p><b>SUGGESTIONS TO IMPROVE CURRENT SITUATIONS</b></p>

TEXT	CODE (INDIVIDUAL)
<b>FACILITY MANAGER:</b>	
<p><i>That depends on the company's objective.</i> (NM-FM:161)</p>	<ul style="list-style-type: none"> <li>•</li> </ul>
<p><i>Yeah, definitely. Sadly that is what happening in Malaysia right now.</i></p> <p><b>So you are the one who push them to consider the long-term operational costs as well?</b></p> <p><i>In fact, for an old building for example the existing building, I actually offer to take over the CapEx [capital expenditure] for you. In the sense of energy performance contracting, I'll finance for you. And then I save from the savings for you and then we use it to cover the CapEx I've given you. So after 5 or 6 years when the CapEx are fully repaid, plus a bit of the interest cost, a bit of a profit, then you'll enjoy another savings for the next 15 years for example. So yes, CapEx is always become the major consideration in Malaysia over the long life cycle requirement. Sadly because life cycle cost is not catching up in Malaysia. As I've mentioned to you in the early part of our discussion, a lot of consultants do not know about the MPV life cycle cost. If they don't know how to run MPV, discounted cash flow and IRR, they would not know the life cycle cost.</i> (OCL-FM:393-404)</p>	<ul style="list-style-type: none"> <li>• Minimize capital cost &gt; building industry in general</li> <li>• Minimize capital cost = minimize operational costs – for FM</li> <li>• FM plays a role to improve the operation &amp; maintenance quality of existing buildings</li> <li>• FM offers owners to finance the CapEx for improving the energy performance of existing buildings. Any savings are paid to FM to cover the CapEx given until they are fully repaid. Owner also pays interest cost and profit to FM. Owner then enjoy savings till the end of the building's useful life.</li> <li>• Most consultants neglect LCC and/or don't have the knowledge to execute LCC analysis</li> </ul>
<p><i>Yes. Capital cost is more important.</i> (KCD-FM:154)</p>	<ul style="list-style-type: none"> <li>• Minimize capital cost &gt;</li> </ul>
<p><i>We consider both.</i> (ZS-FM:188)</p>	<ul style="list-style-type: none"> <li>• Minimize capital cost = Minimize operational cost</li> </ul>
TEXT	CODE (INDIVIDUAL)
<b>REGULATOR, POLICY MAKER &amp; GOVERNMENT PROJECT IMPLEMENTOR</b>	
<p><i>It depends on the client. If you can make them understand then the tendency will be there, to think about minimizing</i></p>	<ul style="list-style-type: none"> <li>• Minimize capital cost &gt; for government project implementor</li> </ul>

<p><i>long term operation cost rather than worrying about capital cost only. But we don't have the time to be their salesman to promote EE or rainwater harvesting all the time. So there are gaps and end up they said no. Rainwater harvesting is feasible, but not BIPV. It has been implemented in the private sector. I thought rainwater harvesting is already a government policy under MHLG but not effective. Some of their residential projects which incorporated rainwater harvesting are not successful. MHLG should have given awareness to the residents. Some residents modified the system which defeated the original purpose of having it. The continuity is not there.</i></p> <p>(CPK-PI:377-385)</p>	<ul style="list-style-type: none"> <li>• Lack of knowledge and awareness among government officials</li> <li>• Rainwater harvesting is viable</li> <li>• Lack of awareness among residents on rainwater harvesting</li> <li>• BIPV is not viable</li> <li>• Policy on rainwater harvesting on residential projects by MHLG is not effective.</li> </ul>
<p><i>Both have been considered. We cannot find the cheapest way out and suffer later. We also cannot let things happen later and not considering it now. We didn't take things easily. I think the industry outside also had considered it, because they are much faster than us. They are thinking about the economic revenue further than us, and even before we start thinking about it.</i></p> <p><b>Sometimes you can tell that this building must have considered the minimum construction cost more than the minimum operation cost because of the full single-glazing facades, no shading devices, inefficient cooling system...</b></p> <p><i>DBKL wouldn't allow it in the first place, so they have to...you know...work out some money because DBKL doesn't allow it. The requirement is strict about glass, on how you treat your air-conditioning, or how big your building should be, how much green you should provide for people. Unless they fulfil, it cannot be developed. So in the first place, it is not a cheaper kind of thing. So you get the requirement for each of the thing. Facilities and infrastructures are to cater for everyone for a long time run.</i></p>	<ul style="list-style-type: none"> <li>• Minimize capital cost = Minimize operational cost – for LA</li> <li>• LA ensures certain green design criteria are integrated for the purpose of development approval.</li> <li>• LA would consider giving waivers (if requested due to cost) to certain green features if it only affects the aesthetic values</li> <li>• Building industry can only be improved if regulatory bodies provide rules and regulations</li> </ul>

<p><i>So that is basic. Then people come with more fancy ideas, and start wanting to cut cost, by asking for waivers on certain things. So if it only affects the aesthetics aspect then will we consider. We know what people can afford and what they can't. Like I have said, during the last 5 years, people start to realize, you got to fulfil the standards to develop in KL, then and it is not becoming an issue anymore.</i></p> <p><b>So you actually play a role in helping people to consider the long term operational cost?</b></p> <p><i>We play a major role because the architects understand the problems. Developers...depend on their educational level background. So they said the only way we [DBKL] can help the building industry is by DBKL giving them rules and regulations on how to do it. So we did. We try to help the economy based people, providing good facilities for them but there are basics that they've to fulfil. We are not here just to approve plans.</i></p> <p>(NN-R/PM:432-455)</p>	
<p><i>This is my opinion. Looking at our contractors now, they are looking for a short term construction cost. They don't look at the life-cycle costing. They don't look at the values that they will bring in when they invest extra. Our contractors just want jobs, finish them up, get profit as much as possible, and as soon as possible. They care less about the environment and the long term operation cost. We have to do something to change. I think the most effective way is to do some kind of regulations. Right now if we want to improve the standard, we can try by providing incentives, educational program to create awareness and so on. But still, I think for our people, the most effective's way is by law! Make it mandatory. But sorry to say, our professionals are actually highly educated. They were educated from overseas and some have experiences</i></p>	<ul style="list-style-type: none"> <li>• Minimize capital cost &gt; for builders</li> <li>• LCC has always been ignored</li> <li>• Most builders are unconcerned about the environment and long term operational costs.</li> <li>• Can provide incentives and educational programs to create awareness but only law can make a difference</li> <li>• Consultants who were educated from and experienced working with green/sustainable buildings overseas are reluctant to practice them locally.</li> </ul>

working overseas. But when they come to our country, they don't practice whatever they have been practicing overseas. (MCA-PM:228-238)	
Yes, except for some isolated examples (GL-PM:266)	<ul style="list-style-type: none"> <li>Minimize capital costs &gt;</li> </ul>

**For rented/leased office spaces owned and managed by Setia Haruman/ Goldis Berhad, do the tenants pay directly their cooling and electric power usage or these are actually paid by Setia Haruman/ Goldis Berhad as the building owner?**

TEXT	CODE (INDIVIDUAL)	CODE (GROUPED)	CATEGORY
<b>DEVELOPER, OWNER &amp; DEVELOPER-OWNER:</b>			
<p>1. Electricity usage: TNB will read the bulk meter and charge Setia Haruman (SHSB) accordingly. SHSB will in turn bill the tenants as individual office has a meter also. SHSB/Propel will read this meter and apply the unit rate; charges payable by tenant to SHSB. This is not an ideal situation; better if tenant is responsible directly for applying and paying to TNB.</p> <p>2. Air-cond: During office hour, air-cond is free ie inclusive in service charges payable for up to 40 hrs per week. Any additional usage, tenant will pay rate per hour to SHSB. SHSB will pay monthly bill to Megajana who supply the air-cond via district cooling system. Note: For common areas, SHSB will pick up the charges for electricity and air-cond. Tenants pay for their demised premises only.</p> <p>3. Unlikely for owners/landlords to be fully responsible for tenants Utility bills unless service charges are very high or unit is very small like Business Centre units ie 200sq. ft. and not much equipment in it. For business centre units, normally rental payable is inclusive of air-cond and electricity only and not phone bills, faxing, equipment and typing services etc. Furthermore, energy tariffs are going up every so often and owner will end up losing. It is industry standard that tenants pay utility bills. (MM-D:369-385)</p>	<ul style="list-style-type: none"> <li></li> </ul>		
Nearly all commercial buildings for rentals will build in air con charges into the rental. At GTower, we are proposing a new business model. We charge a base rental, and air con is charged on a PAY AS YOU USE basis. This allows the tenants also to operate on 24/7 basis without excessive "After hours" air con charges.(CN-D/O:201-204)	<ul style="list-style-type: none"> <li></li> </ul>		



**Q.33 Are there any incentives available to promote investments in green technologies or energy efficient equipments?**

TEXT	CODE (INDIVIDUAL)
<b>ARCHITECT:</b>	
<i>Not that I am aware of. (KK-A:197)</i>	<ul style="list-style-type: none"> <li>Not aware</li> </ul>
<i>Yes, PTM had done it for the solar panels. (WS-A:268)</i>	<ul style="list-style-type: none"> <li>Incentives for PV from Malaysia Energy Centre</li> </ul>
<i>In Malaysia, currently there are incentives for solar panels given by PTM. (CSA-A:336)</i>	<ul style="list-style-type: none"> <li>Incentives for PV from Malaysia Energy Centre</li> </ul>
<i>There are some tax incentives if you use renewable energy. But I am not well versed with it. (TLM-A:287)</i>	<ul style="list-style-type: none"> <li>Tax incentives for using RE</li> </ul>
<i>Yeah. For instance, if you pay less than RM6million income tax, government will subsidize your photovoltaics and other renewable technologies. More than RM6 million, the government will help you get tax exemption. (KY-A:255-257)</i>	<ul style="list-style-type: none"> <li>&lt;RM6mil income tax – government will subsidize PV and other RE</li> <li>&gt;RM6mil income tax – government will help giving tax exemption</li> </ul>
<i>Not in Malaysia. (SH-A:361)</i>	<ul style="list-style-type: none"> <li>Nothing</li> </ul>
<i>Firstly it is more on renewable energy like PV system, there are many incentives given. Hopefully once we implement GBI, buildings that have been certified as Platinum is given certain incentives because Malaysians like incentive and subsidies a lot. Get the government involved. That will be a start then the rest will follow. Hopefully the MGBC, PAM or ACEM will look into GBI for Retrofit Building because at the moment we are looking at new buildings only. But we have old/existing buildings too, do something about that. (SA-A:380-386)</i>	<ul style="list-style-type: none"> <li>Current incentives by the government focus on RE</li> <li>Incentives work well in Malaysia</li> <li>Giving incentives to highly rated buildings (using building rating system) by the government would promote green/sustainability the building industry.</li> <li>Rating system should focus on existing buildings as well.</li> </ul>
<i>Currently there is only tax incentive by Malaysian Industrial Development Authority (MIDA) to bring and incorporate</i>	<ul style="list-style-type: none"> <li>Tax incentives by MIDA to bring and incorporate green technologies</li> </ul>

CODE (GROUPED)	CATEGORY
<b>From all 30 interviewees</b>	
<b>BIPV</b>	<b>GOVERNMENT INCENTIVES</b>
<ul style="list-style-type: none"> <li>Incentives for PV from Malaysia Energy Centre (3x)</li> <li>Incentives for PV are funded by United Nations.</li> <li>Incentives for PV are only for residential – not eligible for office building developer/owner to apply.</li> <li>Rebate from TNB to owners of Grid Connected BIPV with surplus electricity sent back into the grid</li> <li>&lt;RM6mil income tax – government will subsidize PV and other RE</li> <li>&gt;RM6mil income tax – government will help giving tax exemption</li> <li>Current incentives by the government focus on RE</li> <li>Tax incentives for using RE</li> <li>Tax incentives by MIDA to bring and incorporate green technologies (2x)</li> <li>Direct incentives are available for various green equipments</li> <li>10% sales tax waiver on EE equipment (determined by star ratings)</li> <li>Tax incentives by MITI are spelt out</li> </ul>	

<p>green technologies. Currently it is not well-informed. Not all organizations or developers are aware of this. (LCH-A:348-349)</p>	<ul style="list-style-type: none"> <li>Industry is not well-informed about the incentives by MIDA</li> </ul>
<p>No (NB-A:225)</p>	<ul style="list-style-type: none"> <li>Nothing</li> </ul>
TEXT	CODE (INDIVIDUAL)
ENGINEER & ENVIRONMENTAL CONSULTANT:	
<p><i>If you talk about direct incentives, of course there are various equipments that have incentives... but the incentives are very tedious to apply. In fact we say give us the proper manner, they keep promising us but keep delaying. They are there but I always encourage the industry, don't wait for those. There are more incentives to your own. If you look into incentives only, nothing moves. I don't get defeated when MS 1525 doesn't go into bylaw, we go to another direction. Move on. The green movement will also be peer pressure move...</i> (CTL-ME:556-561)</p>	<ul style="list-style-type: none"> <li>Direct incentives are available for various green equipments</li> <li>Incentives application process is very tedious</li> <li>Incentives approval takes a very long time</li> <li>Discourage the industry to rely on incentives to move forward</li> </ul>
<p><i>I know there are. Do you know what the problem is? We don't know how to apply. Why? In 15th January ASHRAE wanted to organize an energy-efficient-system forum. We booked a ballroom in ARMADA hotel. We wanted MIDA to get involved; we called PTM to get the right speakers. We called all the major suppliers to come and listen on how to apply for tax incentives if their products are energy efficient or green. But nobody has responded. We have been kicked like a football by MIDA and MITI and I had to cancel the hotel. I don't want to organize it anymore.</i> <b>Do you know why didn't they respond?</b></p>	<ul style="list-style-type: none"> <li>People do not know the incentives application procedure</li> <li>Used to organize a forum for major suppliers to disseminate information on the incentives application procedure if their products are green                         <ul style="list-style-type: none"> <li>no response from suppliers of green products because they're disappointment with the difficulties involved in the incentives application</li> </ul> </li> </ul>

<p>in Budget 2008</p> <ul style="list-style-type: none"> <li>Government must give incentives to encourage investment on green technologies and equipment. E.g. no import duties, 5-year tax clear operation</li> </ul>	
CODE (GROUPED)	CATEGORY
<ul style="list-style-type: none"> <li>Double tax waiver on EE equipments</li> <li>Investment Tax Allowance for EE since 2006 and Double Tax Deduction on investment in EE since 2008</li> <li>KLCH is designing some incentives e.g. less car park spaces and less processing fees for green/ EE buildings</li> <li>CIDB doesn't provide any incentives</li> <li>Nothing (4x)</li> <li>Not aware (4x)</li> <li>Not sure (2x)</li> </ul>	<p><b>CONTINUED</b></p>
<p><b><u>Tedious &amp; long process</u></b></p> <ul style="list-style-type: none"> <li>Incentives application process is very tedious (2x)</li> <li>Incentives approval takes a very long time (2x)</li> <li>People do not know the incentives application procedure</li> <li>Used to organize a forum for major suppliers to disseminate information on the incentives application</li> </ul>	<p><b>COMPLAINTS</b></p>

<p><i>We listened to a presentation by a lady from a certain ministry about government incentives. Later, when we tried to call her and approach her...we cannot get her! Why? Because they sent a young executive, young person who might be the Assistant Director or whatever to do the jobs that they know nothing about.</i></p> <p><i>I received an email from a major supplier. He told me that his client did a lot of hypermarket chain. They spent 10-20mil on energy efficient equipments. This year they are going to spend a lot again. So they went to see MIDA to seek advice on how to apply investment tax incentives. MIDA referred them to one guy in PTM. That person called me and asked whether I want to approach that guy or not. I was scared to be kept around the bush. You see there are incentives offered...but you tell me how to apply!</i></p> <p><i>The star ratings...there are already incentives now approved by the Parliament on the 30th of September [2008], that's why they are rushing. If they found that this air-cond split unit is energy efficient rated as 5 star, the government is willing to waive 10% sales tax. So fair enough. But how to apply? Obviously there are bad experience and difficulties faced by my people now. They said go to MIDA. MIDA's people kick us to MITI. MITI refers us to here and there. You know in Malaysia, some government departments are overlapping doing the same thing? Until now they just talk talk talk. Yet then the government says...you in the private sector, why don't you come and apply?</i></p> <p>(NYK-ME:329-354)</p>	<ul style="list-style-type: none"> <li>○ inefficient cooperation from MIDA and MITI due to inexperienced/ inexpert personnel involved and overlapping tasks by different departments</li> <li>● 10% sales tax waiver on energy efficient equipment (determined by star ratings)</li> </ul>	<p>procedure if their products are green</p> <ul style="list-style-type: none"> <li>○ no response from suppliers of green products because they're disappointment with the difficulties involved in the incentives application</li> <li>○ inefficient cooperation from MIDA and MITI due to inexperienced/ inexpert personnel involved and excessive bureaucratic red tape</li> </ul> <ul style="list-style-type: none"> <li>● Incentives application and approval processes are not straight-forward and very tedious due excessive bureaucratic red tape (2x)</li> <li>● No one-stop centre to ease the application and approval process</li> </ul> <p><b><u>Information not well-disseminated</u></b></p> <ul style="list-style-type: none"> <li>● Industry is not well-informed about the incentives by MIDA</li> <li>● Information about tax incentives for energy efficient equipments is not specific and well-published or well-disseminated.</li> </ul> <p><b><u>Items not comprehensive &amp; specific</u></b></p> <ul style="list-style-type: none"> <li>● Green materials/products endorsed for tax incentives are not comprehensive.</li> <li>● Information about tax incentives for energy efficient equipments is not specific and well-published or well-disseminated.</li> <li>● Non-specific benefits/ incentives</li> </ul>
<p><i>There are some incentives provided by the government to do this. One of them is sort of double tax waiver on energy efficiency equipments. But the problem with all these incentives provided by the government is that they are not straight forward. It is a mathematical or accountant's maze that they have to go through. So a lot of people get</i></p>	<ul style="list-style-type: none"> <li>● Double tax waiver on energy efficient equipments</li> <li>● Incentives application and approval processes are not straight-forward and very tedious due excessive</li> </ul>	

<p><i>frustrated trying to apply for it because it is a big maze on how to have it approved.</i></p> <p><i>At the end of the day, the government will get the benefit from it because they can then reduce the subsidy to the gas – for electricity to the power stations, for instance. It would be easier if the government can just have a very clear cut. “If you do this...how much we give you an incentive on”. Because at the end of the day, you still get it back. Right now instead of doing that, they say “You can actually go through a tax reduction of this equipment, you can write it off earlier and so that we can actually get it back in term of the taxation to be paid to the government.</i></p> <p><b>The government? Do you mean KTAK?</b></p> <p><i>By right, incentives should be provided by KTAK but it has been implemented by MIDA. The Ministry of Finance is the top of the controlling point of the cash flow. It is a bit messy right now in term of incentives. If it is much more straightforward you just say “Okay, import tax for the energy EE equipment waived, cut off.” Much straight forward. People will get the impact straight away then they will start importing high performance glass for examples. Right now high performance glass has tax 40% on it which is huge and very expensive. So that’s why most of our Malaysians buildings are still single-glazed, whereas in Singapore they all have moved on to double glazing.</i></p> <p><b>I think BIPV Photovoltaic are also given an incentive</b></p> <p><i>BIPV incentive is actually provided by United Nations. It is purely United Nation funded project. (CKT-EC:400-421)</i></p>	<p>bureaucratic red tape</p> <ul style="list-style-type: none"> <li>• Tax incentives for green materials/products/equipments could promote green movement in the country. Therefore, government can eventually reduce the subsidy to the gas for power generation.</li> <li>• Green materials/ products are very expensive and not popular due to high import tax</li> <li>• Incentives for PV are funded by United Nations.</li> </ul>
TEXT	CODE (INDIVIDUAL)
BUILDER & BUILDER-DEVELOPER:	
<p><i>Not that I know of. At the moment I also suffered from lack of knowledge due to budget constraints.</i></p>	<ul style="list-style-type: none"> <li>• Not aware</li> </ul>

<p>cannot help developers/owners in their development cost calculation.</p> <p><b>General</b></p> <ul style="list-style-type: none"> <li>• Discourage the industry to rely on incentives to move forward</li> <li>• Nobody is interested to apply for incentives</li> <li>• Have Grid Connected BIPV but getting frustrated with the non-acceptance of rebates for the PV generated electricity sent into the electricity grid</li> </ul>	
CODE (GROUPED)	CATEGORY
<ul style="list-style-type: none"> <li>• Green materials/ products are very expensive and not popular due to</li> </ul>	<p><b>ABOUT MATERIALS/ PRODUCTS/</b></p>

(SA-B/D:184-185)	
<p><i>I have not heard of any but I've heard about the incentives for bio-technology where the Bio-Nexus has come up with a lot of incentives. I think the Government must have a body like Bio-Nexus and give this kind of incentives so that people are more willing to invest their money to bring in any green technology or equipment. For example, these technologies should have no import duties being imposed; they are given tax clear operation for 5 years. When they declare dividend, even the directors of the company, they...[not clear], all these things will definitely help.</i></p> <p><i>By right, we should not work by incentives. It must come from the heart. But we have no choice. It is a Malaysian culture to give and receive incentives. It is a wrong way also because you'll do it when you're given with money and not because of your heart. In any developed countries, I don't think there is any incentives been given. Their level of awareness is very high. (JD-B:397-408)</i></p>	<ul style="list-style-type: none"> <li>• Not aware</li> <li>• Government must give incentives to encourage investment on green technologies and equipment. E.g. no import duties, 5-year tax clear operation</li> <li>• Incentives work well in Malaysia because the public's environmental awareness is low.</li> </ul>
<p><i>Those incentives are just words only. To get rebates is a long process. We have installed solar panels in this building. We have the grid connected so we are supposed to sell the electricity that is generated and set to the grid. If I'm not mistaken, we still have not got the....[can't recall the word]. The process is very long. It has been 2 years. Our red-tapes are too much.</i></p> <p><i>They say it is duty free but you have to pay your duty first and apply for your rebates. Just like income tax, you pay extra then you get your refund [laughing]. (TYT-B:292-297)</i></p>	<ul style="list-style-type: none"> <li>• Incentives application and approval processes are not straight-forward and very tedious due excessive bureaucratic red tape</li> <li>• Have Grid Connected BIPV but getting frustrated with the non-acceptance of rebates for the PV generated electricity sent into the electricity grid</li> </ul>
<b>TEXT</b>	<b>CODE (INDIVIDUAL)</b>
<b>DEVELOPER, OWNER &amp; DEVELOPER-OWNER:</b>	
<i>I am not sure. (NA-D:198)</i>	<ul style="list-style-type: none"> <li>• Not sure</li> </ul>
<i>No. (MM-D:388)</i>	<ul style="list-style-type: none"> <li>• Nothing</li> </ul>

<p>high import tax</p> <ul style="list-style-type: none"> <li>• Green materials/products endorsed for tax incentives are not comprehensive.</li> <li>• The process of green certification of certain materials/ products/ equipment to eligible for incentives is ad-hoc.</li> <li>• No specific body to certify green materials/ products/ equipments</li> <li>• Rainwater harvesting system is made compulsory for residential projects in KL.</li> <li>• Rainwater harvesting system is not yet mass-produced in the market and very expensive</li> </ul>	<b>EQUIPMENTS</b>
<ul style="list-style-type: none"> <li>• Incentives work well in Malaysia</li> <li>• Incentives work well in Malaysia because the public's environmental awareness is low.</li> <li>• Giving incentives to highly rated buildings (using building rating system) by the government would promote green/sustainability the building industry.</li> </ul>	<b>THE BEST WAY FORWARD</b>

<p><i>Yes. Tenaga Nasional Berhad offers rebate to owners who install Building Integrated Photo-Voltaic cells whose output is connected back to the national electricity grid. (BTC-D:221-222)</i></p>	<ul style="list-style-type: none"> <li>• Rebate from TNB to owners of Grid Connected BIPV with surplus electricity sent back into the grid</li> </ul>
<p><i>I'm aware but I'm not eligible to apply. For example the Suria 1000 for housings which is not eligible for office buildings. I thought that if we are some kind of energy efficient, we should get some tax incentives. It has been said by so many times by lots of speakers, but I cannot find the documents. So the information is not good, but I've heard about it. It is not well published. I researched the Pusat Tenaga Malaysia [Malaysia Energy Centre] thoroughly for this. I asked them "You give me a hint, we do I go from there?" But they cannot give me more. The best they could give me was that the new Budget there is something about the energy. When you go through the Budget there is nothing specific! You must be specific! When you want to promise somebody to get a certain benefit, you must be specific how much, because that should be incorporated in the development cost calculation, and I just cannot take generally like that. (WR-D/O:732-742)</i></p>	<ul style="list-style-type: none"> <li>• Incentives for PV from Malaysia Energy Centre</li> <li>• Incentives for PV are only for residential – not eligible for office building developer/owner to apply.</li> <li>• Information about tax incentives for energy efficient equipments is not specific and well-published or well-disseminated.</li> <li>• Non-specific benefits/ incentives cannot help developers/owners in their development cost calculation.</li> </ul>
<p><b>TEXT</b></p>	<p><b>CODE (INDIVIDUAL)</b></p>
<p><b>FACILITY MANAGER:</b></p>	
<p><i>Incentives have already been given but nobody takes up. (NM-FM:164)</i></p>	<ul style="list-style-type: none"> <li>• Nobody is interested to apply for incentives</li> </ul>
<p><i>The government (MIDA) are giving the incentives right now. Of course, it has always been very difficult to apply for government incentives and you must apply before the project starts. Secondly, for example you want to go for the eco-friendly carpet or timber and you don't have that list in the MIDA. MIDA would say you must go inland revenue for the tax exemption. Then you go back to the Energy</i></p>	<ul style="list-style-type: none"> <li>• Incentives application process is very tedious</li> <li>• No one-stop centre to ease the application and approval process</li> <li>• Incentives approval takes a very long time</li> <li>• Green materials/products endorsed</li> </ul>

<p><i>Commission. Is this really energy efficient or not? Is it sustainable material or not? So by the time they ding dong ding dong, your project has to be kicked off. So you have to make a decision whether go or no go, that's all. So the MIDA at this point of time, their tax incentives have not been successful. Too troublesome, no one-stop centre, no clear defined products.</i></p> <p><b>Is it because SIRIM does not have a specific department formed to certify all these kinds of eco products?</b></p> <p><i>In a way, yes it is. But SIRIM may lack in certain facilities also. But SIRIM is in a process of learning as well. How do you benchmark it is being greener than the other? And what is the benchmark to ensure it is greener in their sustainability efforts. So a lot of brain storming, learning need to be carried out. (OCL-FM:407-421)</i></p>	<p>for tax incentives are not comprehensive.</p> <ul style="list-style-type: none"> <li>• The process of green certification of certain materials/ products/ equipment to eligible for incentives is ad-hoc.</li> <li>• No specific body to certify green materials/ products/ equipments</li> </ul>
<p><i>There are tax incentives by MITI. You can refer to Budget 2008. They are all there. (KCD-FM:157)</i></p>	<ul style="list-style-type: none"> <li>• Tax incentives by MITI are spelt out in Budget 2008</li> </ul>
<p><i>I am not aware of this. (ZS-FM:191)</i></p>	<ul style="list-style-type: none"> <li>• Not aware</li> </ul>
<p><b>TEXT</b></p> <p><b>REGULATOR, POLICY MAKER &amp; GOVERNMENT PROJECT IMPLEMENTOR</b></p>	<p><b>CODE (INDIVIDUAL)</b></p>
<p><i>You have to check with MIDA. They have incentives. (CPK-PI:388)</i></p>	<ul style="list-style-type: none"> <li>• Tax incentives by MIDA to bring and incorporate green technologies</li> </ul>
<p><i>Those tax benefits by the Government, basically for the reduction of import duties on those efficient equipments and those things. And the other one is the Investment Tax Allowance. Let say if you implement your own solar PV and all that, pay that amount, you can use that amount to offset your tax and you can spread it for a number of years. This is provided by MIDA. (KSK-R/PM:218-221)</i></p>	<ul style="list-style-type: none"> <li>• Tax benefits = reduction of import duties</li> <li>• Investment Tax Allowance by MIDA</li> </ul>
<p><i>No. (AMN-R/PM:178)</i></p>	<ul style="list-style-type: none"> <li>• Nothing</li> </ul>

*Right now we are looking at it, approving it without specifically giving incentives. We had a meeting about providing incentives especially in terms of monetary and extra floor spaces, which is what actually a developer would want actually... like minimize car park spaces and less processing fees.*

**How about incentives for using technologies such as solar panels?**

*Again we are not into giving incentives yet. We will consider what they do, because there are a lot of limitations in developing buildings in KL. But normally when they do fantastic things, the limitations will become looser. So they get advantages from that. But the specifics are still on paper, we are still designing the incentives.*

**Do you encourage the use of rainwater harvesting system?**

*It is becoming compulsory. I don't know who will benefit from it. I think maybe the manufacturer of the products. If you produce it nicely, we can buy it in the market. But right now, we don't have it [rainwater harvesting] yet in the market. The developers are struggling to find a way to actually fulfil this requirement. And we are making it a requirement already especially in the housing scheme. Actually rainwater harvesting would help us in most of our daily chores. We are targeting the people like SP Setia who keen with eco-development first. We cannot have them mass produced because we don't have the items yet in the market.*

**So for the time being, are we importing from elsewhere?**

*Right now we have a lot of our engineers who are designing it. So if they are clever, they may start mass producing it, maybe then it will be quite cheap. But right*

- KLCH is designing some incentives e.g. less car park spaces and less processing fees for green/ energy efficient buildings
- Rainwater harvesting system is made compulsory for residential projects in KL.
- Rainwater harvesting system is not yet mass-produced in the market and very expensive



<p><i>now, it's still expensive. Even, photovoltaic is still expensive. We do not have it in the market and have the economic scale for it. The investment doesn't pay yet. Even you talked about hybrids car that in the market, the investment doesn't pay actually. (NN-R/PM:458-480)</i></p>	
<p><i>In CIDB, we don't have an incentive for it. From any ministries, I am not sure. But from the Environment Department, they have their own scheme. (MCA-PM:241-242)</i></p>	<ul style="list-style-type: none"> <li>• Not sure</li> <li>• CIDB doesn't provide any incentives</li> </ul>
<p><i>Yes. Such fiscal incentives have been granted through the national budgets over the years, mainly from 2006, in the form of ITA (Investment Tax Allowance) for EE. ITA is now in effect equivalent to a "double tax deduction" on investment in EE (1.6 times from 2006 &amp; double from 2008). (GL-PM:269-272)</i></p>	<ul style="list-style-type: none"> <li>• Investment Tax Allowance for EE since 2006</li> <li>• Double Tax Deduction on investment in EE since 2008</li> </ul>

**Q.34 Do you think there is a relationship between sustainability and property market value in the Malaysian context?**

TEXT	CODE (INDIVIDUAL)	CODE (GROUPED)	CATEGORY
<b>BUILDER &amp; BUILDER-DEVELOPER:</b>			
<i>It is a novel idea, if the buyers can afford it and be environmentally conscious at the same time for e.g. the BLUE WATER ESTATE project. (SA-B/D:188-189)</i>	<ul style="list-style-type: none"> <li>• Only if buyers can afford</li> <li>• Only if buyers are environmentally conscious</li> </ul>	<ul style="list-style-type: none"> <li>• Yes (2x)</li> <li>• No relationship yet</li> <li>• Only in the future</li> <li>• Maybe</li> <li>• Only if buyers can afford</li> <li>• Only if buyers are environmentally conscious</li> </ul>	<b>PERCEPTION OF THE RELATIONSHIP</b>
Yes. (TYT-B:300)	<ul style="list-style-type: none"> <li>• Yes</li> </ul>		
<b>DEVELOPER, OWNER &amp; DEVELOPER-OWNER:</b>			
<i>We have discussed this. In Malaysia we have not reached that yet. The problem is that we have no real data from a green building proving that it affects financially e.g. how much money is saved from utility bills after all the investments. Currently, the benefits of green buildings are just based on architects and engineers' words and through our readings. No proof in the local context. So our investors cannot see the real value of green buildings in Malaysia. We did an in-house study [customer survey] before deciding to pursue with a green building. We wanted to go for a green building in one of our commercial development hoping that it would increase our sale price. But then they [investors] would prefer better services, location and etc. but not environmental issues. If we have 2 buildings: one is green which is more expensive; another one is conventional and less expensive. Investors still prefer the conventional one because they have no hard data or proof to show that the green one will cost them less in the long run. The awareness on green issues that is minimal</i>	<ul style="list-style-type: none"> <li>• No relationship yet</li> <li>• Local investors cannot see the real value of green buildings in Malaysia</li> <li>• Currently financial benefits of green buildings are based on consultants' words and international literature</li> <li>• Based on customer survey conducted by a local developer among potential buyers/investors of commercial development, environmental criteria are ranked last</li> <li>• Local buyers/investors prefer a cheaper conventional building than a more expensive green building</li> <li>• No real local data to prove the long term financial benefits of a green building</li> </ul>	<p><b><u>Lack of local data</u></b></p> <ul style="list-style-type: none"> <li>• Local investors cannot see the real value of green buildings in Malaysia</li> <li>• Currently financial benefits of green buildings are based on consultants' words and international literature</li> <li>• No real local data to prove the long term financial benefits of a green building</li> <li>• Developer never came across green buildings being marketed as having the potential of higher rental value or demand.</li> <li>• Currently, market value is determined by other criteria than environmental issues</li> </ul> <p><b><u>Lack of expressed interest from local</u></b></p>	<b>REASONS FOR THE NON-RELATIONSHIP</b>

<p><i>because it is always the dollars and cents. Green building is always associated with the rich!</i> (NA-D:201-213)</p>	
<p><i>In the future but not now. I have not come across developers who market their green buildings and said that they could fetch better rental or better demand, never. Not that I know of. To determine the market value, they look at the location, the office sqft., the connectivity and so on.</i> (MM-D:391-394)</p>	<ul style="list-style-type: none"> <li>• Only in the future</li> <li>• Developer never came across green buildings being marketed as having the potential of higher rental value or demand.</li> <li>• Currently, market value is determined by other criteria than environmental issues</li> </ul>
<p>Yes. (BTC-D:225)</p>	<ul style="list-style-type: none"> <li>• Yes</li> </ul>
<p><i>Maybe, because everybody is gearing towards becoming so called green. Not yet in the local market but foreigners who work here are very particular. I got some experience talking with foreigners who want to know about this energy issues. I suppose because these foreigners like from IBM, they have their HQ somewhere in the US that has the policy on this already. So, corporate companies has this kind of policy who will definitely want to implement in their branches, so when they come to Malaysia, they are looking for that. So, corporate overseas company, yes, but local I don't think so.</i> (WR-D/O:745-751)</p>	<ul style="list-style-type: none"> <li>• Maybe</li> <li>• Corporate foreign companies are more interested in investing on green buildings than the locals</li> </ul>

<p><b>clients</b></p> <ul style="list-style-type: none"> <li>• Based on customer survey conducted by a local developer among potential buyers/investors of commercial development, environmental criteria are ranked last</li> <li>• Local buyers/investors prefer a cheaper conventional building than a more expensive green building</li> <li>• Corporate foreign companies are more interested in investing on green buildings than the locals</li> </ul>	
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## G. CURRENT POLICIES AND REGULATIONS

*Q.35 Are there regulatory requirements and/or economic incentives to expand re-manufacturing and recycling industry?*

TEXT	CODE (INDIVIDUAL)
<b>REGULATOR, POLICY MAKER &amp; GOVERNMENT PROJECT IMPLEMENTOR</b>	
<i>For what I know, Ministry of Science, Technology &amp; Innovation is doing something about this but more of a promotional rather than regulatory. I suppose it will move towards regulatory process.</i> (KSK-R/PM: 226-228)	•
<i>No.</i> (AMN-R/PM:182)	•
<i>I'm also not sure about that.</i> (MCA-PM:247)	•

CODE (GROUPED)	CATEGORY

**Q.36 In developed countries like the US, UK, Australia, provision of less number of car parking spaces than the maximum local planning allowances is encouraged to promote the use of public transports for commuting to work. Do you think this could be implemented in Malaysia?**

TEXT	CODE (INDIVIDUAL)	CODE (GROUPED)	CATEGORY
<p><b>DEVELOPER, OWNER &amp; DEVELOPER-OWNER:</b></p> <p><i>Definitely, we've got less 30%, because originally this building needs to provide..., we have to work out a math here. I am now providing 70% of the requirement for the car parks. 70% equates to 1200 car parks. I got 30% discount. You work out yourself how many car parks equate 100%. The number of car parks is based on gross floor area.</i></p> <p><b>That incentive is only applicable when your building is in a certain distance from public transportation. Beyond that, you must provide 100% of minimum requirement?</b></p> <p><i>Yes. Normally, what happened....that provision was specifically for the KL Sentral development. So, because I'd argued that we are putting overhead bridge adjacent to KL Sentral with only 15 minutes casual walking or 10 minutes brisk walking from our building to KL Sentral, we can provide less car parks because it is very convenient for people to use public transportation. That actually helped because you don't need to put so many car parks and our gross floor area is 1.3 million sqft that's why it worked out to be 1200 after less 30%. Otherwise, I would have to construct another one basement floor...So, that saves a lot of our money and a lot of construction times.</i></p> <p><b>Does this car park discounts only for development around KL Sentral?</b></p> <p><i>KL Sentral alone but we sort of like hitching a ride because of the overhead bridge.</i></p> <p><b>What if other area in Kuala Lumpur where the site is next to LRT stations?</b></p> <p><i>LRT stations are different from KL Sentral. They only cater</i></p>	<ul style="list-style-type: none"> <li>• Developer/owner has been given incentive by KLCH to provide 30% less car parks for their development in KL Sentral</li> <li>• 30% discount from the official requirement of car parks is only specific for KL Sentral development due to the existence of public transportation hub of which caters for all mass transit systems covering extensive destinations.</li> <li>• 30% less car parks = one basement floor. A heap of savings i.e. money and time to developer/owner.</li> <li>• Owner provided pedestrian access i.e. overhead bridge to existing public transportation hub.</li> </ul>	<p><b>Developer/owner 1 – Provided less</b></p> <ul style="list-style-type: none"> <li>• Developer/owner has been given incentive by KLCH to provide 30% less car parks for their development in KL Sentral</li> <li>• 30% discount from the official requirement of car parks is only specific for KL Sentral development due to the existence of public transportation hub of which caters for all mass transit systems covering extensive destinations.</li> <li>• 30% less car parks = one basement floor. A heap of savings i.e. money and time to developer/owner.</li> <li>• Owner provided pedestrian access i.e. overhead bridge to existing public transportation hub.</li> </ul> <p><b>Developer/owner 2 – Provided more</b></p> <ul style="list-style-type: none"> <li>• Owner was given 30% discount from the official requirement of car parks due to a close proximity to LRT station</li> <li>• Despite being given car park discount, owner provided more car parks instead</li> </ul> <p><b>Local Authority</b></p> <ul style="list-style-type: none"> <li>• KLCH still allow the provision of</li> </ul>	<p><b>STATUS OF IMPLEMENTATION</b></p>

<p>for certain destinations whereas KL Sentral is a public transportation hub. We can get away with it [minimum car parking requirement] because we can make assumption that people will come by public transport. (WR-D/O:188-213)</p>	
<p>It has been implemented actually. The public infra network here is still not comprehensive. From town planning perspective... [not clear]. You want less car park, less traffic? Fine, then you need to provide better infrastructure. We sort of are getting there but not quite. Even with G-Tower, because of our proximity to LRT station, we were given 30% discount from the official requirement of car parks. We are only required to provide 800 car parks but we decided to build more because we know that for the type of tenants that we are drawing into G-Tower is the top companies in town. A lot of them are foreign oil &amp; gas companies, central bankers and big IT companies. A lot of the people would still be driving instead of using public transport. We are quite aware of that. Of course as a building owner, when we can provide less car parks, we save more space and save more money – theoretically. But based from our experience, when we have good buildings but the car parks are very bad, the values will depreciate when the spaces are hard to sell or people are less inclined to gravitate towards the building. (CN-D/O:326-337)</p>	<ul style="list-style-type: none"> <li>• Public infrastructure network is still not comprehensive</li> <li>• Owner was given 30% discount from the official requirement of car parks due to a close proximity to LRT station</li> <li>• Despite being given car park discount, owner provided more car parks instead</li> <li>• Reason 1: Tenants involved are the top companies in town who prefer driving than using public transports</li> <li>• Reason 2: Based on owner's experience, a good building with poor car park provision tend to depreciate in its value because spaces are more difficult to sell</li> </ul>
<p><b>TEXT</b></p>	<p><b>CODE (INDIVIDUAL)</b></p>
<p><b>REGULATOR, POLICY MAKER &amp; GOVERNMENT PROJECT IMPLEMENTOR</b></p>	
<p>But in Malaysia, if you provide less [carparks] your building may not be approved by DBKL! Our public transportation is not reliable, not punctual and not covering all areas. I would say to the government..." Give me a better public transportation, I would stop running my car!" [Laughing]. Now government is talking about providing more roads...to</p>	<ul style="list-style-type: none"> <li>• Local public transportation is not reliable and not comprehensive in coverage</li> <li>• Government tend to provide more roads to combat traffic congestions and to boost the local automotive</li> </ul>

<p>more car parks</p> <ul style="list-style-type: none"> <li>• KLCH provides 45%, 30% or 25% discount from the official requirement of car parks depending on the proximity to public transportation hub</li> <li>• Developers/ owners still prefer to provide more car parks than official requirement regardless of the close proximity to public transportation hub.</li> <li>• Government buildings in Putrajaya have been provided less car parks but the public would rather park illegally than to use public transports.</li> </ul> <p><b>Other Government body</b></p> <ul style="list-style-type: none"> <li>• Not now, maybe in the future.</li> </ul>	
<p><b>CODE (GROUPED)</b></p>	<p><b>CATEGORY</b></p>
<p><b>Marketability</b></p> <ul style="list-style-type: none"> <li>• Reason 2: Based on owner's experience, a good building with poor car park provision tend to depreciate in its value because spaces are more difficult to sell</li> </ul>	<p><b>REASONS FOR ALLOWING/ PROVIDING MORE CARPARKS</b></p>

<p>reduce traffic jams and to help our automotive industry. Otherwise who want to buy our Protons and Peroduas? They want to promote people to buy our national cars. Otherwise, our Proton company will close down.</p> <p>Have you experienced using LRT in KL? To go from one place to another place, sometimes you need to switch from LRT to STAR or to Monorail. To switch stations, you need to go down the stairs, cross busy roads, then go up the stairs again... so many obstacles. In the developed countries, all these different trains are under one roof. Our services are disjointed because we are politically motivated. Our public transportation is privately funded, so all transports are built and operated by different companies. The integration and the mechanism to link all together are not there. We don't have the linking Body.</p> <p>But how I wish I didn't have to drive. It is tiring. But in Malaysia, to travel from one place to another using public transportation takes more time than driving because of the time you have to wait and the time you take to switch stations.</p> <p>In Malaysian context, the danger of providing less number of car parks is that your building might not be sellable. (CPK-PI:398-416)</p>	<p>industry</p> <ul style="list-style-type: none"> <li>• Mass transit system in KL is privately funded. STAR LRT, PUTRA LRT, KL Monorail are the light rail transit systems operated by 3 different private companies with 3 different lines. Impacts:             <ul style="list-style-type: none"> <li>○ Services are disjointed</li> <li>○ No linking body to integrate and link all companies together</li> <li>○ Users have to switch stations to go from one place to another – takes longer time</li> <li>○ Users have to go through many obstacles to switch stations</li> </ul> </li> <li>• Government project implementor believes that buildings with insufficient car parks are difficult to sell.</li> </ul>	<p>(D/O)</p> <ul style="list-style-type: none"> <li>• Government project implementor believes that buildings with insufficient car parks are difficult to sell. (GPI)</li> <li>• Reason: Buildings with less car parks are more difficult to sell. (LA)</li> </ul> <p><b>Tenants preference</b></p> <ul style="list-style-type: none"> <li>• Reason 1: Tenants involved are the top companies in town who prefer driving than using public transports (D/O)</li> </ul> <p><b>Local Automotive Industry</b></p> <ul style="list-style-type: none"> <li>• Reducing car parking requirement in the city might jeopardise the survival of the local automotive industry. (LA)</li> <li>• Government gives a lot of incentives to the local automotive industry to increase the public's affordability of owning at least a car/family. (LA)</li> <li>• Government tend to provide more roads to combat traffic congestions and to boost the local automotive industry (LA)</li> </ul>	
<p>I think it depends on the efficiency of our public transportation. If it is reliable and efficient, people are willing to use it when they found it difficult to park their cars. Currently, people are still complaining about our quality of public transportation. They would rather park illegally than to use public transport. (AMN-R/PM:187-190)</p>	<ul style="list-style-type: none"> <li>• Public would be willing to use public transports if finding a car park is troublesome and public transports are reliable and efficient</li> <li>• LA still receives public complaints about the quality of local public transportation</li> <li>• Government buildings in Putrajaya have been provided less car parks but the public would rather park illegally than to use public transports.</li> </ul>	<ul style="list-style-type: none"> <li>• Public would be willing to use public transports if finding a car park is troublesome and public transports are reliable and efficient</li> <li>• Government buildings in Putrajaya have been provided less car parks but the public would rather park illegally than to use public transports.</li> <li>• Public perceive public transports as second class facilities for the lower</li> </ul>	<p><b>PUBLIC'S ATTITUDE</b></p>

<p><i>That should be practiced in Malaysia actually. It works hand on hand. We have to have market/customers then only we can provide better public transportation. On the other hand, if we give a lot of incentives on the automotive industry and the cars get so cheap, everyone would at least have a car each. So it doesn't work both ways. But if you don't help the automotive industry, the problem will occur on the other side. So we are having problems on both sides. We did talk about reducing the car park requirements in the city, and then comes in the automotive industry which needs help. For political reason, we are holding it. So we still can see a lot of car parks being provided because we cannot only think of one sector. But it is getting better because if you go on any day in the city especially in this crowded area, the car parks are quit empty, which is good news. So it is market again. Especially, if you go to Lot 10 or near that area, the car parks are quite empty... the car park charges is RM8/hour, but now it doesn't go more than RM3 because of the monorail link around that area. Somehow we are getting there.</i></p> <p><b>I think it is working. In Adelaide parking spaces are scarce so it forces people to use public transportation, and the parking charges are very...very expensive.</b></p> <p><i>Yes, because of the money they get from the public transportation, and again because it's government funded. And you have to remember Australian public transport is an authority by itself. Then it works. But until recently...until our RAPID [public bus company] is privately funded which</i></p>	<ul style="list-style-type: none"> <li>• Government gives a lot of incentives to the local automotive industry to increase the public's affordability of owning at least a car/family.</li> <li>• KLCH still allow the provision of more car parks</li> <li>• Evidence suggests that there are some private car parks around the cities have been quite empty or reduced in parking fees since the development of KL Monorail.</li> <li>• Unlike Australia, public transportation system in Malaysia is privately funded which is money ventured for profits.</li> <li>• KLCH provides 45%, 30% or 25% discount from the official requirement of car parks depending on the proximity to public transportation hub</li> <li>• Developers/ owners still prefer to provide more car parks than official requirement regardless of the close proximity to public transportation hub.</li> <li>• Reason: Buildings with less car parks are more difficult to sell.</li> <li>• Public perceive public transports as second class facilities for the lower class citizens.</li> </ul>	<p>class citizens.</p> <ul style="list-style-type: none"> <li>• Public infrastructure network is still not comprehensive</li> <li>• Local public transportation is not reliable and not comprehensive in coverage</li> <li>• Mass transit system in KL is privately funded. STAR LRT, PUTRA LRT, KL Monorail are the light rail transit systems operated by 3 different private companies with 3 different lines. Impacts:             <ul style="list-style-type: none"> <li>○ Services are disjointed</li> <li>○ No linking body to integrate and link all companies together</li> <li>○ Users have to switch stations to go from one place to another – takes longer time</li> <li>○ Users have to go through many obstacles to switch stations</li> </ul> </li> <li>• LA still receives public complaints about the quality of local public transportation</li> <li>• Evidence suggests that there are some private car parks around the cities have been quite empty or reduced in parking fees since the development of KL Monorail.</li> </ul>	<p><b>COMPAINTS ABOUT PUBLIC TRANSPORTATION SYSTEM</b></p>
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*is money ventured...so if its money ventured for profit, it doesn't work. So the government has learned from it, they started to do the RAPID. It is beginning to show signs that they have made an improvement. But we still cannot cope. A lot of people want to use especially our STAR, LRT, PUTRA [light rails] which go all the way to KLCC. They are so many people, you can't even get in.*

**Certain buildings are only walking distance to LRT or public transportation hub. Are these buildings allowed to minimize their parking space numbers?**

*Our incentive is 45% less from 100% of our car park requirement. So we've already implemented that. We have distant, we have our radius. So we give 45%, 30% or 25% [less car park requirement] depending on the distance of the building to the transportation hub. But still the quantum is quite big actually. Actually, if you've noticed, we have a building in the city which is attached to the monorail but it has 12 floors for parking...which is about what? 4000 car parks?! I don't know whether it is necessary or unnecessary? We the technical people have mentioned it, but politically, they do not dare yet. They do not dare to provide less car parks. They're afraid that the building might not sell. So it works out with developer, political venture...developer also do not dare to put less car parks, they're afraid it would not sell.*

**Minimising the number of car parks may reduce the**

<p><b>number of floors.. that would save their money!</b></p> <p><i>We are trying to do it right now. Usually they want to build more than what we are giving them in the city. So usually they come back to us and say, "Please give us more plot ratio" and they want to build tall also. So we say okay. You can built tall, so you will have a skinny building down to the podium, and put whatever car park in the ground...mmmm... that's sounds scary to them [chuckles]. I think developers are not ready. If the developers are not ready, it means that the market is not ready. So it's hard. If we see a high rise building with one level of car park in Melbourne, it would be almost impossible in KL.</i></p> <p><i>Our LRTs are still being treated as an alternative transportation from busses. Busses are only for the lower class people. LRT has become a lower class facility. You cannot see CEOs and Directors in Malaysia taking the LRT like those in Melbourne...[chuckles]. In Melbourne everybody tends to use public transportation regardless of their status. It doesn't happen here. Even I take the LRT because I am used to my way of life in Australia. Here in DBKL, only those who graduated from overseas are willing to take the public transports [chuckles]. Local graduates tend to have cars even in their first year of studies. People here in DBKL find it weird if the Directors take the public transport. The mentality of our public looking at public transport as the second class facilities is the problem.</i></p> <p>(NN-R/PM:491-542)</p>	
<p><i>Firstly, to do that...the public transport system must be very good. In our culture, we love to go anywhere by driving on our own. Usually in areas with plenty of parking spaces, those are the areas that we are attracted to go. If you go for shopping with lots of shopping bags, you're definitely don't want to take the LRT. If our public transportation is very well in place, maybe we can try to reduce the numbers</i></p>	<ul style="list-style-type: none"> <li>• Not now, maybe in the future.</li> <li>• Local public transportation system is unreliable with technical dysfunctions and limited destinations coverage.</li> <li>• Public are more incline to go to places with ample parking spaces</li> </ul>

*of parking spaces in order to encourage the usage of public transport. But not now. Efforts have been made by the government to come out with the integrated transport system. But there are still flaws i.e. with technical dysfunction and limited destinations covered in the services. So, I think our public transports are not still unreliable. The buses are rarely punctual, sometimes they brake down. Maybe in the future during the generation of our grandchildren [laughing].*  
(MCA-PM:252-261)

## H. CHALLENGES AND ASPIRATIONS

**Q.37** In your opinion, what are the major barriers faced by local architects/ engineers/ contractors/ developers/ facility managers/ the Government to widespread sustainable office building practices/development in Malaysia?

TEXT	CODE (INDIVIDUAL)
<b>ARCHITECT:</b>	
<i>Attitude towards changes is not there. Paradigm shift is very slow. There is no demand for sustainable buildings and architects are not really educating the public. I find it very difficult to implement green designs in Malaysia because the clients just do not want to spend more money. I hate it! (KK-A:204-207)</i>	<ul style="list-style-type: none"> <li>Architects do not educate the public (A)</li> <li>Lack of demand (A)</li> <li>Clients simply don't want to spend more money (A)</li> </ul>
<i>It is people's attitude is one and financial is the second one because these sustainable products are costly... Somebody is creating the products to get more money. By that default, sustainable product is an anti-social. It creates more social barrier, segregation. Only people who can afford can use these products. Imagine if you want to make energy efficient bulbs compulsory, the poor wont have lights, they can't afford it... Somebody out there is taking advantage and somebody out there is not sincere about this sustainable issues. To me, sustainable issue is just propaganda, it is a name.</i> <b>Can you elaborate more on peoples' attitude?</b> <i>If they are the project managers, they are given tasks to design buildings within certain square feet which are costs. Who cares about maintenance? Normally these are the people who don't care about the maintenance, about the operations, not so much on the architects. At least architects, when we talk about it, they do understand and they can consider if they want it. But it is the project managers who approve it which is actually the barrier.</i>	<ul style="list-style-type: none"> <li>Sustainable products are more costly (A)</li> <li>Sustainability is a propaganda for certain people to get more money (A)</li> <li>Sustainable products are anti-social and create social segregation (A)</li> <li>Project managers don't care about operation and maintenance (A)</li> <li>Unlike architects, project managers are ignorant in green/sustainable design and construction (A)</li> </ul>

CODE (GROUPED)	CATEGORY
<b>From all 30 interviewees</b>	
<ul style="list-style-type: none"> <li>Lack of demand (A)</li> <li>Lack of demand from investors/ buyers (D) (2x)</li> <li>There is not a large enough demand for green/ sustainable buildings. Get worse during economic downturns (EC).</li> </ul> <p><b><u>Causes of clients' disinterest: Lack of education/ awareness (11x)</u></b></p> <ul style="list-style-type: none"> <li>Lack of understanding on the long-term benefits of green buildings among the clients (A)</li> <li>Lack of knowledge about sustainable building among clients (A)</li> <li>Lack of environmental awareness among clients (A)</li> <li>Lack of awareness among investors/ buyers (D)</li> <li>Building owners usually rely on consultants to educate them on green buildings (D/O)</li> <li>Couldn't-care-less attitude among corporate figures (A)</li> <li>People's attitude towards change</li> </ul>	<p><b>LACK OF EXPRESSED INTEREST FROM CLIENTS (PURCHASERS, TENANTS &amp; END USERS)</b> <b>(4+11+14=29)</b></p> <p><b>A, E, EC, B = 18</b> <b>FM = 1</b> <b>D, D/O = 9</b> <b>G = 1</b></p>

<p>Actually that is the biggest barrier. I'd never heard of clients who want to use solar panel and ask the architects to go and find it and the architect says that "I cannot because I don't know", or "I don't know how" or "it is not possible, it is so expensive." It is very easy for people to blame designers or consultants when it comes to sustainability. (WS-A:273-293)</p>	
<p>Lack of knowledge and skills among team members and the second one is the client's knowledge regarding the environmental impact of what they are doing. The knowledge is not there, the people's mindset is not there. There are corporate figures around with couldn't-care-less attitude. (CSA-A:341-343)</p>	<ul style="list-style-type: none"> <li>• Lack of knowledge and skills among team members</li> <li>• Lack of knowledge about sustainable building among clients (A)</li> <li>• Couldn't-care-less attitude among corporate figures</li> </ul>
<p>Awareness from everyone i.e. designers, planners, government officials, developers, land owners! That is the first one. Then after that, then we know what the rest are. There is a very low level of awareness at the moment. (TLM-A:292-294)</p>	<ul style="list-style-type: none"> <li>• Lack of environmental awareness among developers and land owners (A)</li> <li>• Lack of environmental awareness among government officials (A)</li> <li>• Lack of environmental awareness among designers &amp; planners (A)</li> </ul>
<p>Truly green buildings that exist are impractically built. So we are our own obstruction. <b>Are there many demands on green buildings in Malaysia?</b>  In recent years, yes. <b>How do you find the attitudes of local architects towards green design?</b>  I think there is an increasing awareness of the importance and the need to do this. It is something that we all have to confront sooner or later. (KY-A:262-267)</p>	<ul style="list-style-type: none"> <li>•</li> </ul>
<p>I think the bigger awareness of what it entails, what it</p>	<ul style="list-style-type: none"> <li>• Many designers are unfamiliar with</li> </ul>

<p>and improvement (E)</p> <ul style="list-style-type: none"> <li>• Acceptance of the green ideas from building owners (B)</li> <li>• Lack of commitment from the top management to invest more money on greening the building (FM)</li> <li>• Lack of environmental awareness among <b>developers</b> and land owners (A) s</li> <li>• Lack of awareness and wrong attitude among <b>developers</b> (B)</li> </ul> <p><b><u>Causes of clients' disinterest:</u></b> <b><u>Economic / financial concerns (13x)</u></b></p> <ul style="list-style-type: none"> <li>• Economic/ financial concerns among clients (B) (2x)</li> <li>• Business community attitudes to make the most profits with the least investment (G)</li> <li>• Clients simply don't want to spend more money (A)</li> <li>• General public are still unwilling to pay more for a sustainable building (EC)</li> <li>• Owners are doubtful about the economic return of a sustainable building (EC) especially during economic downturn.</li> <li>• Overbuilt problem –prices of properties reduced – made sustainable aspects more difficult to be incorporated in existing buildings (EC)</li> </ul>	
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<p><i>means. What are the markings to get a green building? Not many people are familiar, they know a little bit but not enough. So being unfamiliar is the big area. Once they familiar then they know what they can control, what they can shape. But if you don't know, you can't shape it. I hope with the GBI which is initiated by PAM and not a government body like Singapore that more architects should be aware of what it means. As it evolves and becomes more then was like green sustainable will come in...slowly and slowly you'll add on basically.</i> (SH-A:266-272)</p>	<p>sustainable/ green design</p>
<p><i>Lack of understanding on the real benefits of green buildings among the clients. Developers... to them, the benefits are government rebates, more purchasers, marketing advantages. If not... they won't go for green buildings... To me architects are aware of this.. a long time ago but they are not many because anywhere from all over the world unless you are made aware of the situation and green building situation is that it would affect everyone because human being unless you are affected, they don't care less so you have to be made fully aware of this.</i> (SA-A:407-418)</p>	<ul style="list-style-type: none"> <li>• Lack of understanding on the long-term benefits of green buildings among the clients (A)</li> <li>• Developers will do it if they get government incentives, more purchasers and marketing advantages (A)</li> <li>• Not many architects are fully aware of the importance and the need to design sustainably (A)</li> </ul>
<p><i>The major barriers are awareness. So clients need to be educated. Awareness among clients and partly among consultants because currently, not all consultants are pushing for sustainability in their designs. Some even doing it without knowing the word sustainability. So if education and the awareness have been disseminated, only then they will begin to be aware of what they are doing and they can improve further.</i> (LCH-A:354-358)</p>	<ul style="list-style-type: none"> <li>• Lack of environmental awareness among clients (A)</li> <li>• Many consultants are unfamiliar with sustainable design (A)</li> <li>• Suggestion: Education &amp; awareness programs (A)</li> </ul>
<p>- No political will.</p>	<ul style="list-style-type: none"> <li>• No political will (A)</li> </ul>

<ul style="list-style-type: none"> <li>• Not all tenants appreciate green technologies and willing to pay more rent. (D)</li> <li>• Cost of implementation on new projects (D)</li> <li>• Budget constraint for building owners (D)</li> <li>• Ignorance on the availability of incentives from utility concessionaire (D)</li> <li>• Owners do not feel encouraged to build green buildings. No clear incentives for the investment in rainwater harvesting and no monetary return for sending back PV generated electricity to the grid (D/O).</li> <li>• <b>Developers</b> are unaware of incentives available and what can they gain from them (B)</li> <li>• <b>Developers</b> will do it if they get government incentives, more purchasers and marketing advantages (A)</li> </ul>	
<ul style="list-style-type: none"> <li>• Lack of environmental awareness among building users (FM)</li> <li>• Lack of awareness and wrong attitude among tenants towards conserving energy and water and reducing waste (FM)</li> <li>• Lack of awareness and wrong attitude among tenants towards conserving energy and water and</li> </ul>	<p><b>POOR ATTITUDE AMONG TENANTS</b>  <b>A, E, EC, B = 1</b>  <b>FM = 2</b>  <b>D, D/O = 1</b>  <b>G = 1</b></p>

<p>- Poor or outdated statutory regulations/bylaws. (NB-A:230-231)</p>	<ul style="list-style-type: none"> <li>Poor or outdated statutory regulations/ bylaws (A)</li> </ul>
TEXT	CODE (INDIVIDUAL)
ENGINEER & ENVIRONMENTAL CONSULTANT:	
<p><i>One, not only engineers are faced with a lot of problems within the design team itself, it is the architects who are also not well-verse with it, stop throwing things to the engineers.</i></p> <p><i>Another area is the awareness among the engineers because if it becomes a rat race that you just want to survive, you won't look into being innovative? It has pros and cons. Why are you dropping the fees? Why aren't you holding the fees? Everybody is expensing with his fee control. We still have our mandatory fees. But nobody observes it even which is even worse.</i></p> <p><i>The Board [Board of Engineers] must restructure to make sure people understand that we have to be a serious consultant. Our aim should be the public interest because the public is at stake and you have to protect it. Only the serious players should be there. Then we can move better.</i></p> <p><i>Professional fees, like I say the board doesn't enforce it, there is a lot of under-cuttings. That's where if you undercut and undercut, how can you deliver? You can survive only. So make sure that people who are allowed to practice understand their responsibilities and do justice to the environment. Otherwise, if you cut, cut, cut, no way you're going to bother because you just deliver.</i></p> <p><i>Big barrier is the attitude of people. I can blame the board, I can blame the practitioners but all of us should together</i></p>	<ul style="list-style-type: none"> <li>Architects and engineers are not well-versed with sustainable design (E)</li> <li>Lack of environmental awareness among engineers (E)</li> <li>Professional fees are not enforced to avoid undercutting among consultant engineers. Hence, innovation and sustainability become nuisances (E)</li> <li>People's attitude towards change and improvement (E)</li> </ul>

<ul style="list-style-type: none"> <li>reducing waste (GPI)</li> <li>Lack of green awareness among tenants (D)</li> <li>People are not being taught of environmental issues, hence they are not environmentally conscious (B)</li> </ul>	
CODE (GROUPED)	CATEGORY
<ul style="list-style-type: none"> <li>Sustainable products are more costly (A)</li> <li>Green technologies are expensive (D)</li> <li>Sustainability is a propaganda for certain people to get more money (A)</li> <li>Sustainable/ green buildings are expensive – 10-15% more (EC).</li> <li>Capital Expenditure (CapEx) of green building is too high (FM) – can increase first costs from 10-15%</li> <li>Green technologies are expensive (FM)</li> <li>Cost issue: Green/ sustainable building is expensive (G)</li> <li>MS14000 certification is very expensive – not popular among contractors (G)</li> </ul>	<p><b>THE HIGHER COST OF SUSTAINABLE BUILDING OPTIONS</b></p> <p><b>A, E, EC, B = 3</b></p> <p><b>FM = 2</b></p> <p><b>D, D/O = 1</b></p> <p><b>G = 2</b></p>

<p>drive to improve it. I am so happy that PAM [Malaysian Institute of Architects] right now is driving the industry towards green. You cannot avoid having those who don't want to improve themselves and want undercut. I think this is the biggest barrier. (CTL-ME:566-583)</p>	
<p>I know financial is the barrier but I think the biggest hurdle is people's attitudes. If the developer wants a green building, he doesn't mind paying slightly more because green buildings have more advantages over the conventional one. If developers are looking for more rentable space, more prestige, this is how much more money that they can borrow from the bank. But the perception of people on your good company is also important. Imagine having your building rated as LEED Platinum, waa.....isn't that a prestige. Even though you paid 10% more, it is the perception of people that counts. To me it is the people's attitude including the consulting engineers themselves. They have lack of understanding and they are scared to change. We should be hunger for knowledge. We learn everyday and we should be open-minded. They just prefer the status quo doing the same thing everyday and scared with something new. They have the wrong attitude of not wanting to learn. People only change when they have the knowledge on how to change. Without knowledge, they won't change.</p> <p>Sometimes because the engineers get cheap fees, cheap scale...so they don't want to suggest all these things. So it is an unfortunate that we got involve into this situation. (NYK-ME:361-374)</p>	<ul style="list-style-type: none"> <li>• Lack of understanding among engineers. Engineers prefer status quo and not willing to change or learn how to change (E).</li> <li>• Consulting engineers' professional scale of fee is low – not worth the effort (E)</li> </ul>

<ul style="list-style-type: none"> <li>• Architects do not educate the public (A)</li> <li>• Consultants advise owners that green building is expensive and difficult to make profit (D/O)</li> <li>• Consultants do not promote green/sustainable design to building owners (D/O)</li> <li>• People's attitude towards change and improvement (E)</li> <li>• Project managers don't care about operation and maintenance (A)</li> </ul> <p><b><u>Causes of team members' disinterest:</u></b></p> <p><b><u>Lack of environmental awareness</u></b></p> <ul style="list-style-type: none"> <li>• Lack of environmental awareness among designers &amp; planners (A)</li> <li>• Lack of environmental awareness among engineers (E)</li> <li>• Lack of environmental awareness and knowledge in sustainable design among architects (D/O)</li> <li>• Lack of environmental awareness among professionals and builders (G)</li> <li>• Not many architects are fully aware of the importance and the need to design sustainably (A)</li> </ul>	<p><b>LACK OF EXPRESSED INTEREST FROM PROJECT TEAM MEMBERS</b></p> <p><b>A, E, EC, B = 6</b></p> <p><b>FM = 0</b></p> <p><b>D, D/O = 3</b></p> <p><b>G = 1</b></p>



*For us we are very lucky because we are the only one in Malaysia who is doing such work. So basically there is no competition... But the barrier for others is that there is not a large enough demand. Most buildings, they don't care about green issues, at least not yet. I think this year will be even tougher because there will be less projects in a market because of the economic downturn. In this case, sustainability issues will be further down in their list.*

**Is it because of their mindset that sustainable building or green building must be very expensive?**

*Yes and they are not too wrong about it either. 10 years ago when we talk about sustainable building, people would say "Oh it will cost about 50% more of the building." We have shown that it is not true. So nowadays, the cost increase only 15% or maybe 10% more but it is still substantial unless we can see a return. Now whether their return is there or not is a bit crash. If they have to invest 15% more, they have to rent it out by at least 10% more. Can they actually rent 10% more or not at this economic market? They may not be so interested at this moment.*

*I think the next wave would be the existing buildings, refurbishing the existing building rather than new buildings because there are many office buildings in the world right now to sustain the economy. Unless in India and China where they still need a lot more new buildings, but the thing is the rest of the world, they mostly overbuilt including Malaysia. So how are they going to fill up all these floor spaces? So they may throw out their prices, then more difficult for green issues to be picked up. Unless at the end of the day, the public would pay more for such green buildings, which is not happening yet.*

*It is quite simple if you have an opportunity to rent. I think the challenge is to show that you can do with minimum cost increase when we refurbish. The thing is where is the*

- There is not a large enough demand for green/ sustainable buildings. Get worse during economic downturns (EC).
- Sustainable/ green buildings are expensive – 10-15% more (EC).
- Developers/owners are doubtful about the economic return of a sustainable building (EC) especially during economic downturn.
- Overbuilt problem –prices of properties reduced – made sustainable aspects more difficult to be incorporated in existing buildings (EC)
- General public are still unwilling to pay more for a sustainable building (EC)
- No data on market rental values of green buildings to motivate refurbishment of conventional properties (EC)

- Lack of knowledge and skills among team members (A)
- Many consultants are unfamiliar with sustainable design (A)
- Many designers are unfamiliar with sustainable/ green design (A)
- Architects and engineers are not well-versed with sustainable design (E)
- Many consultants don't know what entails a good operation & maintenance (FM)
- Lack of understanding among engineers. Engineers prefer status quo and not willing to change or learn how to change (E).
- Unlike architects, project managers are ignorant in green/sustainable design and construction (A)
- Lack of knowledge in green/ sustainable design among government designers (GPI)
- Lack of understanding about sustainability issues among industry players (G)
- Many FM are unqualified and have no knowledge to ensure good maintenance and optimal operation of advanced technologies. There is no Board of FM to control the situation (FM)
- Many FM are ignorant in doing preventive maintenance especially

**LACK OF TECHNICAL UNDERSTANDING ON THE PART OF PROJECT TEAM MEMBERS**

**A, E, EC, B = 6**

**FM = 5**

**D, D/O = 0**

**G = 2**

<p>barrier? For example, you want a house with 1000 square foot. Let say, you're willing to pay for RM1000 per month to rent it. Would you rent a house for RM1500 because it is green or would you rent it for RM2000 or would you rent it for RM1100? I think finding out that barrier and how we can reduce the cost to meet that kind of expectation. If you can say that you can do it, you can rent it out for RM1200, people are willing to pay RM1200 with the RM200 premium which 20% premium. Then a lot of them are interested. Even if they invest 20% in renovating it, 20% premium is a lot higher. 20% doesn't just cover the building itself. It covers the maintenance and a lot more. (CKT-EC:427-458)</p>	
TEXT	CODE (INDIVIDUAL)
BUILDER & BUILDER-DEVELOPER:	
<p>Cost, because they always think that it will cost more. So the practitioners please also think about cost as the reality will always be commercial first.</p> <p>Lack of awareness of they just simply don't care as they are breaking the law. The rule if the method works why should we change it?</p> <p>They are not aware if there are any incentives. What do they have to gain from it? (SA-B/D:194-198)</p>	<ul style="list-style-type: none"> <li>Economic/ financial concerns among developers (B)</li> <li>Lack of awareness and wrong attitude among developers (B)</li> <li>Developers are unaware of incentives available and what can they gain from them (B)</li> </ul>
<p>It is money. It involves cost. They feel that if they want to save the trees, then fine. From 100 units of houses they can construct, they can only construct 20. So for that, they have to multiply by so much of the shrinkage [not clear] so they can get back their profit from the 100." So at the end of the day, who is going to suffer? The buyers. I feel this is the main barrier. The one that can make sustainability effective are the regulators. Regulators must play their part.</p> <p>Knowledge – People are not educated or being taught of environmental issues...</p>	<ul style="list-style-type: none"> <li>Economic/ financial concerns among developers (B)</li> <li>Regulators are not playing their role very well – insufficient enforcement (B)</li> <li>People are not being taught of environmental issues, hence they are not environmentally conscious (B)</li> </ul>

<p>during the first 3 years of a building's life. This cause the building to go through major repairs, overhaul or replacement after 3 years of operation (FM)</p> <ul style="list-style-type: none"> <li>Many FM companies do not have basic processors to help them what they do and ensure repeatability (FM)</li> <li>Many FM companies do not have proper checklist on how to ensure systematic maintenance of every part and component (FM)</li> </ul>	
<ul style="list-style-type: none"> <li></li> <li></li> </ul>	
<ul style="list-style-type: none"> <li>No political will (A)</li> <li>People's attitude towards change and improvement (E)</li> <li>No political will. Government buildings do not show good examples of energy conservation and good maintenance practices (B)</li> <li>Political disregard for the environment and efficient use of natural resources (G)</li> <li>Lack of environmental awareness among government officials (A)</li> <li>Lack of legislation to mandate EE or environmental preservation in building codes and standards. Malaysian standards remain as guidelines with no means of</li> </ul>	<p><b>LACK OF POLITICAL WILL &amp; CLEAR FEDERAL POLICY</b></p> <p><b>A, E, EC, B = 6</b></p> <p><b>FM = 3</b></p> <p><b>D, D/O = 0</b></p> <p><b>G = 7</b></p>

<p><i>Whatever regulations, they remain on paper. There is no enforcement. So you cannot blame people end up throwing/littering. Another thing is our mentality. Some of us do not scold our children for littering. We do not give enough awareness and enforcement to our children and our regulators do not give enough enforcement to make our country clean. (JD-B:415-429)</i></p>	
<p><i>No. 1 is the acceptance of the building owners. No.2 is the availability of recycle materials in the market. No.3 is the absence of any information centre [in Malaysia] where you can acquire low carbon materials, recycle materials, eco-materials or health preferable products. It would be greatly helpful for people to specify them in their projects. If you want to buy a 5-Star energy fridge, you can't find it in Malaysia. No.4 is our politicians or no political will. Government talked about reducing their buildings' energy consumption to 10% about 1-2 years ago. When you visit any government buildings on Saturday, you can feel the air-cond is full blast and there are not many people working and they get the door open also. That is their conservation. Then by right, the enforcement should punish the operators of individual building as to why their energy consumption is very high. Not to mention the energy, maintenance is another deplorable issue. (TYT-B:305-316)</i></p>	<ul style="list-style-type: none"> <li>• Acceptance of the green ideas from building owners (B)</li> <li>• Availability of recycle materials in the market (B)</li> <li>• Scarce and poorly accessible information available on green products and high-performance building systems (B)</li> <li>• No political will. Government buildings do not show good examples of energy conservation and good maintenance practices (B)</li> </ul>
<b>TEXT</b>	<b>CODE (INDIVIDUAL)</b>
<b>DEVELOPER, OWNER &amp; DEVELOPER-OWNER:</b>	
<p><i>Awareness among investors is the major barrier. We can impose [green building] but it is not our money [that is used for buying the building]. Developers build buildings for other people. So it is the investors decision whether they want to go for green or not. (NA-D:218-220)</i></p>	<ul style="list-style-type: none"> <li>• Lack of awareness among investors/ buyers (D)</li> <li>• Lack of demand from investors/ buyers (D)</li> </ul>

<p>legislative enforcement for non-compliance (G)</p> <ul style="list-style-type: none"> <li>• Poor or outdated statutory regulations/ bylaws (A)</li> <li>• Regulators are not playing their role very well – insufficient enforcement (B)</li> <li>• Electricity tariff is low – people tend to waste energy (FM) (2x)</li> <li>• Electricity tariff is low. Water is cheap. People tend to waste (GPI)</li> <li>• Electricity tariff is low making the payback period for green technology too long (G)</li> <li>• No political will to an immediate change (FM)</li> <li>• Lack of awareness and knowledge among government officials (GPI)</li> <li>• Lack of understanding among the decision-makers or top management who give approvals (GPI)</li> <li>• Government always concern about financial issues in any decision-makings i.e. cost implication to the government and the industry (G)</li> </ul>	
<b>CODE (GROUPED)</b>	<b>CATEGORY</b>
<ul style="list-style-type: none"> <li>• Professional fees are not enforced to avoid undercutting among consultant engineers. Hence, innovation and sustainability become nuisances (E)</li> <li>• Consulting engineers' professional scale of fee is low – not worth the</li> </ul>	<p><b>THE FAILURE OF SERVICE FEE STRUCTURES TO REFLECT LONG-TERM SAVINGS</b></p>

<p><i>It is the awareness. Let say I install an energy efficient air-conditioning system that can get rid of dust or what ever. Of course, I want some returns. My rental must not be the same with others, must be higher or else my profit margin would be small. The main question is that...will the tenant prefer to pay this higher rental or not? There are traders who market these kinds of efficient equipments and products but when we looked at the cost....and the worst part is that people don't appreciate them.</i></p> <p><b>So, awareness among building tenants? They don't demand because they are not aware of the benefits of the green buildings?</b></p> <p><i>That's right. Our local tenants won't say, "If the buildings are not green, we won't move in". If they say things like that, like it or not, we have to deliver them. Not only us, the whole industry will do it. That's number one, there's no demand.</i></p> <p><i>These green buildings are not publicized enough. Manufacturers overseas just use local agents to sell their products. When something goes wrong, spare parts are difficult and take too long to be obtained. (MM-D:399-412)</i></p>	<ul style="list-style-type: none"> <li>• Green technologies are expensive (D)</li> <li>• Not all tenants appreciate green technologies and willing to pay more rent. (D)</li> <li>• Lack of green awareness among tenants (D)</li> <li>• No demand from investors/ buyers (D)</li> <li>• Lack of publicity on green products/materials (D)</li> <li>• Imported green products/equipment are sold through local agents who cannot guarantee efficient replacement and maintenance (D)</li> </ul>
<p><i>Cost of implementation on new projects</i></p> <p><i>Budget constraint for building owners</i></p> <p><i>Ignorance on the availability of incentives from utility concessionaire (BTC-D:230-232)</i></p>	<ul style="list-style-type: none"> <li>• Cost of implementation on new projects (D)</li> <li>• Budget constraint for building owners (D)</li> <li>• Ignorance on the availability of incentives from utility concessionaire (D)</li> </ul>
<p><i>It is the information, if they abandon of it, then they did get through. There is a green building seminar for RM500, you cannot do that because this is not how you preach green buildings. We got TVs and radios; I don't know how many</i></p>	<ul style="list-style-type: none"> <li>• Information has not been successfully integrated and effectively disseminated or promoted (D/O)</li> <li>• Building owners usually rely on</li> </ul>

<p>effort</p> <ul style="list-style-type: none"> <li>• No data on market rental values of green buildings to motivate refurbishment of conventional properties (EC)</li> <li>• Scarce and poorly accessible information available on green products and high-performance building systems (B)</li> <li>• Lack of publicity on green products/materials (D)</li> <li>• Information has not been successfully integrated and effectively disseminated or promoted (D/O)</li> </ul>	<p><b>LACK OF INFORMATION</b></p> <p><b>A, E, EC, B = 2</b></p> <p><b>FM = 0</b></p> <p><b>D, D/O = 2</b></p> <p><b>G = 0</b></p>
<ul style="list-style-type: none"> <li>• People are not being taught of environmental issues, hence they are not environmentally conscious (B)</li> </ul>	<p><b>LACK OF TRAINING/ EDUCATION IN SUSTAINABLE DESIGN/ CONSTRUCTION</b></p>
<ul style="list-style-type: none"> <li>• Projects are awarded to the lowest bidder and not to the lowest evaluated bidder. The lowest bidders may not be the good quality contractors doing sustainable practices (G)</li> </ul>	<p><b>AWARD TO LOWEST BIDDER</b></p>
<ul style="list-style-type: none"> <li>• Availability of recycle materials in the market (B)</li> <li>• Imported green products/equipment are sold through local agents who</li> </ul>	<p><b>LACK OF GREEN PRODUCTS SUPPLIERS IN THE AREA</b></p>

<p>green advertisements are there on TV and radio. Those belong to the government.</p> <p><b>You are talking about information that is available in Malaysia?</b></p> <p><i>Yes, or even not in Malaysia. I'm talking about the information transmitted to the building owners. If we don't let us know, then we wouldn't know. It so happen in this case 'I knew about it so I try my best'. But how about other owners? Because there are some of them who actually impress with the idea. Green buildings are beautiful also because when you design towards that especially when you say you pay less electricity bill, who wouldn't want less electricity bill? They always want to do it, but not many owners know about it, because they rely on the consultants. I really hate consultants especially architects. In previous presentations for the bank, I sat in the presentations. They did not know that I am an architect, they thought I am just one of the bankers. The shit that they're throwing to the bank, I really got sick about it. I don't believe these people got PAM Part 3 or RIBA Part 3 or even graduated. It is so very disheartened. They were saying "We're going to give you this NFA, you're going to make money...bla...bla...bla." What about the passive design? They don't even care about passive design. When we start asking questions, then they say "Yes, yes we can incorporate that." I mean bloody hell. It should be incorporated in the first place and promote it to us! That is their mentality. So the awareness and knowledge among architects is a big issue. That is the responsibility of the consultants. No building can be constructed in Malaysia without the submitting person being an architect. So the architects must do the business, don't come to the client and tell green building is expensive. You do not know how to do it, you don't know how to present it and you don't even care about it! Because green building can make</i></p>	<p>consultants to educate them on green buildings (D/O)</p> <ul style="list-style-type: none"> <li>• Consultants do not promote green/ sustainable design to building owners (D/O)</li> <li>• Consultants advise owners that green building is expensive and difficult to make profit (D/O)</li> <li>• Lack of environmental awareness and knowledge in sustainable design among architects (D/O)</li> <li>• Owners do not feel encouraged to build green buildings. No clear incentives for the investment in rainwater harvesting and no monetary return for sending back PV generated electricity to the grid (D/O).</li> </ul>	<p>cannot guarantee efficient replacement and maintenance (D)</p> <ul style="list-style-type: none"> <li>• To impose regulation on the use of energy efficient/ green products/ equipment is difficult because they are hardly available in the local market (G)</li> <li>• Government cannot force the industry to use green/ sustainable materials because many of them are not produced/ available locally (G)</li> </ul>	<p><b>A, E, EC, B = 1</b>  <b>FM = 0</b>  <b>D, D/O = 1</b>  <b>G = 2</b></p>
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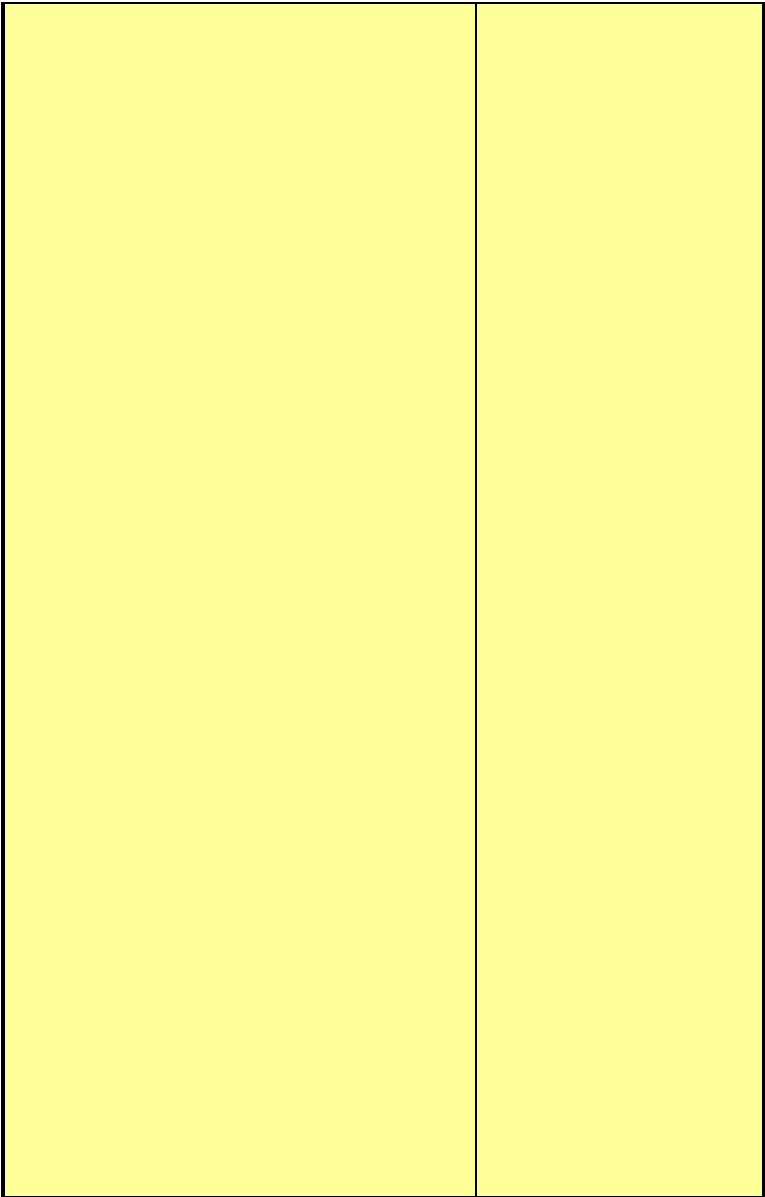
money, there a lot of ways of doing it, so I blame it on the architects.

**At least you are one of the owners who really aware on the green issues, but not other owners. When they are not knowledgeable on the benefits of green buildings, they don't demand for those kinds of buildings, when they don't demand, architects won't give.**

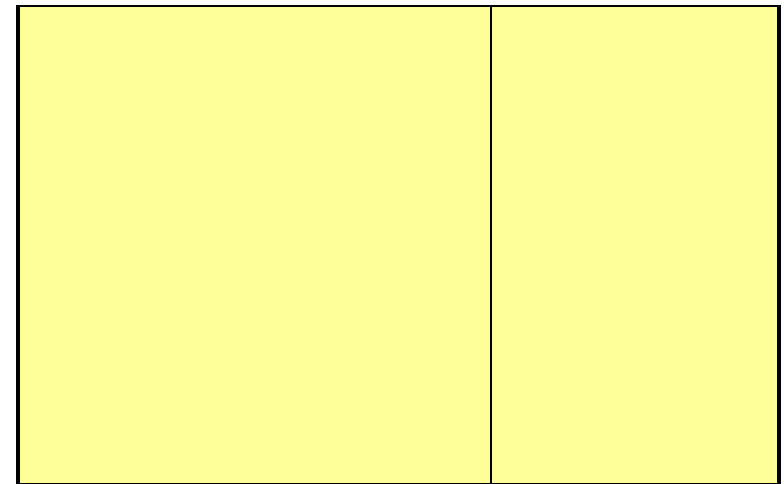
*But there's another one thing. Being aware of it, I am the one person from many Directors. How did I go and stress it to them [other Directors]? So that is another issue, they are also not aware of it. How do you go and approach the Vice Presidents to tell them that, because they have to go to the bottom line. This is where the consultants play their role. Now they have 'one foot' already in the owner's organization but they need to support it in a very good way, but their support is very poor. It is always like that in the industry. I'll blame the industry who did this all to us. They shouldn't do it.*

**Is there any other barrier that you can think of?**

*I would say the constraint, sometimes when you want to do something good, you don't have the encouragement for it. For example, you want to do rainwater harvesting because you want to save money, so you don't need to use main water but what do I get out of it? I have to spend more for the extra tanks. I have to do extra redundant plumbing because plumbing for rainwater is different from normal plumbing. I even save the headache on the main water company for not needing to supply more water to me, but what do I get out of it? So that is another impediment because bottom line doing a building is always a business, I want to win something from it also, if I do good, I want something back. I don't want to do good just for the environmental sake, to be honest. I want something economic return from it. If I save the stress from the main*



<p>water supply, what do I get out of it? But that has never been the encouragement. Similarly with the main electricity supply, if you do photovoltaic, and if you sell back to the grid, how much will you get back? Peanuts! There is no really truthful black and white about this thing. So it will discourage people for doing that. We should encourage them that way. Nobody ask a single cent for the capital cost, they want to put it, but what do you get back because you know when we talk about water, electricity, these are in a long term, talking about 30, 50 years business. So, if you can show something in a long term then it will be good. Not only you didn't give information about it, when I get the information, you didn't even give me the benefits economically. (WR-D/O:765-818)</p>	
TEXT	CODE (INDIVIDUAL)
FACILITY MANAGER:	
<p><i>Cost! When you build something which is commercial, you want your returns. You can't run away from it or else you won't survive. Your returns are determined by the market no matter how sophisticated your building is... Solar panels and water harvesting are expensive technologies. The technical and cost issues are always in your mind.</i> (NM-FM:169-177)</p>	<ul style="list-style-type: none"> <li>• Green technologies are expensive (FM)</li> </ul>
<p><i>Major obstacle is the CapEx issues. Many times I heard people saying that to go for a green building, the CapEx is only 5% more 10% more. I want to tell you it is not true.</i></p> <p><b>Basically the developer, the owners are saying that or the consultants?</b></p> <p><i>The consultants. You look at the ZEO building. If you compare to the building that they've built, ZEO building is 10-12% more expensive than conventional cost of construction. The building construction cost is about RM450 per sq.ft. I cannot imagine that being a</i></p>	<ul style="list-style-type: none"> <li>• Capital Expenditure (CapEx) of green building is too high (FM) – can increase first costs from 10-15%</li> <li>• Many FM are unqualified and have no knowledge to ensure good maintenance and optimal operation of advanced technologies. There is no Board of FM to control the situation (FM)</li> <li>• Many FM are ignorant in doing preventive maintenance especially</li> </ul>



conventional construction cost at all. For a RM450 or RM480 per sq.ft. of ZEO building, how can that be? 10% more than a conventional cost? I just not adapt that but also that is the government project. It is for showcase so that it is inflated to the extent that it is beyond what private entity would pay.

**So the showcase building built by the government should be less expensive?**

I agree, but then they say it is only 10% more. But of course the 10% more if might base is so high. So it costs 10%, it might be little but my base is low. Competitive base cost but then it is 40%, 60% or 100% more. So the issue here is... when we are talking about 10% or 15% more. **What is the base price that we are comparing with? And whose base price that we are talking about?**

**Did you find any problems with the level of awareness or level of knowledge among local facilities manager or demand from the developers on green buildings?**

Definitely. When the business is there, anybody tomorrow will become facility managers themselves. Can you imagine when I go for a tender in JKR, they have 60 companies calling themselves facilities managers and who they are? They are cleaners, they are air-cond contractors they are companies looking for money. Of course, the 'kepala' [Head or Board] makes the requirements but Malaysia doesn't have the 'kepala' for that facility management. So whoever knows about air-cond, you're the building cleaners, fire contractors, electrical contractors, you are qualified.

And as I've said, facility management ensures the built environment functions satisfactory. In order to do that, anything that is looking into the built environment, you need to have the key people, a pool of people with different expertise. **You need to have a processor to ensure the**

during the first 3 years of a building's life. This cause the building to go through major repairs, overhaul or replacement after 3 years of operation (FM)

- Many FM companies do not have proper checklist on how to ensure systematic maintenance of every part and component (FM)
- Many FM companies do not have basic processors to help them what they do and ensure repeatability (FM)
- Many consultants don't know what entails a good operation & maintenance (FM)



repeatability to ensure that the maintainability is always good, you ensure that the operability is always optimal. They want to ensure that people have the knowledge to adapt the technology.

As I've mentioned, a lot of so called FM companies do not even have a basic knowledge of how to service a functional split unit, let alone the advanced technology. You are talking about advanced technology, why? Because if I am getting a contract for a new building, things are new so they run okay. We don't even have to maintain them. A new car... if you do not maintain it, it will still run for the next 2 years with no problems. Government contracts, anybody who are knowing who who...you'll get the contract. But you don't need to maintain, it will still run. If you press the air-cond, you will have the air-cond. If you on the light, the light is there. But they do not have the in depth knowledge of operational detail equipment. They do not know how to do preventive maintenance. They do not even have the checklist on how to ensure systematic maintenance of every component and part. After 3 years contract expired, I can swear, when the entire major problems risen up, then you have another FM company to take over. But then your equipment is rotten, you need to overhaul. It is not an oil change anymore, not a minor repair. You are talking about overall replacement equipment. So yes we have many so called facility management companies but I would say many of them know nothing about FM. They don't even have the basic processors to help them what they do. Today I know this person, I'm going to form a company and get a few technicians and tomorrow we'll run. I start with a few repair works and that is what we call as a FM company. But we are not looking into long term in terms of energy conservation, sustainability, comfort and safety and this is sadly happening in Malaysia. We don't have the capacity in

<p><i>terms of FM; we don't have the knowledge of the technology being installed.</i></p> <p><i>You ask a lot of people for example air-conditioning, energy saving devices VAV, we look into the buildings, how many are functioning? Not functioning. In order to have the VAV to work, you must have a sensor working, the pressure working, the motor working; you must have the calibration. How many people know how to do it? So we have the most advanced technology but we don't have the people who know how to operate and maintain it. So we need to have a capacity building in the country, but how many people want to do it? It is a dirty job...needs to climb to the top, open up and check, calibrate the sensor, temperature sensor, calibrate pressure sensor, calibrate the motor. At this temperature sensor you are open 20%, which is a motorised control.</i></p> <p><i>Honestly, a lot of consultants do not even know what is O&amp;M. Of course they know but having lack of that hands-on of experiences. Going through the hassle of operations and maintenance is so huge and so cumbersome...so they do not know. But I think the industry is more open right now. (OCL-FM:412-486)</i></p>	
<p><i>Lack of awareness among building users or general public. Our electricity tariff is low. So people tend to waste energy. Political will is not there to make an immediate change to the way we practice. (KCD-FM:162-164)</i></p>	<ul style="list-style-type: none"> <li>• Lack of environmental awareness among building users (FM)</li> <li>• Electricity tariff is low – people tend to waste energy (FM)</li> <li>• No political will to an immediate change (FM)</li> </ul>
<p><i>One is to have the commitment of the top management to spend or invest more money on greening the building. Most of them worry so much on the economic returns. Payback period is too long.</i></p> <p><i>Mostly it is about the peoples' awareness and attitude. Lots of our tenants are unaware of the importance of conserving</i></p>	<ul style="list-style-type: none"> <li>• Lack of commitment from the top management to invest more money on greening the building (FM)</li> <li>• Lack of awareness and wrong attitude among tenants towards conserving energy and water and</li> </ul>

<p><i>energy and water and reducing waste. When there is small leakage, they ignore until small problem becomes a big problem. They produce lots of wastes. But our electricity tariff is very low, so people tend to waste energy.</i> (ZS-FM:196-202)</p>	<p>reducing waste (FM)</p> <ul style="list-style-type: none"> <li>• Electricity tariff is low – people tend to waste energy (FM)</li> </ul>
<p><b>TEXT</b> <span style="float: right;"><b>CODE (INDIVIDUAL)</b></span></p>	
<p><b>REGULATOR, POLICY MAKER &amp; GOVERNMENT PROJECT IMPLEMENTOR</b></p>	
<p><i>Lack of awareness and knowledge among people in JKR and ministries. When they have no awareness and knowledge, they don't give us their support. We are putting in some programs for sustainability, see how is their respond from the central agency? Very poor.</i> <i>... lack of understanding among the decision-makers who give approval or top management.</i> <i>People in JKR do not aware the impact of their wasteful practices. The total electricity bill in Block F for the whole year is around RM1million! They didn't know that. They didn't realize that they are acting wastefully. It is all about peoples' attitude. Maybe because our electricity tariff is very low, we receive a lot of subsidy from the government, our water is cheap. Selangor State Government even give the first few cubic metre of water free! People won't use efficiently if it is cheap or free. I even read in the newspaper a few days ago that Dato' Sri Muhyiddin Yassin and Dato' Shaziman want to bring down the tariff rate further! I totally don't agree!</i> <i>Similarly with people in LEO building. The building was designed to achieve 100kwh/m2/yr building index but the building didn't achieve that for a certain period of time after occupancy. It took so many months to build the right habits among the occupants. Before shifted to LEO buildings, the staffs were given awareness programs on the EE features in their new building as well as the dos and the don'ts. In</i></p>	<ul style="list-style-type: none"> <li>• Lack of awareness and knowledge among government officials (GPI)</li> <li>• Lack of understanding among the decision-makers or top management who give approvals (GPI)</li> <li>• Lack of awareness and wrong attitude among tenants towards conserving energy and water and reducing waste (GPI)</li> <li>• Electricity tariff is low. Water is cheap. People tend to waste (GPI)</li> <li>• Lack of knowledge in green/ sustainable design among government designers (GPI)</li> </ul>

<p><i>their old office rented at Jalan Semantan, they even had a demonstration office.</i></p> <p><i>Attitudes among JKR designers is also an issue. Sometimes, they feel that they are good enough and don't have to attend any trainings or seminars to increase their knowledge on green buildings. (CPK-PI:426-451)</i></p>	
<p><i>As far as the Government is concern, they always feel the cost implication. I think they are very sensitive with that. If they introduce something and there is a cost implication to the developer, public then they're a bit...</i></p> <p><i>The other major barrier is the market or the availability of equipment. If these are available locally, then there'll be no problem. If you put a regulation but you don't have the thing available, need to be imported...that is also an issue that is sensitive to the government. These equipments may not be available in the market because there is no demand. So it becomes like "chicken and egg" situation. So they have to promote it first, make sure everybody uses it, enough materials, then bring in the regulation. The promotion must be aggressive.</i></p> <p><b>So the first one is about the financial issue...</b></p> <p><i>Financial is definitely the issue. Like the UBBL, we want to include the energy efficiency, the Deputy Prime Ministry asked "what is the cost implication?" "You then must use a high efficiency motors? But is it available in the market?" If it is not available then it has to be imported. Then initially giving the subsidies or tax free and then withdrawing it. So these are the major barriers: the availability of equipments, materials and financial. I think the so called knowledge and awareness, generally people are aware but the costs always come first. (KSK-R/PM:236-251)</i></p> <p><i>Our LEO building has 8-10 years payback period. It is not acceptable by the developers. They want 2-3 years. In fact, yesterday I was talking to Bandaraya Development about</i></p>	<ul style="list-style-type: none"> <li>• Government always concern about financial issues in any decision-makings i.e. cost implication to the government and the industry (G)</li> <li>• To impose regulation on the use of energy efficient/ green products/ equipment is difficult because they are hardly available in the local market (G)</li> <li>• Electricity tariff is low making the payback period for green technology too long (G)</li> <li>• Suggestion: Government should aggressively promote the use of green technologies and ensure the widespread usage before imposing any regulation (G) – move to Q. 38</li> </ul>

<p>putting solar PV, they said “People tell me if I put solar PV if I get then higher tariff, higher CDM, I can make money”. Then I told him “Without any assistance, the payback period is around 50 years, if you have higher tariff, maybe can reduce to 15years. With CDM maybe can reduce to about 14 years.” So I said “You want to go green? The payback period is too long. The equipment is too expensive and our electricity tariff is cheap.” (KSK-R/PM:265-271)</p>	
<p>Most people are not clear with the reasons behind our guidelines and regulations. Most people tend to challenge them. Awareness on sustainability issues among industry players. (AMN-R/PM:195-197)</p>	<ul style="list-style-type: none"> <li>• Lack of understanding about sustainability issues among industry players (G)</li> </ul>
<p>We don't have any problem. Everything is there. People are willing to invest a bit more actually, because they know that it would at most 15-20% more of their investment value. But maybe the biggest barrier would be the lack of technical part. The technology is there, but we don't have the lower basic people who want to manufacture it, and the materials. So if we have to import from overseas, it wouldn't make any sense. It will not be called as sustainable. The technology is already there but we don't have the materials in Malaysia. Let say if you want to use fibre glass wool to insulate the roof... in Australia it is okay because it is locally available and everybody is using it. But in Malaysia nobody is producing it, so how can we force people to use it? If we have it, I am sure people would want to invest because public would start to realize the importance of it. (NN-R/PM:547-565)</p>	<ul style="list-style-type: none"> <li>• Government cannot force the industry to use green/ sustainable materials because many of them are not produced/ available locally (G)</li> </ul>
<p>Major barriers... I think is financial. For building construction, people always go for the minimum cost. So of course there will be a barrier in putting the environmental requirement, because it involves money. For example for the MS14000, less number of contractors goes for it,</p>	<ul style="list-style-type: none"> <li>• Cost issue: Green/ sustainable building is expensive (G)</li> <li>• MS14000 certification is very expensive – not popular among contractors (G)</li> </ul>

*because one of the things is ...to be certified it involves a lot of cost... RM15, 000 above .And to maintain the system you have to face several audits and you have to pay for all these things. So these are other factors that hinder the contractor going for MS14000. I think the main basically is the cost.*

**You were mentioning about your guidelines. These guidelines are actually voluntary, right?**

*Yes, they are voluntary. It depends on your level of awareness and your level of education. Maybe in your case, you've been studying overseas and you've seen good practices in sustainability there and you come back to Malaysia and try to practice it here. That level of awareness is still lacking among our professionals and builders. We want to survive in our local market because when we go for competitions, of course the ones that offer the lowest price will get the project. That is common. So contractors just cut whatever they can cut so they could offer the best price. Actually now, even though they have been saying that they don't go for the lowest bidder, but it doesn't happen. They still go for the lowest bidder. By right it shouldn't be that way. They should go for the lowest evaluated bidder. The word 'evaluated' should be there. But, as for now, they always go for the lowest bidder. If you are still using that kind of approach, definitely you won't get quality contractors or builders who are trying to do some good practices in the construction.*

**Do you (CIDB) facing any problem in encouraging the use of IBS?**

*Yes, we have problems. They said that it involves their capital costs because they need to have the mould and everything. But now the government has stepped in, the Ministry of Finance they had issued a circular to the government offices that the industry must use a certain*

- Lack of environmental awareness among professionals and builders (G)
- Projects are awarded to the lowest bidder and not to the lowest evaluated bidder. The lowest bidders may not be the good quality contractors doing sustainable practices (G)
- Initiative: Government has made it mandatory for government projects to use a certain percentage of IBS components (G) – move to Q. 38

<p>percentage of IBS components. Then it had works. Before that it didn't work. It still needs to be enforced. (MCA-PM:266-292)</p>	
<p>- The government's "culture" of granting subsidies, especially in keeping the energy prices "affordable" for the population &amp; for the industrial users to compete in the international market. Unfortunately, the subsidies only distorted further the advantage for the well-off over the have-nots.</p> <p>- Legislation, or rather, the lack of it to mandate EE or environmental preservation in building codes and standards. The MS 1525 guidelines for EE in non-residential buildings remain as just guidelines with no means of legislative enforcement for non-compliance.</p> <p>- Business community attitudes to make the most profits with the least investment, irrespective of any other penalties that may entail.</p> <p>- The (until recently) political disregard for the environment &amp; efficient use of natural resources, or "public interests", in the (mistaken) concern to be seen as being "business friendly". (GL-PM:277-289)</p>	<ul style="list-style-type: none"> <li>• Lack of legislation to mandate EE or environmental preservation in building codes and standards. Malaysian standards remain as guidelines with no means of legislative enforcement for non-compliance (G)</li> <li>• Business community attitudes to make the most profits with the least investment (G)</li> <li>• Political disregard for the environment and efficient use of natural resources (G)</li> </ul>

**Q.38 How would you suggest to lower those barriers in order to encourage building professionals/ builders/ facility managers/ building industry/ developers to adopt/develop more sustainable office building practices?**

TEXT	CODE (INDIVIDUAL)
<b>ARCHITECT:</b>	
<i>Have more seminars. Talk about it more. Media should play the major role to promote sustainability issues. Just like wearing seat belt for passages sitting at the back. People would do it only when the government makes it mandatory. Government should impose new developments to be green or sustainable. Otherwise people won't do it. Whatever government adopts is always the minimum. When the regulation covers just the minimum, people would only follow the minimum requirements. The rest...they couldn't care less. (KK-A:210-215)</i>	<ul style="list-style-type: none"> <li>• Conduct more seminars</li> <li>• Educate the public through various media</li> <li>• Make it mandatory</li> </ul>
<i>Actually maybe the clients, when they consider giving paperwork on feasibility study of a building, they should consider the economics. When they want to make a decision, they should do a feasibility study and a brief then comes out from it. The feasibility study should take into consideration of all aspects – social, cultural, investment cost after 5 years, during 5 years and then they should prioritize. If the investment cost is limited, then spread it. Have another budget after 5 years so that all these requirements can be spread. Maybe you don't invest now, you can invest it in 5 years time so all the original structure can be taken care of. Same like when you do the feasibility study of the future expansion of spaces. Feasibility study should be done in a holistic approach.</i>	<ul style="list-style-type: none"> <li>• Feasibility study should not only consider the economic issue but also the environmental, social and cultural issues. It should not only consider investment cost during 5 years but also 5 years after operation phase.</li> <li>• Conduct awareness programs on sustainability issues for owners and investors – i.e. general public.</li> </ul>
<b>Do you have any other suggestions?</b>	
<i>Like architects or consultants' training generally, we are</i>	

CODE (GROUPED)	CATEGORY
<b>From all 30 interviewees</b>	
<b>Final categorization see pg.89-95</b>	
<p><b>ACTIONS FOR EDUCATION SECTOR</b>  <u>Expand learning offerings</u></p> <ul style="list-style-type: none"> <li>• Give awareness and educate the young in schools (5x)</li> <li>• Integrate sustainable designs &amp; construction in architectural &amp; engineering education programs (2x)</li> </ul> <p><b>ACTIONS FOR THE PRIVATE SECTOR</b>  <u>Enable continued organisational learning</u></p> <ul style="list-style-type: none"> <li>• Conduct more in-house seminars &amp; trainings (2x)</li> <li>• Professionals to be more proactive in convincing their clients to adopt green principles</li> <li>• Educate the professionals through CPD programs</li> <li>• Ensure that the decision-makers of developer companies are the right</li> </ul>	<b>CAPACITY-BUILDING</b>



<p><i>trained to pick up any new things... This continuous learning is already in place. It is a matter of individual's choice and attitude. But there are no trainings available for building owners.</i></p> <p><b>They are the ones who should demand for green buildings...</b></p> <p><i>Even if they don't demand, they should be receptive. Meaning that if somebody suggests that they should go for this, they should say "ok, that sounds good" or "I want to contribute in social" or "I want to resolve the problems for the next 5 years and not just for now". So the priority list is to the building owners and the investors. In terms of their level of awareness, there should be a programme to increase their level of awareness on doing sustainable issues. (WS-A:296-317)</i></p>	
<p><i>Educate people. For the design professionals, we can run the CPD programs, but for the publics, we need to educate them by using different types of media. Most of the heat gain comes through our roof and yet we don't have any bylaw that states you need to have a minimum insulation on the roof. That's why we are pushing MS 1525 to be put in as a bylaw so you will not satisfy MS1525 if you don't have insulation on your roof. So that will be covering the bare minimum.</i></p> <p><b>When do you think that MS 1525 will be gazetted into bylaw?</b></p> <p><i>Since 2002, I've been involved...until now. They still talk, talk and talk. (CSA-A:346-353)</i></p>	<ul style="list-style-type: none"> <li>• Educate the professionals through CPD programs</li> <li>• Educate the public through various media</li> <li>• Conforming to MS1525 should be make mandatory</li> <li>• Review by-laws and regulations to accommodate the changes brought about by sustainable construction practices</li> </ul>

<p>ones to push for sustainability.</p> <p><b>ACTIONS FOR GOVERNMENT &amp; REGULATORY STAKEHOLDERS</b></p> <p><b><u>Introduce compulsory continued professional education</u></b></p> <ul style="list-style-type: none"> <li>• Make it part of the exam to be a professional consultant</li> <li>• CIDB to conduct more promotions on sustainability issues</li> <li>• Structure engineers' CPD points to include green/ sustainable building practices</li> <li>• Awareness programs for the tenants of government buildings</li> </ul> <p><b><u>Raise awareness among government officials and politicians</u></b></p> <ul style="list-style-type: none"> <li>• Capacity building among government designers</li> <li>• Educate Federal officials at all levels to be trained, motivated and involved in implementing actual green building procedures</li> <li>• Educate local authority officials</li> <li>• Malaysian government should ensure that the capacity is being built to ensure the right persons are managing their facilities</li> </ul> <p><b>ACTIONS FOR CLIENTS</b></p> <p><b><u>Develop own understanding of sustainability and the benefits of</u></b></p>	
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<i>Gives programs to increase their awareness, more incentives and better legislations. Conforming to MS1525 has to be made compulsory. (TLM-A:297-298)</i>	<ul style="list-style-type: none"> <li>Conforming to MS1525 should be made mandatory</li> </ul>
<i>A lot more research that needs to be done, with theoretical work, technical work and design competition work in order for us to design green. (KY-A:270-271)</i>	<ul style="list-style-type: none"> <li>Conduct more research</li> </ul>
<i>What PAM is trying to do is to tie up with some universities. Get the universities to buy in. It starts from the beginning. How you begin is how you end. If your education system does not promote it, becomes part and parcel of your design, no matter if you come from Princeton or you come from wherever, apart from doing the flying roofs and all the sinuous shapes and the graphics. The very bare minimum component that you need as a structure to your architecture. For me it starts from education system. Mandatory by the government only hitting the guys who are already in their 30s. It doesn't hit they guys who are 18 years old. You have to start green, you have to start from school. Hearing about climate change and how it affects them. Recycling in schools been just normal. Thinking of it a good way, thinking of it as a challenge instead of another burden. (SH-A:375-384)</i>	<ul style="list-style-type: none"> <li>Give awareness and educate the young in schools</li> <li>Integrate sustainable designs &amp; construction in architectural &amp; engineering education programs</li> <li>Make it mandatory</li> </ul>

<b>more sustainable choices</b>	
<ul style="list-style-type: none"> <li>Instil the feeling of respect to the environment via religious teachings</li> <li>Conduct awareness programs on sustainability issues for owners and investors – i.e. general public</li> <li>Educate the public through various media (7x)</li> </ul>	
<ul style="list-style-type: none"> <li>Make it mandatory (6x)</li> <li>Conforming to MS1525 should be made mandatory (2x)</li> <li>Amend the building codes</li> <li>Regulations will only come into effect when people are well-educated</li> <li>Make it mandatory e.g. office buildings to install rainwater harvesting system</li> <li>Local authorities to develop the capacity to make GBI mandatory</li> <li>Enforce the specification of materials that conform to Malaysian Standard</li> <li>Initiative: Government has made it mandatory for government projects to use a certain percentage of IBS components (G) – from Q. 37</li> <li>Enact necessary legislation and enforce for compliance with the relevant codes and standards</li> <li>Review by-laws and regulations to accommodate the changes</li> </ul>	<b>MANDATORY BY GOVERNMENT</b>

<p><i>Education from the young then promotions in the media. The other thing when they knocked when the electricity tariff is high so they don't have a choice. I remember once when the inflation was high, then they start green campaign, everybody planted vegetables at their backyard and after that, nothing. If a thing has to be done, do it regularly. Government bodies always depend on the one at the top. If the top management people are passionate about this issue, make sure the subordinates follow. All organizations depend on their superiors and whoever replaces him must follows through old policies on top of your new policies, then there is continuity.</i></p> <p><b>What do you suggest to lower that barrier of understanding among the clients?</b></p> <p><i>Awareness. Rating system is a hot topic among clients now because foreign investors are asking for it. If the foreigners do not bother, nobody would care. (SA-A:423-433)</i></p>	<ul style="list-style-type: none"> <li>• Give awareness and educate the young in schools</li> <li>• Educate the public through various media</li> <li>• Educate Federal officials at all levels to them trained, motivated and involved in implementing actual green building procedures.</li> <li>• Consultants to promote building rating system to clients</li> </ul>
<p><i>The education systems and the awareness programmes. (LCH-A:361)</i></p>	<ul style="list-style-type: none"> <li>• Give awareness and educate the young in schools</li> <li>• Educate the public through various media</li> </ul>
<p><i>- Change the building codes.</i></p> <p><i>- Change the local authority officials. Melaka City Hall has started putting mandatory requirement for rainwater harvesting for housing projects. Make it mandatory, that's how it should be. (NB-A:234-237)</i></p>	<ul style="list-style-type: none"> <li>• Amend the building codes</li> <li>• Educate local authority officials</li> <li>• Make it mandatory</li> </ul>
<b>TEXT</b>	<b>CODE (INDIVIDUAL)</b>
<b>ENGINEER &amp; ENVIRONMENTAL CONSULTANT:</b>	

<p>brought about by sustainable construction practices</p> <ul style="list-style-type: none"> <li>• Professional fee system to be revised</li> </ul>	
<ul style="list-style-type: none"> <li>• Need more innovative high end developers (both private and public) who are willing to add another percentage of investment cost to develop green buildings (new or retrofitted) to find out whether green buildings can increase rental value.</li> <li>• More developers must be willing to develop showcase buildings and publish their economic and social benefits for others to learn.</li> <li>• Need high end developers who are willing to deliver green properties to demonstrate that they can be sold quickly – so others will follow suit.</li> </ul>	<b>CHAMPION DEVELOPERS</b>
<ul style="list-style-type: none"> <li>• CIDB to conduct courses and trainings for labours level 1,2 &amp; 3; Professional organizations to conduct courses and trainings for management level 4 &amp; 5</li> <li>• Government to develop more examples buildings in the next 5-10 years.</li> <li>• Government to give support to NGOs</li> </ul>	<b>COLLABORATIVE EFFORTS</b>
<b>CODE (GROUPED)</b>	<b>CATEGORY</b>

<p><i>Engineers have CPD points but they are structured wrongly. They have to be restructured. Another one is quite sensitive. I suggested that 50% of the board members should be elected not appointed. Right now, who are there? No academics, all practitioners. You go to IEM blog site, my wish list is all there. It's all published. My 20-year-old devils still going on, we cannot improve. The time when we don't change the minister, we cannot improve. Now when we've changed the minister, they say government not moving yet. If we get the wrong people, stifling it, we are in trouble. Just like CIDB [Construction Industry Development Board] also wrong people running it and not moving properly. Even my GBI, I am trying to help CIDB, you know what? They said, you want points for what? QLASSIC, construction quality! We sat in the committee, how are you promoting it? I am not forcing it, you must subscribe and we give you the points.</i></p> <p><b>I haven't heard about QLASSIC but I've heard about Singaporean CONQUAS...</b></p> <p><i>So nobody has heard about it, so what have they been doing all these years? It is a bit shocking, isn't it? Where is the promotion? I went to the meeting, I waited for half-an-hour, nobody turned up! It was supposed to be 2-day session, in the end only half-day session, finished! I criticized CIDB so many times, I was black-listed once. But to improve they came to me</i></p>	<ul style="list-style-type: none"> <li>• Structure engineers' CPD points to include green/ sustainable building practices</li> <li>• CIDB to conduct courses and trainings for labours level 1,2 &amp; 3; Professional organizations to conduct courses and trainings for management level 4 &amp; 5</li> <li>• CIDB to conduct more promotions on sustainability issues</li> <li>• Professional fee system to be revised</li> </ul>	<ul style="list-style-type: none"> <li>• Adopt advanced technology when the capacity i.e. expertise and financial to operate and maintain is available</li> <li>• Ensure with advanced technology equipments are supplied with detailed operation and maintenance manuals and examine them before purchasing.</li> <li>• Provide detailed operation and maintenance manual for every advanced technology equipment installed in the building to the building owner.</li> <li>• Don't adopt a unique technology with no other common/ comparative components/parts (services and parts can be obtained from other brands) OR building owners to lock in spare parts costs for the next 5 years</li> <li>• Stop importing the non-efficient or below par equipments.</li> </ul>	<p><b>OPERATIONAL EFFICIENCY OF BUILDING SYSTEMS</b></p>
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<p><i>when I wrote a long letter. In those days, I was telling them, "Please stop conducting courses for level-4 and 5 management level, leave it to the industry. Go straight off to level 1,2 and 3, they are still the labours. You can't get that right, why you want to talk about the management level?" They want to invite the industry to come for a 7-day-brainstorming session in a resort, all paid for. You waste my time! You think our time is not money? Save the money. Use the money to outsource someone to write something and then assemble people for half-a-day to comment. Don't waste your money and retreat. You go to retreat, how many people do work? I criticize them to outsource it. (CTL-ME:592-615)</i></p> <p><i>The Board [Board of Engineers] must restructure to make sure people understand that we have to be a serious consultant. Our aim should be the public interest because the public is at stake and you have to protect it. Only the serious players should be there. Then we can move better.</i></p> <p><i>Professional fees, like I say the board doesn't enforce it, there is a lot of under-cuttings. That's where if you undercut and undercut, how can you deliver? You can survive only. So make sure that people who are allowed to practice understand their responsibilities and do justice to the environment. Otherwise, if you cut, cut, cut, no way you're going to bother because you just deliver.</i></p>		<ul style="list-style-type: none"> <li>• Create awareness by promoting green products</li> <li>• Market the green buildings. This marketing campaign should create a "brand" or identity for sustainable building to incorporate this concept into everyday life for the building industry and general public.</li> <li>• Frequent promotional campaign on a national basis to inform the public on the benefits in the long run.</li> <li>• Consultants to promote building rating system to clients</li> <li>• Suggestion: Government should aggressively promote the use of green technologies and ensure the widespread usage before imposing any regulation (G) – from Q. 37</li> </ul>	<p><b>PROMOTION &amp; MARKETING</b></p>
<p><i>The government has to make a law for it, make it mandatory. Like JKR, they have the minimum standard of MS 1525, it is really good. We have sat down together and discuss whatever that is good for the industries. Even they want the public opinion; I think the public are willing to. (NYK-ME:377-380)</i></p>	<ul style="list-style-type: none"> <li>• Make it mandatory</li> </ul>	<ul style="list-style-type: none"> <li>• Create awareness by giving incentives (4x)</li> <li>• Tax deduction on capital investment for building owners on the implementation.</li> <li>• Abolish duties on renewable energy related products</li> <li>• Developers make use of government incentives to reduce</li> </ul>	<p><b>ECONOMIC INCENTIVES</b></p>

		<p>their CapEx</p> <ul style="list-style-type: none"> <li>Do more aggressive promotions with rebates on more expensive energy efficient/green items – to encourage the public to use them.</li> </ul>	
<p><i>We need more innovative developers who are willing to test the market. Those developers who want to build new green buildings, they want to be the best, they want to be highest top of the top. So their buildings will become so expensive because they are putting all the best things into their buildings. That is the perceptions. But old buildings, we can make them green, for example, this building itself which we have turned this part here to be green without much cost increase at all. It can be done. Now the question is, is there any champion in that area? Let's put it in the low-cost things in... make it green... maybe add another 8% investment in it and see if people will rent it 20% more rental.</i></p> <p><b>When that developer become champion then...</b></p> <p><i>Then everybody starts to copy it. Everybody will say "okay, I am willing to invest 5 million more in this building and then I can get so much more rental up." So much better when they found out that green buildings can increase their rental value. We need to find a demonstration project. Old building...</i></p>	<ul style="list-style-type: none"> <li>Need more innovative high end developers (both private and public) who are willing to add another percentage of investment cost to develop green buildings (new or retrofitted) to find out whether green buildings can increase rental value.</li> <li>Government to develop more examples buildings in the next 5-10 years.</li> </ul>	<ul style="list-style-type: none"> <li>Conduct more research</li> <li>Need for credible evidence of the advantages of green to support green clients and convert new ones e.g. local case studies (2X)</li> <li>Conduct life cycle analysis before adopting advanced technologies</li> <li>Feasibility study should not only consider the economic issue but also the environmental, social and cultural issues. It should not only consider investment cost during 5 years but also 5 years after operation phase.</li> </ul>	<p><b>RESEARCH/STUDY</b></p>

<p>spruce it up to a green building.</p> <p><b>Do you think that this should be done by the private sector or the government?</b></p> <p><i>Both. Okay in Malaysia private sectors and government sectors are widely divided. What do you do in government sectors may not be translated in the private sector very well and what you do in private sector cannot be translated by the government very well. So we have to have a champion in both sides. But I think the government side it is easier to be done because they're supports from UNDP to push for these things. So there will be a project coming up by UNDP to push the Government to go through this route where they would do part of a co-funding. They [UNDP] are funding almost 50% of the cost. Government side I'm not too worry. Just wait for all these things to progress on and there will be example buildings coming up in the next 5 to 10 years. It is the private sector that is very difficult to commit right now – to find the champion developer.</i></p> <p>(CKT-EC:461-484)</p>	
TEXT	CODE (INDIVIDUAL)
BUILDER & BUILDER-DEVELOPER:	
<p><i>To create awareness by incentives, product knowledge and legislation. (SA-B/D:202)</i></p>	<ul style="list-style-type: none"> <li>• Create awareness by giving incentives</li> <li>• Create awareness by promoting green products</li> <li>• Make it mandatory</li> </ul>
<p><i>Education – So we have to start teaching our children the importance of the environment. Start instilling it from the kindergarten. Not when they've started working and the boss telling them about it. The religious teachings for what ever religion, they must not talk on religion and politics only. They must also preach and instil the importance on sustainability issues to show the respect to our environment so that we as</i></p>	<ul style="list-style-type: none"> <li>• Give awareness and educate the young in schools</li> <li>• Instil the feeling of respect to the environment via religious teachings</li> <li>• Regulations will only come into effect when people are well-</li> </ul>

<ul style="list-style-type: none"> <li>• Make energy prices to reflect the market values (2x)</li> </ul>	<p><b>REDUCE SUBSIDY</b></p>
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<p><i>human will be able to take it to our system. Sometimes when we just impose regulations, people just ignore.</i></p> <p><i>Regulations will only come into effect when people are well-educated. They know this is not to disallow them making more money; it is to save our children and our children's children.</i></p> <p><i>Certain people are benefiting from reporting it. Everybody wants the name for themselves. They are not sincerely doing it. There are also good people in this country who are really working hard towards it like NGOs. But they are not given the right platform and support. Government should sit with them together because these people have nothing to gain from it e.g. monetary or whatsoever. (JD-B:432-444)</i></p>	<p>educated.</p> <ul style="list-style-type: none"> <li>• Government to give support to NGOs</li> </ul>
<p><i>Branding may work in our local context. Just like people say, "Oh...I've got a green building." With the plaque displayed on the wall and the building is widely spread in the media. That would be the driving force for developers and property owners to go for green or sustainable building. Singapore is government controlled and government push. Here is difficult. (TYT-B:319-322)</i></p>	<ul style="list-style-type: none"> <li>• Market the green buildings. This marketing campaign should create a "brand" or identity for sustainable building to incorporate this concept into everyday life for the building industry and general public.</li> </ul>
<p><b>TEXT</b> <span style="float: right;"><b>CODE (INDIVIDUAL)</b></span></p>	
<p><b>DEVELOPER, OWNER &amp; DEVELOPER-OWNER:</b></p>	
<p><i>For the investors or the public with money, they should be given scientific data showing the benefits of a green building to different level of people.</i></p> <p><i>The professionals especially the architects have to play the right role. They should be aware of green issues because they are the ones who design the buildings, convince the clients. So architectural education should include sustainability issues. (NA-D:224-228)</i></p>	<ul style="list-style-type: none"> <li>• Need for credible evidence of the advantages of green to support green clients and convert new ones e.g. local case studies</li> <li>• Integrate sustainable designs &amp; construction in architectural &amp; engineering education programs</li> </ul>
<p><i>This is quite tough unless for whatever reasons you manage to persuade one big developer to do green buildings with the cutting-edge technologies installed. Then you do a study in terms of how much the monthly bills are, how productive the</i></p>	<ul style="list-style-type: none"> <li>• Need for credible evidence of the advantages of green to support green clients and convert new ones e.g. local case studies</li> </ul>



<p><i>workers are, how fast the buildings are occupied, how satisfied the tenants are...you declare them. You invite people to go in the buildings and what ever. I think that is very good start. Show some proofs to the public. Have some solid data to convince people. If there's somebody who can sponsor this, it is even better. There is no point saying without proof. Equipments cost millions not hundreds.</i></p> <p><b>There should be the awareness programme in the media or something?</b></p> <p><i>That's right, maybe seminars and etc. Even better if you do a study on green office buildings in Malaysia, not outside Malaysia because we know our climate, we know our needs, our demand. If you want to tailor your own clothes and you measure on other person's body, it will not fit you.</i></p> <p>(MM-D:416-429)</p>	<ul style="list-style-type: none"> <li>• Educate the public through various media</li> <li>• Conduct more seminars</li> </ul>
<p><i>Frequent promotional campaign on a national basis to inform the public on the benefits in the long run.</i></p> <p><i>Tax deduction on capital investment for building owners on the implementation.</i></p> <p><i>Abolish duties on renewable energy related products</i></p> <p>(BTC-D:236-239)</p>	<ul style="list-style-type: none"> <li>• Frequent promotional campaign on a national basis to inform the public on the benefits in the long run.</li> <li>• Tax deduction on capital investment for building owners on the implementation.</li> <li>• Abolish duties on renewable energy related products</li> </ul>
<p><i>...Elsewhere, in Singapore, it is a sin to use treated water for flushing toilets. They can do it over there why can't we do it here? If you talking about maintenance, office building is easier to do it because there is more flushing water compared to drinking water. Drinking water is always come through tank thing then it fixed to the dispenser, hot or cool, things like that. So people don't really drink the treated water in office. So that is the easiest way that you can implement – rainwater harvesting. Rainwater harvesting failed because of</i></p>	<ul style="list-style-type: none"> <li>• Make it mandatory e.g. office buildings to install rainwater harvesting system</li> <li>• Educate the public through various media e.g. reasons behind and eventual agenda of recycling</li> <li>• Make it part of the exam to be a professional consultant.</li> </ul>

*maintenance. People always said “How do you maintain it?” Any corporate buildings now have a facility management company who manage it, so you can just call them to do contract to maintain it. So what is so difficult about it? If Singapore can do it, I can’t believe that we can’t do it. Because of the pressing issue, you just have to make it a law. That may sound harsh but so as the wearing seatbelt, just do it! Because the authorities are not serious about it, so you can forever pitching about it and forget about it. Only people who are passionate about it will do it. Let alone that we don’t get anything out of doing it, so make it a law. That’s better. And knowledge, I suppose, you must suppose to put it on media. I see the government advertisement, it’s more on the awareness on cleanliness to avoid breeding mosquitoes, and there’s a lot of advertisements about eating well etc. etc. There are some on recycle but they never tell what is the eventual agenda for doing recycle. What is it that you want people to recycle? They never really tell that, just said the blue bin, the red bin, the green bin are for all these things. Try to put our papers in the right bin etc. etc. Not only they never put the bins adequately, they also never tell eventually what it is for. Public have to be educated through the media. Reduce all these nonsense drama and push this forward really serious, otherwise we know that you are not interested in this as well... And of course the consultants, you have to make it part of exam to be a professional. I mean PAM Part 3 exam, put in something about environment or sustainability. So they must be aware of it. So, when they submit their case study, every students who are aspired architects want-to-be and when they sit for the professional final exam, ask them to pass a case report on making a green building or sustainable building or something like that. Make it as a part, why not? They are going to read about their project anyway. Ask them to write about one feature of a green office project like the questions you asked me earlier. Of course schools teach green issues*

<p>as part of their syllabus. (WR-D/O:822-856)</p>	
<p><i>But the people who believe in doing something are not the decision makers at the moment but they will be the decision makers in the future. Existing generation of developers will have for that generation. The demand for green buildings is there but it just won't happen. The same thing for us because we drive it from the top. It is much easier that way. If we didn't drive it from the top and we left it to the middle management people to do these things, it won't come up...And ultimately it will go down to dollars and cents. If let say I'm the finance manager in a company that is looking for a space. So what if I go for a green building? What does it mean to me? I would be thinking about a way to save money and increase productivity. That's the difference between low energy and green building. The green building is designed to increase productivity. They won't know it, they won't feel it immediately after occupying the building. So decided to be the first to do it, it is a showcase or case study building. That's why I'm saying when GBI comes down and all that, people would find it difficult unless they see the benefits of it [which can be proved by our building once completed and occupied]. (CN-D/O:353-369)</i></p>	<ul style="list-style-type: none"> <li>• Ensure that the decision-makers of developer companies are the right ones to push for sustainability.</li> <li>• More developers must be willing to develop showcase buildings and publish their economic and social benefits for others to learn.</li> </ul>
<p><b>TEXT</b> <b>FACILITY MANAGER:</b></p>	<p><b>CODE (INDIVIDUAL)</b></p>
<p>Government should give incentives for these. (NM-FM:180)</p>	<ul style="list-style-type: none"> <li>• Create awareness by giving incentives</li> </ul>

### **Aren't there any manuals for them to refer to in operating and maintaining the technology that has been installed?**

*There have the manuals, but then you know people who install do not know that. For example, in one that the buildings that we manage, it has the most advanced UPS. Even the local agents do not know how to maintain them. I looked the manual and our managers sat down, it says maintenance free, but how can that be? When you have a rotating equipment how can it be maintenance free.*

*And when you ask the local one, they don't know how to maintain because the locals are only the reseller; an agent of 1 or 2 persons and they come from overseas. And when you look at the manual, you'll see maintenance is nothing. So our engineers look at it. Lubrication is required. They need to put helium to cool the system. It is a very advanced technology with precision. It is not a normal operation we are talking about. It can be the only one in Malaysia for the government project. Then they will present maintenance free but it is so delicate that you are using helium gas to cool it down. The book will tell you maintenance free; nothing to maintain. You know any rotating equipment needs lubrication. You need to ensure oil level is checked every day and every week it is topping up to ensure the helium level is always correct and no leakage. And how can rotating equipment be air-tight or air-sealed for 5 years? Of course we believe it didn't work. And one day, a leakage problem appeared. The local agency had to take their people from overseas to come. And that repair cost them about RM50-60K.*

*Again the issue here is that we adopt the latest technology but we don't have the capacity.*

*Secondly, we adopt a technology that is so unique, that you know there are no other common parts. So we are at the mercy to be slaughtered for our efficiency... So the issue of the technology, I advocate that we should use that technology*

- Adopt advanced technology when the capacity i.e. expertise and financial to operate and maintain is available
- Ensure with advanced technology equipments are supplied with detailed operation and maintenance manuals and examine them before purchasing.
- Provide detailed operation and maintenance manual for every advanced technology equipment installed in the building to the building owner.
- Don't adopt a unique technology with no other common/comparative components/parts (services and parts can be obtained from other brands) OR building owners to lock in spare parts costs for the next 5 years
- Conduct life cycle analysis before adopting advanced technologies
- Developers make use of government incentives to reduce their CapEx
- Malaysian government should ensure that the capacity is being built to ensure the right persons are managing their facilities.

<p><i>having not the only one. You have other brands that you can obtain the services and parts from. Just like a car; you can buy parts from “Borsch”, from “Philips” or whatever, you can change the tyre from different brands. So when we look into the lifecycle analysis, it is very important even before we adopt the technology. Do they have comparative component?</i></p> <p><i>Thirdly, it is very important to ask “If don’t have, can I look into other equipment?” If they have no choice, that the only one we have, then we need to ask them to lock in the spare parts costs for the next 5 years. Prices are fluctuating so much and companies are wasting a lot of money for that purpose. So I think that the capacity issue...we don’t have adequate people, having that kind of knowledge and expertise. One thing when you do maintenance, maintenance is not everybody’s job. It is a dirty job. Malaysian government should ensure that the capacity is being built to ensure the right persons are managing their facilities. Of course they can train more and more and I’m not talking about monopolizing. The market is free. They have to get the right people to do the right job.</i></p> <p><b>You were mentioning about the CapEx issue, are there any actions that should be taken?</b></p> <p><i>I think they should be using the government’s incentives.</i> (OCL-FM:503-544)</p>	
<p><i>We have been doing energy programs for so many years. We advertise on TV to increase public awareness. I am not sure what should we do about our low electricity tariff. Our income per capita is low compared to developed countries. The poor ones would suffer if we increase our electricity tariff. (KCD-FM:167-170)</i></p>	<ul style="list-style-type: none"> <li>•</li> </ul>
<p><i>Both government and private sectors should play an active role. Government can give incentives like tax reduction to developers to come up with sustainable buildings and infrastructure. Educating people to be aware of green issues is something that both sectors should do. Not all benefits of</i></p>	<ul style="list-style-type: none"> <li>• Create awareness by giving incentives</li> <li>• Give awareness and educate the young in schools</li> </ul>

<p><i>sustainable buildings are direct i.e. minimum long term operation cost. Some are indirect like enhancing productivity. So education, awareness program should be given emphasized. (ZS-FM:205-210)</i></p>	<ul style="list-style-type: none"> <li>Educate the public through various media</li> </ul>
TEXT	CODE (INDIVIDUAL)
REGULATOR, POLICY MAKER & GOVERNMENT PROJECT IMPLEMENTOR	
<p><i>We have been giving an awareness programs to people in JKR to make them understand the impact of wasteful practices, to make them understand that they have the control to reduce waste. The capacity building among JKR designers is also important. Elements like passive design and other basic principles of green or sustainable buildings should be adopted. (CPK-PI:454-457)</i></p>	<ul style="list-style-type: none"> <li>Awareness programs for the tenants of government buildings</li> <li>Capacity building among government designers</li> </ul>
<p><i>We always say that there should be aggressive promotions with rebates. You use this and that, you import then you get rebates for this. Just like buying refrigerators. Of course the higher efficiency refrigerators cost higher than the normal one. If you buy the higher efficiency ones, you'll get RM200 or RM300 in return. You show that you've bought it, either you get through the government or you get through your tax, that's how they implement. There should be promotions with rebates so that people will use them. Once they use, they'll realize the benefits. They won't feel the pinch of paying a bit more. Definitely have to be that friendly approach. Then the market will pick up.</i></p> <p><i>The other thing is stop importing the non-efficient or below par equipments. A lot of things being dumped here in Malaysia. For example, this bulb is cheaper than that bulb, so I'll buy this bulb. So many water pumps are coming in, but nobody looks at the higher efficiency ones.</i></p> <p>(KSK-R/PM:254-264)</p>	<ul style="list-style-type: none"> <li>Do more aggressive promotions with rebates on more expensive energy efficient/green items – to encourage the public to use them.</li> <li>Stop importing the non-efficient or below par equipments.</li> <li>Make energy prices to reflect the market values</li> <li>Suggestion: Government should aggressively promote the use of green technologies and ensure the widespread usage before imposing any regulation (G) – from Q. 37</li> </ul>
<p><i>Have our guidelines gazetted in the Uniform Building By-Law.</i></p>	<ul style="list-style-type: none"> <li>Make it mandatory</li> </ul>

<p><i>This is still under planning stage. (AMN-R/PM:200)</i></p> <p><i>We are hoping that there are higher end developers who could provide assurance to the public by showing that green properties can be sold quickly. When other developers see this, hopefully they will follow suit. We will start with the smaller industry for providing the materials for green building. Slowly the people will learn from it, unless DBKL make it mandatory for buildings to follow GBI 100%, then it would be different. Although DBKL doesn't ask to follow the GBI, we are going to look into the technical provision and we have always been anyway. The quantity of glass, the type of roof that you use, the size of the building compared to the green area around it are all in our existing planning requirements which still help towards approaching a green building. So GBI is for those who want the rating. It's not within the capacity of DBKL to force the rating. To make sure sustainable/green architecture, we provide the guidelines which is quite good for a start.</i></p> <p><i>(NN-R/PM:568-578)</i></p>	<ul style="list-style-type: none"> <li>• Need high end developers who are willing to deliver green properties to demonstrate that they can be sold quickly – so others will follow suit.</li> <li>• Local authorities to develop the capacity to make GBI mandatory</li> </ul>
<p><i>I think the government should provide some kind of incentives. And I think again create the awareness. That is the common term that we used. Promote...create awareness...promote...create awareness [chuckles]. Now, we are going to enforce the using of building materials that conform to Malaysian Standard and to make it mandatory. For example, for an architect, you are specifying sanitary ware or sanitary tile in your drawings. So whatever tiles that you've specified, you must also mention all the standards related. But to make it mandatory, the common terms come up again are...we must educate... create awareness... we have to give incentives.</i></p> <p><b>Did SIRIM [Standards writing organization] actually identify that kind of materials?</b></p> <p><i>MITI [Ministry of International Trade and Industry] would</i></p>	<ul style="list-style-type: none"> <li>• Create awareness by giving incentives</li> <li>• Enforce the specification of materials that conform to Malaysian Standard</li> <li>• Initiative: Government has made it mandatory for government projects to use a certain percentage of IBS components (G) – from Q. 37</li> </ul>

<p><i>identify them and then when they announce it as mandatory, they will pass it over to us and we will put it under our act. And then we will implement and enforce it.</i></p> <p>(MCA-PM:295-306)</p>	
<p><i>- The government has granted adequate fiscal incentives to make green features economically attractive for owner/developers. It is now the time for the professionals to be more proactive in convincing their clients to adopt the respective green principles for sustainable development trends for national interests &amp; their clients' economic benefits.</i></p> <p><i>- Lack of legislation is still a great chasm. Enactment of the necessary legislation and stringent enforcement for compliance with the relevant codes &amp; standards for sustainable development is critical.</i></p> <p><i>- One simple, but maybe politically unpalatable, option is to make energy prices reflect the market values &amp; give direct subsidy support to the have-nots who deserve the support.</i></p> <p>(GL-PM:292-300)</p>	<ul style="list-style-type: none"> <li>• Professionals to be more proactive in convincing their clients to adopt green principles</li> <li>• Enact necessary legislation and enforce for compliance with the relevant codes and standards</li> <li>• Make energy prices to reflect the market values</li> </ul>



**Q.39 What suggestions do you have to promote 'sustainability' in the Malaysian office building industry?**

TEXT	CODE (INDIVIDUAL)	CODE (GROUPED)	CATEGORY
<b>ARCHITECT:</b>		<b>From all 30 interviewees</b>	
<p>Government should give incentives to the industry. Create design competitions for sustainable building projects. Give awards to green buildings based on their score using rating system. Hopefully Green Building Council would do something. Education at university level so that green is inculcated from the earlier stage in architectural education. Create environmental awareness among the younger generation. (KK-A:218-223)</p>	<ul style="list-style-type: none"> <li>• Give incentives to the industry</li> <li>• Create more design competitions</li> <li>• Recognize &amp; reward green buildings based on merits using rating system</li> <li>• Integrate sustainable designs &amp; construction in architectural &amp; engineering education programs</li> <li>• Give awareness and educate the young in schools</li> </ul>	<p><b>Final categorization see pg.89-95</b></p> <ul style="list-style-type: none"> <li>• Give awareness and educate the young in schools (3x)</li> <li>• Education - at the school, university and corporate levels (3x)</li> <li>• Integrate sustainable designs &amp; construction in architectural &amp; engineering education programs (2x)</li> <li>• CPD programs for the professionals</li> <li>• Re-educate the professionals through CPD programs</li> <li>• Create awareness among building tenants</li> <li>• Create more design competitions</li> <li>• Cultivate the importance of sustainable development in education and media</li> <li>• Educate the public about the existing incentives through various media (2x)</li> <li>• Government to educate the public about green/sustainable buildings through various media</li> <li>• Government to sort out which ministry to champion in sustainability related to the building industry – to promote and give awareness on GBI</li> </ul>	<b>EDUCATION</b>
<p>I think the government should practice it first. The main reason is that the building investors, if in Malaysia, they play the biggest role; they spend the most money as an organization, they spend most money in the industry... <b>Only then private sector will follow?</b> Private sector will follow...for example in Australia, they do it because of branding, so that they can sell their properties higher. Generally people will misinterpret that into value or money. To me, the way I look at it is the capitalizing. They do it because they have something to sell, they have an edge over the rest because their building is sustainable or whatsoever, they consider social impact of the future, all those things make them nicer people, therefore their properties should be higher in value. So in a sense it is insincere. You don't do it because you are really concerned but because of you can sell higher or you can make more profits. So the thing to look for, or not to look for or to watch out for. So makes sure whatever we do here, make sure the sustainable issues or green issues are not a brand. It is</p>	<ul style="list-style-type: none"> <li>• Government should practice it seriously first</li> </ul>		

<i>not just for name, no sincerity, being capitalized which is a normal human behaviour. (WS-A:320-335)</i>	
<i>I don't think this is the part of the Government. It is the designers who make the final decisions on how we do certain things. So the architects and designers... they are the ones who need to back up. We do have a lot of education regarding this matter during our university base but sometimes the education is a little bit lopsided toward temperate climate. So, sometimes when I do CPD lectures to the architects in Malaysia, I find that they have this tendency to think back to temperate climate. They fail to realize that we are not in a temperate climate; we are in tropical climate, so the sun is not your friend anymore, it is our biggest enemy. So I find out that a lot of architects who are trained overseas, they still have that temperate hang up so our education need to jack up a few steps to re-educate our architects. (CSA-A:356-364)</i>	<ul style="list-style-type: none"> <li>• CPD programs for the professionals</li> </ul>
<i>Since we have done GBI, we have to push GBI as far as we can and then Government must give incentives and provide guidance and clear policy to support this direction and eventually legislation. (TLM-A:301-303)</i>	<ul style="list-style-type: none"> <li>• Promote the adoption of GBI</li> <li>• Give incentives to the industry</li> <li>• Government to provide guidance, clear policy &amp; eventually legislation</li> </ul>
<i>Education, both at the university level and the corporate level. (KY-A:274)</i>	<ul style="list-style-type: none"> <li>• Education, both at the university level and the corporate level</li> </ul>

<p>to the public and industry players</p> <ul style="list-style-type: none"> <li>• MGBC (non-government and non-profit driven organization) needs to give the public awareness, media and trainings to make sure people are well-trained and understand the rating system i.e. GBI.</li> <li>• Professional bodies to collaborate with REHDA to conduct awareness and educational programs for the developers</li> <li>• Professional bodies to conduct regular awareness and educational programs for the professionals</li> </ul>	
<ul style="list-style-type: none"> <li>• Recognize &amp; reward green buildings based on merits using rating system (2x)</li> <li>• GBI would promote sustainability but the government is still not ready to make it mandatory.</li> </ul>	<b>METRICS/ ASSESSMENT METHODS &amp; RECOGNITION</b>

<p><i>I think the Government should make the GBI mandatory.</i>  <b>So basically you are saying that GBI can promote sustainability in the industry?</b></p> <p><i>Green buildings are only 5% of the total construction and they are maybe just in new buildings. So you just have to wait for a couple more years before the 5% to become sustainable that will come because of the global environment making you have to be sustainable. It always has to come through a crisis. A sustained crisis. Not a momentary crisis. (SH-A:387-392)</i></p>	<ul style="list-style-type: none"> <li>• Make GBI mandatory</li> </ul>	<ul style="list-style-type: none"> <li>• Give incentives based on the building's green certification</li> <li>• Green building rated during design phase must be audited upon completion to maintain rating</li> <li>• Implement a simple building rating system</li> <li>• Promote the adoption of GBI</li> </ul> <p><b><u>Mandatory adoption</u></b></p> <ul style="list-style-type: none"> <li>• Make green building rating mandatory (4x)</li> <li>• Make green building rating system mandatory or have it endorsed by the government and given to a certain agency to implement and then make it mandatory.</li> <li>• Building rating system to be implemented and enforced by the government</li> <li>• Merit point system to building design prior to approval by local authorities</li> </ul>	
<p><i>At the moment GBI is privately driven. We were debated on how actually to get the government's support because in Malaysia there is no one agency that is looking into it, there are multiple of agencies. So if somebody asked, then I'll say... you get the PM [Prime Minister] or the MOF [Minister of Finance] because if go for MECW [Ministry of Energy, Water &amp; Communication], that ministry only concerns the energy and water, what about other aspects? Certain aspect is under Ministry of Housing &amp; Local Government, certain aspect is under Ministry of Environment and Natural Resources and etc.</i></p> <p><b>So do you think GBI is something that can promote sustainability in this industry?</b></p> <p><i>Yes, we have to do that. Hopefully we can get support from one agency which they can do the promotion and awareness among the public and industry players and subsequently mandatory because if it is mandatory and not being enforced, it becomes useless. (SA-A:438-448)</i></p>	<ul style="list-style-type: none"> <li>• Government to sort out which ministry to champion in sustainability related to the building industry – to promote and give awareness on GBI to the public and industry players</li> </ul>		
<p><i>Firstly for instance the Malaysia Standard of Energy Efficiency MS1525, we have been pushing it to be gazetted in the Uniform Building Bylaw 1984 and it has gone through a very tedious process and a lot of red tapes. The only suggestion [I have] is that perhaps the government should</i></p>	<ul style="list-style-type: none"> <li>• Reduce bureaucracy red tape to have green/sustainability principles as mandatory requirement</li> <li>• Educate the public about the existing incentives through various media</li> </ul>	<ul style="list-style-type: none"> <li>• Government to provide guidance, clear policy &amp; eventually legislation</li> <li>• Reduce bureaucracy red tape to have green/sustainability principles as mandatory requirement</li> </ul>	<p><b>MANDATORY BY GOVERNMENT</b></p>

<p><i>reduce all the red tapes so that these green requirements can be made mandatory in the Uniform Building Bylaw. That will enable the sustainability approaches as a catalysed to promote sustainability approach and also to expedite the process in Malaysia.</i></p> <p><i>If all developers are aware of the incentives given, of course they will push for more green technologies in their projects. I think the government should use the media to disseminate the awareness to the general publics about the existence of these incentives.</i></p> <p><i>Rating system should be mandatory like what Singapore is doing. They can implement it in very short period.</i> (LCH-A:365-377)</p>	<ul style="list-style-type: none"> <li>• Make green building rating mandatory</li> </ul>
<p><i>For a start, draw the curtains or blinds in high-rise full of curtain walls and utilize natural daylight instead of closing windows and switching on the lights!</i></p> <p><i>Apply basic first year architectural training principles in every project – very low tech solutions.</i> (NB-A:240-242)</p>	<ul style="list-style-type: none"> <li>• Create awareness among building tenants</li> </ul>
TEXT	CODE (INDIVIDUAL)
ENGINEER & ENVIRONMENTAL CONSULTANT:	
<p><i>We are on course right now. After the seminar, a lot of queries have come in. Even PAM has already started to schedule regular lectures on MS1525. After the MS1525, then lectures on GBI. For the professionals that is what we are doing. Then tie in with compulsory CPD, it will really improve. At the same time, we have to also work with REHDA [Real Estate and Housing and Developers</i></p>	<ul style="list-style-type: none"> <li>• Professional bodies to conduct regular awareness and educational programs for the professionals</li> <li>• Professional bodies to collaborate with REHDA to conduct awareness and educational programs for the developers</li> </ul>

<ul style="list-style-type: none"> <li>• Local culture – people only do when it is mandatory or when there are penalties for non-compliance.</li> <li>• Government should make the compliance mandatory for new projects</li> <li>• Legislation should be enacted to compel existing office buildings to comply within a grace period.</li> <li>• Government i.e. all relevant ministries should be serious in both the implementation and enforcement.</li> <li>• Enact legislation to demand higher building codes &amp; standards,</li> <li>• Mandate building retro-fits of existing buildings to meet the higher standards, with reasonable grace period for compliance.</li> <li>• Mandate the need for building grading before any transfer of ownership for existing buildings (subject to grace period mentioned above)</li> </ul>	
CODE (GROUPED)	CATEGORY
<ul style="list-style-type: none"> <li>• Government should practice it seriously first</li> <li>• Government to make sure projects are running even during economic slowdowns</li> <li>• Government to sort out which ministry to champion in sustainability</li> </ul>	<p><b>OTHER INITIATIVES FROM GOVERNMENT</b></p>

<p>Association] so that we can brief the members regularly. You've got to keep volunteering. You must pull all the volunteers to create the awareness and they will see the benefits of it. They'll see not only the benefits financially but benefits for the future generation. They must look at that.</p> <p><b>Is there anything that the government should do?</b></p> <p>The government must sort out, which ministry wants to champion. Right now we have so many ministries related to building industry. So I really don't know which one. This ministry has to put the budget and lead it. Indirect incentives like higher plot ratios and etc. but in Malaysia is a bit tough because in different state, different local authority. Federal laws can never get down, so it takes a long time. (CTL-ME:618-631)</p>	<ul style="list-style-type: none"> <li>• Government to sort out which ministry to champion in sustainability related to the building industry – to put budget and lead it</li> </ul>	<p>related to the building industry – to put budget and lead it</p> <ul style="list-style-type: none"> <li>• Government should practice it seriously first. Then promote it to the private sector.</li> <li>• Build more demonstration buildings outside Putrajaya</li> <li>• Raising energy prices to reflect current market rates</li> </ul>	
<p>The bridge that we talking about could be the MGBC [Malaysia Green Building Council]. It depends on how it is run. What MGBC needs do is to give the public awareness, media, and trainings to make sure that people are well trained and understand these issues. There should give more promotions, ratings and all these things that need to do. In all areas, they need to do it well in order to push the agenda forward. MGBC is supposed to be doing that. You'll see they can be successful. Our MGBC is very different from the rest of the world. Singapore BCA is government funded. A lot of other countries, their Green Building Council are profit-driven and this [MGBC] is non-profit driven. So who would be the one who will be driving it? If it is a profit-driven then the interests are there, the COB interest drive profitably for everyone. Then there is a different approach. MGBC is more or less an NGO so it would be interesting to see how it will grow. If there is demand, the demand is there to drive you. If there is no demand, then the MGBC needs to drive... whole different issues.</p>	<ul style="list-style-type: none"> <li>• MGBC (non-government and non-profit driven organization) needs to give the public awareness, media and trainings to make sure people are well-trained and understand the rating system i.e. GBI.</li> <li>• Government to make sure projects are running even during economic slowdowns</li> </ul>	<ul style="list-style-type: none"> <li>• Give incentives to the industry (4x)</li> <li>• Give incentives based on the building's green certification</li> <li>• Incentives e.g. tax exemption or tax reduction to developers and designers</li> <li>• Incentives from the government e.g. income tax deduction</li> <li>• Local culture – people pay more attention to the economic aspects of sustainability. So government should give more incentives to promote sustainability.</li> <li>• The promoters of “sustainability” must always consider and promotes its attractiveness in dollars and cents as by end of the day to create a critical mass of this “sustainable fellowship”, money will always talks</li> </ul>	<p><b>ECONOMIC INCENTIVES</b></p>

<p><b>Do you think government should also play a role instead of just MGBC?</b></p> <p><i>I don't think we can expect any help from the government in term of funding. In this area, the priority is quite low especially in this year, 2009. What is important from the government right now is make sure that the projects is running so that the impact of the economic slowdown is not being felt so much. So that is their priority at least for this year unless we can get that settled down. This would be very low on their priority. (CKT-EC:487-504)</i></p>	
TEXT	CODE (INDIVIDUAL)
<b>BUILDER &amp; BUILDER-DEVELOPER:</b>	
<p><i>As long as there is commercial demand for office space in Malaysia, it will always be sustainable business. Hoping that the sustainability concept will go further than just dollar and cents but extended to sustainable philosophy of sustaining the environment etc, etc. But the promoters of this so called "sustainability" must always consider and promotes its attractiveness in dollars and cents as by end of the day to create a critical mass of this "sustainable fellowship", money will always talks louder than the environment. It is sad but I am a realist. (SA-B/D:205-211)</i></p>	<ul style="list-style-type: none"> <li>• The promoters of "sustainability" must always consider and promotes its attractiveness in dollars and cents as by end of the day to create a critical mass of this "sustainable fellowship", money will always talks louder than the environment.</li> </ul>
<p><i>Of course incentives from the government but we cannot put the whole burden on the government. How much can the government do? You can imagine there are only about 30, 40, 50 MPs in the ministers to take care of 21 million people? It is not easy and they cannot satisfy everybody's needs. So I think the most important thing is the cultivation by use to our children and we as grown ups must do it, talk about the importance of it to our neighbours, colleagues and friends. Then this thing will spread. I think that is the only way. All the regulatory measures, giving incentives are all very standard.</i></p>	<ul style="list-style-type: none"> <li>• Give incentives to the industry</li> <li>• Cultivate the importance of sustainable development in education and media</li> <li>• Merit point system to building design prior to approval by local authorities</li> </ul>

<p>louder than the environment.</p>	
CODE (GROUPED)	CATEGORY
<ul style="list-style-type: none"> <li>• Private sector to push for it without relying so much on the government</li> <li>• Market the green buildings. This marketing campaign should create a "brand" or identity for sustainable building to incorporate this concept into everyday life for the building industry and general public.</li> <li>• Top 10 developers to test the market with green buildings</li> </ul>	<p><b>PUSH FROM PRIVATE SECTOR</b></p>

<p><b>Do you think by having the project assessed in terms of its sustainable performance with merit points given by the authorities prior to building approval can actually promote sustainability in the industry?</b></p> <p><i>That is a professional approach. You are not being forced to. You want that merit points or not? If you get so many merit points, definitely you would like to stay there. Eventually this thing becomes a system itself; it becomes a practice. Everybody will start doing it and will change the whole world. I think that is a very good idea because they are not talking about a system and they are not talking about incentives, they are not talking about regulations; they are talking about merit points. (JD-B:447-462)</i></p>	
<p><i>PAM and MGBC are the best drivers because government is not doing their work [laughing]. (TYT-B:325)</i></p>	<ul style="list-style-type: none"> <li>Private sector to push for it without relying so much on the government</li> </ul>
<p><b>TEXT</b></p> <p><b>DEVELOPER, OWNER &amp; DEVELOPER-OWNER:</b></p>	<p><b>CODE (INDIVIDUAL)</b></p>
<p><i>The government should place sustainability as part of the criteria for building approval. Then give awards or show appreciation to those buildings that achieve certain score. Then everybody will start follow. Currently designers/developers just say that their building is green but people don't know how green the building is or how they achieved that. So if the building is rated using certain criteria, then people would be more aware.</i></p> <p><i>I think green should be an image. Like a person who drives a BMW, people would see him/her having a better image compared to others. When green is an image... if you have a green building, you are the better people in the property market, then others would follow. Let people be proud of owning/occupying/developing a green building. (NA-D:231-239)</i></p>	<ul style="list-style-type: none"> <li>Make green building rating mandatory – for building approval.</li> <li>Recognize &amp; reward green buildings based on merits using rating system</li> <li>Market the green buildings. This marketing campaign should create a “brand” or identity for sustainable building to incorporate this concept into everyday life for the building industry and general public.</li> </ul>
<p><i>I think someone, companies or government, who advocate</i></p>	<ul style="list-style-type: none"> <li>Education - at the school, university</li> </ul>

<p><i>this have got to be educated from young. That is for our future generation. We also need to educate developers and the building users, not to say tenants but users of the building who can be the public. In fact, developers also need to expect to give some sense of responsibility. Developers cannot only think of their money. The young people are the easiest to convince.</i></p> <p><b>If the government gives more incentives, would that create more demands?</b></p> <p><i>Not necessarily. Sometimes they can be abused. In Malaysia, what ever needs to be done, make sure everybody does it. Not just a few. There are people who had done it and incurred a lot of cost but not successful because the people have got a choice. They can do wrong things without given penalties. Then why should they do it? At the end of the day, they are not the ones who are staying or working in the building. Someone else do. It is not them who will get suffocated in the building. So why do they have to bother? But if there's no choice...they have to do it or else penalty. Maybe give tax exemption or tax reduction to those developers and designers who develop green buildings. Or get incentives...that sort of return from the government only then people would move towards that. If they have a choice of not doing it, they won't to do it. Malaysian culture is like that. (MM-D:432-447)</i></p>	<p>and corporate levels</p> <ul style="list-style-type: none"> <li>• Incentives e.g. tax exemption or tax reduction to developers and designers</li> <li>• Local culture – people only do when it is mandatory or when there are penalties for non-compliance.</li> </ul>
<p><i>The Government should make the compliance mandatory for new projects. Legislation should also be enacted to compel existing office buildings to comply within a grace period. (BTC-D:242-243)</i></p>	<ul style="list-style-type: none"> <li>• Government should make the compliance mandatory for new projects</li> <li>• Legislation should be enacted to compel existing office buildings to comply within a grace period.</li> </ul>
<p><i>The first thing is that office buildings are built to fulfil certain function. If you give a non-sustainable building; it can still serve as a functional office. For it to come from the private</i></p>	<ul style="list-style-type: none"> <li>• Government should practice it seriously first. Then promote it to the</li> </ul>



sector is a bit difficult because if I can rent a non-sustainable building with a lesser rental and with the money I have, surely I'll do that. But this is where the government has to drive it. It has to be a top bottom thing. It has to start there first. The government must be serious about it first. Once they are serious, they always can come out with the mechanisms to promote it. So far that I know, they say they are serious, they created Malaysia Energy Centre, but it stops there. So from top to bottom it doesn't flow very nice to the people like us. It doesn't do that way. People are more attracted to incentives...I think out of all the sustainability pillars, I think the economic is the one that drives a lot of people to do it...I think it is more to the economic, when you talk about economic, everybody will pay attention, so do something on the economic.

#### **If government give incentives like tax reduction...**

Yes, that would drive it. People want to see the economic gain and the economic gain can also be in the long term not necessarily now. People invest in capital cost. As I earlier said to you, I am willing to go for recycled materials even if they cost 30% more, but I want to see the long term... how much would I gain. And if I don't have to pay a certain percentage of tax for the next 30 years, why not? I will spend now but I will not have to spend later, you see? I still need to pay tax eventually because now you don't need to pay tax if you buy artwork. That is how it works right?...But all these things...if the government is serious about it...as it is now, I'm yet to ascertain whether the government is serious about it or not. If they are serious, it cannot come from just one ministry, it has to come from all ministries, from all government. So from the top goes all the way down. The recycling thing is part of the scheme, you know, the implementation is very bad. The implementation and enforcement, you have to do it both. So by the time maybe another 50 years, it will already be

private sector.

- Local culture – people pay more attention to the economic aspects of sustainability. So government should give more incentives to promote sustainability.
- Government i.e. all relevant ministries should be serious in both the implementation and enforcement.

<p><i>embedded in our culture to do it. (WR-D/O:859-891)</i></p>	
<p><b>Would you agree with me if I say that when people see that your green buildings have higher value, higher occupancy rate...other developers will follow suit to remain competitive?</b></p> <p><i>Yes. In fact, the tier 1 top 10 developers are now looking at this issue seriously e.g. YTL, IGB, Sunrise, SP Setia.</i></p> <p><b>There are developers and owners who want to see real data to prove that green buildings can actually improve productivity of the tenants and save money in the long run. I mean data based on local case studies.</b></p> <p><i>That's why I like Green Mark because Green Mark has annual audit. If you design for it but you don't build it accordingly...if you don't comply with your design, you'll lose your rating. I don't know whether GBI will take off in Malaysia or not because I don't think the Government here is going to do that. Once you have your building certified you have to show that your building is actually green [once completed]. Then you have no choice but to comply. There will be a proper audit team.</i></p> <p><i>However, it shouldn't come from the industry players who form the rating system in a forum and call it a Green Building Index. There shouldn't be handled by people with vetted interest. It should come from the government. From what I can see...there are a lot of vetted interests. I don't think I want to be the champion on this. I am just stating things from my own perspective. (CN-D/O:371-387)</i></p>	<ul style="list-style-type: none"> <li>• Top 10 developers to test the market with green buildings</li> <li>• Green building rated during design phase must be audited upon completion to maintain rating</li> <li>• Building rating system to be implemented and enforced by the government</li> </ul>
<p><b>TEXT</b></p>	<p><b>CODE (INDIVIDUAL)</b></p>
<p><b>FACILITY MANAGER:</b></p>	
<p><i>When you say sustainable building...have the building quantified. What are the criteria that make the building sustainable? Then simplify it... not a long list.</i></p>	<ul style="list-style-type: none"> <li>• Implement a simple building rating system</li> </ul>

<p><b>CODE (GROUPED)</b></p>	<p><b>CATEGORY</b></p>

(NM-FM:183-184)	
<i>Definitely education – in schools, universities and professional bodies. (KCD-FM:173)</i>	<ul style="list-style-type: none"> <li>• Education – in schools, universities and professional bodies.</li> </ul>
<i>Incentives are the best carrots that the government can give to the industry. (ZS-FM:213)</i>	<ul style="list-style-type: none"> <li>• Give incentives to the industry</li> </ul>
<b>TEXT</b>	<b>CODE (INDIVIDUAL)</b>
<b>REGULATOR, POLICY MAKER &amp; GOVERNMENT PROJECT IMPLEMENTOR</b>	
<p><i>Of course if the government could give incentives to the industry, it would be much better. In Singapore I think they give incentives based on the building's certification. Their green labelling becomes mandatory. Top down approach would work in Malaysia. Everybody has to do it for the sake of future generations.</i></p> <p><i>I think, in Malaysia we need to build more demonstration buildings. People would believe only when they see. Our demonstration buildings are only in Putrajaya and nowhere else. (CPK-PI:460-465)</i></p>	<ul style="list-style-type: none"> <li>• Give incentives based on the building's green certification</li> <li>• Make green building rating mandatory</li> <li>• Build more demonstration buildings outside Putrajaya</li> </ul>
<p><i>Promotions need be done by the professionals. There is a need to re-educate professionals at the expense of the government. In terms of economic analysis, the benefits for both the developer and those who buy the properties and persons who rent the property and ultimately the country in terms of CO2 emission. Once the professionals are quite conversant with green or sustainable buildings, then we have to inform the public. Public now are more environment conscious. Basic environmental issues can be taught in schools. It is a lot of money they should spend. Government is always reluctant on this.</i></p> <p><b>In the UK, corporate companies demand for green buildings because they want the green logo on their business and they are proud of it. The driver is bottom-up. In Singapore, the Government makes it mandatory</b></p>	<ul style="list-style-type: none"> <li>• Make green building rating system mandatory or have it endorsed by the government and given to a certain agency to implement and then make it mandatory.</li> <li>• Give awareness and educate the young in schools</li> <li>• Integrate sustainable designs &amp; construction in architectural &amp; engineering education programs</li> <li>• Re-educate the professionals through CPD programs</li> <li>• Educate the public about green/sustainable buildings through various media</li> </ul>

<b>CODE (GROUPED)</b>	<b>CATEGORY</b>

<p><b>for green buildings to be delivered and the driver is top-down. Which way do you think Malaysia should follow?</b></p> <p><i>It has to be top-down in here. Very very difficult to come another way around. Very very difficult. Like building rating system, it should be made mandatory by the government. Or it should be endorsed by the government and given to certain agency to implement and then make it mandatory. But coming from bottom-up, it won't go far.</i></p> <p>(KSK-R/PM:274-288)</p>			
<p><i>Education would be the best, it means right from the start. From the kindergarten...teaching how not to waste electricity, water...we start from the very basics. And then we go further by educating the public through our media and teach them to recycle. Then we go higher but it takes time.</i></p> <p>(NN-R/PM:581-584)</p> <p><b>Would GBI promote this?</b></p> <p><i>GBI is not compulsory. It is just a voluntary. It is just to show to people of what they can do. So still the market doesn't call for it unless the government makes it compulsory. But we are not going that way. Government has decided that we are not doing it because our economy is unstable. We are still inviting investors and if the investors want to do it at their own accord, it is ok. If not, no...Unless we make our own products and they are cheap, I think people would consider. GBI would be fantastic for big conglomerate companies or those higher end developers who have a lot of money to them their buildings rated like SP Setia, Sunway, Sunrise, Naza TTDI and etc.</i></p>	<ul style="list-style-type: none"> <li>• Give awareness and educate the young in schools</li> <li>• Educate the public about the existing incentives through various media</li> <li>• GBI would promote sustainability but the government is still not ready to make it mandatory.</li> </ul>		
<p><i>Same. Training...awareness...incentives. Giving incentives is the best way that can be done for private sector.</i></p>	<ul style="list-style-type: none"> <li>• Incentives from the government e.g. income tax deduction</li> </ul>		

<p><i>Whatever they've spent, it can be deducted from their income tax. That kind of incentives can attract the private sector to do it. (MCA-PM:309-311)</i></p>			
<p><i>Following on from the above, remove the barriers such as:</i></p> <ul style="list-style-type: none"> <li>- <i>Raising energy prices to reflect current market rates,</i></li> <li>- <i>Enact legislation to demand higher building codes &amp; standards,</i></li> <li>- <i>Mandate building retro-fits of existing buildings to meet the higher standards, with reasonable grace period for compliance.</i></li> <li>- <i>Mandate the need for building grading before any transfer of ownership for existing buildings (subject to grace period mentioned above) (GL-PM:303-309)</i></li> </ul>	<ul style="list-style-type: none"> <li>• Raising energy prices to reflect current market rates</li> <li>• Enact legislation to demand higher building codes &amp; standards,</li> <li>• Mandate building retro-fits of existing buildings to meet the higher standards, with reasonable grace period for compliance.</li> <li>• Mandate the need for building grading before any transfer of ownership for existing buildings (subject to grace period mentioned above)</li> </ul>		

## COMBINATION OF ANSWERS TO Q.38 &amp; Q.39

**ISSUE: ACTIONS FOR RESEARCH & EDUCATION SECTOR****CATEGORY: CAPACITY-BUILDING****Build internal capacity**

- Conduct more research

**Expand learning offerings**

- CPD programs for the professionals
- Re-educate the professionals through CPD programs (2x)

**CATEGORY: PARTNERSHIPS AND COOPERATION****Establish research and educational partnerships with industry sectors, NGOs and government**

- Need for credible evidence of the advantages of green to support green clients and convert new ones e.g. more local case studies (2X)

**CATEGORY: ENCOURAGING AND SUPPORTING IMPLEMENTATION****Through technology transfer**

- Build more demonstration buildings outside Putrajaya
- Government to develop more examples buildings in the next 5-10 years.

**By raising awareness**

- Give awareness and educate the young in schools (8x)
- Integrate sustainable designs & construction in architectural & engineering education programs (4x)
- Education - at the school, university and corporate levels (3x)
- Conduct more seminars & trainings (2x)
- Educate the public through various media (7x)
- Cultivate the importance of sustainable development in education and media
- Educate the public about green/sustainable buildings through various media

## **ISSUE: ACTIONS FOR THE PRIVATE SECTOR**

### **CATEGORY: CAPACITY-BUILDING**

#### **Enable continued organisational learning**

- Ensure that the decision-makers of developer companies are the right ones to push for sustainability.

#### **Support the development of external capacity**

- Professional bodies to conduct regular awareness and educational programs for the professionals
- CIDB to conduct courses and trainings for labours level 1,2 & 3; Professional organizations to conduct courses and trainings for management level 4 & 5
- MGBC (non-government and non-profit driven organization) needs to give the public awareness, media and trainings to make sure people are well-trained and understand the rating system i.e. GBI.

### **CATEGORY: ACCESS TO FUNDING**

- Developers make use of government incentives to reduce their CapEx

### **CATEGORY: PARTNERSHIPS AND COOPERATION**

- Professional bodies to collaborate with REHDA to conduct awareness and educational programs for the developers.

### **CATEGORY: INTERNAL HOUSEKEEPING**

#### **Assess risk and benefits**

- Conduct life cycle analysis before adopting advanced technologies
- Feasibility study should not only consider the economic issue but also the environmental, social and cultural issues. It should not only consider investment cost during 5 years but also 5 years after operation phase.

#### **Foster more efficient use of resources and reduce environmental impact of the industry**

- Private sector to push for it without relying so much on the government
- Professionals to be more proactive in convincing their clients to adopt green principles

### **CATEGORY: ENCOURAGING AND SUPPORTING IMPLEMENTATION**

#### **Commercialize new services, materials and tools**

- Create awareness by promoting green products
- Consultants to promote building rating system to clients

**Create demand**

- Need more innovative high end developers (both private and public) who are willing to add another percentage of investment cost to develop green buildings (new or retrofitted) to find out whether green buildings can increase rental value.
- Need high end developers who are willing to deliver green properties to demonstrate that they can be sold quickly – so others will follow suit.
- Market the green buildings. This marketing campaign should create a “brand” or identity for sustainable building to incorporate this concept into everyday life for the building industry and general public (2x).
- Frequent promotional campaign on a national basis to inform the public on the benefits in the long run.
- Top 10 developers to test the market with green buildings

**Use new technologies and efficient building systems**

- Adopt advanced technology when the capacity i.e. expertise and financial to operate and maintain is available
- Ensure with advanced technology equipments are supplied with detailed operation and maintenance manuals and examine them before purchasing.
- Provide detailed operation and maintenance manual for every advanced technology installed in the building to the building owner.
- Don't adopt a unique technology with no other common/ comparative components/parts (services and parts can be obtained from other brands) OR building owners to lock in spare parts costs for the next 5 years
- Stop importing the non-efficient or below par equipments.

**CATEGORY: MONITORING AND EVALUATION****Participate in certification scheme**

- Implement a simple building rating system
- Green building rated during design phase must be audited upon completion to maintain rating



## **ACTIONS FOR CLIENTS**

### **CATEGORY: CAPACITY-BUILDING**

#### **Develop own understanding of sustainability and the benefits of more sustainable choices**

- Create awareness among building tenants
- Instil the feeling of respect to the environment via religious teachings
- Conduct awareness programs on sustainability issues for owners and investors – i.e. general public
- Create more design competitions

### **CATEGORY: MONITORING AND EVALUATION**

#### **Participate in certification scheme**

- Implement a simple building rating system
- Green building rated during design phase must be audited upon completion to maintain rating

#### **Monitor benefits and impacts**

- More developers must be willing to develop showcase buildings, monitor and publish their economic and social benefits for others to learn.

## **ACTIONS FOR GOVERNMENT & REGULATORY STAKEHOLDERS**

### **CATEGORY: CAPACITY-BUILDING**

#### **Create an advisory body**

- Government to sort out which ministry to champion in sustainability related to the building industry – to promote and give awareness on GBI to the public and industry players
- Government to sort out which ministry to champion in sustainability related to the building industry – to put budget and lead it

#### **Raise awareness among government officials and politicians**

- Educate Federal officials at all levels to be trained, motivated and involved in implementing actual green building procedures
- Educate local authority officials
- Malaysian government should ensure that the capacity is being built to ensure the right persons are managing their facilities
- Capacity building among government designers
- Awareness programs for the tenants of government buildings

#### **Introduce compulsory continued professional education**

- Make it part of the exam to be a professional consultant
- Structure engineers' CPD points to include green/ sustainable building practices

### **CATEGORY: ACCESS TO FUNDING**

- Government to make sure projects are running even during economic slowdowns

### **CATEGORY: PARTNERSHIPS AND COOPERATION**

- CIDB to conduct courses and trainings for labours level 1,2 & 3; Professional organizations to conduct courses and trainings for management level 4 & 5
- Government to give support to NGOs

### **CATEGORY: INTERNAL HOUSEKEEPING**

#### **Lead by example**

- Government should practice it seriously first
- Government should practice it seriously first. Then promote it to the private sector.
- Reduce bureaucracy red tape to have green/sustainability principles as mandatory requirement

#### **Change professional fee system**

- Professional fee system to be revised.

**CATEGORY: ENCOURAGING AND SUPPORTING IMPLEMENTATION****Change standards and regulations to support sustainable construction**

- Government to provide guidance, clear policy & eventually legislation
- Enact legislation to demand higher building codes & standards,
- Mandate building retro-fits of existing buildings to meet the higher standards, with reasonable grace period for compliance.
- Mandate the need for building grading before any transfer of ownership for existing buildings (subject to grace period mentioned above)
- Legislation should be enacted to compel existing office buildings to comply within a grace period.
- Review by-laws and regulations to accommodate the changes brought about by sustainable construction practices

**Provide effective incentives and disincentives**

- Give incentives to the industry (4x)
- Give incentives based on the building's green certification (2x)
- Incentives e.g. tax exemption or tax reduction to developers and designers
- Incentives from the government e.g. income tax deduction
- Local culture – people pay more attention to the economic aspects of sustainability. So government should give more incentives to promote sustainability.
- The promoters of “sustainability” must always consider and promotes its attractiveness in dollars and cents as by end of the day to create a critical mass of this “sustainable fellowship”, money will always talks louder than the environment.
- Create awareness by giving incentives (4x)
- Tax deduction on capital investment for building owners on the implementation.
- Abolish duties on renewable energy related products
- Do more aggressive promotions with rebates on more expensive energy efficient/green items – to encourage the public to use them.
- Local culture – people only do when it is mandatory or when there are penalties for non-compliance.
- Recognize & reward green buildings based on merits using rating system (2x)
- Educate the public about the existing incentives through various media (2x)

**Enforce regulations**

- Government i.e. all relevant ministries should be serious in both the implementation and enforcement of regulations
- Government should make the compliance mandatory for new projects
- Building rating system to be implemented and enforced by the government

**Reduce subsidies**

- Make energy prices to reflect the market values (2x)
- Raising energy prices to reflect current market rates

### **Promotions**

- Suggestion: Government should aggressively promote the use of green technologies and ensure the widespread usage before imposing any regulation (G) – from Q. 37
- CIDB to conduct more promotions on sustainability issues

### **CATEGORY: MONITORING AND EVALUATION**

#### **Participate in monitoring and evaluating schemes**

- Make green building rating mandatory (4x)
- Make green building rating system mandatory or have it endorsed by the government and given to a certain agency to implement and then make it mandatory.
- GBI would promote sustainability but the government is still not ready to make it mandatory.
- Promote the adoption of GBI
- Merit point system to building design prior to approval by local authorities

## Appendix D: Focus Groups Documents

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D-2	Example of a List of Criteria	D 10
D-3	Example of a Criteria Sheet – front page	D 11
D-4	Example of a Benchmark Sheet – back page (for criteria covered in both SBTool and Stage-1 frameworks)	D 12
D-5	Example of a Benchmark Sheet – back page (for criteria covered in Stage-1 framework only)	D 13

## Appendix D-1: List and Groupings of Criteria for Six Focus Groups

**Note:**

- Only the shaded criteria were used in the focus groups.
- "NIL" under SBTool 07 means the criterion is not existed and the criterion under Stage-1 framework was used in the focus groups instead.
- "NIL" under Stage-1 framework means the criterion was not cited during the interview process. However, these criteria will be added in the Stage-2 framework if rated as important or very important by the focus groups.

FOCUS GROUPS	CATEGORIES (SBTOOL)	CRITERIA (SBTOOL 07)	EQUIVALENT CRITERIA FROM STAGE-1 FRAMEWORK
1 SITE, PLANNING AND MANAGEMENT	Site Selection	Pre-development ecological value or sensitivity of land	LAND USE: Select sites that have <b>low ecological value</b> or in <b>non-sensitive areas</b>
		Pre-development agricultural value of land	NIL
		Vulnerability of land to flooding	NIL
		Potential for development to contaminate nearby bodies of water	EMISSIONS TO WATER: Select sites with <b>optimum distance from water body</b> to reduce the risk of water contamination
		Pre-development contamination status of land	LAND USE: Redevelopment of <b>used/brownfield site</b> rather than green field
		Proximity of site to public transportation	EMISSIONS TO AIR: Select <b>sites that are near to public transport stops</b>
		Distance between site and residential occupancies	EMISSIONS TO AIR: Select <b>sites that are reasonably near residential zones</b>
		Proximity to commercial and cultural facilities	ACCESSIBILITY: Select sites that are <b>easily accessible/ walking distance to nearby services</b>
		Proximity to public recreation areas and facilities	NIL
		NIL	LAND USE: Select sites that are within <b>urban areas</b> with existing infrastructure
	Project Planning	Feasibility of use of renewable energy	NIL
		Use of Integrated Design Process	SOCIAL COHESION: Support for <b>inter-disciplinary work</b> between architects, engineers, costing specialists, operation people and other relevant actors right from the beginning of the design process.
		Potential environmental impact of development or re-development	TBL ACCOUNTING: Increase the practice of referring to <b>Environmental Impact Assessment (EIA) report</b> prepared by environmental experts by the project team.
		Site orientation to maximize passive solar potential	NON-RE CONSUMPTION: Use of <b>passive cooling</b> strategies
	Urban Design and Site Development	Development density	EFFICIENCY, EFFECTIVENESS and FLEXIBILITY: Maximize <b>plot ratio</b> to generate denser development
		Provision of mixed uses within the project	SOCIAL COHESION: Provide <b>mixed uses</b> within the project to support an active streetscape and to reduce the need for commuting transport
		Encouragement of walking	EMISSIONS TO AIR: Availability of <b>pedestrian access between building and basic services</b>
		Support for bicycle use	EMISSIONS TO AIR: Provide <b>bicycles and/or bicycle parking spaces</b> for building users
		Policies governing use of private vehicles	EMISSIONS TO AIR: Provide only minimum allowable <b>parking spaces</b>

	Provision of project green space	LAND USE: Maximize <b>potential for green/open space</b> on the site for informal recreation
	Use of native plantings	LAND USE: Improve <b>ecological value</b> of natural landscape
	Provision of trees with shading potential	NON-RE CONSUMPTION: Use of <b>passive cooling</b> strategies
	Development or maintenance of wildlife corridors	NIL
	NIL	EMISSIONS TO AIR: Provide <b>connection from building to existing public transportation network</b>
	NIL	EMISSIONS TO AIR: Provide <b>more than minimum allowable motorcycle parking spaces</b> to discourage the use of cars
Impacts on Site	Impact of construction process on natural features of the site	LAND USE: Minimize <b>ecological and other damage</b> to existing soil, water bodies and flora and fauna of the site or adjacent lands due to the construction process
	Impact of construction process or landscaping on soil erosion	
	Changes of biodiversity on the site	
	Adverse wind conditions at grade around tall buildings	
Functionality and Efficiency	Spatial Efficiency (NFA=minus vertical circulation and M&E rooms)	EFFICIENCY, EFFECTIVENESS and FLEXIBILITY: <b>Maximize workspace/directly functional area to total floor area ratio</b>
	Volumetric Efficiency	NIL
Flexibility and Adaptability	Ability to modify technical building systems	EFFICIENCY, EFFECTIVENESS and FLEXIBILITY: Provide <b>building services systems with maximum flexibility</b> for different users/ requirements
	Adaptability constraints imposed by structure	EFFICIENCY, EFFECTIVENESS and FLEXIBILITY: <b>Structural design with maximum adaptability</b> for new uses
	Adaptability constraints imposed by floor-to-floor heights	EFFICIENCY, EFFECTIVENESS and FLEXIBILITY: Adequate <b>floor-to-floor height</b> to offer high level of functionality for almost any occupancy
	Adaptability constraints imposed by building envelope and technical systems	NIL
	Adaptability of future changes in type of energy supply	NIL
	NIL	EFFICIENCY, EFFECTIVENESS and FLEXIBILITY: <b>Space planning for maximum flexibility</b> for different users/ requirements
<b>TOTAL: 37</b>	<b>SUBTOTAL: 33</b>	<b>SUBTOTAL: 4</b>

FOCUS GROUPS	CATEGORIES (SBTOOL)	CRITERIA (SBTOOL 07)	EQUIVALENT CRITERIA FROM STAGE-1 FRAMEWORK
<b>2 ENERGY EFFICIENCY AND SYSTEM MAINTENANCE</b>	Total Life Cycle Non-RE	Annual non-renewable primary energy used for facility operation	NON-RE CONSUMPTION: Reduce fossil fuel <b>energy consumption for building operations</b>

	NIL	NON-RE CONSUMPTION: Use <b>energy efficient light fixtures and office appliances</b>
	NIL	NON-RE CONSUMPTION: Use <b>highly efficient ventilation and air conditioning systems</b>
	NIL	NON-RE CONSUMPTION: Use <b>dimnable and/or auto-sensored lighting system</b>
		NON-RE CONSUMPTION: Use <b>integrated lighting concept</b>
Elect. Peak Demand for Facility Operation	same	NIL
Renewable Energy	Use of off-site energy that is generated from renewable sources	NIL
	Provision of on-site renewable energy systems	NON-RE CONSUMPTION: Provide <b>on-site power generation systems</b>
Safety and Security During Operations	Maintenance of core building functions during power outages	NIL
Commissioning of Facility Systems	same	EFFICIENCY, EFFECTIVENESS and FLEXIBILITY: Requirement of contracted <b>comprehensive commissioning, and post-occupancy commissioning</b> to be performed for all building services
Controllability	Provision and operation of an effective facility management control system	EFFICIENCY, EFFECTIVENESS and FLEXIBILITY: Provide and operate an effective <b>facility management control system</b> to maximize the operational efficiency of building systems
	Capability for partial operation of building technical systems	NIL
	Deg of local control of lighting systems in non-residential occupancies	NIL
	Degree of personal control of technical systems by occupants	NON-RE CONSUMPTION: Facilitate <b>personal control</b> of the lighting and thermal comfort systems by occupants
Maintenance of Operating Performance	Development and implementation of a maintenance management plan	EFFICIENCY, EFFECTIVENESS and FLEXIBILITY: Develop and implementation of a long-term <b>maintenance management plan</b> for efficient building operation.
	On-going monitoring and verification of performance (energy sub-metering)	NON-RE CONSUMPTION: Install <b>energy sub-metering</b> system for each floor/section/tenancy to monitor energy consumption
	Retention of as-built drawings and documentation	NIL
	Provision and maintenance of a building log.	NIL
	Performance incentives in leases or sales agreements	NIL



NIL	NON-RE CONSUMPTION: Minimize energy transmission through the building skin by a <b>tight, thermally resistant envelope</b>
NIL	ACCESSIBILITY: Easy <b>access to building technical systems</b> for repair and maintenance
NIL	ACCESSIBILITY: <b>East to clean the building facades</b> and other elements or design
<b>TOTAL: 21</b>	<b>SUBTOTAL: 15</b>
	<b>SUBTOTAL: 6</b>

FOCUS GROUPS	CATEGORIES (SBTOOL)	CRITERIA (SBTOOL 07)	EQUIVALENT CRITERIA FROM STAGE-1 FRAMEWORK
<b>3</b> INDOOR AND OUTDOOR ENV. QUALITY	Indoor Air Quality	Off-gassing of pollutants from interior finish materials	HUMAN HEALTH: Use interior finish <b>materials</b> with <b>low- or zero-pollutant off-gassing</b>
		Pollutant migration between occupancies	HUMAN HEALTH: Provide separately <b>ventilated and isolated areas/ rooms which generate pollutants</b>
		Pollutants generated by facility maintenance	HUMAN HEALTH: Use low/zero pollutants <b>cleaning and maintenance products and processes</b>
		Pollutants generated by occupant activities	HUMAN HEALTH: Provide <b>separately ventilated rooms/areas for tobacco smoking</b>
		CO2 concentrations in indoor air (ASHRAE)	HUMAN HEALTH: Provide <b>carbon dioxide monitoring and control system</b> for main occupancy areas
		IAQ monitoring during project operations	HUMAN HEALTH: Adequate <b>monitoring of occupants' satisfaction</b> with indoor environmental quality
	Ventilation	Effectiveness of ventilation in naturally ventilated occupancies	HUMAN HEALTH: Increase the practice of <b>building flush-out</b> to reduce possible indoor air quality contamination after construction completion and prior to occupancy
		Air quality and ventilation in mechanically ventilated occupancies (ASHRAE)	HUMAN HEALTH: Maximize <b>openings and cross-ventilation</b> in naturally ventilated spaces
		Air movement in mechanically ventilated occupancies	NIL
	Air Temperature and Relative Humidity	Effectiveness of ventilation in mechanically ventilated occupancies (air change effectiveness) (ASHRAE)	HUMAN HEALTH: Provide optimum <b>air movement for thermal comfort</b> in mechanically ventilated spaces
		Air temp and relative humidity in mechanically ventilated occupancies (ASHRAE)	HUMAN HEALTH: Provide appropriate <b>air changes</b> to maximize level and quality of fresh air in the ventilation systems
	Daylighting and Illuminance	Air temperature in naturally ventilated occupancies (ASHRAE)	HUMAN HEALTH: Adequate <b>monitoring of occupants' satisfaction</b> with indoor environmental quality
		Daylighting in primary occupancy areas	NON-RE CONSUMPTION: Use <b>integrated lighting concept</b>
		Glare in non-residential occupancies	HUMAN HEALTH: Minimize <b>glare conditions</b> in main occupancy areas

	Illumination levels and quality of lighting	HUMAN HEALTH: Appropriate <b>illumination level and lighting quality</b> in public and work areas
Noise and Acoustics	Noise attenuation through the exterior envelope	HUMAN HEALTH: Minimize <b>noise level</b> and provide satisfactory level of <b>acoustic performance</b>
	Transmission of facility equipment noise to primary occupancies	
	Noise attenuation between primary occupancy areas	
	Acoustic performance within primary occupancy areas	
Greenhouse Gas Emissions	Annual GHG emissions from all energy used for facility operations	EMISSIONS TO AIR: Reduce <b>greenhouse gas emissions</b> from all energy used for <b>building operations</b>
Other Atmospheric Emissions	Emissions of ozone-depleting substances during facility operations	NIL
	Emissions of acidifying emissions during facility operations	NIL
	Emissions leading to photo-oxidants during facility operations	NIL
	NIL	EMISSIONS TO AIR: Minimize <b>air pollution from site workers' accommodation</b>
Other Local and Regional Impacts	Impact on access to daylight or solar energy potential of adjacent property	ADJACENT PROPERTIES: Reduce possibility of <b>overshadowing adjacent properties</b>
	Heat Island Effect – landscaping and paved areas	NIL
	Heat Island Effect – roofing	NIL
	Atmospheric light pollution	ADJACENT PROPERTIES: Minimize <b>light spillage from exterior lightings</b> into the atmosphere
	NIL	ADJACENT PROPERTIES: Reduce <b>potential glare to adjacent properties</b>
<b>TOTAL: 29</b>	<b>SUBTOTAL: 27</b>	<b>SUBTOTAL: 2</b>

FOCUS GROUPS	CATEGORIES (SBTOOL)	CRITERIA (SBTOOL 07)	EQUIVALENT CRITERIA FROM STAGE-1 FRAMEWORK
<b>4 MATERIALS AND SOLID WASTES</b>	Materials	Annualized non-renewable primary energy embodied in construction materials	RESOURCE MANAGEMENT: Increase use of <b>materials that have less environmental impact in producing them</b>
		Re-use of suitable existing structure(s)	EMISSIONS TO LAND: <b>Reuse of suitable existing structure(s)</b> on the site, as part of the new project
		Minimal use of finishing materials	EMISSIONS TO LAND: Minimize <b>use of finishing materials</b> to minimize the direct and indirect consumption of resources
		Minimal use of virgin materials	NIL

	Use of durable materials	RESOURCE MANAGEMENT: Use <b>durable materials</b> that require less maintenance
	Re-use of salvaged materials	EMISSIONS TO LAND: Increase usage of <b>salvaged, refurbished or used materials</b> from off-site sources
	Use of recycled materials from off-site sources	RESOURCE MANAGEMENT: Increase use of <b>products and materials with recycled content</b>
	Use of bio-based products obtained from sustainable sources	RESOURCE MANAGEMENT: Increase use of <b>bio-based products and materials</b> obtained from managed/sustainable sources
	Use of cement replacing materials in concrete	RESOURCE MANAGEMENT: Increase use of <b>products and materials with recycled content</b>
	Use of materials that are locally produced	LOCAL PEOPLE: Increase use of <b>locally produced materials</b>
	Design for disassembly, re-use or recycling	EMISSIONS TO LAND: <b>Design for easy disassembly of components</b> – so that they can be reused or recycled at the end of the service life of the components
	NIL	EMISSIONS TO LAND: Increase the practice of treating <b>land-clearing debris as a resource</b>
	NIL	RESOURCE MANAGEMENT: Increase use of <b>materials that can be recycled</b>
	Maintenance of building envelop performance	NIL
	Annualized GHG emissions embodied in construction materials	RESOURCE MANAGEMENT: Increase use of <b>materials that have less environmental impact in producing them</b>
	NIL	EMISSIONS TO LAND: Design for <b>repeatability</b> and increased use of <b>standardized and prefabricated</b> components to reduce wastages
Solid Wastes	Solid waste resulting from the construction and demolition process	EMISSIONS TO LAND: Implement <b>construction waste management program</b> with sorting, reuse and recycling measures
	Solid waste resulting from facility operations	EMISSIONS TO LAND: Provide <b>spaces for collection of recyclables</b> , recycling storage and staging areas in the building
	Collection and recycling of solid wastes in the community or project	EMISSIONS TO LAND: Maximize <b>inorganic wastes</b> sent to recycling facilities
	Minimizing danger of hazardous waste on site	NIL
	NIL	EMISSIONS TO LAND: Minimize <b>land pollution from site workers' accommodation</b>
<b>TOTAL: 21</b>	<b>SUBTOTAL: 17</b>	<b>SUBTOTAL: 4</b>

FOCUS GROUPS	CATEGORIES (SBTOOL)	CRITERIA (SBTOOL 07)	EQUIVALENT CRITERIA FROM STAGE-1 FRAMEWORK
<b>5 WATER EFFICIENCY AND LIQUID WASTE</b>	Potable Water	Use of potable water for site irrigation	WATER CONSUMPTION: Minimize <b>use of potable water for landscape irrigation</b>
		Use of potable water for occupant needs (water conservation)	WATER CONSUMPTION: Use of <b>water efficient plumbing fixtures and appliances</b>
		On-going monitoring and verification of performance (water sub-metering)	WATER CONSUMPTION: Install <b>water meters</b> for all major water uses in the project to monitor and manage water consumption and to locate any leakages in the pipe lines

	NIL	WATER CONSUMPTION: Minimize use of <b>potable water for the testing of fire fighting system</b>
		WATER CONSUMPTION: Minimal use of <b>potable water for cooling system</b>
Wastewater, Stormwater and Rainwater	Liquid effluents from facility operations sent off the site	EMISSIONS TO WATER: Utilize <b>on-site wastewater treatment systems</b> using <b>black water</b> for non-potable uses
	Retention of rainwater for later re-use	WATER CONSUMPTION: <b>Harvest rainwater</b> for later re-use to reduce the potable water consumption
	Untreated stormwater retained on the site	NIL
	Provision of surface water management system	EMISSIONS TO WATER: Implement <b>stormwater management strategies</b> to control the quantity and quality of stormwater runoff, hence preventing flood and soil erosion
	Availability of a split grey / potable water system	EMISSIONS TO WATER: Utilize <b>on-site wastewater treatment systems</b> using <b>gray water</b> for non-potable uses
	Composting and re-sue of sludge in the community or project	NIL
	NIL	EMISSIONS TO WATER: Minimize <b>storm sewer or stream pollution from site workers' accommodation</b>
<b>TOTAL: 12</b>	<b>SUBTOTAL: 9</b>	<b>SUBTOTAL: 3</b>

FOCUS GROUPS	CATEGORIES (SBTOOL)	CRITERIA (SBTOOL 07)	EQUIVALENT CRITERIA FROM STAGE-1 FRAMEWORK
<b>6 SOCIAL AND ECONOMIC ASPECTS</b>	Social Aspects	Access for physically handicapped persons	INCLUSIVENESS: Provide for <b>universal access</b>
		Access to views from work areas	HUMAN HEALTH: Maximize <b>visual access to exterior views</b> or view to an atrium from workstations
		Measures planned to maximize security for building users	ACCESSIBILITY: Maximize <b>personal safety and security</b> for users to access and use the building
		Skills and knowledge of operating staff	EDUCATION and AWARENESS: Improve <b>skills and knowledge of operation and maintenance staff</b>
		Minimization of construction accidents	HUMAN HEALTH: Adapt practices that <b>avoid construction accidents</b>
		NIL	INCLUSIVENESS: Provide <b>facilities for users with children</b>
		NIL	INCLUSIVENESS: Provide <b>facilities for users to perform religious and spiritual quotient</b>
		NIL	HUMAN HEALTH: Provide <b>recreational facilities</b>
		NIL	ACCESSIBILITY: Adequate <b>access to communication technology</b>
NIL	EDUCATION and AWARENESS: Improve <b>knowledge on sustainable design and development issues among design team members</b>		

	NIL	EDUCATION and AWARENESS: Provide <b>spaces</b> for education
	NIL	EDUCATION and AWARENESS: Improve <b>sustainable construction skills among construction workers</b>
	NIL	EDUCATION and AWARENESS: Increase of <b>occupants' awareness</b> on consumption and waste production
	NIL	SOCIAL COHESION: Increase <b>involvement of users</b> in development process
	NIL	SOCIAL COHESION: Increase <b>participation of affected community</b> in development process
	NIL	SOCIAL COHESION: Balance between provision of workspaces and <b>common spaces for social interaction</b>
Cultural and Perceptual Aspects	Relationship of design with existing streetscapes	CULTURAL and HERITAGE: Preserve <b>characteristics of existing streetscapes</b>
	Compatibility of urban design with local cultural values	CULTURAL and HERITAGE: Compatibility of urban design and building architecture with <b>local cultural values</b>
	Maintenance of heritage value of existing facility	CULTURAL and HERITAGE: Preserve <b>heritage value</b> of existing buildings for refurbishment project
Cost and Economic	Minimization of Life-cycle cost	TBL ACCOUNTING: Consider both <b>capital/construction cost, along with long-term operating costs</b> for both tenant-occupied and leased office building
	Minimization of construction cost	
	Minimization of operating and maintenance cost	
Support of Local Economy		LOCAL PEOPLE: Use experienced <b>local design teams</b>
		LOCAL PEOPLE: Use experienced <b>local contractors employment</b>
		LOCAL PEOPLE: Use <b>local labour</b> employment
		LOCAL PEOPLE: Linkage to <b>local service providers</b>
		LOCAL PEOPLE: Provide <b>training opportunities for local people</b> to be future skilled construction workers
Commercial Viability		TBL ACCOUNTING: Minimization of <b>payback period</b>
		TBL ACCOUNTING: Increased <b>rental/market value</b> or higher overall <b>property investment returns (ROI)</b>
NIL		TBL ACCOUNTING: Conduct <b>Risk Analysis</b>
NIL		TBL ACCOUNTING: Conduct <b>Triple Bottom Line (TBL)</b> before deciding to pursue with the project
NIL		TBL ACCOUNTING: Assess and evaluate the <b>quality of workmanship</b> of construction works prior to hand over
<b>TOTAL: 26</b>	<b>SUBTOTAL: 6</b>	<b>SUBTOTAL: 20</b>

Appendix D-2: Example of a List of Criteria

<b>A</b>	<b>SITE, PLANNING and MANAGEMENT</b>														
<b>A1</b>	<b>Site Selection</b>														
A1.1 Pre-development ecological value or sensitivity of land A1.2 Pre-development agricultural value of land A1.3 Vulnerability of land to flooding A1.4 Potential for development to contaminate nearby bodies of water A1.5 Pre-development contamination status of land A1.6 Proximity of site to public transportation A1.7 Distance between site and residential occupancies A1.8 Proximity to commercial and cultural facilities A1.9 Proximity to public recreation areas and facilities  OTHER: ..... OTHER: .....	<table border="1" style="width: 100%; text-align: center;"> <thead> <tr> <th colspan="3">Please tick (√) one box</th> </tr> <tr> <th>LESS IMPORTANT</th> <th>IMPORTANT</th> <th>VERY IMPORTANT</th> </tr> </thead> <tbody> <tr> <td style="height: 20px;"></td> <td style="height: 20px;"></td> <td style="height: 20px;"></td> </tr> <tr> <td style="height: 20px;"></td> <td style="height: 20px;"></td> <td style="height: 20px;"></td> </tr> </tbody> </table>			Please tick (√) one box			LESS IMPORTANT	IMPORTANT	VERY IMPORTANT						
Please tick (√) one box															
LESS IMPORTANT	IMPORTANT	VERY IMPORTANT													
<b>A2</b>	<b>Project Planning</b>														
A2.1 Feasibility of use of renewable energy A2.2 Use of Integrated Design Process A2.3 Potential environmental impact of development or re-development A2.4 Site orientation to maximize passive solar potential  OTHER: ..... OTHER: .....	<table border="1" style="width: 100%; text-align: center;"> <thead> <tr> <th colspan="3">Please tick (√) one box</th> </tr> <tr> <th>LESS IMPORTANT</th> <th>IMPORTANT</th> <th>VERY IMPORTANT</th> </tr> </thead> <tbody> <tr> <td style="height: 20px;"></td> <td style="height: 20px;"></td> <td style="height: 20px;"></td> </tr> <tr> <td style="height: 20px;"></td> <td style="height: 20px;"></td> <td style="height: 20px;"></td> </tr> </tbody> </table>			Please tick (√) one box			LESS IMPORTANT	IMPORTANT	VERY IMPORTANT						
Please tick (√) one box															
LESS IMPORTANT	IMPORTANT	VERY IMPORTANT													

## Appendix D-3: Example of a Criteria Sheet – front page

<b>CATEGORY</b> <b>A1</b>		<b>SITE SELECTION</b>
<b>CRITERIA</b> <b>A1.8</b>		<b>Proximity to commercial and cultural facilities</b>
<b>Intention</b>		<i>To encourage the selection of sites with access to at least a basic range of commercial and cultural facilities within walking distance.</i>
<b>Applicable Phase</b>		Design phase only
<b>C</b> <b>H</b> <b>O</b> <b>I</b> <b>C</b> <b>E</b>  <i>(Tick one box only)</i>		<b>Very important, must be included</b>
	Reasons/Comments:	
		<b>Important, can be included</b>
	Reasons/Comments:	
		<b>Less important, may be omitted</b>
	Reasons/Comments:	
		<b>Not important, can be omitted</b>
	Reasons/Comments:	
Other Suggestion (Criteria) for same Intention:		

Appendix D-4: Example of a Benchmark Sheet – back page (for criteria covered in both SBTool 07 and Stage-1 MOBSA Framework)

<b>A1.8</b>	<b>Indicator</b>	Agree	Distance in m. to a wide range of food, and a basic range of other retail and cultural needs.
		Proposal <i>(if different from above)</i>	
		<i>(if new indicator is proposed, then proceed to next criterion)</i>	
<b>BENCHMARKS</b>	<b>Best Practice</b>	Agree	For an occupant located in the middle of the occupancy, the distance to a wide range of food, and a basic range of other retail and cultural needs is equal to or less than 1000m.
		Proposal	
	<b>Good Practice</b>	Agree	For an occupant located in the middle of the occupancy, the distance to a wide range of food, and a basic range of other retail and cultural needs is equal to or less than 1800m.
		Proposal	
	<b>Acceptable Practice</b>	Agree	For an occupant located in the middle of the occupancy, the distance to a wide range of food, and a basic range of other retail and cultural needs is equal to or less than 3000m.
		Proposal	
	<b>Poor Practice</b>	Agree	For an occupant located in the middle of the occupancy, the distance to a wide range of food, and a basic range of other retail and cultural needs is equal to or less than 3400m.
		Proposal	



Appendix D-5: Example of a Benchmark Sheet – back page (for criteria covered in Stage-1 MOBSA Framework only)

<b>Criteria D1.17</b>	<b>Indicator</b>	Proposal		
			<b>Design Phase</b>	<b>Operation Phase</b>
<b>BENCHMARKS</b>	<b>Best Practice</b>	Proposal		
	<b>Good Practice</b>	Proposal		
	<b>Acceptable Practice</b>	Proposal		
	<b>Poor Practice</b>	Proposal		



## Appendix E: Questionnaire Survey Documents

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## Appendix E-1: Cover Letter to Government Agencies (Malay version)



SCHOOL OF ARCHITECTURE, LANDSCAPE  
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CRICOS Provider Number 00123M

30 Mac, 2009

(Nama)  
(Jawatan)  
(Alamat)

Tuan/Puan,

**Permohonan Bantuan Bagi Mengedarkan Borang Kajiselidik “Office Building Sustainability Assessment Framework for the Malaysian Building Sector”**

Dengan segala hormatnya saya merujuk kepada perkara di atas.

Saya adalah pelajar PhD yang sedang menjalankan penyelidikan yang bertajuk “Development of a Sustainability Assessment Framework for Malaysian Office Buildings Using a Mixed-Methods Approach”. Rangkakerja penilaian bangunan pejabat mapan yang akan disyorkan oleh penyelidikan ini akan digunakan sebagai asas bagi membangunkan sistem penarafan bangunan pejabat mapan khusus bagi Malaysia, yang mana jika dilaksanakan akan menggalakkan dan mempromosi praktis-praktis pembangunan bangunan pejabat mapan di Malaysia. Bagi merealisasikan matlamat menghasilkan rangkakerja penilaian bangunan pejabat mapan yang sesuai dan dapat diterimapakai di Malaysia, amatlah penting bagi saya untuk mendapatkan kerjasama daripada pakar-pakar yang terdiri dari jurutera, arkitek, perancang, pemaju dan juga pihak berkuasa atau badan kerajaan yang bertanggungjawab di atas pengurusan industri pembinaan di Malaysia.

Oleh itu, saya amatlah berbesar hati sekiranya pihak tuan boleh membantu saya dalam mengedarkan borang kajiselidik ini kepada staff di jabatan tuan. Di sini saya sertakan 3 borang kajiselidik, 3 sampul surat berstem untuk digunakan bagi menghantar semula borang kajiselidik yang telah dilengkapi serta 3 keping CD yang mengandungi artikel-artikel terpilih sebagai tanda penghargaan dari pihak saya. Saya memohon jasa baik pihak tuan agar borong-borong ini dapat dikembalikan dalam masa **seminggu** dari tarikh surat ini.

Di harap, pihak tuan tidak berkeberatan untuk menghubungi saya pada bila-bila masa sekiranya ada sebarang pertanyaan dan kemusykilan. Perhatian dan kerjasama pihak tuan saya dahului dengan ribuan terima kasih.

Yang benar,

**Zalina Shari**

Pelajar PhD, School of Architecture, Landscape Architecture & Urban Design,  
University of Adelaide, SA 5005, Australia

**Assoc. Prof. Dr Veronica Soebarto (Penyelia)**

School of Architecture, Landscape Architecture & Urban Design, University of Adelaide, SA 5005, Australia  
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## Appendix E-2: Cover Letter



**A SURVEY ON OFFICE BUILDING SUSTAINABILITY  
ASSESSMENT FRAMEWORK  
FOR THE MALAYSIAN BUILDING SECTOR**

Ref. no.:

Dear Participant,

The topic of this research is “Development of a Sustainability Assessment Framework for Malaysian Office Buildings Using a Mixed-Methods Approach”. The Office Building Sustainability (OBS) assessment framework proposed by this study could be used as the basis of developing a OBS assessment system for Malaysia, which in turn would help to regulate, encourage and promote sustainable office building practices. In order to establish an appropriate OBS assessment framework for Malaysia, it is important to understand local building stakeholders’ perceptions about the most significant issues to be considered in the framework and their expectations about OBS assessment in Malaysia.

Therefore, I would like to invite you to participate in this survey. Please complete the attached questionnaire at your earliest convenience and return it to me in the envelope provided before the deadline of **7 April 2009**. Completing this questionnaire should take no longer than 20 minutes. In appreciation of your support, enclosed is a CD containing selected articles on “Cities and Climate Change”.

Please be advised that this survey is being conducted privately and it is agreed that individual survey documents will not be forwarded for any other purposes other than for this research and the information in them will not be available to other people apart from presentation in a summary form.

Should you have any question or concern regarding this research, please do not hesitate to contact me at the address above. Thank you very much in advance for your support and cooperation to this survey.

Warm Regards,

**Zalina Shari**

PhD Candidate

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Tel: +61 4 22423791 (Adelaide) 016 2351250 (Malaysia)

Email: [zalina.shari@adelaide.edu.au](mailto:zalina.shari@adelaide.edu.au)

You can also contact my supervisor

**Assoc. Prof. Dr Veronica Soebarto**School of Architecture, Landscape Architecture & Urban Design,  
University of Adelaide, SA 5005, AustraliaTel: +61 8 8303 5695 Email: [veronica.soebarto@adelaide.edu.au](mailto:veronica.soebarto@adelaide.edu.au)**To be completed by respondent (optional):**

Organisation: \_\_\_\_\_

Name: \_\_\_\_\_

Job Title: \_\_\_\_\_

Email: \_\_\_\_\_ Date of survey: \_\_\_\_\_/2009

## Appendix E-3: Reminder Letter



SCHOOL OF ARCHITECTURE, LANDSCAPE  
ARCHITECTURE, AND URBAN DESIGN

ZALINA SHARI  
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web: <http://www.architecture.adelaide.edu.au>  
CRICOS Provider Number 00123M

22 APRIL 2009

Dear Sir/Madam,

### **Little Reminder: A Survey on Office Building Sustainability Assessment Framework for the Malaysian Building Sector**

To research for establishment of an appropriate office building sustainability (OBS) assessment framework for Malaysia, we have sent survey questionnaire to 500 local building stakeholders (including you) regarding local stakeholders' perceptions about the most significant issues to be considered in the framework and their expectations about OBS assessment in Malaysia.

So far, many building stakeholders have filled and returned the questionnaire, while some have not. If you have filled and sent back the questionnaire we sent you, please accept our heartfelt thank you. If you have not done so, could you please be advised that we are still waiting for the reply from you?

If you have not received the questionnaire, or if you hope to fill the electronic version of questionnaire, please call us at +614 22423791, or send email to [zalina.shari@adelaide.edu.au](mailto:zalina.shari@adelaide.edu.au). We will be delighted to send a new questionnaire to you immediately upon request. Collecting each survey questionnaire is important to our research; therefore, your support and assistance are immensely appreciated.

With very best wishes,

**Zalina Shari**

PhD Candidate

---

You can also contact my supervisor

### **Assoc. Prof. Dr Veronica Soebarto**

School of Architecture, Landscape Architecture & Urban Design,  
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Email: [veronica.soebarto@adelaide.edu.au](mailto:veronica.soebarto@adelaide.edu.au)

Appendix E-4: Survey Questionnaire

### **PART I – BACKGROUND**

**1.1 Profession/Vocation**

Architect	<input type="checkbox"/>	Real Estate Developer/ Building Owner/ Investor	<input type="checkbox"/>	Policy-maker/Regulator	<input type="checkbox"/>
Engineer	<input type="checkbox"/>	Project Manager	<input type="checkbox"/>	Contractor/Builder	<input type="checkbox"/>
Planner	<input type="checkbox"/>	Facility Manager/ Building Operator	<input type="checkbox"/>	Other (please specify) .....	<input type="checkbox"/>

**1.2 Gender**

Male  Female

**1.3 Highest level of educational qualification**

Postgraduate degree	<input type="checkbox"/>	Undergraduate degree	<input type="checkbox"/>	Secondary School Matriculation	<input type="checkbox"/>
Postgraduate diploma	<input type="checkbox"/>	Diploma or Certificate	<input type="checkbox"/>	Other (please specify) .....	<input type="checkbox"/>

**1.4 What type of organisation do you work for?**

Design Consultancy	<input type="checkbox"/>	Property Development/ Investment	<input type="checkbox"/>	Project Management	<input type="checkbox"/>
Government Agency/ Regulatory Body	<input type="checkbox"/>	Facility Mgt./ Building Operation & Maintenance	<input type="checkbox"/>	Construction Company	<input type="checkbox"/>
Education	<input type="checkbox"/>	Other (please specify) .....	<input type="checkbox"/>		

**1.5 Years of working experience in your profession/vocation**

1 – 4 years	<input type="checkbox"/>	10 – 19 years	<input type="checkbox"/>	More than 30 years	<input type="checkbox"/>
5 – 9 years	<input type="checkbox"/>	20 – 30 years	<input type="checkbox"/>		

**PART II – SUSTAINABILITY AWARENESS**

**2.1 Do you consider sustainability assessment an important issue for office building development?**

Sustainability assessment of a building denotes any method meant for assessing the impact of a building (i.e. its characteristic, operation or services) to the environment and human.

Yes  Comments:.....

No  Please briefly explain: .....

(You may continue, if you want to)

**2.2 Please rank the following list to indicate the most suitable stage of project development to incorporate sustainability issues.** Instruction: Put the number 5 against the one which you think is the MOST suitable stage, then so on down to 1 for the one which is the LEAST suitable. Equal ranking can be shown as a same number e.g. 1,1,3,4,5 etc.

Pre-Design/ Inception Stage	<input type="checkbox"/>
Design Development Stage	<input type="checkbox"/>
Construction Stage	<input type="checkbox"/>
Operation Stage	<input type="checkbox"/>
Refurbishment/ Demolition Stage	<input type="checkbox"/>

**2.3 Below are the 3 Sustainability Issues to be considered in determining the sustainability performance of a building. Please rate the importance of these issues, in comparison to each other.**

Instruction: Please tick (✓) your answers.

<i>Not Important</i>	<i>Moderately Important</i>	<i>Important</i>	<i>Very Important</i>
--------------------------	---------------------------------	------------------	---------------------------

SUSTAINABILITY ISSUES					
		1	2	3	4
a	Environmental protection				
b	Enhance human well-being				
c	Economic development				

**2.4 Are you familiar with the following existing building performance assessment systems?**

Instruction: Please tick (✓) your answer(s).

Yes   BREEAM (UK)  Green Mark (Singapore)   
 LEED (US)  CASBEE (Japan)   
 GBTool/ SBTTool (International)  Green Star (Australia)   
 Other (please specify):   
 .....

No

**PART III – SUSTAINABILITY PREFERENCES**

Within each Sustainability Issue listed in Question 2.3 are a number of Sub-Issues (in shaded areas). Each Sub-Issue has its own Criteria to be considered in determining the sustainability performance of an office building. Please rate the importance of these Criteria. Instruction: Please tick (✓) your answers.

3.1 ENVIRONMENTAL ISSUES <small>(element of construction works, parts of works, processes or services that can interact with the environment)</small>		Not Important AND	Less Important AND	Important AND	Very Important AND
		Can be Omitted	May be Omitted	Should be Assessed	Must be Assessed
<b>A</b>	<b>Land use &amp; Impacts on Ecology</b>	1	2	3	4
1	Minimize <b>ecological &amp; other damage</b> to existing soil, water bodies and flora & fauna of the site or adjacent lands due to the construction process				
2	<b>Improve ecological value</b> of natural landscape (i.e. diversity of the plantings & use of native species from the area)				
3	Maximize <b>potential for green/open space</b> on the site for informal recreation				
4	Provide <b>greenery</b> within and/or on the rooftop of the building				
5	Select <b>sites that have low ecological value or in non-sensitive areas</b>				
6	<b>Redevelopment</b> of existing/used site rather than green field				
7	Select <b>sites that have low risk of flooding</b>				
8	Select <b>sites that are within urban areas with existing infrastructure</b>				
9	Other: .....				
10	Other: .....				
<b>B</b>	<b>Supports Resource Management</b>	1	2	3	4
1	Increase use of <b>bio-based products &amp; materials</b> obtained from managed/sustainable sources				
2	Increase use of <b>products &amp; materials with recycled content</b>				
3	Use <b>durable materials</b> that require less maintenance (for non-structural elements)				
4	Increase use of <b>materials that can be recycled</b>				
5	Increase use of <b>materials that have less environmental impact in producing them</b>				
6	Other: .....				



7	Other: .....				
<b>C Emissions to Air</b>		<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>
1	Reduce <b>greenhouse gas emissions</b> from all energy used for <b>building operations</b>				
2	Select <b>sites that are near to public transport stops</b>				
3	Provide <b>connection from building to existing public transportation network</b> (e.g. footbridge, covered walkway etc.)				
4	Availability of <b>pedestrian access between building &amp; basic services</b> (e.g. shops, banks, eating outlets)				
5	Select <b>sites that are reasonably near residential zones</b>				
6	Provide only <b>minimum allowable parking spaces</b>				
7	Provide <b>more than minimum allowable motorcycle parking spaces</b> to discourage the use of cars				
8	Provide <b>bicycles and/or bicycle parking spaces</b> for building users				
9	Minimize <b>air pollution from site workers' accommodation</b>				
10	Other: .....				
11	Other: .....				
<b>D Emissions to Land/ Solid Waste</b>		<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>
1	<b>Reuse</b> of suitable <b>existing structure(s)</b> on the site, as part of the new project				
2	<b>Design for easy disassembly of components</b> – so that they can be reused or recycled at the end of the service life of the components				
3	Provide <b>space for collection of recyclables, recycling storage &amp; staging areas</b> in the building				
4	Increase use of <b>salvaged, refurbished or used materials</b> from off-site sources				
5	Increase the practice of treating <b>land-clearing debris as a resource</b>				
6	Implement <b>construction waste management program</b> with sorting, reuse & recycling measures				
7	Minimize <b>use of interior finishing materials</b> to minimize the direct & indirect consumption of resources				
8	Design for repeatability and increase <b>use of standardized and prefabricated building components</b> (e.g. beams, columns, walls, slabs, windows, doors etc.) to reduce wastages				
9	Minimize <b>land pollution</b> (e.g. solid wastes) <b>from site workers' accommodation</b>				
10	Maximize <b>recycling of office recyclables</b> (i.e. amount sent to recycling facilities)				
11	<b>Safe handling and storage of hazardous wastes on site</b>				
12	Other: .....				
13	Other: .....				
<b>E Emissions to Water</b>		<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>
1	Reduce the <b>risk of water contamination to nearby water body</b> (e.g. lake, river, wetland)				
2	Implement <b>stormwater management strategies</b> to control the quantity and quality of stormwater runoff, hence preventing flood & soil erosion (i.e. use permeable pavements, detention basin or retention ponds)				
3	Utilize <b>on-site wastewater treatment systems</b> using:				

(for non-potable uses e.g. site irrigation, toilet flushing)

a. Gray water (e.g. from shower, sinks, condensate from cooling towers)

b. Black water (e.g. from toilets)

4 Minimize **storm sewer or stream pollution from site workers' accommodation**

5 Other: .....

6 Other: .....

**F Impacts on Adjacent Properties** **1 2 3 4**

1 Reduce possibility of **overshadowing adjacent properties**

2 Reduce **potential glare to adjacent properties** (e.g. by limiting the use of reflective glass on building façades)

3 Minimize **light spillage from exterior lightings** into the atmosphere

4 Reduce **noise and vibration** generated during the construction of the project (e.g. by using appropriate type of foundation system if the site is located at critical location i.e. near hospitals, schools)

5 Other: .....

6 Other: .....

**G Non-renewable Energy Consumption** **1 2 3 4**

1 Reduce annual fossil fuel **energy consumption for building operations**

2 Use **integrated lighting concept** (i.e. optimize daylighting in permanently occupied spaces; and consider heat gain, lighting quality & reduce reliance on electric lighting)

3 Use **passive cooling strategies** (i.e. design of the building's cooling & ventilation systems relying on sunlight, wind, vegetation & other naturally occurring resources on the building site)

4 Design for a **tight, thermally resistant envelope** to prevent leakage of cool draft through building skin

5 Use **highly efficient ventilation & air-conditioning systems**

6 Use **dimnable and/or auto-sensored lighting system** (i.e. controlled according to daylight availability and/or occupancy)

7 Install **energy sub-metering system** for each floor/section/tenancy to monitor energy consumption

8 Provide **on-site power generation systems** [e.g. photovoltaics (PVs)]

9 Use **energy efficient light fixtures & office appliances**

10 Facilitate **personal control** of the lighting & thermal comfort systems by occupants

11 Minimize the **size of lighting system control zones** to optimize energy savings

12 Other: .....

**H Potable Water Consumption** **1 2 3 4**

1 Minimize **use of potable water** (i.e. treated water) for:

a. Landscape irrigation

b. The testing of fire fighting system

c. Cooling system

2 Use **water efficient plumbing fixtures & appliances** (e.g. low-flush toilets, air entraining taps & shower heads)

3 Install **water meters** for all major water uses in the project to **monitor water consumption** & to locate any leakages in the pipe lines

4	Harvest rainwater for later re-use to reduce the potable water consumption	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
5	Other: .....	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>

<b>3.2 SOCIAL ISSUES</b> <small>(element of construction works, parts of works, processes or services that can interact with society or quality of life)</small>	<i>Not Important AND</i>	<i>Less Important AND</i>	<i>Important AND</i>	<i>Very Important AND</i>
	<i>Can be Omitted</i>	<i>May be Omitted</i>	<i>Should be Assessed</i>	<i>Must be Assessed</i>
<b>I Accessibility</b>	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>

1	Select <b>sites that are walking distance to basic services</b> (e.g. shops, banks, post office, eating outlets, clinics etc)	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
2	Maximize <b>personal safety &amp; security</b> for users to access & use the building	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
3	Easy access to <b>building technical systems</b> for repair & maintenance	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
4	Adequate access to <b>communication technology</b> (e.g. internet, telephone, video-conferencing)	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
5	<b>Easy to clean</b> the building facades & other elements or design (or consider self cleaning facades)	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
7	Other: .....	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>

<b>J Education &amp; Awareness</b>	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>
------------------------------------	----------	----------	----------	----------

1	Readiness and competency of design team members on sustainable design & development issues	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
2	Provide <b>spaces for education</b> (e.g. library)	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
3	Improve <b>sustainable construction skills among construction workers</b>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
4	Improve <b>skills &amp; knowledge of maintenance &amp; operation staff</b>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
5	Increase <b>occupants' awareness on consumption &amp; waste production</b> (i.e. water, energy & materials/products)	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
6	Other: .....	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>

<b>K Inclusiveness of Opportunities</b>	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>
---	----------	----------	----------	----------

1	Provide for <b>universal access</b> (i.e. access for disabled, elderly, prams/strollers, and 'abled' people)	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
2	Provide <b>facilities for users with children</b> (e.g. play room/area, child care/nursery, mother's room)	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
3	Provide <b>facilities for users to perform religious and spiritual quotient</b> (e.g. praying room & ablution areas)	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
4	Other: .....	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>

<b>L Human Health &amp; Well-being</b>	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>
--	----------	----------	----------	----------

1	Adapt practices that <b>avoid construction accidents</b>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
2	Use interior finish <b>materials</b> (e.g. solvents, paints, adhesives, carpeting, particleboard) <b>with low- or zero-pollutants off-gassing</b>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
3	Provide <b>separately ventilated &amp; isolated areas/rooms which generate pollutants</b> (e.g. copier rooms, waste storage areas, janitorial rooms)	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
4	Use <b>low/zero pollutants cleaning &amp; maintenance products &amp; processes</b>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
5	Non-exposure to tobacco smoke:				
	a. <b>Prohibit tobacco smoking</b> in the building	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
	b. <b>Provide separately ventilated rooms/areas for tobacco</b>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>

<b>smoking</b>					
6	Provide appropriate <b>air changes</b> to maximize level & quality of fresh air in the ventilation systems	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
7	Provide <b>carbon dioxide monitoring &amp; control system</b> for main occupancy areas	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
8	Provide optimum <b>air movement for thermal comfort</b> in mechanically ventilated spaces	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
9	Maximize openings & <b>cross-ventilation</b> in naturally ventilated spaces (e.g. in lobbies, café, washrooms)	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
10	Increase the practice of <b>building flush-out</b> to reduce possible indoor air quality (IAQ) contamination after construction completion and prior to occupancy (or conduct IAQ test after the building is occupied)	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
11	Maximize <b>visual access to exterior views</b> or view to an atrium from workstations	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
12	Appropriate <b>illumination level &amp; lighting quality</b> in public and work areas	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
13	Minimize <b>glare conditions</b> in main occupancy areas	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
14	Minimize <b>noise level &amp; provide satisfactory level of acoustic performance</b> (i.e. adequate noise attenuation through the wall facing the noisiest site boundary; minimum noise transmission from mechanical and equipment rooms; reduce noise impacts between all occupancy types)	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
15	Adequate <b>monitoring of occupants' satisfaction</b> with indoor environmental quality (i.e. thermal, visual & acoustic comfort)	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
16	Select <b>sites that are walking distance to recreation areas</b> or facilities	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
17	Provide <b>recreational facilities</b> (e.g. gym, game room, sports facilities) for building users	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
18	Other: .....	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
<b>M</b>	<b>Support for Social Cohesion</b>	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>
1	Increase <b>participation of users in development process</b> to ensure users' requirements are met	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
2	Increase <b>participation of affected community in development process</b> to avoid conflict and ensuring the sustainability of the development	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
3	Support for <b>inter-disciplinary work</b> between architects, engineers, costing specialists, operations people and other relevant actors right from the beginning of the design process	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
4	Provide <b>mixed uses within the project</b> , to support an active streetscape & to reduce the need for commuting transport (e.g. office combined with retail)	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
5	<b>Space planning for maximum social interaction</b> (e.g. visual link between floors, provision of common/break areas, minimal enclosures, user friendly etc.)	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
6	Other: .....	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
<b>N</b>	<b>Cultural &amp; Heritage Aspects</b>	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>
1	Maintain the <b>heritage value of existing buildings for refurbishment project</b> (i.e. new features, systems & materials are consistent with the character of the original design of the heritage building)	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
2	Compatibility of urban design & building architecture with <b>local cultural values</b> (functionally & aesthetically)	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
3	Other: .....	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
<b>O</b>	<b>Local People &amp; Employment</b>	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>

1	Use experienced <b>local design teams</b>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
2	Use experienced <b>local contractors</b>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
3	Use <b>local labour</b>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
4	Linkage to <b>local service providers</b>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
5	Increase use of <b>locally produced materials</b>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
6	Provide <b>training opportunities for local people</b> to be future skilled construction workers	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
7	Other: .....	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>

<b>3.3 ECONOMIC ISSUES</b> (element of construction works, parts of works, processes or services that can interact with economic conditions)	<i>Not Important AND</i>	<i>Less Important AND</i>	<i>Important AND</i>	<i>Very Important AND</i>
	<i>Can be Omitted</i>	<i>May be Omitted</i>	<i>Should be Assessed</i>	<i>Must be Assessed</i>
<b>P Efficiency, Effectiveness &amp; Flexibility</b>	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>

1	Maximize <b>workspace/directly functional area to total floor area ratio</b> (i.e. Net Letable/ Leasable Area)	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
2	Maximize <b>plot ratio</b> to generate denser development (i.e. ratio of the total floor area to the total site area as permitted by local authority)	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
3	<b>Space planning for maximum flexibility</b> for different users/ requirements	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
4	Provide <b>building services systems with maximum flexibility</b> for different users/ requirements	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
5	<b>Structural design with maximum adaptability</b> for new uses	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
6	Adequate <b>floor-to-floor height</b> to offer high level of functionality for almost any new occupancy	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
7	Develop & implement a <b>long-term maintenance management plan</b> for efficient building operation	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
8	Provide & operate an effective <b>facility management control system</b> to maximize the operational efficiency of building systems (e.g. HVAC, lighting and vertical transportation systems)	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
9	Requirement of contracted <b>comprehensive commissioning, and post-occupancy commissioning</b> to be performed for all building services (e.g. BMS, mechanical, electrical and hydraulic)	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
10	Provide <b>as-built drawings &amp; equipment manuals</b> to operating staff & owners to ensure efficient operation	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
11	Other: .....	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>

<b>Q Triple Bottom Line Accounting</b>	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>
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1	Minimize <b>payback period</b>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
2	High <b>rate of occupancy</b> and low rate of occupancy turnover	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
3	Consider both <b>capital/construction cost, along with long-term operating costs</b> (utilities & maintenance) (To determine whether the long-term savings are worth the higher capital cost)	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
4	Increase the practice of referring to <b>Environmental Impact Assessment (EIA) report</b> prepared by environmental experts (if available for the project) by the project team.	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
5	Conduct <b>Design Risk Analysis</b>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
6	Conduct <b>Triple Bottom Line (TBL)</b> before deciding to pursue with the project (i.e. ensure the Environmental, Social & Economic outcomes of the project are considered during conception stage. Sustainable development goals & strategies are documented and all team players are made aware of their responsibilities)	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>

- 7 Assess and evaluate the **quality of workmanship** of construction works prior to hand over 

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- 8 Other: ..... 

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**3.4 Please rate the Sub-Issues.** Instruction: Please tick (✓) your answers.

<b>ENVIRONMENTAL ISSUES</b>		<i>Not Important</i>	<i>Less Important</i>	<i>Important</i>	<i>Very Important</i>
		<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>
A	Land Use & Impacts on Ecology				
B	Supports Resource Management				
C	Emissions to Air				
D	Emissions to Land/ Solid Waste				
E	Emissions to Water				
F	Impacts on Adjacent Properties				
G	Non-renewable Energy Consumption				
H	Potable Water Consumption				
	Other .....				

<b>SOCIAL ISSUES</b>		<i>Not Important</i>	<i>Less Important</i>	<i>Important</i>	<i>Very Important</i>
		<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>
I	Accessibility				
J	Education & Awareness on Sustainable Development				
K	Inclusiveness of Opportunities to Use & Access the Building				
L	Human Health & Well-being				
M	Participation in Social Decision Processes & Support for Social Cohesion				
N	Cultural & Heritage Aspects				
O	Local People & Employment				
	Other .....				

<b>ECONOMIC ISSUES</b>		<i>Not Important</i>	<i>Less Important</i>	<i>Important</i>	<i>Very Important</i>
		<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>
P	Efficiency, Effectiveness & Flexibility				
Q	Triple Bottom Line Accounting – Planet, People Profit				
	Other .....				

**PART IV – EXPECTATIONS OF OFFICE BUILDING SUSTAINABILITY ASSESSMENT (OBSA) SYSTEMS** OBSA system denotes any method of measuring how well or poor an office building is performing (if measured during operation stage) or is likely to perform (if measured during design stage), against a declared set of sustainability criteria with the aim of recognizing and rewarding best practice and excellence.

**4.1 Do you agree that Malaysia needs its own OBSA System to be established?**

Yes		Comments (if any):.....
No		Please explain in detail: .....
Yes, but not now		Please explain in detail: .....

**4.2 What is the best approach for Malaysian building industry to implement an OBSA System?**

Mandatory by the Government  Voluntary basis  Incremental from voluntary to mandatory

**4.3 If Malaysia adopts a mandatory approach for a specific OBSA system within the next five years (2009-2013), which of the following phases of project development do you think should the assessment system be implemented?**

Instruction: Please rank your answers. Put the number 4 against the one which you think is the MOST important stage, then so on down to 1 for the one which is the LEAST important. Equal ranking can be shown as same number e.g. 1,1,3,4 etc.

Planning Approval Phase (to indicate the future potential sustainable performance of the project)   
 Building Approval Phase (to rate the sustainability of a building during design before construction)   
 As Built or Post-Construction Phase (to validate the building's conformation to initial design)   
 Operation Phase (also applied to existing buildings - to provide an objective & factual indication of the Actual performance of the project)

**4.4 If Malaysia adopts a voluntary approach for a specific OBSA system within the next five years (2009-2013), what do you think are the key drivers that could encourage the industry to adopt the assessment system?** E.g. fiscal incentives by the Government, marketing advantage for the organisation's business, higher rental/market value of the rated properties and etc.

**4.5 Additional comments:** If you have any comments or observations about OBSA system generally or particular criteria to be assessed in the system, please add these comments below.

\*\*\*\*\***END**\*\*\*\*\*  
 Thank you for your kind assistance. Copy of the compiled results of the survey will be made available. If you want to receive a copy of the survey results, please email me at [zalina.shari@adelaide.edu.au](mailto:zalina.shari@adelaide.edu.au).

<b>Thank you once again for your participation in this survey.</b>	
<b>Please return as soon as possible, by 7 April 2009, in the envelope provided to:</b>	
<b>Zalina Shari</b> c/o Prof. Dato' Dr. Elias Salleh Department of Architecture, Faculty of Design & Architecture, Universiti Putra Malaysia, 43400 Serdang, Selangor.	<b>OR</b> Fax to 03-62595484 (Attn. Zalina Shari)  For any queries, please email me or Prof. Dato' Dr. Elias Salleh at 0194503145 or 03-89464051

## Appendix F: Validated MOBSA Framework for Each Assessment Phase

F-1	Applicable MOBSA Criteria by Phase of Assessment	F 2-3
F-2	Validated Comprehensive MOBSA Framework (All Phases)	F 4-40
F-3	Validated MOBSA Framework for the Pre-Design Phase	F 41-50 (In CD)
F-4	Validated MOBSA Framework for the Construction & Commissioning Phase	F 51-61 (In CD)
F-5	Validated MOBSA Framework for the Operation Phase	F 62-77 (In CD)



## Appendix F-1: Applicable MOBSA Criteria by Phase of Assessment

Social Sub-Issue	Code	Criteria	Applicable criteria by phase			
			P-Dsn	Dsn	C&C	Ops
Education & Awareness	S-EDU-1	Awareness of building occupants				
	S-EDU-2	Readiness & competency of design team	■	■		
	S-EDU-3	Skills & knowledge of maintenance & operation staff		■	■	■
	S-EDU-4	Skills among construction workers		■	■	
Support for Social Cohesion	S-COH-1	Inter-disciplinary work	■	■		
	S-COH-2	Support active streetscape	■	■		■
	S-COH-3	Space planning for maximum social interaction	■	■		■
	S-COH-4	Participation of affected community	■		■	
	S-COH-5	Participation of users	■	■		
Accessibility	S-ACC-1	Personal safety & security	■	■	■	■
	S-ACC-2	Maintenance access for building facades	■	■		■
	S-ACC-3	Access to communication technology	■	■		■
	S-ACC-4	Maintenance access for building services installations	■	■		■
	S-ACC-5	Access to nearby services	■	■		
Inclusiveness of Opportunities	S-INC-1	Universal access	■	■		■
	S-INC-2	Facilities for users to perform religious obligations	■	■		■
	S-INC-3	Facilities for users with children	■	■		■
Human Health & Well-being	S-HUM-1	Avoid construction accidents		■	■	■
	S-HUM-2	Level & quality of fresh air	■	■		■
	S-HUM-3	Openings & cross ventilation	■	■		■
	S-HUM-4	Noise level & acoustic performance	■	■		■
	S-HUM-5	Illumination level & quality of artificial lighting	■	■		■
	S-HUM-6	Prohibit tobacco smoking	■	■	■	■
	S-HUM-7	Low/zero pollutants cleaning & maintenance	■		■	■
	S-HUM-8	Interior finish materials with low/zero off-gassing	■	■		■
	S-HUM-9	Air movement for thermal comfort	■	■		■
	S-HUM-10	Glare conditions	■	■		■
	S-HUM-11	Building flush-out	■	■	■	■
	S-HUM-12	Areas/rooms which generate pollutants & odour	■	■		■
	S-HUM-13	Monitoring of occupants' satisfaction with IEQ	■			■
Cultural & Heritage Aspects	S-CUL-1	Heritage significance of the building or adjoining/nearby heritage buildings	■	■	■	■
Local People & Employment	S-LOC-1	Training opportunities for unskilled local people			■	
	S-LOC-2	Locally available materials & products	■	■		
	S-LOC-3	Local service providers				■
	S-LOC-4	Experienced local design teams		■		
	S-LOC-5	Experienced local contractors		■	■	
Environmental Sub-Issue	Code	Criterion	P-Dsn	Dsn	C&C	Ops
Land Use & Impacts on Ecology	EN-ECO-1	Damage to soil, water bodies, and flora & fauna		■	■	
	EN-ECO-2	Landscape spaces on the site	■	■		■
	EN-ECO-3	Ecological value of natural landscape	■	■		■
	EN-ECO-4	Risk of flooding	■	■		
Supports Resource Management	EN-SRM-1	Materials that have less environmental impact**	■	■		
	EN-SRM-2	Building design for maximum durability	■	■		
	EN-SRM-3	Bio-based products & materials	■	■	■	■
	EN-SRM-4	Materials that can be recovered or recycled	■	■		
	EN-SRM-5	Products & materials with recycled content	■	■	■	■
Emissions to Air	EN-AIR-1	Access to basic services & connection to public transportation network	■	■		■
Emissions to Land/ Solid Waste	EN-LAN-1	Handling & storage of hazardous wastes on site	■	■		■
	EN-LAN-2	Construction waste management programme	■	■	■	
	EN-LAN-3	Spaces for collection of recyclables	■	■	■	■
	EN-LAN-4	Recycling of office recyclables	■	■		■
	EN-LAN-5	Pollution from site workers' accommodation	■		■	
	EN-LAN-6	Standardized & prefabricated components	■	■	■	
Emissions to Water	EN-EWA-1	Stormwater management strategies	■	■	■	
	EN-EWA-2	Pollution from site workers' accommodation	■		■	
	EN-EWA-3	On-site wastewater treatment systems	■	■		■

Impacts on Adjacent Properties	EN-ADJ-1	Noise & vibration generated during construction	■	■	■	
Non-Renewable Energy Consumption	EN-ENE-1	Energy efficient light fixtures & office appliances	■	■		■
	EN-ENE-2	Efficient ventilation & air-conditioning systems	■	■		
	EN-ENE-3	Passive cooling strategies	■	■		
	EN-ENE-4	Integrated lighting concept	■	■		■
	EN-ENE-5	Fossil fuel energy consumption for operations	■	■		■
	EN-ENE-6	Size of building systems control zones	■	■		■
	EN-ENE-7	Automatic lighting control systems	■	■		■
	EN-ENE-8	Energy sub-metering system	■	■		■
	EN-ENE-9	Personal control of the thermal comfort systems	■	■		■
Potable Water Consumption	EN-WAT-1	Harvest rainwater	■	■	■	■
	EN-WAT-2	Water efficient plumbing fixtures & appliances	■	■		■
	EN-WAT-3	Potable water for landscaping irrigation	■	■		■
	EN-WAT-4	Potable water for cooling system	■	■		■
	EN-WAT-5	Water meters	■	■		■
<b>Economic Sub-Issue</b>	<b>Code</b>	<b>Criterion</b>	<b>Applicable criteria by phase</b>			
			<b>P-Dsn</b>	<b>Dsn</b>	<b>C&amp;C</b>	<b>Ops</b>
Triple Bottom Line Accounting	EC-TBL-1	Referring to EIA report	■	■		
	EC-TBL-2	Quality of workmanship			■	
	EC-TBL-3	Capital cost & long-term operational costs	■	■		
	EC-TBL-4	Triple Bottom Line	■	■		
	EC-TBL-5	New & untested sustainable products & technologies	■	■		
Efficiency, Effectiveness & Flexibility	EC-EEF-1	Long-term maintenance management plan	■	■		■
	EC-EEF-2	Building management control system	■	■		■
	EC-EEF-3	Comprehensive building records	■	■	■	■
	EC-EEF-4	Spatial flexibility	■	■		
	EC-EEF-5	Building services systems with maximum flexibility	■	■		
	EC-EEF-6	Comprehensive commissioning	■	■	■	■
	EC-EEF-7	Structural and core layout with maximum adaptability	■	■		
	EC-EEF-8	Floor-to-floor height for high level of functionality	■	■		
	EC-EEF-9	Directly functional area to total floor area ratio	■	■		
<b>Innovation</b>	<b>Code</b>	<b>Criterion</b>				
Innovation	INN-1	Innovative strategies and technologies		■	■	■
	INN-2	Exceeding MOBSA benchmarks		■	■	■
<b>Note:</b>						
P-Dsn = Pre-design phase; Dsn = Design phase;						
C&C = Construction & Commissioning phase; Ops = Operations phase						

**Note:** Assessment Phase: P-Dsn = Pre-design phase; Dsn = Design phase; C&C = Construction & Commissioning phase; Ops = Operations phase  
 Spatial Scale: G = Global level: *Impacts on resources specifically identified to be global*; C = Community and regional level: *Impacts on the neighbourhood, community and region*;  
 S = Site level: *Site-specific attributes*; B = Building level: *Certain construction techniques, attributes of buildings, or types of building materials*; and O = Other: *Criteria that do not fit the above.*

Issue	Sub-Issues	Criteria & Benchmarking	Assess. Phase	Spatial Scale
<b>S: SOCIAL</b>				
<b>EDU: Education and Awareness</b>				
S-EDU-1	<b>Increase awareness of building occupants</b>	<p>Property management company has prepared a building-specific user and environmental manual/guideline; AND                      The manual/guideline has been provided to ALL tenants and building occupants.</p> <p><i>The manual/guideline shall include the following information:</i></p> <ul style="list-style-type: none"> <li>- Facilities and provisions provided in the building;</li> <li>- Services provided by the building and property management company;</li> <li>- Contact persons and methods of contact for the building's major property management staff;</li> <li>- Health, hygiene, fire, safety and security information for the building;</li> <li>- Environmental guidelines, such as the recyclable materials collection and sorting locations, and the basic information introducing the types of recyclable materials;</li> <li>- Guidelines to minimise nuisance to other building occupants and users;</li> <li>- Methods to reduce adverse environmental impacts.</li> </ul> <hr/> <p>ADDITIONAL:</p> <ul style="list-style-type: none"> <li>- All occupants are exposed on a monthly basis to current, previous and targeted building performance figures (i.e. water, electricity, waste and accidents) via leaflets, posters or intranet; AND</li> <li>- A fixed set of guidelines is posted at prominent places for continuous awareness of the occupants in conserving energy and water as well as reducing waste.</li> </ul>	Ops	O
S-EDU-2	<b>Readiness and competency of design team members</b>	<p>At least one principal member in the design team has had training and/or experience and/or very knowledgeable in sustainable design and development, hence ready and competent to help develop and support the sustainable design goals for the project from the schematic design phase through to construction completion.</p> <p><i>Note: An expanded design team for a sustainable design with commissioning includes the following members:</i></p> <ul style="list-style-type: none"> <li>• Owner, architect, design engineers, landscaping/site specialist, interior designer, cost estimator</li> <li>• Energy analyst/engineer – intimately familiar with energy and daylight analysis modelling tools</li> <li>• Environmental design consultant – helps design teams recognize design synergies and opportunities to implement sustainable design features without increasing construction costs.</li> <li>• Commissioning Authority – documents the Owner's Project Requirements (OPRs) starting in the pre-design phase – records the owner's objectives, criteria, and goals and benchmarks for gauging success in achieving the defined requirements. The OPR document forms the basis from which all design, construction, acceptance, and operational decisions are made.</li> </ul> <hr/> <p>ADDITIONAL:</p>	P-Dsn	O

	Workshop has been held to educate the entire team (client and consultants) about the impact of buildings and construction on human health, well-being, and productivity; resource use; community development; ecosystem; and the opportunities for improvement.	
	At least one of major design companies used has a valid ISO 14001 Environmental Management System (EMS) accreditation throughout the project development.	Dsn
S-EDU-3	<b>Improve skills and knowledge of maintenance and operation staff</b>	O
	Tender Specification clearly specifies the requirements for appropriate and effective trainings to be arranged by Contractors and Suppliers for the future operating staff, to allow them to familiarize themselves with the building design philosophy, as well as the strategies and methods for the operation of various building facilities and building services systems.	Dsn
	<i>Note: Scope of training shall be appropriate to the scale of the building and the complexity of the building services installations and building facilities. The training shall cover but not limited to the following information:</i>	
	- Building design philosophy and characteristics;	
	- Usage and provisions provided in the building;	
	- Operation, troubleshooting and maintenance of all building facilities, systems and equipment.	
	Records indicate that Contractors and Suppliers and/or Designers have provided appropriate and effective trainings for the operating and maintenance staff to familiarize them with the building design philosophy, as well as strategies and methods for the operation of various building facilities and building services systems; AND the training scope and information are entirely satisfied by the Client's representatives.	C&C
	<i>Note: Scope of training shall be appropriate to the scale of the building and the complexity of the building services installations and building facilities. The training shall cover but not limited to the following information:</i>	
	- Building design philosophy and characteristics;	
	- Usage and provisions provided in the building;	
	- Operation, troubleshooting and maintenance of all building facilities, systems and equipment.	
	Only certified property management company staff of the building are employed; AND They are provided with training at least once a year.	Ops
	<i>Note: The training topics shall cover, but not limited to health and hygiene, fire and safety, security, communication method with building occupants and building technology. The training materials shall include basic and latest information on relevant topics.</i>	
	ADDITIONAL: The property management company is accredited with ISO 14001 Environmental Management System (EMS) accreditation prior to and throughout the construction process.	
S-EDU-4	<b>Improve sustainable construction skills among construction workers</b>	O
	Accreditation to the ISO 14001 Environmental Management System is specified as one of the requirements in the tender pre-qualification of major contractor companies.	Dsn
	The Contractor has valid ISO 14001 Environmental Management System (EMS) accreditation prior to and throughout the construction process.	C&C
	ADDITIONAL: The Contractor has implemented a comprehensive, project-specific Environmental Management Plan (EMP) for the works in accordance with the format set by the Department of Environment (DOE).	
	ADDITIONAL Evidence is provided to demonstrate that efforts have been made to identify the training needs to enhance the level of knowledge and skill of the workers on sustainable construction and the training has been provided at the early stage of construction process for:	
	- The major contractors' management and supervisory staff, and construction workers; OR	

- The major contractors' management and supervisory staff only.

## COH: Support for Social Cohesion

S-COH-1	<b>Support for inter-disciplinary work right from the beginning of the design process</b>	O
	The Client's Project Brief commits to support multi-disciplinary work between architects, engineers, cost specialists, operation people and other relevant actors right from the beginning of the design process.	P-Dsn
	A credible detailed plan exists for the implementation of a high quality Integrated Design Process (IDP) to identify functional and environmental priorities at the initiation of the Project, evaluate options and develop the design.	Dsn
	<i>Elements of IDP:</i>	
	<ul style="list-style-type: none"> <li>• Ensure that as many of the interested parties as possible are represented on the design team as early as possible;</li> <li>• Inter-disciplinary work right from the beginning of the design process;</li> <li>• Discussion and documentation by the owners and the design team of the relative importance of various performance and cost issues and the establishment of a consensus on these matters between client and designers and among the designers themselves;</li> <li>• Provision of a design facilitator (or environmental design consultant) to suggest strategies for the team to considered, as well as a commissioning authority to raise performance issues throughout the process and to bring specialized knowledge to the table;</li> <li>• Addition of an energy specialist to test various design assumptions through the use of energy and daylight simulations throughout the process, to provide relatively objective information on a key aspect of performance;</li> <li>• Addition of subject specialists (e.g. for daylighting, thermal storage) for short consultations with the design team;</li> <li>• Clear articulation of performance targets and strategies to be updated throughout the process by the owner and the design team.</li> </ul>	
S-COH-2	<b>Planning to support active streetscape and provisions for community</b>	C
	The Client's Project Brief commits to plan the building to support active streetscape by providing spatial and facility provisions that benefit the community.	P-Dsn
	If there is no existing streetscape or the project is developed on a green site with limited close neighbourhood, provisions shall be made to serve the building occupants and users.	
	ADDITIONAL: An amenity conflict appraisal has been carried out with survey on existing amenity/communal service provisions in the surrounding to identify duplication of services/ amenity conflicts, and to identify and evaluate the possible community supports that could be offered by the new building.	
	If there is no existing streetscape or the project is developed on a green site with limited close neighbourhood, this credit is 'Not applicable'.	
	<i>Note: The extent of amenity provision covers various supports for elderly, youth, students, passer-by, building occupants and people from outside the building. Support should be in form of those not addressed by other criteria e.g. healthcare, retail shops, restaurant/cafe, library, leisure &amp; recreational facilities, gallery. Additions to the existing inadequate supports or amenities can be provided in the new building, rather than repeated within the neighbourhood context.</i>	
	Design documentation indicates that the building ground floor or podium level will support active streetscape during and after office hours because the following provisions are designed to serve the community:	Dsn
	<ul style="list-style-type: none"> <li>- Communal and social service provisions such as healthcare, gallery, library, recreational and leisure facilities;</li> <li>- Convenient commercial service provisions such as restaurant/cafe and retail shops.</li> </ul>	
	OR	
	Acceptable evidence is available to demonstrate that adequate amenity provisions are provided in the immediate neighbouring sites to serve the existing local communities as well as the new building.	

	<p>If there is no existing streetscape or the project is developed on a green site with limited close neighbourhood, amenity provisions shall be designed to serve the building occupants and users.</p> <p><i>Note: The extent of amenity provision covers various supports for elderly, youth, students, passer-by, building occupants and people from outside the building. Support should be in form of those not addressed by other criteria e.g. healthcare, retail shops, restaurant/cafe, library, leisure &amp; recreational facilities, gallery. Additions to the existing inadequate supports or amenities can be provided in the new building, rather than repeated within the neighbourhood context.</i></p> <p>ADDITIONAL: Design documentation indicates that the building will provide spaces for vending machines for food and drinks, post box and cash machine to serve building occupants, users and community.</p>	
	<p>Field observations confirm that the building ground floor or podium level supports active streetscape during and after office hours because the following provisions are provided to serve the community:</p> <ul style="list-style-type: none"> <li>- Communal and social service provisions such as healthcare, gallery, library, recreational and leisure facilities;</li> <li>- Convenient commercial service provisions such as restaurant/cafe and retail shops.</li> </ul> <p>OR</p> <p>Acceptable evidence is available to demonstrate that adequate amenity provisions are provided in the immediate neighbouring sites to serve the existing local communities as well as the new building.</p> <p>If there is no existing streetscape or the project is developed on a green site with limited close neighbourhood, amenities are provided to serve the building occupants and users.</p> <p><i>Note: The extent of amenity provision covers various supports for elderly, youth, students, passer-by, building occupants and people from outside the building. Support should be in form of those not addressed by other criteria e.g. healthcare, retail shops, restaurant/cafe, library, leisure &amp; recreational facilities, gallery. Additions to the existing inadequate supports or amenities can be provided in the new building, rather than repeated within the neighbourhood context.</i></p> <p>ADDITIONAL: Field observations indicate that the building has vending machines for food and drinks, post box and cash machine to serve building occupants, users and community.</p>	Ops
S-COH-3	<b>Space planning for maximum social interaction</b>	B
	<p>The Client's Project Brief commits to create an environment in the building that promotes social interaction and communication.</p>	P-Dsn
	<p>For a multiple-tenancies building: The design provides a break-out and group workspace/meeting spaces for every tenancy or at least on every 3 floors, whichever is smaller.</p> <p>OR</p> <p>For an owner-occupier building: The design provides a break-out and group workspace/meeting spaces for every 3 floors.</p>	Dsn
	<p><i>Note: A break-out space is a quiet area away from the bustle of the workplace which functions as temporary relaxation zone and to hold less formal client or internal meetings. A group workspace is an area within the zone of individual workspaces to facilitate team cohesiveness and collaboration.</i></p> <p>For a multiple-tenancies building: Field observations indicate that a break-out and group workspace/meeting spaces have been provided for every tenancy or at least on every 3 floors, whichever is smaller.</p> <p>OR</p> <p>For an owner-occupier building: Field observations indicate that a break-out and group workspace/meeting spaces have been provided for every 3 floors.</p>	Ops

<i>Note: A break-out space is a quiet area away from the bustle of the workplace which functions as temporary relaxation zone and to hold less formal client or internal meetings. A group workspace is an area within the zone of individual workspaces to facilitate team cohesiveness and collaboration.</i>		
S-COH-4	<b>Increase participation of affected community in development process</b>	O
	The Client's Project Brief commits to encourage affected community participatory approach building planning to avoid conflict or minimise nuisance generated from the building that cause adverse impacts to the community and surroundings.	P-Dsn
	<i>Note: Affected community include tenants, property owners, and businesses within 100m of the project boundary, as well as the recognized community planning group and any other interested persons.</i>	
	The Contractor has identified the potential sensitive receivers (e.g. school, hospital, residential flats) nearby the site due to site activities; and avoided site activities with severe nuisance to the identified sensitive receivers where possible, and to provide protective and remedial measures; AND A continuous communication channel between the Developer/Owner, Contractor and the surrounding residents and building users has been established to convey their opinions, complaints and advices such that the Developer/Owner is able to adjust the new building construction method and remedial works to minimize the environmental and safety impacts to the community.	C&C
	ADDITIONAL: The Contractor has designated a person to record and review the opinion, complaints and advices raised by the surrounding residents and building users.	
	<i>Note: Affected community include tenants, property owners, and businesses within 100m of the project boundary, as well as the recognized community planning group and any other interested persons.</i>	
S-COH-5	<b>Increase participation of users in development process</b>	O
	The Client's Project Brief commits to encourage user participatory approach building planning to ensure users' requirements are met; hence, minimising nuisance generated from the building usage.	P-Dsn
	Representative of clients and/or future users have involved in the design process (workshops/ meetings with models and large format drawings).	Dsn
	If the prospective occupants are unknown during the design phase (e.g. for speculative development), this credit is 'Not applicable'.	
<b>ACC: Accessibility</b>		
S-ACC-1	<b>Maximize personal safety and security</b>	B
	The Client's Project Brief commits to provide safe working environment and effective security to the building and its occupants and users, by means of both spatial planning and security facilities.	P-Dsn
	Suitable security design measures have been taken to prevent unauthorised entry, impede the removal of stolen goods, and reduce vandalism directed against the building. For example, - Plan buildings to eliminate dark cul-de-sacs and unnecessary recess space; - Provision of wide and open staircases; - Design buildings to provide unobstructed view of people approaching controlled areas and around the buildings; - Minimise vehicle access points; and - Plan building to restrict entry to specific zones to selected persons (i.e. depending on the level of security needed in the zone).	Dsn
	ADDITIONAL: The design provides reasonable quantities of passive security facilities to suit the scale and complexity of the building will be provided, such as access barrier/gate, security fence, fence and barrier for access to the slope, exposed pipes and cables, etc.	

	<p>ADDITIONAL: The design provides reasonable quantities of active security facilities to suit the scale and complexity of the building will be provided, such as:</p> <ul style="list-style-type: none"> <li>- Electronic Access Control Systems;</li> <li>- Closed-circuit television (CCTV) Surveillance System;</li> <li>- Anti-theft Security and Alarm System;</li> <li>- Communication (intercom) system;</li> <li>- Security guards.</li> </ul>	
	<p>The Contractor has provided reasonable quantities (in accordance with the scale and complexity of the site) of passive security facilities and provisions in construction site, such as security guard stand, access barrier/gate, security fence.</p>	C&C
	<p>ADDITIONAL: The Contractor has provided reasonable quantities (in accordance with the scale and complexity of the site) of active security facilities and provisions in construction site, such as:</p> <ul style="list-style-type: none"> <li>- Electronic Access Control Systems;</li> <li>- Closed-circuit television (CCTV) Surveillance System;</li> <li>- Anti-theft Security and Alarm System;</li> <li>- Communication (intercom) system;</li> <li>- Security guards.</li> </ul>	
	<p>Field observations confirm that reasonable quantities of passive security facilities to suit the scale and complexity of the building will be provided, such as access barrier/gate, security fence, fence and barrier for access to the slope, exposed pipes and cables, etc.</p>	Ops
	<p>ADDITIONAL: Field observations confirm that reasonable quantities of active security facilities to suit the scale and complexity of the building have been provided, such as:</p> <ul style="list-style-type: none"> <li>- Electronic Access Control Systems;</li> <li>- Closed-circuit television (CCTV) Surveillance System;</li> <li>- Anti-theft Security and Alarm System;</li> <li>- Security guards.</li> </ul>	
	<p>ADDITIONAL: Building operator (owner/property manager) has formulated and implemented a safety management and fire evacuation plan for building occupants; AND a fire drill is conducted for building occupants not less than once a year.</p>	
S-ACC-2	<p><b>Convenient and safe maintenance access for building facades and other elements or design</b></p>	B
	<p>The Client's Project Brief commits to design the building elements for ease of effective maintenance during the whole life-cycle of an occupied building.</p>	P-Dsn
	<p>Design documentation indicates that the building is designed with self-cleaning facades, skylight, and/or roof;</p>	Dsn
	<p>OR</p> <p>Design documentation showing the access paths for inspection, cleansing and maintenance indicates that window, atria and roof glazing cleaning will be capable to be carried out safely and without undue disturbance to staff due to the provisions of the following facilities:</p> <ul style="list-style-type: none"> <li>- Permanent window cleaning and maintenance access systems (e.g. cat ladders, roof top support systems for elevating platforms, external shadings that also function as platform for cleaning and maintenance); OR</li> <li>- Sufficient space for platform transportation and erection, and full-coverage of gondola tracks (if movable maintenance platforms and gondolas are to be used). For buildings over 9 m and up to 30 m high, facilities for either manual or power operated gondolas/suspended access are provided; whilst above this height must have the facility for power operated gondolas; AND</li> <li>- A suitable form of restraint – if a cleaner requires to stand on a ladder or other object or lean out of the window in order to carry out the cleaning process; and ladder restraints – if windows are to be cleaned from an external ladder.</li> </ul>	



	<p>System descriptions and drawings (showing the access paths for inspection, cleansing and maintenance indicates that window) and on-site investigation confirm that window, atria and roof glazing cleaning can be carried out safely and without undue disturbance to staff due to the provisions of the following facilities:</p> <ul style="list-style-type: none"> <li>- Permanent window cleaning and maintenance access systems (e.g. cat ladders, roof top support systems for elevating platforms, external shadings that also function as platform for cleaning and maintenance); OR</li> <li>- Sufficient space for platform transportation and erection, and full-coverage of gondola tracks (if movable maintenance platforms and gondolas are to be used). For buildings over 9 m and up to 30 m high, facilities for either manual or power operated gondolas/suspended access are provided; whilst above this height must have the facility for power operated gondolas; AND</li> <li>- A suitable form of restraint – when a cleaner requires to stand on a ladder or other object or lean out of the window in order to carry out the cleaning process; and ladder restraints – when windows are to be cleaned from an external ladder.</li> </ul>	Ops
S-ACC-3	<p><b>Adequate access to communication technology</b></p> <p>The Client's Project Brief commits to provide adequate access to communication technology to support informal communication and reduce requirements for travel and space among building occupants.</p> <p>Every workstation in the building, as indicated by design documentation, will have access to telephone and internet/email to allow occupants to conduct telephone/computer/video-conferencing over the internet e.g. via skype.</p> <p>Every workstation in the building, as indicated by on-site investigation, has access to telephone and internet/email to allow occupants to conduct telephone/computer/video-conferencing over the internet e.g. via skype.</p>	B P-Dsn Dsn Ops
S-ACC-4	<p><b>Convenient and safe maintenance access for all building services installation.</b></p> <p>The Client's Project Brief commits to design the building technical systems for ease of effective maintenance during the whole life cycle of an occupied building.</p> <p>Convenient and safe access of HVAC delivery systems for repair and maintenance, as indicated by design documentation, will be assisted by ALL of the followings:</p> <ul style="list-style-type: none"> <li>- Convenient access for maintenance to cable containment, air ducts and pipes where feasible;</li> <li>- Sufficient access doors and panels to services shafts;</li> <li>- Simplified, well-marked signage to clearly indicate purpose, source and destination of specific sections of the delivery system;</li> <li>- Sufficient access platform, or space for temporary maintenance platform erection (for services mounted outdoors);</li> <li>- Minimization of duct run lengths and elbows (with the intent of minimizing pressure losses, reducing surface area and difficulty for ease of cleaning);</li> <li>- Sufficient and convenient maintenance access, such as access panel and cleansing eye to allow cleansing of all sections of air ducts; and access to each straight air duct and damper.</li> </ul> <p>Convenient and safe access of HVAC delivery systems for repair and maintenance, as indicated by field observations, is assisted by ALL of the followings:</p> <ul style="list-style-type: none"> <li>- Convenient access for maintenance to cable containment, air ducts and pipes where feasible;</li> <li>- Sufficient access doors and panels to services shafts;</li> <li>- Simplified, well-marked signage to clearly indicate purpose, source and destination of specific sections of the delivery system;</li> <li>- Sufficient access platform, or space for temporary maintenance platform erection (for services mounted outdoors);</li> <li>- Minimization of duct run lengths and elbows (with the intent of minimizing pressure losses, reducing surface area and difficulty for ease of cleaning);</li> <li>- Sufficient and convenient maintenance access, such as access panel and cleansing eye to allow cleansing of all sections of air ducts; and access to each straight air duct and damper.</li> </ul>	B P-Dsn Dsn Ops
S-ACC-5	<p><b>Easy access to nearby services</b></p>	C

The Client's Project Brief commits to allow easy access to nearby services to reduce the need for building occupants to travel by cars. P-Dsn

Where evidence provided demonstrates that the building is located within 500m of the following accessible local amenities: Dsn

- a. Grocery shop/supermarket and/or food outlet
- b. Post office
- c. Bank
- d. Clinic and pharmacy

If ALL of the above amenities are designed to be integrated in the development or provided in the building (as addressed by criterion S-COH-2), this credit is 'Not applicable'.

*Note: The distance must be measured via safe pedestrian routes e.g. pavements and safe crossing points or, where provided, dedicated pedestrian crossing points.*

### INC: Inclusiveness of Opportunities

S-INC-1	<b>Provide for universal access</b>	B
	The Client's Project Brief commits to provide universal access to enhance the sense of inclusion for all building occupants and users.	P-Dsn
	<i>Note: Effective inclusion will harmonize all building occupants and users, irrespective whether they are of healthy or disabled, children, adult or elder persons.</i>	
	<u>CASE 1: The Local Authority does not make mandatory in the use of MS1184 Code of Practice on Access for Disabled People to Public Buildings:</u>	Dsn
	Spaces are designed to enhance the connectivity for all types of occupants and users, such as disabled and elderly persons as well as healthy people,	
	- in addition to the current minimum requirements of MS1184;	
	OR	
	- in accordance with the minimum requirements of MS1184	
	<u>CASE 2: The Local Authority makes mandatory in the use of MS1184 Code of Practice on Access for Disabled People to Public Buildings:</u>	
	Spaces are designed to enhance the connectivity for all types of occupants and users, such as disabled and elderly persons as well as healthy people, in addition to the current minimum requirements of MS1184.	
	<i>Note: Effective inclusion will harmonize all building occupants and users, irrespective whether they are of healthy or disabled, children, adult or elder persons.</i>	
	Observations and occupant surveys indicate that building facilities are accessible to all types of occupants and users, such as disabled, elderly persons and healthy people, in addition to the current minimum requirements of MS1184 as well as the facilities and provisions provided by the Designer/ Developer.	Ops
	<i>Note: Effective inclusion will harmonize all building occupants and users, irrespective whether they are of healthy or disabled, children, adult or elder persons.</i>	
S-INC-2	<b>Provide facilities for users to perform religious obligations</b>	B
	The Client's Project Brief commits to provide optimum spatial arrangements and facilities to enhance different religious beliefs among building occupants and users.	P-Dsn
	<u>Moslem:</u>	Dsn
	The design provides a facility to pray/common prayer room (separate spaces and ablution areas for ladies and gentlemen staff); and in each room, the direction of Kiblat will be clearly indicated;	
	AND	
	The facility is located at appropriate location as follows:	
	- podium/first floor, if no eating outlet is provided on upper floor; OR	

	<p>- the same floor as and adjacent to washrooms and eating outlet or amenity space.</p> <p>AND</p> <p><u>Other religions:</u> Having one gathering room per building (may also be served as multi-purpose room or a meeting room)</p> <p><u>Moslem:</u> Field observations confirm that a facility to pray/common prayer room (separate spaces and ablution areas for ladies and gentlemen staff) has been provided; and in each room, the direction of Kiblat has been clearly indicated, and shared facilities such as praying mats, Qurans/ Surah Yassin have been provided;</p> <p>AND</p> <p>The facility is located at appropriate location as follows:</p> <p>- podium/first floor, if no eating outlet is provided on upper floor; OR</p> <p>- the same floor as and adjacent to washrooms and eating outlet or amenity space.</p> <p>AND</p> <p><u>Other religions:</u> Having one gathering room per building (may also be served as multi-purpose room or a meeting room)</p>	Ops	
S-INC-3	<b>Provide facilities for users with children</b>		B
	The Client's Project Brief commits to provide optimum spatial arrangements and facilities to cater for building users with children to enhance their quality of life.	P-Dsn	
	The design provides a crèche area and a mother's room to cater for building users (and if necessary, users of neighbouring blocks) to enhance their quality of life.	Dsn	
	<i>Note: Solve the issue of emergency escape for children especially for when the first few floors are car parks and the facilities have to be provided on the upper floor.</i>		
	Field observations confirm that a crèche area and a mother's room have been provided and operated to cater for building users (and if necessary, users of neighbouring blocks) to enhance their quality of life.	Ops	
	<i>Note: Solve the issue of emergency escape for children especially for when the first few floors are car parks and the facilities have to be provided on the upper floor.</i>		
<b>HUM: Human Health and Well-being</b>			
S-HUM-1	<b>Adapt practices that avoid construction accidents</b>		B
	Accreditation to the occupational health and safety management system – OSHMS MS1722:2005 and/or OHSAS 18001:2007 – is specified as one of the requirements in the tender pre-qualification of major contractor companies.	Dsn	
	The Contractor has implemented an effective Occupational Safety and Health Management System (OSHMS) for a conducive working environment so as to ensure safety and health at work of all workers and the general public during project execution.	C&C	
	AND All workers have attended the Safety Induction Course.		
	ADDITIONAL: The Contractor has valid occupational health and safety management system accreditation – OSHMS MS1722:2005 and/or OHSAS 18001:2007 prior to and throughout the construction process.		
	The property management company is accredited with occupational health and safety management system – OSHMS MS1722:2005 and/or OHSAS 18001:2007.	Ops	
S-HUM-2	<b>Optimize the level and quality of fresh air in mechanically ventilated spaces</b>		B

	The Client's Project Brief commits to provide optimum design of building systems to enhance the environmental hygiene of mechanically ventilated spaces with good quality fresh air.	P-Dsn	
	An analysis of proposed ventilation systems in mechanically ventilated areas of the occupancy indicates that sufficient fresh air will be provided in the interior of the building and the air change effectiveness (ACE), as determined by ASHRAE 129-1997, is: ≥95% OR 89-94%	Dsn	
	<i>Note: All fresh air intakes shall be located away from pollutant sources, which included, but not limited to building exhaust air louvers and exhaust outlet from adjacent buildings, air exhaust openings of refuse collection room, enclosed/semi-enclosed car park and public transport terminal, smoke discharge openings, and gas discharges exhaust from toilets and kitchens plumbing vents, etc. Fresh air intake openings shall be protected from rain entrainment and covered by a screen to prevent entry of birds, rodents and extraneous articles. ASHRAE 62.1-2010 Ventilation for Acceptable Indoor Air Quality can be referred as design guidelines.</i>		
	ADDITIONAL: Design documentation indicates that carbon dioxide sensors will be installed in occupied zones to maintain sufficient ventilation at the times of different occupancy; hence, addressing the balance of fresh air supply and energy efficiency.		
	Field monitoring, undertaken at least one year after occupancy, indicates that the interior of the building is provided with sufficient fresh air and the air distribution effectiveness at the work surface is equivalent to: ≥95% OR 89-94%	Ops	
	<i>Note: All fresh air intakes shall be located away from pollutant sources, which included, but not limited to building exhaust air louvers and exhaust outlet from adjacent buildings, air exhaust openings of refuse collection room, enclosed/semi-enclosed car park and public transport terminal, smoke discharge openings, and gas discharges exhaust from toilets and kitchens plumbing vents, etc. Fresh air intake openings shall be protected from rain entrainment and covered by a screen to prevent entry of birds, rodents and extraneous articles. ASHRAE 62.1-2010 Ventilation for Acceptable Indoor Air Quality can be referred as design guidelines.</i>		
	ADDITIONAL: Field observations indicate that carbon dioxide sensors have been installed in occupied zones to maintain sufficient ventilation at the times of different occupancy; hence, addressing the balance of fresh air supply and energy efficiency.		
S-HUM-3	<b>Maximize openings and cross ventilation in naturally ventilated spaces</b>		B
	The Client's Project Brief commits to provide optimum building design to enhance the environmental hygiene and thermal comfort of naturally ventilated spaces with good cross ventilation.	P-Dsn	
	The building or part of the building (e.g. toilets, carparks, lobby) is naturally ventilated.	Dsn	
	ADDITIONAL: Evidence is provided to demonstrate that the opening area in naturally ventilated space is adequate to comply with the natural ventilation requirements of ASHRAE 62.1-2007.		
	<i>Covered in S-HUM-13</i>	Ops	
S-HUM-4	<b>Minimise noise level and provide satisfactory level of acoustic performance</b>		B
	The Client's Project Brief commits to minimise noise nuisance affecting building occupants.	P-Dsn	
	The system design follows the ASHRAE's Practical Guide to Noise and Vibration Control for HVAC Systems resulting in ambient noise levels (with all engineering services operating normally but with no activity in the area) not exceeding the following:	Dsn	
	- Cellular offices, interview rooms, first aid rooms, conference rooms : 40 dB(A)		
	- Open plan offices : 45 dB(A)		
	<i>Covered in S-HUM-13</i>	Ops	

S-HUM-5	<b>Appropriate illumination level and artificial lighting quality</b>	B
	The Client's Project Brief commits to create a high quality visual environment in occupied spaces by means of providing good artificial lighting comfort and quality.	P-Dsn
	The office lighting design has a maintained illuminance level of no more than specified in MS1525:2007 for 90% of NLA as measured at the working plane (900mm AFFL).	Dsn
	ADDITIONAL: Provision is made for task lighting in each 15m <sup>2</sup> or less. ADDITIONAL: High frequency ballasts are installed in fluorescent luminaries over a minimum of 90% of NLA. <i>Covered in S-HUM-13</i>	Ops
S-HUM-6	<b>Prohibit tobacco smoking in the building</b>	B
	The Client's Project Brief commits to provide a non-smoking building OR a building with dedicated smoking facilities.	P-Dsn
	The design does not provide dedicated rooms or areas because such activities are prohibited in the building; OR The design provides separate and separately ventilated rooms or areas for tobacco smoking in the building.	Dsn
	<i>Note: Smoking substantially increases the perceived pollution burden (to 2-6 times). The deterioration in air quality caused by smoking can only be compensated by substantially increased ventilation. According to international research results 100 m3 fresh air is needed to eliminate the effect of one cigarette smoked.</i>	
	Observations indicate that site workers are not exposed to tobacco smoke because such activities are prohibited anywhere on the site; OR Observations indicate that site workers have possible exposure to tobacco smoke because such activities are only prohibited in enclosed spaces.	C&C
	<i>Note: Smoking substantially increases the perceived pollution burden (to 2-6 times). The deterioration in air quality caused by smoking can only be compensated by substantially increased ventilation. According to international research results 100 m3 fresh air is needed to eliminate the effect of one cigarette smoked.</i>	
	Occupants are not exposed to tobacco smoke or other occupant generated pollutants in public spaces because the entire building adopted a 'No Smoking Policy'; OR Occupants are not exposed to tobacco smoke in public spaces because based on field observations, separate and separately ventilated (i.e. with dedicated exhaust air duct to extract smoke) rooms or areas for such activities have been provided.	Ops
	<i>Note: Smoking substantially increases the perceived pollution burden (to 2-6 times). The deterioration in air quality caused by smoking can only be compensated by substantially increased ventilation. According to international research results 100 m3 fresh air is needed to eliminate the effect of one cigarette smoked.</i>	
S-HUM-7	<b>Use low/zero pollutants cleaning and maintenance products and processes</b>	B
	The Client's Project Brief commits to minimise the threat of health and hygiene problems arising from building operation and usages, particularly during cleaning and maintaining the building.	P-Dsn
	Documentation indicates that only no/low emission (non-toxic and biodegradable) cleaning products are consumed during construction works.	C&C
	Surveys indicate that airborne pollutants caused by the use of building maintenance products and processes cause LEAST or NO dissatisfaction amongst building occupants and users or 85% of occupants are satisfied; OR Surveys indicate that airborne pollutants cause INFREQUENT dissatisfaction amongst building occupants and users or 75% of occupants are	Ops

	satisfied.	
S-HUM-8	<b>Use interior finish materials with low- or zero-pollutant off-gassing</b>	B
	The Client's Project Brief commits to minimise the use of high emission interior finish materials for the whole life of the building.	P-Dsn
	Tender Specification clearly specifies the use of low- or zero-emission finishing materials; AND According to design documentation,	Dsn
	<u>Paints</u> Zero or low VOC paint and coating are used on 95% of all painted surfaces; OR No paint is used in the project.	
	<u>Carpets</u> Only zero or low VOC carpets are used; OR Where no carpet has been installed in the project and projects wish to use low-VOC flooring, all flooring installed in the project meet the emissions limits.	
	<u>Adhesives and sealants</u> 95% of all adhesives and sealants have zero or low VOC content; OR No adhesives or sealants are used.	
	<u>Wood products</u> All composite wood products (including exposed or concealed applications) either contain low-emission formaldehyde or contain no formaldehyde.	
	If no engineered wood products are used within the project, this credit is "Not Applicable".	
	Zero or low VOC paint are used on 95% of all painted surfaces during decoration and refurbishment works during operation stage.	Ops
S-HUM-9	<b>Provide optimum air movement for thermal comfort in mechanically ventilated spaces</b>	B
	The Client's Project Brief commits to provide optimum design of building systems to enhance the thermal comfort in mechanically ventilated spaces with optimum air movement.	P-Dsn
	The air movement/ air velocity of 95% of the NLA are designed in accordance with MS1525:2007 (i.e. 0.15 m/s – 0.5 m/s).	Dsn
	<i>Note: Ventilation effectiveness accounts for the path that supply air moves through an occupied space and reaches an exhaust or return; directness of delivery of ventilation air to the occupants, i.e., diffuser type and location; and placement of obstructions to air movement such as partitions and acoustic barriers.</i>	
	Field measurements indicate that the Predicted Mean Vote (PMV) meets the conditions for thermal comfort.	Ops
	<i>Note: Results are calculated from the inputs of air temperature, mean radiant temperature, relative humidity, air velocity, clothing thermal resistance and metabolic rate.</i>	
S-HUM-10	<b>Minimise glare conditions in main occupancy areas</b>	B
	The Client's Project Brief commits to create a high quality visual environment by means of creating building details that minimise discomfort caused by excessive glare.	P-Dsn
	According to design documentation, internal (e.g. screens, blinds, light shelves) AND external (fixed or movable, horizontal or vertical) shading devices will be fitted to all glazing and atriums that eliminate all direct sun penetration.	Dsn
	ADDITIONAL: Motorized blinds on photocell controllers will be used in areas where individual control is not desired.	

	According to field observations, internal (e.g. screens, blinds, light shelves) AND external (fixed or movable, horizontal or vertical) shading devices are fitted to all glazing and atriums that eliminate all direct sun penetration. ADDITIONAL: Motorized blinds on photocell controllers are used in areas where individual control is not desired.	Ops	
S-HUM-11	<b>Increase the practice of building flush-out</b>		<b>B</b>
	The Client's Project Brief commits to minimise possible indoor air quality contamination prior to occupancy and during the whole life cycle of the occupied building.	P-Dsn	
	Evidence suggests that permanent air flushing system of at least 10 airchanges/hour operation will be provided. OR Tender Specification clearly specifies the requirements for air duct cleanliness and building flush out at building handover stages.	Dsn	
	A building flush-out is performed with new filtration media using 100% outside air supply, 3 months prior to handing over, once a week; OR 1 month prior to handing over, once a week.	C&C	
	If building flush-out was not performed at building handover stages, an IAQ testing is conducted within 12 months of occupancy, and results indicate that maximum concentrations for pollutants do not exceed the maximum limit as stipulated in the Code of Practice on Indoor Air Quality by Department of Occupational Safety and Health (DOSH) Malaysia, as follows: - Overall carbon dioxide levels: <1000ppm; - Overall carbon monoxide levels: <10ppm; - Dust particulate levels: <0.15mg/m3; - Total volatile organic compound levels: <3ppm. OR Scheduled flush-outs are performed on a continuous basis, by means of natural or mechanical ventilation. ADDITIONAL: Maintenance records indicate that building operator carries out regular visual inspection on the cleanliness of air distribution systems, such as air handling unit, ventilation fan, air filter, air duct, damper, louver etc. Inspection is conducted no more than every 3 months for system operates more than 12 hours a day, and 6 months for system operates less than 12 hours a day.	Ops	
S-HUM-12	<b>Provide separately ventilated and isolated areas/rooms which generate pollutants and odour</b>		<b>B</b>
	The Client's Project Brief commits to minimise pollutants and odour dispersion problems arising from building operation and usages.	P-Dsn	
	According to design documentation, ALL rooms and spaces in this occupancy that contain equipment or activities generating chemical pollutants and odour (e.g. copier rooms, waste storage areas, janitorial rooms, pantries) are designed with dedicated exhaust air ducts to extract polluted air from these rooms/areas to the outdoors; and isolated from other occupied spaces.	Dsn	
	According to field observations, ALL rooms and spaces in this occupancy that contain equipment or activities generating chemical pollutants and odour (e.g. copier rooms, waste storage areas, janitorial rooms, pantries) are provided with dedicated exhaust air ducts to extract polluted air from these rooms/areas to the outdoors; and isolated from other occupied spaces.	Ops	
	<i>Note: This credit is not applicable to smoking room which is addressed by other credit.</i>		
S-HUM-13	<b>Adequate monitoring of occupants' satisfaction with indoor environmental quality</b>		<b>B</b>
	The Client's Project Brief commits to maintain the environment of occupied spaces with good indoor environmental quality by means of undertaking adequate monitoring and corrective actions during the whole life cycle of the occupied building.	P-Dsn	

<p>Surveys have taken place to assess occupant satisfaction with indoor environmental quality no more than every 6 months, and the records are kept by the building operator for at least 3 years (minimum 1 year record shall be provided for the first assessment in operation phase);</p> <p>AND</p> <p>and their independent latest results are as follows:</p> <p><u>Air temperature &amp; relative humidity+ air movement = Thermal Comfort:</u>                  ≥90% OR                  80-89%</p> <hr/> <p>ADDITIONAL:  <u>Air change &amp; ventilation:</u>                  ≥90% OR                  80-89%</p> <hr/> <p>ADDITIONAL:  <u>Indoor air quality:</u>                  ≥90% OR                  80-89%</p> <hr/> <p>ADDITIONAL:  <u>Glare conditions:</u>                  ≥90% OR                  80-89%</p> <hr/> <p>ADDITIONAL:  <u>Illumination levels and quality of lighting:</u>                  ≥90% OR                  80-89%</p> <hr/> <p>ADDITIONAL:  <u>Noise level:</u>                  ≥90% OR                  80-89%</p> <hr/> <p>ADDITIONAL:                  A plan for corrective action has been developed to address problem areas indicated by survey results with more than 20% occupants' dissatisfaction. This plan should include field measurement of relevant environmental variables in problems areas.</p>	Ops
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**CUL: Cultural and Heritage Aspects**

S-CUL-1	<p><b>Enhance or maintain the heritage significance of the building or adjoining/nearby heritage buildings</b></p> <p>The Client's Project Brief commits to provide a building design that enhances or maintains the heritage significance of the building or adjoining/nearby heritage buildings.</p> <p><u>For existing non-heritage building in a heritage zone (adaptive reuse):</u>                  The entire building, or a large portion (minimum 50%) of the building, such as building envelope, courtyard is reused; AND                  The design of external and internal features enhances or maintains the heritage significance of the building, and new features, systems and materials are so well integrated into the existing fabric; OR                  Only the design of external features enhances or maintains the heritage significance of the building, and new features, systems and materials are so well integrated into the existing fabric.</p> <p><u>For new building on a vacant site in a heritage zone:</u></p>	B
	<p>The Client's Project Brief commits to provide a building design that enhances or maintains the heritage significance of the building or adjoining/nearby heritage buildings.</p>	P-Dsn
	<p><u>For existing non-heritage building in a heritage zone (adaptive reuse):</u>                  The entire building, or a large portion (minimum 50%) of the building, such as building envelope, courtyard is reused; AND                  The design of external and internal features enhances or maintains the heritage significance of the building, and new features, systems and materials are so well integrated into the existing fabric; OR                  Only the design of external features enhances or maintains the heritage significance of the building, and new features, systems and materials are so well integrated into the existing fabric.</p>	Dsn



The design of external features enhances or maintains the heritage significance of adjoining/nearby buildings, and new features, systems and materials are so well integrated into the existing fabric.

AND

If the immediate adjacent building(s) are having cultural heritage value, the building foundation and structure of the new building are designed to minimize any adverse structural and environmental impacts towards the adjacent building(s) with cultural heritage value during construction process.

For new building on a vacant site in a heritage zone:

C&C

If the immediate adjacent building(s) are having cultural heritage value, the Contractor has established preventive measures to minimize any adverse structural and environmental impacts towards the adjacent building(s) with cultural heritage value during construction process.

Existing non-heritage building in a heritage zone (adaptive reuse):

Ops

The mode of operation maintains the heritage significance of the building or its sub-systems.

### LOC: Local People and Employment

S-LOC-1	<p><b>Provide training opportunities for unskilled local people (employed for the works) to be future semi-skilled or skilled construction workers</b></p> <p>At least 40% of all unskilled workers involved in the project are local people;</p> <p>AND</p> <p>They have received competency-based training courses (on-site or off-site) with certification or have undergone any of the related CIDB accreditation programmes for the workers prior to or throughout the project.</p> <p>OR</p> <p>At least 80% of all construction workers involved in the project are local semi-skilled and skilled workers.</p> <p><i>Note: Based on CIDB record, unskilled (general) workers make up almost half of the total workers registered with CIDB and outnumber semi-skilled and skilled workers by more than 2-to-1. Additionally, around 250,000 of approximately 800,000 construction workforce are foreigners especially from Indonesia and ASEAN region. Foreign workers are usually unskilled when they first arrive in Malaysia. This has impacted the productivity and quality of the construction industry. Unskilled foreign labour is cheaper to employ in the short term than skilled local labour. This labour preference with its associated low wages, lower the incentive for construction companies to migrate to more productive and newer construction technology and methods, and reduces the attractiveness of the industry to employ more highly-skilled or local labour.</i></p>	C
		C&C
S-LOC-2	<p><b>Increased use of locally available materials and products</b></p> <p>The Client's Project Brief commits to utilize locally available materials and products, as much as possible, for the whole life of the building.</p> <p>The percentage (by weight), of the aggregate, sand, concrete, masonry, steel and glass used in the project produced within the greater urban region is:</p> <p>≥80% OR</p> <p>50-79%.</p> <p>ADDITIONAL:</p> <p>≥80% of finishes (based on cost) are made in the country.</p> <p>ADDITIONAL:</p> <p>≥80% of fittings (based on cost) are made in the country</p>	C
		P-Dsn
		Dsn
S-LOC-3	<p><b>Linkage to local service providers</b></p> <p>At least 80% of maintenance and repairs (based on cost) of building, furniture and fittings are undertaken by local companies (within 50km).</p> <p>If there are no local companies with appropriate maintenance and repair skills available within 50km of the building site, this credit is "Not</p>	C
		Ops

		Applicable".		
S-LOC-4	<b>Use experienced local design teams</b>			C
		At least 80% of design teams (including planners, architects, engineers, landscape architects, interior designers and environmental consultants) appointed for the project are local companies who have had good track records in designing similar type of projects; OR Collaborative work with foreign design teams to improve local know-how only on specialised knowledge where local talent is not available.	Dsn	
S-LOC-5	<b>Use experienced local contractors</b>			C
		Experienced local contractor who have good track records in constructing similar type of projects is specified as one of the requirements in the tender pre-qualification of major contractor companies.	Dsn	
		At least 80% of construction cost is carried out by local construction companies (within 50km of the building site) who have had good track records in constructing similar type of projects.	C&C	
		If there are no qualified local construction companies available within 50km of the building site; OR If no qualified local construction companies operating within 50km of the building site responded to the invitation to bid, this credit is "Not Applicable". OR Collaborative work with foreign construction companies to improve local know-how.		

Issue	Sub-Issues	Criteria & Benchmarking	Assess. Phase	Spatial Scale
<b>EN: ENVIRONMENTAL</b>				
<b>ECO: Land use and Impacts on Ecology</b>				
EN-ECO-1		<b>Minimise ecological and other damage to existing soil, water bodies and flora and fauna of the site or adjacent lands</b>		S
		The Client's Project Brief commits to minimise ecological and other damage on the site or adjacent lands by protecting the ecological value of the site and implementing effective preventive works before site formation works.	P-Dsn	
		A total Erosion and Sedimentation Control Plan (ESCP) during construction process (which covers planning considerations, vegetative stabilisation, physical stabilisation, diversion on runoff, flow velocity reduction and sediment trapping/filtering) for all construction activities associated with the project has been implemented.	Dsn	
		ADDITIONAL: The Designers have conducted a field survey to existing trees within the site; and designated all existing healthy trees with high amenity value for preservation and/or transferred to other site for reuse.		
		This credit is "Not Applicable" for projects built on a used site with no existing trees or trees with high amenity value.		
		A total Erosion and Sedimentation Control Plan (ESCP) during construction process (which covers planning considerations, vegetative stabilisation, physical stabilisation, diversion on runoff, flow velocity reduction and sediment trapping/filtering) for all construction activities associated with the project has been implemented.	C&C	
		The ESCP is in conformance with the erosion and sedimentation requirements of the approved Earthworks Plans OR Local erosion and sedimentation standards and codes, whichever is more stringent.		
		ADDITIONAL: The Contractor has provided effective tree preservation and protection measures on site for all identified and designated healthy trees within the		

	site to minimize the adverse impact to the preserved trees due to construction activities.	
EN-ECO-2	<b>Maximize potential for landscape spaces on the site</b>	S
	The Client's Project Brief commits to design and provide greenery and landscape features within the site to enhance living quality.	P-Dsn
	According to design documentation, land that is allocated as landscape space for project users, has an area, expressed as a percent of the total site area, of: ≥20% OR 17-19%	Dsn
	This credit is "Not Applicable" for urban infill projects or projects built on a confined site with no external areas.	
	ADDITIONAL: Design documentation indicates that a reasonable scale of landscape area (relative to the scale of the building) will be provided within the building and/or on the rooftop, such as courtyard gardens, podium roof and sky gardens, to improve the working environment.	
	<i>Note: Landscape, in the form of greenery, water features, hard landscape and fixed furniture are recommended in communal open space, podium garden, skygarden, slope, retaining wall and semi-enclosed area. Hard and soft landscape or solely soft landscape is acceptable for both credits.</i>	
	Field observations indicate that a reasonable scale of landscape area (relative to the scale of the building) is provided within the building and/or on the rooftop, such as courtyard gardens, podium roof and sky gardens, to improve the working environment.	Ops
	ADDITIONAL: Field observations and other relevant evidence indicate that proper maintenance and management are carried out to ensure the good condition of the landscape area and open space for the use by the building occupants, users or public.	
	<i>Note: Landscape, in the form of greenery, water features, hard landscape and fixed furniture are recommended in communal open space, podium garden, skygarden, slope, retaining wall and semi-enclosed area. Hard and soft landscape or solely soft landscape is acceptable for both credits.</i>	
EN-ECO-3	<b>Improve the ecological value of natural landscape</b>	S
	The Client's Project Brief commits to enhance the ecological value of natural landscape by using non-invasive plantings	P-Dsn
	The percentage of landscaped area (including on roof if present) planted with non-invasive plantings that are considered as endemic to the area or low irrigation demand, as per landscaping plans and specifications, is: 100% OR 70-99%	Dsn
	If there is no landscaping, or landscaping represents less than 1% of the site area, this credit is "Not Applicable".	
	The percentage of landscaped area (including on roof if present) planted with non-invasive plantings that are considered as endemic to the area or low irrigation demand, as determined by field observations and landscape plans and specifications, is: 100% OR 70-99%	Ops
	If there is no landscaping, or landscaping represents less than 1% of the site area, this credit is "Not Applicable".	
EN-ECO-4	<b>Select sites that have low risk of flooding</b>	C
	The Client's Project Brief commits to avoid the risk of flooding on site during construction and the whole life cycle of the occupied building.	P-Dsn
	The height of the minimum elevation of the site above the elevation of the 100-year flood plain is 2.5m and comply to MASMA guidelines	Dsn

	OR ...1m...	
<b>SRM: Supports Resource Management</b>		
EN-SRM-1	<b>Increase use of materials that have less environmental impact in producing them</b>	G
	The Client's Project Brief commits to minimise the environmental impact by using materials with low-embodied energy for structure and building envelope.	P-Dsn
	The predicted embodied energy for materials used in the structure and building envelope, as determined an acceptable LCA-based estimating method, is: 2.0 GJ/m <sup>2</sup> or 27 MJ/m <sup>2</sup> /year; OR 2.8 GJ/m <sup>2</sup> or 37 MJ/m <sup>2</sup> /year	Dsn
	<i>Note: This indicator assesses the estimate of embodied primary energy used for structure, envelope (excl. glazing), and major interior components, as determined by a program designed to estimate embodied energy and emissions through Life Cycle Analysis; also, estimate of lifespan.</i>	
EN-SRM-2	<b>Design building for maximum durability</b>	B
	The Client's Project Brief commits to minimise material consumption and wastage for the whole life of the building by designing the building for maximum durability.	P-Dsn
	Drawings and specifications indicate that all building envelope materials are durable (i.e. require less maintenance, repair and replacement) that can withstand sunlight, temperature and humidity changes, and condensation.	Dsn
	ADDITIONAL: All building materials used in high pedestrian traffic areas (i.e. main entrance, public areas and thoroughfares i.e. corridors, lifts, stairs, doors etc) are durable and low-maintenance that can withstand wear-and-tear.	
	ADDITIONAL: Internal and external areas of the building where vehicular, trolley and pedestrian movement occur have been identified; AND Suitable durability and protection measures or design features have been specified to prevent damage to the vulnerable parts of these building areas from such traffic. This must include, but not be limited to: - Protection from the effects of high pedestrian traffic in main entrances, public areas and thoroughfares (corridors, lifts, stairs, doors etc). - Protection against any internal vehicular/trolley movement within 1m of the internal building fabric in storage, delivery, corridor and kitchen areas. - Protection against, or prevention from, any potential vehicular collision where vehicular parking and manoeuvring occurs within 1m of the external building façade for all car parking areas and within 2m for all delivery areas.	
	ADDITIONAL: Details roof and wall sections, and other critical aspects such as roof overhangs show that effective measures have been incorporated to limit water entry and migration of moisture (e.g. continuity of air/vapour barrier, exterior detailing weather membranes etc.)	
EN-SRM-3	<b>Increase use of bio-based products and materials obtained from managed/sustainable sources</b>	B
	The Client's Project Brief commits to encourage the use of timber obtained from managed/sustainable sources.	P-Dsn
	According to technical specifications and/or drawings, timber products used for permanent construction (e.g. permanent framing, flooring, finishes, partitions) are sourced from any combination of the following: - Forest Stewardship Council (FSC) or Malaysia Timber Certification Council (MTCC) Certified Timber - post-consumer recycled timber (must have 50% post-consumer recycled content)	Dsn

	<p>- Re-used timber And the percentage (by cost) of these timber products is: ≥75% OR 50-74%</p> <p>If the material cost of timber represents less than 0.1% of the project's contract value, this credit is "Not Applicable".</p> <p>According to the Contractor's material use records and relevant photographic evidence on site, the percentage (by cost) of all timber products used for temporary works (e.g. hoarding, formwork, site office fabrication, site accommodation) that has been sourced from post-consumer recycled timber (must have 50% post-consumer recycled content) and/or re-used timber, is: ≥75% OR 50-74%</p> <p>If the material cost of timber represents less than 0.1% of the project's contract value, this credit is "Not Applicable".</p> <p>ADDITIONAL: No timber products were used for formwork and hoarding on site (e.g. used metal instead).</p> <p>According to timber use (location and usage) and delivery records, the timber products used for daily operation and decoration, and minor addition and alteration works after building handover (or in the past 3 years) have been sourced from any combination of the following:</p> <ul style="list-style-type: none"> <li>- Forest Stewardship Council (FSC) or Malaysia Timber Certification Council (MTCC) Certified Timber</li> <li>- post-consumer recycled timber (must have 50% post-consumer recycled content)</li> <li>- Re-used timber</li> </ul> <p>And the percentage (by cost) of these timber products is: ≥75% OR 50-74%</p> <p>If the material cost of timber represents less than 0.1% of the project's contract value, this credit is "Not Applicable".</p>	C&C
EN-SRM-4	<b>Increase use of materials that can be recovered or recycled</b>	B
	<p>The Client's Project Brief commits to minimise material consumption and wastage by encouraging the use of materials that can be recovered or recycled at the end of the building useful life.</p> <p>Percentage (by cost) of building materials that can be recovered or recycled is: 30% OR 20%</p> <p><i>Note: Example of building materials that can be recovered or recycled are:</i></p> <ul style="list-style-type: none"> <li>- Bricks and concrete used for clean-fill;</li> <li>- Timber to be salvaged for new structural or material use; timber waste ground into mulch or garden compost;</li> <li>- Crushed concrete used as road-base;</li> <li>- Plasterboard crushed for soil container or for use in the manufacture of new plasterboard;</li> <li>- Steel, aluminium and other metals for reuse in the manufacture of new metal products.</li> </ul>	P-Dsn
		Dsn
EN-SRM-5	<b>Increase use of products and materials with recycled content</b>	B
	<p>The Client's Project Brief commits to minimise material consumption and wastage by encouraging the use of materials with recycled content.</p> <p><u>Concrete:</u></p>	P-Dsn
		Dsn

According to design report, technical specifications and/or drawings,  $\geq 10\%$  (by weight/volume) of all aggregates used for structural purposes are recycled; AND 100% of aggregates used in non-structural uses are recycled.

If the material cost of new concrete represents less than 1% of the project's contract value, this credit is "Not Applicable".

ADDITIONAL:

Steel:

$\geq 80\%$  of all steel, by weight/volume, in the project has a post-consumer recycled content greater than 50%;

OR

$\geq 50\%$  of all steel, by weight/volume, in the project has a post-consumer recycled content (i.e. product composition that contains some percentage of material diverted from the product user's waste stream).

If the material cost of steel represents less than 1% of the project's contract value, this credit is "Not Applicable".

*Note: The cycled content of materials shall be determined by dividing the weight/volume of recycled content in the item by the total weight/volume of all materials in the item.*

According to the Contractor's material use records and relevant photographic evidence on site, the percentage of materials used with recycled content follows the requirements as stipulated in the Designer's specification; AND C&C

The Contractor has established and implemented material use strategy by their own initiative such as using recycled bricks and blocks, plastics, packing board of papers, wood chips and etc.

*Note: The cycled content of materials shall be determined by dividing the weight/volume of recycled content in the item by the total weight/volume of all materials in the item.*

According to material use (location and usage) and delivery records, the percentage of materials and components with recycled content used for daily operation (e.g. paper and storage box), maintenance and minor addition and alteration works (e.g. building structure, false ceiling, partition wall, door, window, landscaping materials) after building handover (or in the past 3 years) is  $\geq 10\%$ . Ops

*Note: The cycled content of materials shall be determined by dividing the weight/volume of recycled content in the item by the total weight/volume of all materials in the item.*

### AIR: Emissions to Air

	<b>Provide pedestrian access to basic services and connect to existing public transportation network</b>	<b>C</b>
EN-AIR-1	<p>The Client's Project Brief commits to minimise and mitigate air pollution by encouraging walking and the use of public transportation among building occupants and users.</p> <p>The distance between the nearby public transport interchange and the building entrances is:</p> <p><math>\leq 300\text{m}</math> OR</p> <p><math>\leq 100\text{m}</math></p> <p>ADDITIONAL:</p> <p>The design provides a safe, convenient and comfortable on-site footpaths (elevated, continuous and sheltered walkways OR a pavement along a street), connecting the building to nearby buildings/basic services and public transportation network or local transport nodes.</p> <p>The distance between the nearby public transport interchange and the building entrances is:</p> <p><math>\leq 300\text{m}</math> OR</p> <p><math>\leq 100\text{m}</math></p> <p>ADDITIONAL:</p> <p>A safe, convenient and comfortable on-site footpaths have been provided (elevated, continuous and sheltered walkways OR a pavement along a street), connecting the building to nearby buildings/basic services and public transportation network or local transport nodes.</p>	<p>P-Dsn</p> <hr/> <p>Dsn</p> <hr/> <p>Ops</p>

LAN: Emissions to Land/ Solid Waste		
EN-LAN-1	<b>Save handling and storage of hazardous wastes on site</b>	S
	The Client's Project Brief commits to plan and implement effective hazardous waste management strategies.	P-Dsn
	There is a detailed and credible plan to minimise the danger of improper storage of hazardous wastes on the site in accordance with EMS 14001:2004. OR There is a credible plan to minimise the danger of improper storage of hazardous wastes on the site.	Dsn
	The result of an assessment of the safety of hazardous waste storage on the site indicates very minor or no deficiencies. OR The result of an assessment of the safety of hazardous waste storage on the site indicates minor deficiencies.	Ops
EN-LAN-2	<b>Implement construction waste management program with sorting, reuse and recycling measures</b>	B
	The Client's Project Brief commits minimise construction waste generation by planning and implementing effective waste management strategies, including sorting, reusing, recycling and disposal of construction and demolition waste.	P-Dsn
	Design specification and relevant contact documents clearly indicate the requirement for an effective implementation of construction and demolition waste management plan by the Contractor; AND The Contractor has formulated a comprehensive Waste Management Plan that, at a minimum identifies the salvageable materials to be diverted from landfills and whether the salvageable materials are sorted on site or commingled; AND The percentage (by mass) of all demolition and construction wastes that are reused (on or off site) and/or transferred to a recovery factory, as predicted in the construction waste management plan, is: ≥70% OR 50-69%	Dsn
	<i>Note: Salvageable materials include inert waste, such as metals, bricks and tiles, as well as non-inert waste such as timber, paper and plastic. Waste management plan shall include, but not limited to key types of waste to be reduced, waste reduction targets, waste reduction programmes, packaging waste management and waste disposal procedures. Apart from that, effective implementation is required to ensure strategies (e.g. in the form of educational basis, instructions or guidelines) are applicable to all site workers and cover the entire site area, including site office.</i>	
	The Contractor has implemented an effective Waste Management Plan and carried out weekly implementation records AND the percentage (by mass) of all demolition and construction wastes that have been reused (on or off site) and/or transferred to a recovery factory, as recorded in construction waste management records, is: ≥70% OR 50-69%	C&C
	<i>Note: Salvageable materials include inert waste, such as metals, bricks and tiles, as well as non-inert waste such as timber, paper and plastic. Waste management plan shall include, but not limited to key types of waste to be reduced, waste reduction targets, waste reduction programmes, packaging waste management and waste disposal procedures. Apart from that, effective implementation is required to ensure strategies (e.g. in the form of educational basis, instructions or guidelines) are applicable to all site workers and cover the entire site area, including site office.</i>	
	<b>ADDITIONAL:</b> An inspection has been conducted every week to ensure that the strategies are implemented according to the procedure and guidelines as stipulated in the waste management plan and keep up-to-date with the waste management records.	

	<p><i>Note: Designated person(s) shall ensure all workers and staff on site acknowledge the target and method of the construction waste management plan. Also, the designated person(s) shall identify any improvement required to enhance the effectiveness of waste management and maximising the recyclable waste collection and reuse.</i></p>														
EN-LAN-3	<p><b>Provide spaces for collection of recyclables, recycling storage and staging areas in the building</b></p>		B												
	<p>The Client's Project Brief commits to minimise municipal waste generation by providing spatial and facility provisions for collecting, sorting and storing recyclable and non-recyclable waste during the whole life cycle of the occupied building.</p>	P-Dsn													
	<p>The Design provides a centralised space for sorting and storage of office recyclables generated by building occupants and users and it is:</p>	Dsn													
	<p>- adequately sized in accordance with table below:</p> <table border="1" style="margin-left: 40px;"> <thead> <tr> <th>GFA (m<sup>2</sup>)</th> <th>Min area of recyclable storage space (% of GFA)</th> </tr> </thead> <tbody> <tr> <td>≤500</td> <td>1.50%</td> </tr> <tr> <td>1,000</td> <td>0.80%</td> </tr> <tr> <td>5,000</td> <td>0.35%</td> </tr> <tr> <td>10,000</td> <td>0.25%</td> </tr> <tr> <td>≥20,000</td> <td>0.1</td> </tr> </tbody> </table>	GFA (m <sup>2</sup> )	Min area of recyclable storage space (% of GFA)	≤500	1.50%	1,000	0.80%	5,000	0.35%	10,000	0.25%	≥20,000	0.1		
GFA (m <sup>2</sup> )	Min area of recyclable storage space (% of GFA)														
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10,000	0.25%														
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	<p>- located in the same level as the loading dock with a clearly marked, sign-posted, convenient and guaranteed access route within one of the following walking distances:</p> <ul style="list-style-type: none"> <li>o 20m of the exit used for recycling pick-up; OR</li> <li>o 20m of the lift core serving all floors; OR</li> <li>o 3m of the shortest route connecting the lift core serving all floors and the exit used for recycling pick-up.</li> </ul>														
	<p><i>Note: A centralised space can improve the delivery process for large amount of waste and it could be allocated for each building or for the whole development.</i></p>														
	<p>ADDITIONAL: The Design provides designated space(s) and facilities per floor for sorting and storage of recyclable and non-recyclable waste.</p>														
	<p>Evidence indicates that a centralised space has been provided on construction site for sorting and storage of salvageable construction waste; and it is located with convenient waste delivery access and with minimal environmental impact due to waste transportation within the site.</p>	C&C													
	<p>Field observations confirm that a centralised space and facilities have been provided for sorting and storage of office recyclables generated by building occupants and users.</p>	Ops													
	<p><i>Note: A centralised space can improve the delivery process for large amount of waste and it could be allocated for each building or for the whole development.</i></p>														
	<p>ADDITIONAL: Designated space(s) and facilities have been provided on each floor for sorting and storage of recyclable and non-recyclable waste.</p>														
EN-LAN-4	<p><b>Maximize recycling of office recyclables</b></p>		B												
	<p>The Client's Project Brief commits to minimise municipal waste generation by planning and implementing effective plan that maximises the recycling of office recyclables among building occupants and users during the whole life cycle of the occupied building.</p>	P-Dsn													
	<p>A detailed and comprehensive municipal waste management plan exists to collect, store and send at least 90% of office recyclables to recycling facilities;</p>	Dsn													
	<p>OR</p> <p>A detailed plan exists to collect, store and send at least 60% of office recyclables to recycling facilities.</p>														
	<p><i>Note: The municipal waste management plan should suit the managed building. Apart from that, effective implementation is required to ensure strategies (e.g. in the form of management procedures, instructions or guidelines) are applicable for all building occupants and property management staff of the building.</i></p>														



	<p>The building operator has effectively implemented the municipal waste management plan; AND The actual percentage of office recyclables collected, stored and sent to recycling facilities in the past 1 year is, ≥90% OR ≥60%</p> <p><i>Note: The municipal waste management plan should suit the managed building. Apart from that, effective implementation is required to ensure strategies (e.g. in the form of management procedures, instructions or guidelines) are applicable for all building occupants and property management staff of the building.</i></p> <p>ADDITIONAL: An inspection has been conducted every week to ensure that the strategies are implemented according to the procedure and guidelines as stipulated in the waste management plan.</p> <p><i>Note: Designated person(s) shall ensure all workers and staff on site acknowledge the target and method of the construction waste management plan. Also, the designated person(s) shall identify any improvement required to enhance the effectiveness of waste management and maximising the recyclable waste collection and reuse.</i></p>	Ops
EN-LAN-5	<p><b>Minimise land pollution from site workers' accommodation</b></p> <p>The Client's Project Brief commits to minimise and mitigate land pollution and the subsequent health and environmental impacts generated from site workers' accommodation.</p> <p>Proper disposal of municipal waste generated from site workers' accommodation is implemented.</p> <p>ADDITIONAL The Contractor has provided training and information on health and hygiene issues to construction site workers.</p> <p>ADDITIONAL The Contractor has designated a member of site staff to inspect the site workers' accommodation once a week, and to identify health and hygiene problem areas, for instance, stagnant water offering a breeding ground for mosquitoes, which may bite site workers and cause transmission of diseases; AND Health risk remedial work, such as stagnant water removal, has been implemented.</p>	S P-Dsn C&C
EN-LAN-6	<p><b>Design for repeatability and increase use of standardized and prefabricated components</b></p> <p>The Client's Project Brief commits to design and construct the building and its facilities for ease of construction and less materials use, and with consideration of innovative construction technology.</p> <p>Design documentation indicates that any combination of the following items will be used in the building construction to enhance buildability and minimize environmental impacts:</p> <ul style="list-style-type: none"> <li>- Precast structure (such as precast slab, staircase, column and beams);</li> <li>- Standardised components (such as services riser, refuse chute, standardised door leaf, window etc);</li> <li>- Full precast module (such as modular office) and/or integrated services module (such as prefabricated toilet unit, plant room unit, bathroom unit, which completed with full building services equipment, pipes, ducts and cable containments).</li> </ul> <p>AND The design has been assessed using IBS Content Scoring System (IBS Score) by the Malaysia CIDB and the score obtained is: ≥75% OR 60-74%</p> <p>Evidence suggests that the Contractor has proposed and provided any combination of the following items which are considered other than specified in the Design Stage to enhance buildability and minimise environmental impacts:</p> <ul style="list-style-type: none"> <li>- Precast structure (such as precast slab, staircase, column and beams);</li> <li>- Standardised components (such as services riser, refuse chute, standardised door leaf, window etc);</li> <li>- Full precast module (such as modular office) and/or integrated services module (such as prefabricated toilet unit, plant room unit, bathroom unit, which completed with full building services equipment, pipes, ducts and cable containments).</li> </ul>	B P-Dsn Dsn C&C

EWA: Emissions to Water		
EN-EWA-1	<b>Implement stormwater management strategies</b>	C
	The Client's Project Brief commits to plan and implement effective stormwater management strategies to control the runoff volumes and pollutant loads to the waterways of the municipality.	P-Dsn
	<u>CASE 1: Previously undeveloped site (or the site consists of less than 50% impervious surface in its pre-development state):</u> Stormwater management strategies are implemented in accordance with Stormwater Management Manual for Malaysia (MASMA) that prevent the post-development peak flow rate from the outlet point(s) of the site to the downstream public drainage system or receiving water from exceeding the pre-development rate.	Dsn
	<u>CASE 2: Previously developed site (or the site already consists of more than 50% impervious surface in its pre-development state):</u> Stormwater management strategies are implemented in accordance with MASMA that result in a 25% decrease in the volume of stormwater runoff.	
	<i>Note: Often the techniques used are architectural (e.g. vegetative roofs), landscaping (pervious pavements, bioswales), and civil (detention basins, filtration). Other technique includes collecting the stormwater and storing it for future use on-site.</i>	
	The contactor has formulated and implemented construction site water pollution management plan.	C&C
	ADDITIONAL: Relevant evidence indicates that surface run-off from construction site are discharged into storm drains via adequately designed sand/silt removal facilities such as sand traps, silt traps and sediment basins.	
	ADDITIONAL: Relevant evidence indicates that wastewater generated from general building construction activities, such as concreting, plastering, and cleansing, are discharged into foul sewers with sufficient silt removal facility.	
EN-EWA-2	<b>Minimise storm sewer or stream pollution from site workers' accommodation</b>	C
	The Client's Project Brief commits to minimise and mitigate water pollution and the subsequent health and environmental impacts generated from site workers' accommodation.	P-Dsn
	Proper septic tank has been installed to prevent pollution of storm sewer or receiving stream generated from site workers' accommodation.	C&C
EN-EWA-3	<b>Utilize on-site wastewater treatment systems using greywater</b>	S
	The Client's Project Brief commits to minimise potable water consumption and wastage by recycling and reusing greywater.	P-Dsn
	The design provides all individual occupancies in the project with separate supplies of potable water for required occupancy uses and greywater for toilets and irrigation.	Dsn
	OR The design provides all individual occupancies in the project with separate supplies of potable water for required occupancy uses and greywater for irrigation only.	
	<i>Note: The greywater system collects drainage from sinks (except for kitchens and clinical areas) and showers, washing machines, condensate from air-conditioning systems and water discharged from cooling towers, swimming pools, fountains and other water sources that do not contain food or human waste. The greywater is filtered and disinfected and then stored in a cistern or tank until needed. It is then piped in a special separate piping system for reclaimed water to the points of use. The on-site sewage treatment system approach can include traditional septic systems or more modern biological treatment systems that create a local natural wetland ecosystem that purifies wastewater after a biological digestion process is applied to the sewage.</i>	
	All individual occupancies in the project have been provided with separate supplies of potable water for required occupancy uses and greywater	Ops

for toilets and irrigation.

OR

All individual occupancies in the project have been provided with separate supplies of potable water for required occupancy uses and greywater for irrigation only.

*Note: The greywater system collects drainage from sinks (except for kitchens and clinical areas) and showers, washing machines, condensate from air-conditioning systems and water discharged from cooling towers, swimming pools, fountains and other water sources that do not contain food or human waste. The greywater is filtered and disinfected and then stored in a cistern or tank until needed. It is then piped in a special separate piping system for reclaimed water to the points of use. The on-site sewage treatment system approach can include traditional septic systems or more modern biological treatment systems that create a local natural wetland ecosystem that purifies wastewater after a biological digestion process is applied to the sewage.*

**ADJ: Impacts on Adjacent Properties**

**EN-ADJ-1 Reduce noise and vibration generated during construction C**

The Client's Project Brief commits to minimise and mitigate noise pollution affecting the community and surroundings due to construction process. P-Dsn

Contract documents clearly spell out the requirement for noise and vibration that may be caused by the works to be lower than the maximum permissible limit stipulated in Schedule 6 of the Planning Guidelines for Environmental Noise Limits and Control by Department of Environment. Dsn

The Contractor has formulated and implemented a good management plan for the control of noise pollution at the construction site; C&C

AND

Field measurements confirm that actual sound levels during day time, evening and night time by receiving land use for the project are lower than the maximum permissible limit stipulated in Schedule 6 of the Planning Guidelines for Environmental Noise Limits and Control by Department of Environment, by:

8% OR

5%

*Note: All reasonable measures to control the source of, or limit exposure to, noise during the operation of equipment, plant, process or activity with noise generation should be undertaken. Such measures should be proportionate and reasonable, and may include one or more of the following:*

- the size, design and inherent operation characteristics of the plant, equipment, process or activity;
- the adjustment of operational parameters to limit the intensity of sound emissions,
- the selection and usage of low sound power levels equipment;
- the provision if necessary, and appropriate use of sound attenuators, acoustic plenum, and other acoustic filtering devices;
- the provision if necessary, and appropriate use of acoustic enclosures and other sound enclosing devices;
- the provision if necessary, and appropriate use of screening barriers (man-made, natural or otherwise);
- the proper conduct and adequate supervision of operation; and
- regular and efficient maintenance of plant and control equipment.

**ENE: Non-renewable Energy Consumption**

**EN-ENE-1 Use energy efficient light fixtures and office appliances B**

The Client's Project Brief commits to encourage the use of energy efficient fixtures, appliances and equipment to minimise energy consumption. P-Dsn

Design documentation indicates that the lighting load or power density (including ballast loss) for 90% of the NLA meet the following criteria at Dsn

720mm AFFL:

5 W/ m<sup>2</sup> OR

7.5 W/ m<sup>2</sup> OR

	10 W/ m <sup>2</sup> All office appliances installed has the power index of: 12W/m <sup>2</sup> OR 16W/m <sup>2</sup>	Ops
EN-ENE-2	<b>Use highly efficient ventilation and air-conditioning systems</b> The Client's Project Brief commits to design the building services systems with a higher level of energy efficiency to minimise energy consumption. Energy efficient ventilation and air-conditioning systems are selected in accordance with the Energy Efficiency and Conservation Guidelines for Malaysian Industries Part 1: Electrical Energy-use Equipment.	B P-Dsn Dsn
EN-ENE-3	<b>Use passive cooling strategies</b> The Client's Project Brief commits to design the building with a higher level of energy efficiency by considering passive cooling strategies to minimise energy consumption. The Designers have conducted a site investigation on local topographic conditions and building arrangements in the surrounding area for site layout planning.  <i>Note: The topographic conditions shall include nearby hills/mountains, vegetation and water ponds which may affect the natural ventilation and evaporative cooling effectiveness. Also, the building height, dimensions and separation of surrounding buildings shall also be identified to evaluate the effectiveness of daylight access, solar shading, wind permeability and noise source.</i> ADDITIONAL: Building envelop is designed to cut down external heat gain and hence reduce cooling load of the air-conditioning system, and meet the following criteria: - The overall thermal transfer value (OTTV) of building envelope for a building having a total air-conditioned area exceeding 4000m <sup>2</sup> and above, does not exceed 50 W/m <sup>2</sup> as stipulated in MS1525. AND - The roof thermal transfer value (RTTV) of building roofs with skylight and the entire enclosure below is fully air-conditioned, does not exceed 25 W/m <sup>2</sup> as stipulated in MS1525; OR - The thermal transmittance (U-value) of the roof of a conditioned space does not exceed 0.4 W/ m <sup>2</sup> K (for light weight roof under 50kg/ m <sup>2</sup> ) or 0.6 W/ m <sup>2</sup> K (for heavy weight roof above 50kg/ m <sup>2</sup> ) as stipulated in MS1525.	B P-Dsn Dsn
EN-ENE-4	<b>Use integrated lighting concept</b> The Client's Project Brief commits to design the building with optimum access to daylight to minimise energy consumption as well as to improve the environmental quality inside the building. The percentage of the NLA that has a Daylight Factor (DF) of 1.0-3.5% at the working plane level (800mm from floor level), as indicated by design and relevant simulation results, is: 70% OR 50% OR 30%  <i>Note: Review sun path diagram relative to the site and building forms to guide development of the daylight design. Consider sun angles throughout the year for the best orientation and shading strategies. Establish daylight strategy early in schematic design, as it influences decision making related to the site plan, building orientation, building massing and fenestration. However, daylighting needs to take into account the sky conditions more than sun movement. Locate program area that benefit most from daylight at perimeter zones with northern and southern exposures to the greatest extent possible. Eastern and western exposures require more careful sun control strategies to control glare and overheating from low angle sun. The requirement for daylight can be effectively controlled by the depth of the room. In general, higher levels of reflectance and higher window head heights</i>	B P-Dsn Dsn

	<p><i>allow deeper rooms.</i></p> <p>The actual percentage of the NLA that has a Daylight Factor (DF) of 1.0-3.5% at the working plane level (800mm from floor level), as indicated by site measurements, is: 70% OR 50% OR 30%</p> <p><i>Note: Review sun path diagram relative to the site and building forms to guide development of the daylight design. Consider sun angles throughout the year for the best orientation and shading strategies. Establish daylight strategy early in schematic design, as it influences decision making related to the site plan, building orientation, building massing and fenestration. However, daylighting needs to take into account the sky conditions more than sun movement. Locate program area that benefit most from daylight at perimeter zones with northern and southern exposures to the greatest extent possible. Eastern and western exposures require more careful sun control strategies to control glare and overheating from low angle sun. The requirement for daylight can be effectively controlled by the depth of the room. In general, higher levels of reflectance and higher window head heights allow deeper rooms.</i></p>	Ops
EN-ENE-5	<p><b>Reduce fossil fuel energy consumption</b></p> <p>The Client's Project Brief commits to minimise the overall building fossil fuel energy consumption for the whole life of the building by effective design and efficient operation.</p> <p><b>Conditional requirement for the whole assessment:</b> The project's predicted/actual Building Energy Intensity (BEI) which measures the total energy used in the building for one year (in kilowatts hours) divided by the air-conditioned floor area of the building (in square meters), must not exceed 150 kWh/m<sup>2</sup>/year. 0-89 kWh/m<sup>2</sup>/year; OR 90-120 kWh/m<sup>2</sup>/year; OR 121-150 kWh/m<sup>2</sup>/year</p>	B P-Dsn Dsn Ops
EN-ENE-6	<p><b>Optimise the size of building systems control zones</b></p> <p>The Client's Project Brief commits to minimise energy consumption by means of providing a building with high operational flexibility to suit the variation of the instantaneous demands of the building occupants and facilities.</p> <p>Design documentation indicates that all individual or enclosed spaces are individually switched; the size of individually switched lighting zones does not exceed 100m<sup>2</sup> for 90% of the NLA; and Switching is clearly labelled and easily accessible by building occupants;</p> <p>ADDITIONAL: An individually addressable lighting system (i.e. the lighting fixtures must be able to be readdressed/regrouped without wiring) is provided for 90% of the NLA.</p> <p><i>Note: 'Easily accessible switch' = wired for each zone of 100m<sup>2</sup> and must be located as follows:</i></p> <ul style="list-style-type: none"> <li>• within the 100m<sup>2</sup> zone and at every entry (2- or 3-way switches may need to be provided) to the floor or tenancy (if known), whichever is smaller; OR</li> <li>• at the entry point to the tenancy or floor (whichever is smaller) if the area controlled by the switching does not exceed 500m<sup>2</sup>.</li> </ul> <p><i>'Individually addressable lighting system' = the lighting fixtures must be able to be readdressed/regrouped without wiring.</i></p> <p>ADDITIONAL: Provisions are designed to enhance the thermal comfort performance at partial operation based on system part-load operation and control strategies of centralized system.</p> <p><i>Note: For buildings with centralized building services systems, certain level of operational flexibility is restricted. On some occasions, whole floor building systems have to be activated in order to serve single building occupant outside of normal operating hours, such that building system is operated uneconomically and energy is wasted. Hence, the optimum size of control zones shall be determined according to the space usage and floor area.</i></p>	B P-Dsn Dsn

	<p>On-site investigation confirms that all individual or enclosed spaces are individually switched; the size of individually switched lighting zones does not exceed 100m<sup>2</sup> for 90% of the NLA; and Switching is clearly labelled and easily accessible by building occupants.</p> <p>ADDITIONAL: An individually addressable lighting system (i.e. the lighting fixtures must be able to be readdressed/regrouped without wiring) is provided for 90% of the NLA.</p> <p>ADDITIONAL: On-site investigation confirms that effective provisions have been provided to enhance the thermal comfort performance at partial operation based on system part-load operation and control strategies of centralized system.</p> <p><i>Note: For buildings with centralized building services systems, certain level of operational flexibility is restricted. On some occasions, whole floor building systems have to be activated in order to serve single building occupant outside of normal operating hours, such that building system is operated uneconomically and energy is wasted. Hence, the optimum size of control zones shall be determined according to the space usage and floor area.</i></p>	Ops
EN-ENE-7	<p><b>Use automatic lighting control system</b></p> <p>The Client's Project Brief commits to encourage the use of automatic lighting control system to minimise energy consumption, while providing a high visual quality.</p> <p>Design documentation indicates that automatic lighting control system will be provided in all daylight zones to allow coordinated and active operation between natural and artificial light sources in response to the interior requirements and outdoor daylight conditions.</p> <p><i>Note: The integrated control shall be able to minimise the operating period of electric lighting and to allow for more use of daylight.</i></p> <p>ADDITIONAL: Design documentation indicates that occupancy sensors which automatically shut off lighting in unoccupied areas will be provided for at least 25% NLA.</p> <p><i>Note: Types of sensors include passive infrared sensors (sense the heat radiated by people), ultrasonic sensors (detect motion), and dual-technology occupancy sensors. Integrate occupancy sensors with daylight dimming controls that dim electric lighting levels in response to daylight.</i></p> <p>On-site investigation confirms that automatic lighting control system has been provided in all daylight zones to allow coordinated and active operation between natural and artificial light sources in response to the interior requirements and outdoor daylight conditions.</p> <p><i>Note: The integrated control shall be able to minimise the operating period of electric lighting and to allow for more use of daylight.</i></p>	P-Dsn Dsn Ops
EN-ENE-8	<p><b>Install energy sub-metering system for each floor/section/tenancy</b></p> <p>The Client's Project Brief commits to provide sufficient provision for the effective measurement and monitoring of energy consumption in the building operation period.</p> <p>According to design documentation, sub-metering will be provided for substantive energy uses within the building (i.e. all energy uses of 50kW or greater) and the system will be linked to BMS to monitor energy consumption data.</p> <p>If the building is less than 500m<sup>2</sup>, this credit is 'Not applicable'.</p> <p>ADDITIONAL: Sub-metering will be provided separately for lighting AND separately for power for each floor or tenancy, whichever is smaller.</p> <p><i>Note: Metering of all individual equipment may not be cost-effective, but metering of particular groups of equipment and major equipment could be sufficient in many cases in order to understand the energy use pattern and for future energy use planning. Also, metering provisions allow regular energy audits to be carried out by building operators or energy audit consultants. Energy metering, monitoring and logging provisions for the continuous recording of energy use are recommended.</i></p>	P-Dsn Dsn

	<p>According to field observation, sub-metering is provided for substantive energy uses within the building (i.e. all energy uses of 50kW or greater) and the system is linked to BMS to monitor energy consumption data.</p> <p>If the building is less than 500m<sup>2</sup>, this credit is 'Not applicable'.</p> <p>ADDITIONAL: Sub-metering is provided separately for lighting AND separately for power for each floor or tenancy, whichever is smaller.</p> <p><i>Note: Metering of all individual equipment may not be cost-effective, but metering of particular groups of equipment and major equipment could be sufficient in many cases in order to understand the energy use pattern and for future energy use planning. Also, metering provisions allow regular energy audits to be carried out by building operators or energy audit consultants. Energy metering, monitoring and logging provisions for the continuous recording of energy use are recommended.</i></p> <p>ADDITIONAL: Evidence revealed that competent in-house energy audit team has been formed or an external energy audit team (e.g. building services consultants and tertiary academic institutions) has been employed to carry out walk-through energy consumption audit for the whole building not less than once for 3 years.</p>	Ops
EN-ENE-9	<p><b>Facilitate personal control of thermal comfort systems</b></p> <p>The Client's Project Brief commits to facilitate personal control over indoor climate to minimise health symptoms, and improve comfort satisfaction and performance of building occupants.</p> <p>Design reports and relevant technical specification and drawings indicate that individual comfort controls (over air temperature, radiant temperature, air speed or humidity) will be provided for ≥50% of the building occupants to enable adjustments to suit individual task needs and preferences, while maintaining the indoor environment within acceptable limits.</p> <p>AND Comfort system controls will be provided for all shared multi-occupant spaces (meeting rooms, amphitheatre etc.) to enable adjustments to suit group needs and preferences.</p> <p><i>Note: Occupants in many building experience an uncomfortable environment when working at odd hours (at night or on weekends) because the HVAC systems have not been designed to permit occupants to control their own needs. This criterion is applicable to personal control over thermal comfort system only as lighting system control zone is addressed in other credit. Also, it applies to the extent to which passive strategies in hybrid ventilated (air-conditioned and natural ventilated) buildings are capable of providing a range of control patterns as it does for fully air-conditioned buildings.</i></p> <p>System descriptions, schematic diagrams together with on-site investigation confirm that individual comfort controls (over air temperature, radiant temperature, air speed or humidity) are provided for ≥50% of the building occupants to enable adjustments to suit individual task needs and preferences, while maintaining the indoor environment within acceptable limits.</p> <p>AND Comfort system controls are provided for all shared multi-occupant spaces (meeting rooms, amphitheatre etc.) to enable adjustments to suit group needs and preferences.</p> <p><i>Note: Occupants in many building experience an uncomfortable environment when working at odd hours (at night or on weekends) because the HVAC systems have not been designed to permit occupants to control their own needs. This criterion is applicable to personal control over thermal comfort system only as lighting system control zone is addressed in other credit. Also, it applies to the extent to which passive strategies in hybrid ventilated (air-conditioned and natural ventilated) buildings are capable of providing a range of control patterns as it does for fully air-conditioned buildings.</i></p>	B P-Dsn Dsn Ops
<p><b>WAT: Potable Water Consumption</b></p>		
EN-WAT-1	<p><b>Harvest rainwater for later re-use</b></p>	S

	The Client's Project Brief commits to minimise potable water consumption and wastage by using captured rainwater.	P-Dsn
	Design documentation indicates that a rainwater harvesting system will be provided and the calculations provided suggests that the provision will lead to 20% reduction in potable water consumption; OR ...10% reduction...	Dsn
	Relevant photographic and other evidence suggest that rainwater has been harvested and reused within the construction site and the provision has led to 20% reduction in potable water consumption; OR ...10% reduction...	C&C
	Field observations indicate that a rainwater harvesting system has been provided and the operation and maintenance records for the rainwater recycling and treatment suggests that the provision has led to 20% reduction in potable water consumption; OR ...10% reduction...	Ops
EN-WAT-2	<b>Use water efficient plumbing fixtures and appliances</b>	B
	The Client's Project Brief commits to encourage the implementation of effective water conservation strategies and the application of water conservation measures.	P-Dsn
	The percentage of all lavatory faucets with water flow between 0.5-1.0 GPM, as indicated by design reports and specifications, is: 100% OR 75-99%	Dsn
	ADDITIONAL: The percentage of all toilets with dual-flush or low-flush system (less than or equal to 6 liters) is: 100% OR 75-99%	
	<i>Note: Use aerators on lavatory faucets to reduce water flow from 2.5 GPM to 0.5 or 1.0 GPM. Use automated controls for lavatory faucets for water conservation, such as infrared sensor faucets, delayed action shutoff, or automatic mechanical shutoff valves. Use dual-flush or low-flush toilets. Do not use automatic flush toilets and urinals to avoid excessive flushing.</i>	
	The actual percentage of all lavatory faucets with water flow between 0.5-1.0 GPM, indicated by system descriptions and relevant photos taken during operation phase, is: 100% OR 75-99%	Ops
	ADDITIONAL: A actual percentage of all toilets with dual-flush or low-flush system (less than or equal to 6 liters) is: 100% OR 75-99%	
	<i>Note: Use aerators on lavatory faucets to reduce water flow from 2.5 GPM to 0.5 or 1.0 GPM. Use automated controls for lavatory faucets for water conservation, such as infrared sensor faucets, delayed action shutoff, or automatic mechanical shutoff valves. Use dual-flush or low-flush toilets. Do not use automatic flush toilets and urinals to avoid excessive flushing.</i>	
EN-WAT-3	<b>Minimise use of potable water for landscaping irrigation</b>	S
	The Client's Project Brief commits to minimise potable water consumption and wastage for landscaping irrigation by implementing effective water	P-Dsn



		conservation strategies and/or using non-potable water.		
		Potable water consumption for landscape irrigation is predicted to be reduced by 50% through the following: - Installation of water-efficient irrigation systems e.g. sub-soil or drip irrigation and/or - Use of non-potable water (i.e. captured rainwater or greywater) for landscape irrigation OR According to landscaping plans and specifications, water-conserving or self-sustaining landscape will be installed which is based on plants tolerant of soils, climate and water availability	Dsn	
		If there is no landscaping, or landscaping represents less than 1% of the site area, this credit is "Not Applicable".		
		Potable water consumption for landscape irrigation is actually reduced by 50% through the following: - Installation of water-efficient irrigation systems e.g. sub-soil or drip irrigation and/or - Use of non-potable water (i.e. captured rainwater or greywater) for landscape irrigation OR According to observations made during operation phase, water-conserving or self-sustaining landscape has been installed which is based on plants tolerant of soils, climate and water availability	Ops	
		If there is no landscaping, or landscaping represents less than 1% of the site area, this credit is "Not Applicable".		
EN-WAT-4		<b>Minimise use of potable water for cooling system</b>		B
		The Client's Project Brief commits to minimise potable water consumption and wastage for cooling system.	P-Dsn	
		Potable water consumption of water-based heat rejection system is predicted to be reduced by 90%; OR According to design documentation, no water-based heat rejection systems will be provided; OR ...reduced by 50%	Dsn	
		Potable water consumption of water-based heat rejection system is actually reduced by 90%; OR According to observations made during operation phase, no water-based heat rejection systems have been provided; OR ...reduced by 50%	Ops	
EN-WAT-5		<b>Install water meters for all major water uses in the project</b>		B
		The Client's Project Brief commits to provide sufficient provision for the effective measurement and monitoring of water consumption in the building operation period.	P-Dsn	
		Design documentation indicates that a water sub-metering system will be provided for high water-usage operations (e.g. irrigation, cooling tower) or for tenants. ADDITIONAL: All water sub-meters will be linked to BMS to monitor water consumption data and to enable detection of water leakage.	Dsn	
		Field observation indicates that a water sub-metering system is provided for high water-usage operations (e.g. irrigation, cooling tower) or for tenants. ADDITIONAL: All water sub-meters are linked to BMS to monitor water consumption data and to enable detection of water leakage.	Ops	
Issue	Sub-Issues	Criteria & Benchmarking	Assesmt. Phase	Spatial Scale

## EC: ECONOMIC

### TBL: Triple Bottom Line Accounting – Planet, People, Profit

EC-TBL-1	<b>Refer to Environmental Impact Assessment (EIA) report</b>	C																		
	The Client's Project Brief commits to avoid environmental impacts and to minimise and control the adverse effects due to environmental impacts of the building.	P-Dsn																		
	Evidence suggests that the preliminary EIA report prepared by environmental experts (if available) has been referred to by the project team during the design process.	Dsn																		
EC-TBL-2	<b>Assess and evaluate the quality of workmanship of construction works</b>	B																		
	Evidence suggests that the workmanship of the construction work has been assessed using Quality Assessment System in Construction (QLASSIC) by CIDB prior to hand over; and the score obtained is: ≥80% OR 65-79%	C&C																		
EC-TBL-3	<b>Consider both capital/construction and operational costs</b>	B																		
	The Client's Project Brief commits to carry out comprehensive and life-cycle economic considerations in building development.	P-Dsn																		
	<i>Note: The economic analysis shall be in form of life-cycle costing (LCC) approach, with the considerations of capital cost, construction and installation cost, operation and maintenance cost, decommissioning cost, life of the building/component/system, interest rates, discount rates and other significant factors that may affect the LCC results. The LCC process shall be a co-operation among the Client, Designer and Quantity Surveyor.</i>																			
	LCC has been carried out for major sustainable/green building features and systems and the calculation results of savings by adopting the features and systems, as well as their payback period are available. It shows that the number of major green building features and systems included in the analysis is:  ≥ 10 OR ≤ 5 OR < 5	Dsn																		
	<i>Note: The economic analysis shall be in form of life-cycle costing (LCC) approach, with the considerations of capital cost, construction and installation cost, operation and maintenance cost, decommissioning cost, life of the building/component/system, interest rates, discount rates and other significant factors that may affect the LCC results. The LCC process shall be a co-operation among the Client, Designer and Quantity Surveyor.</i> <i>Sustainable/Green building features and systems include, but not limited to:</i>																			
	<table style="width: 100%; border: none;"> <tr> <td style="width: 33%;">High performance building envelope</td> <td style="width: 33%;">Materials selection for the project</td> <td style="width: 33%;">Radiant cooling</td> </tr> <tr> <td>Energy efficient lighting</td> <td>Rainwater harvesting</td> <td>Renewable energy systems</td> </tr> <tr> <td>Stormwater management</td> <td>Greywater recycling systems</td> <td>Enthalpy heat recovery</td> </tr> <tr> <td>Chiller heat recovery</td> <td>Evaporative condensers</td> <td>Displacement ventilation</td> </tr> <tr> <td>Waterside economizer cycle</td> <td>Indirect and direct evaporative cooling</td> <td>Variable Speed Drive</td> </tr> <tr> <td>Desiccant dehumidification</td> <td>Ventilation air heat recovery</td> <td></td> </tr> </table>	High performance building envelope	Materials selection for the project	Radiant cooling	Energy efficient lighting	Rainwater harvesting	Renewable energy systems	Stormwater management	Greywater recycling systems	Enthalpy heat recovery	Chiller heat recovery	Evaporative condensers	Displacement ventilation	Waterside economizer cycle	Indirect and direct evaporative cooling	Variable Speed Drive	Desiccant dehumidification	Ventilation air heat recovery		
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EC-TBL-4	<b>Conduct Triple Bottom Line before deciding to pursue with the project</b>	O																		
	At the outset of a project, preferably before a site is even selected, a goal setting session is held with all team members participating to: - establish the objectives for pursuing a sustainable building project; and	P-Dsn																		

	<p>- understand the options available under any sustainable building rating system to achieve the desired level of performance coinciding with the project's program; and clearly communicate realistic objectives to those responsible for designing, constructing, or acquiring green assets.</p> <p>ADDITIONAL: Triple Bottom Line (TBL) of the project making transparent the organisation's decisions that explicitly take into consideration impacts on the environment and people, as well as on financial capital, is available in a written report.</p>	
EC-TBL-5	<p><b>Manage the performance risks associated with new and untested sustainable building products and technologies</b></p> <p>The Client's Project Brief commits to manage the performance risks associated with new and untested sustainable/green building products and technologies incorporated in the building.</p> <p>If new and untested building products and/or technologies are selected, contract documents expressly state such products and/or technologies are new, and that their selection or recommendation does not constitute a warranty of performance.</p> <p>OR</p> <p>Contract documents clearly spell out who is responsible for the selection of products and technologies to be used, so that the parties can adequately address the risks assumed and planned accordingly, including cost estimates.</p> <p><i>Note: Performance risks center around the ability of products, systems and buildings to perform in a sustainable/green environment. New products and technologies are being developed to meet the increasing demand for sustainable/green construction. Many 'environmental-friendly' products and technologies are in their infancy in terms of field testing; hence disputes may arise regarding who bears the risk of failure or poor performance. Only time will tell whether the new products and technologies will actually perform as promised.</i></p>	<p>O</p> <p>P-Dsn</p> <p>Dsn</p> <p>Ops</p>
<p><b>EEF: Efficiency, Effectiveness and Flexibility</b></p>		
EC-EEF-1	<p><b>Develop and implement a long-term maintenance management plan</b></p> <p>The Client's Project Brief commits to develop and implement a long-term maintenance management plan for efficient and effective building operation, maintenance and management.</p> <p>An explicit plan exists for future preventive and corrective maintenance and efficient operation of the facility, covering all technical systems, and providing performance targets, system maintenance and replacement guidance over a 25-year period.</p> <p>OR</p> <p>... over at least a 10-year period.</p> <p>Detailed preventive and corrective maintenance plans for the first 3 years exist to help minimise accidental breakdown of services.</p> <p><i>Note: Planned preventive maintenance works shall be carried out within the anticipated life cycle of the building components, facilities and services before breakdown or abnormal operation are detected. Since planned preventive maintenance work could not prevent all accidental failure, planned corrective maintenance works are also essential. The corrective maintenance plan shall comprise of accidental system failure response and repairing plan, spare parts and component list, as well as contingency plan for the temporary shut-down of services serving the building occupants.</i></p> <p>ADDITIONAL: The building inspection checklist as well as inspection and performance/functional testing records for at least 3 years are kept by building operator (minimum of 1 year record shall be provided for the first assessment in operation phase); AND the record indicates that regular inspection and performance testing on building services installations are conducted regularly.</p> <p><i>Note: Inspection checklist shall include, but not limited to the visual inspection on conditions and performance/functional tests of public lighting, plumbing and drainage systems, HVAC installations serving public areas, and other facilities and building services systems in the building.</i></p> <p>ADDITIONAL: The building inspection checklist and inspection record for at least 3 years are kept by building operator (minimum of 1 year record shall be</p>	<p>B</p> <p>P-Dsn</p> <p>Dsn</p> <p>Ops</p>

	provided for the first assessment in operation phase); AND the record indicates that regular inspection is conducted of the followings to ensure proper, effective and safe functioning:	
	<ul style="list-style-type: none"> <li>- Means of escape and fire resisting construction e.g. walls, floors, staircases, fire-resisting doors, openings, fire-resisting enclosures, etc.</li> <li>- Building fabric, structure and facade;</li> <li>- Slope, retaining wall and private roads.</li> </ul>	
EC-EEF-2	<b>Provide and operate an effective building management control system</b>	B
	The Client's Project Brief commits to provide effective building management control system for efficient and effective building operation, maintenance and management.	P-Dsn
	A systematic tool called Central Control and Monitoring Systems (CCMS) or Building Management System (BMS) will be/has been provided and its capability is consistent with the complexity of building systems; AND The system will/has enabled the followings:	Dsn Ops
	<ul style="list-style-type: none"> <li>- The operation status monitoring of various major electrical and mechanical installations, such as lift &amp; escalator, electrical system, chiller plant, boiler plant, pumping system, water circulation systems, fire and smoke alarm system, and security system; the daily automatic monitoring of operation such that system faults and abnormal operations can be identified at an early stage; the recording of operating history hence helping the building operator to establish an effective maintenance plan.</li> </ul>	
	<b>ADDITIONAL:</b>	
	<ul style="list-style-type: none"> <li>- The operation control of various major electrical and mechanical installations as described above, to minimise failures due to human errors.</li> </ul>	
	<i>Note: If a fire is detected, then the system could be used to prevent the smoke from spreading by opening exhaust dampers and closing outdoor air intake dampers of the fire floor and send all elevators to the ground floor and park them to prevent people from using them in the event of a fire.</i>	
	<b>ADDITIONAL:</b>	
	<ul style="list-style-type: none"> <li>- The automatic control and monitoring of lighting installations according to the scheduled occupancy programme.</li> </ul>	
	<i>Note: Energy management and control system should be considered in any building exceeding 40,000sqft or 3700 sqm of gross area. A Building Management System (BMS) manages the following systems:</i>	
	<ul style="list-style-type: none"> <li>- Building Automation System (BAS) that provides automatic monitoring, interaction and management for electricity, lighting, plumbing, ventilation and air-conditioning, water supply and drainage, and environmental control systems at a simple control centre.</li> <li>- Security Automation System (SAS) – addressed by other credit.</li> <li>- Fire Automation System (FAS) – addressed by other credit.</li> </ul>	
EC-EEF-3	<b>Provide comprehensive building records to operating staff and owners</b>	O
	The Client's Project Brief commits to make available a complete set of building records for efficient and effective building operation, maintenance and management.	P-Dsn
	Tender Specification clearly specifies the requirements comprehensive building records from the Contractor.	Dsn
	<i>Note: The building records shall comprise, but not limited to the following items:</i>	
	<ul style="list-style-type: none"> <li>- Documented design intent – building, structural, drainage, site formation, alterations and additions plans approved by the Local Authority.</li> <li>- Building services as-built drawings – fire services, underground drains, drainage, water supply, electrical, lighting, broadcasting, gas supply, HVAC, etc.</li> <li>- Layout plan for hidden utilities – electricity cables, gas pipes, telephone lines etc.</li> <li>- Operations and maintenance manual for building services, mechanical components and installations;</li> <li>- Testing and commissioning report</li> </ul>	
	The Contractor has complied and provided the full set of building records to the satisfaction of the client's representatives, and convey to building operator.	C&C

	<p><i>Note: The building records shall comprise, but not limited to the following items:</i></p> <ul style="list-style-type: none"> <li>- Documented design intent – building, structural, drainage, site formation, alterations and additions plans approved by the Local Authority.</li> <li>- Building services as-built drawings – fire services, underground drains, drainage, water supply, electrical, lighting, broadcasting, gas supply, HVAC, etc.</li> <li>- Layout plan for hidden utilities – electricity cables, gas pipes, telephone lines etc.</li> <li>- Operations and maintenance manual for building services, mechanical components and installations;</li> </ul> <p><i>Testing and commissioning report</i></p>		
	The property management company and/or Owners' Corporation keep the full set of building records and the updated versions properly.		Ops
	<p><i>Note: The building records shall comprise, but not limited to the following items:</i></p> <ul style="list-style-type: none"> <li>- Documented design intent – building, structural, drainage, site formation, alterations and additions plans approved by the Local Authority.</li> <li>- Building services as-built drawings – fire services, underground drains, drainage, water supply, electrical, lighting, broadcasting, gas supply, HVAC, etc.</li> <li>- Layout plan for hidden utilities – electricity cables, gas pipes, telephone lines etc.</li> <li>- Operations and maintenance manual for building services, mechanical components and installations;</li> </ul> <p><i>Testing and commissioning report</i></p>		
EC-EEF-4	<p><b>Spatial flexibility for different users/requirements</b></p> <p>The Client's Project Brief commits to design interior spaces with high adaptability and flexibility for change in usage during the whole life-cycle of the occupied building.</p> <p>No partitions are provided (to be installed by tenants)</p> <p>OR</p> <p>Saleable/rental areas can easily be reconfigured to suit different users/requirements by providing open ceiling and removable internal partitions</p> <p>ADDITIONAL: Saleable/rental areas are designed with minimum interior finishing and fittings to minimise waste generation.</p> <p>OR</p> <p>Potential buyers and tenants are allowed to provide their own choices of internal finishing and fittings before completion of construction works to minimise waste generation.</p>		B
			P-Dsn
			Dsn
EC-EEF-5	<p><b>Provide building services systems with maximum flexibility for different users/ requirements</b></p> <p>The Client's Project Brief commits to design building services systems with high adaptability and flexibility for change in usage during the whole life-cycle of the occupied building.</p> <p><u>Ease of adapting HVAC systems to changing occupant requirements:</u> With a minimum adjustment, the existing HVAC delivery systems and associated control systems, can accommodate all basic types of layout from open-plan to cellular layout and also accommodate added functions such as copier or meeting rooms, hence changes in layout will result in less disruption to user operations.</p> <p><i>Note: For instance, a standardized layout for air and water distributions, and installing of air ducts in open ceilings are possible methods to enhance adaptability. Reasonable spare space in chiller plant, boiler plant, heat rejection plant, and centralized air handling plant, to cope with additional installations for future demand expansion. Reasonable spare capacity of air duct and water pipes would result in these be able to cope with loading increase and reduce friction loss in distribution process, thus lower pumping/fan power.</i></p> <p>ADDITIONAL: <u>Ease of adapting lighting systems to changing occupant requirements:</u> The lighting layout, luminaire type and control system permit easy and rapid changes required for minor changes in office layout, such as from open-plan to cellular, or to add or delete other functions, such as copier or meeting rooms.</p>		B
			P-Dsn
			Dsn

<p><i>Note: For instance, spare capacity of power and control cabling, normal and essential power sources, cable containment, space in distribution boards and switchboards are all important in enhancing the electrical services flexibility. Sufficient space and convenient access to cable containment are also necessary to minimize cable wiring/re-wiring works, and minimize subsequent disturbance to the building occupants.</i></p>			
EC-EEF-6	<p><b>Perform comprehensive commissioning, and post-occupancy commissioning for all building services</b></p> <p>The Client's Project Brief commits to perform comprehensive pre-commissioning, commissioning and quality monitoring for all building services.</p> <p>Tender Specification clearly specifies the requirement for comprehensive pre-commissioning, commissioning and quality monitoring to be performed for all building services (BMS, mechanical, electrical and hydraulic) and the works shall be done in exact accordance with ASHRAE Commissioning Guideline.</p> <p>The Contractor has carried out comprehensive and effective testing and commissioning works prior to handover to the building operator in exact accordance with ASHRAE Commissioning Guideline and to the satisfaction of the Client's representatives.</p> <p>AND</p> <p>For large projects or buildings with complicated building systems, an independent Commissioning Specialist is appointed at the onset of the design process to verify that comprehensive pre-commissioning and commissioning are performed for all the building services in accordance with ASHRAE Commissioning Guideline.</p> <p>Evidences suggest that tuning has been implemented on all building systems after building handover, and the tuning process involved the relevant members of the design team. The Building Tuning Report on the outcomes of the tuning process has been provided to the building owner and made available to the design team.</p> <p>AND</p> <p>Full re-commissioning has been carried out for all building services 12 months after practical completion.</p>	<p>P-Dsn</p> <p>Dsn</p> <p>C&amp;C</p> <p>Ops</p>	B
EC-EEF-7	<p><b>Structural design with maximum adaptability for new uses</b></p> <p>The Client's Project Brief commits to design building structure with high adaptability and flexibility for change in usage during the whole life-cycle of the occupied building.</p> <p>The location and capacity of the building core and the structural grid have been designed to permit an acceptable level of flexibility in the planning of interior spaces and future uses.</p> <p><i>Note: Constructing large-span bays, avoiding disproportionately large columns and infrequent changes of floor levels, optimizes the flexibility of the space and increases its appeal for reuse. Placement of shear walls, utility walls and fire separations acknowledges and provides for changing occupant uses.</i></p>	<p>P-Dsn</p> <p>Dsn</p>	B
EC-EEF-8	<p><b>Adequate floor-to-floor height to offer high level of functionality for almost any occupancy</b></p> <p>The Client's Project Brief commits to provide floor-to-floor height with high adaptability and flexibility for change in usage during the whole life-cycle of the occupied building.</p> <p>Adaptation to another building use would result in a high level of functionality of the new occupancy. Floor-to-floor heights are <math>\geq 3.6\text{m}</math>.</p> <p>OR</p> <p>... would result in an acceptable level of functionality of the new occupancy. Floor-to-floor heights are <math>\geq 3.4\text{m}</math>.</p> <p><i>Note: Structural elements such as beams reduce the overall effective floor-to-ceiling height. If these are continuous over the entire floor, the floor-to-floor height refers to the height between the floor and the underside of the structural elements.</i></p>	<p>P-Dsn</p> <p>Dsn</p>	B
EC-EEF-9	<p><b>Maximize workspace/directly functional area to total floor area ratio</b></p> <p>The Client's Project Brief commits to provide a building design with maximum spatial efficiency.</p> <p>Design documentation indicates that the ratio of the total net lettable area (NLA) over the total gross floor area (GFA) of the building, is:</p>	<p>P-Dsn</p> <p>Dsn</p>	B

≥85% OR  
80-84%

*Note: Nett lettable area (NLA) is the gross internal area less common areas, ancillary spaces (corridors, plant room, toilet blocks etc.) and structural/ internal party walls (but not partitioning or other non load-bearing walls).*

Issue	Criteria & Benchmarking	Assess. Phase	Spatial Scale
<b>INN: INNOVATION</b>			
INN-1	<p><b>Innovative strategies and technologies</b></p> <p>The initiative is a technology or process that is considered a 'first' in the World OR The project substantially contributes to the broader market transformation towards sustainable development in the World. OR The initiative is a technology or process that is considered a 'first' in Malaysia OR The project substantially contributes to the broader market transformation towards sustainable development in Malaysia.</p>	Dsn C&C Ops	○
INN-2	<p><b>Exceeding MOBSA benchmarks</b></p> <p>The solution results in a substantial (e.g. 5% or greater above the specified percentage for the best performance) social/environmental/economic impact targeted by an existing credit.</p>	Dsn C&C Ops	○

**Note:** Assessment Phase: P-Dsn = Pre-design phase; Dsn = Design phase; C&C = Construction & Commissioning phase; Ops = Operations phase  
 Spatial Scale: G = Global level: *Impacts on resources specifically identified to be global*; C = Community and regional level: *Impacts on the neighbourhood, community and region*;  
 S = Site level: *Site-specific attributes*; B = Building level: *Certain construction techniques, attributes of buildings, or types of building materials*; and O = Other: *Criteria that do not fit the above.*

Issue	Sub-Issues	Criteria & Benchmarking	Assess. Phase	Spatial Scale
<b>S: SOCIAL</b>				
<b>EDU: Education and Awareness</b>				
S-EDU-1		<b>Increase awareness of building occupants</b> N.A.		O
S-EDU-2		<b>Readiness and competency of design team members</b> At least one principal member in the design team has had training and/or experience and/or very knowledgeable in sustainable design and development, hence ready and competent to help develop and support the sustainable design goals for the project from the schematic design phase through to construction completion.  <i>Note: An expanded design team for a sustainable design with commissioning includes the following members:</i> <ul style="list-style-type: none"> <li>• Owner, architect, design engineers, landscaping/site specialist, interior designer, cost estimator</li> <li>• Energy analyst/engineer – intimately familiar with energy and daylight analysis modelling tools</li> <li>• Environmental design consultant – helps design teams recognize design synergies and opportunities to implement sustainable design features without increasing construction costs.</li> <li>• Commissioning Authority – documents the Owner's Project Requirements (OPRs) starting in the pre-design phase – records the owner's objectives, criteria, and goals and benchmarks for gauging success in achieving the defined requirements. The OPR document forms the basis from which all design, construction, acceptance, and operational decisions are made.</li> </ul> ADDITIONAL: Workshop has been held to educate the entire team (client and consultants) about the impact of buildings and construction on human health, well-being, and productivity; resource use; community development; ecosystem; and the opportunities for improvement.	P-Dsn	O
S-EDU-3		<b>Improve skills and knowledge of maintenance and operation staff</b> N.A.		O
S-EDU-4		<b>Improve sustainable construction skills among construction workers</b> N.A.		O
<b>COH: Support for Social Cohesion</b>				
S-COH-1		<b>Support for inter-disciplinary work right from the beginning of the design process</b> The Client's Project Brief commits to support multi-disciplinary work between architects, engineers, cost specialists, operation people and other relevant actors right from the beginning of the design process.	P-Dsn	O
S-COH-2		<b>Planning to support active streetscape and provisions for community</b>		C



	The Client's Project Brief commits to plan the building to support active streetscape by providing spatial and facility provisions that benefit the community.	P-Dsn
	If there is no existing streetscape or the project is developed on a green site with limited close neighbourhood, provisions shall be made to serve the building occupants and users.	
	ADDITIONAL: An amenity conflict appraisal has been carried out with survey on existing amenity/communal service provisions in the surrounding to identify duplication of services/ amenity conflicts, and to identify and evaluate the possible community supports that could be offered by the new building.	
	If there is no existing streetscape or the project is developed on a green site with limited close neighbourhood, this credit is 'Not applicable'.	
	<i>Note: The extent of amenity provision covers various supports for elderly, youth, students, passer-by, building occupants and people from outside the building. Support should be in form of those not addressed by other criteria e.g. healthcare, retail shops, restaurant/cafe, library, leisure &amp; recreational facilities, gallery. Additions to the existing inadequate supports or amenities can be provided in the new building, rather than repeated within the neighbourhood context.</i>	
S-COH-3	<b>Space planning for maximum social interaction</b>	B
	The Client's Project Brief commits to create an environment in the building that promotes social interaction and communication.	P-Dsn
S-COH-4	<b>Increase participation of affected community in development process</b>	O
	The Client's Project Brief commits to encourage affected community participatory approach building planning to avoid conflict or minimise nuisance generated from the building that cause adverse impacts to the community and surroundings.	P-Dsn
	<i>Note: Affected community include tenants, property owners, and businesses within 100m of the project boundary, as well as the recognized community planning group and any other interested persons.</i>	
S-COH-5	<b>Increase participation of users in development process</b>	O
	The Client's Project Brief commits to encourage user participatory approach building planning to ensure users' requirements are met; hence, minimising nuisance generated from the building usage.	P-Dsn
<b>ACC: Accessibility</b>		
S-ACC-1	<b>Maximize personal safety and security</b>	B
	The Client's Project Brief commits to provide safe working environment and effective security to the building and its occupants and users, by means of both spatial planning and security facilities.	P-Dsn
S-ACC-2	<b>Convenient and safe maintenance access for building facades and other elements or design</b>	B
	The Client's Project Brief commits to design the building elements for ease of effective maintenance during the whole life-cycle of an occupied building.	P-Dsn
S-ACC-3	<b>Adequate access to communication technology</b>	B
	The Client's Project Brief commits to provide adequate access to communication technology to support informal communication and reduce requirements for travel and space among building occupants.	P-Dsn
S-ACC-4	<b>Convenient and safe maintenance access for all building services installation.</b>	B
	The Client's Project Brief commits to design the building technical systems for ease of effective maintenance during the whole life cycle of an	P-Dsn

	occupied building.		
S-ACC-5	<b>Easy access to nearby services</b>		C
	The Client's Project Brief commits to allow easy access to nearby services to reduce the need for building occupants to travel by cars.	P-Dsn	
<b>INC: Inclusiveness of Opportunities</b>			
S-INC-1	<b>Provide for universal access</b>		B
	The Client's Project Brief commits to provide universal access to enhance the sense of inclusion for all building occupants and users.	P-Dsn	
	<i>Note: Effective inclusion will harmonize all building occupants and users, irrespective whether they are of healthy or disabled, children, adult or elder persons.</i>		
S-INC-2	<b>Provide facilities for users to perform religious obligations</b>		B
	The Client's Project Brief commits to provide optimum spatial arrangements and facilities to enhance different religious beliefs among building occupants and users.	P-Dsn	
S-INC-3	<b>Provide facilities for users with children</b>		B
	The Client's Project Brief commits to provide optimum spatial arrangements and facilities to cater for building users with children to enhance their quality of life.	P-Dsn	
<b>HUM: Human Health and Well-being</b>			
S-HUM-1	<b>Adapt practices that avoid construction accidents</b>		B
	N.A.		
S-HUM-2	<b>Optimize the level and quality of fresh air in mechanically ventilated spaces</b>		B
	The Client's Project Brief commits to provide optimum design of building systems to enhance the environmental hygiene of mechanically ventilated spaces with good quality fresh air.	P-Dsn	
	ADDITIONAL: Field observations indicate that carbon dioxide sensors have been installed in occupied zones to maintain sufficient ventilation at the times of different occupancy; hence, addressing the balance of fresh air supply and energy efficiency.		
S-HUM-3	<b>Maximize openings and cross ventilation in naturally ventilated spaces</b>		B
	The Client's Project Brief commits to provide optimum building design to enhance the environmental hygiene and thermal comfort of naturally ventilated spaces with good cross ventilation.	P-Dsn	
S-HUM-4	<b>Minimise noise level and provide satisfactory level of acoustic performance</b>		B
	The Client's Project Brief commits to minimise noise nuisance affecting building occupants.	P-Dsn	
S-HUM-5	<b>Appropriate illumination level and artificial lighting quality</b>		B
	The Client's Project Brief commits to create a high quality visual environment in occupied spaces by means of providing good artificial lighting comfort and quality.	P-Dsn	
S-HUM-6	<b>Prohibit tobacco smoking in the building</b>		B
	The Client's Project Brief commits to provide a non-smoking building OR a building with dedicated smoking facilities.	P-Dsn	

S-HUM-7	<b>Use low/zero pollutants cleaning and maintenance products and processes</b>	B
	The Client's Project Brief commits to minimise the threat of health and hygiene problems arising from building operation and usages, particularly during cleaning and maintaining the building.	P-Dsn
S-HUM-8	<b>Use interior finish materials with low- or zero-pollutant off-gassing</b>	B
	The Client's Project Brief commits to minimise the use of high emission interior finish materials for the whole life of the building.	P-Dsn
S-HUM-9	<b>Provide optimum air movement for thermal comfort in mechanically ventilated spaces</b>	B
	The Client's Project Brief commits to provide optimum design of building systems to enhance the thermal comfort in mechanically ventilated spaces with optimum air movement.	P-Dsn
S-HUM-10	<b>Minimise glare conditions in main occupancy areas</b>	B
	The Client's Project Brief commits to create a high quality visual environment by means of creating building details that minimise discomfort caused by excessive glare.	P-Dsn
S-HUM-11	<b>Increase the practice of building flush-out</b>	B
	The Client's Project Brief commits to minimise possible indoor air quality contamination prior to occupancy and during the whole life cycle of the occupied building.	P-Dsn
S-HUM-12	<b>Provide separately ventilated and isolated areas/rooms which generate pollutants and odour</b>	B
	The Client's Project Brief commits to minimise pollutants and odour dispersion problems arising from building operation and usages.	P-Dsn
S-HUM-13	<b>Adequate monitoring of occupants' satisfaction with indoor environmental quality</b>	B
	The Client's Project Brief commits to maintain the environment of occupied spaces with good indoor environmental quality by means of undertaking adequate monitoring and corrective actions during the whole life cycle of the occupied building.	P-Dsn
<b>CUL: Cultural and Heritage Aspects</b>		
S-CUL-1	<b>Enhance or maintain the heritage significance of the building or adjoining/nearby heritage buildings</b>	B
	The Client's Project Brief commits to provide a building design that enhances or maintains the heritage significance of the building or adjoining/nearby heritage buildings.	P-Dsn
<b>LOC: Local People and Employment</b>		
S-LOC-1	<b>Provide training opportunities for unskilled local people (employed for the works) to be future semi-skilled or skilled construction workers</b>	C
	N.A.	
S-LOC-2	<b>Increased use of locally available materials and products</b>	C
	The Client's Project Brief commits to utilize locally available materials and products, as much as possible, for the whole life of the building.	P-Dsn
S-LOC-3	<b>Linkage to local service providers</b>	C
	N.A.	

S-LOC-4	<b>Use experienced local design teams</b> N.A.	C
S-LOC-5	<b>Use experienced local contractors</b> N.A.	C

Issue	Sub-Issues	Criteria & Benchmarking	Assess. Phase	Spatial Scale
<b>EN: ENVIRONMENTAL</b>				
<b>ECO: Land use and Impacts on Ecology</b>				
EN-ECO-1	<b>Minimise ecological and other damage to existing soil, water bodies and flora and fauna of the site or adjacent lands</b>	The Client's Project Brief commits to minimise ecological and other damage on the site or adjacent lands by protecting the ecological value of the site and implementing effective preventive works before site formation works.	P-Dsn	S
EN-ECO-2	<b>Maximize potential for landscape spaces on the site</b>	The Client's Project Brief commits to design and provide greenery and landscape features within the site to enhance living quality.	P-Dsn	S
EN-ECO-3	<b>Improve the ecological value of natural landscape</b>	The Client's Project Brief commits to enhance the ecological value of natural landscape by using non-invasive plantings	P-Dsn	S
EN-ECO-4	<b>Select sites that have low risk of flooding</b>	The Client's Project Brief commits to avoid the risk of flooding on site during construction and the whole life cycle of the occupied building.	P-Dsn	C
<b>SRM: Supports Resource Management</b>				
EN-SRM-1	<b>Increase use of materials that have less environmental impact in producing them</b>	The Client's Project Brief commits to minimise the environmental impact by using materials with low-embodied energy for structure and building envelope.	P-Dsn	G
EN-SRM-2	<b>Design building for maximum durability</b>	The Client's Project Brief commits to minimise material consumption and wastage for the whole life of the building by designing the building for maximum durability.	P-Dsn	B
EN-SRM-3	<b>Increase use of bio-based products and materials obtained from managed/sustainable sources</b>	The Client's Project Brief commits to encourage the use of timber obtained from managed/sustainable sources.	P-Dsn	B
EN-SRM-4	<b>Increase use of materials that can be recovered or recycled</b>	The Client's Project Brief commits to minimise material consumption and wastage by encouraging the use of materials that can be recovered or recycled at the end of the building useful life.	P-Dsn	B
EN-SRM-5	<b>Increase use of products and materials with recycled content</b>			B

	The Client's Project Brief commits to minimise material consumption and wastage by encouraging the use of materials with recycled content.	P-Dsn	
<b>AIR: Emissions to Air</b>			
EN-AIR-1	<b>Provide pedestrian access to basic services and connect to existing public transportation network</b>		C
	The Client's Project Brief commits to minimise and mitigate air pollution by encouraging walking and the use of public transportation among building occupants and users.	P-Dsn	
<b>LAN: Emissions to Land/ Solid Waste</b>			
EN-LAN-1	<b>Save handling and storage of hazardous wastes on site</b>		S
	The Client's Project Brief commits to plan and implement effective hazardous waste management strategies.	P-Dsn	
EN-LAN-2	<b>Implement construction waste management program with sorting, reuse and recycling measures</b>		B
	The Client's Project Brief commits minimise construction waste generation by planning and implementing effective waste management strategies, including sorting, reusing, recycling and disposal of construction and demolition waste.	P-Dsn	
EN-LAN-3	<b>Provide spaces for collection of recyclables, recycling storage and staging areas in the building</b>		B
	The Client's Project Brief commits to minimise municipal waste generation by providing spatial and facility provisions for collecting, sorting and storing recyclable and non-recyclable waste during the whole life cycle of the occupied building.	P-Dsn	
EN-LAN-4	<b>Maximize recycling of office recyclables</b>		B
	The Client's Project Brief commits to minimise municipal waste generation by planning and implementing effective plan that maximises the recycling of office recyclables among building occupants and users during the whole life cycle of the occupied building.	P-Dsn	
EN-LAN-5	<b>Minimise land pollution from site workers' accommodation</b>		S
	The Client's Project Brief commits to minimise and mitigate land pollution and the subsequent health and environmental impacts generated from site workers' accommodation.	P-Dsn	
EN-LAN-6	<b>Design for repeatability and increase use of standardized and prefabricated components</b>		B
	The Client's Project Brief commits to design and construct the building and its facilities for ease of construction and less materials use, and with consideration of innovative construction technology.	P-Dsn	
<b>EWA: Emissions to Water</b>			
EN-EWA-1	<b>Implement stormwater management strategies</b>		C
	The Client's Project Brief commits to plan and implement effective stormwater management strategies to control the runoff volumes and pollutant loads to the waterways of the municipality.	P-Dsn	
EN-EWA-2	<b>Minimise storm sewer or stream pollution from site workers' accommodation</b>		C
	The Client's Project Brief commits to minimise and mitigate water pollution and the subsequent health and environmental impacts generated from site workers' accommodation.	P-Dsn	
EN-EWA-3	<b>Utilize on-site wastewater treatment systems using greywater</b>		S
	The Client's Project Brief commits to minimise potable water consumption and wastage by recycling and reusing greywater.	P-Dsn	

**ADJ: Impacts on Adjacent Properties**

EN-ADJ-1	<b>Reduce noise and vibration generated during construction</b>	C
	The Client's Project Brief commits to minimise and mitigate noise pollution affecting the community and surroundings due to construction process.	P-Dsn

**ENE: Non-renewable Energy Consumption**

EN-ENE-1	<b>Use energy efficient light fixtures and office appliances</b>	B
	The Client's Project Brief commits to encourage the use of energy efficient fixtures, appliances and equipment to minimise energy consumption.	P-Dsn

EN-ENE-2	<b>Use highly efficient ventilation and air-conditioning systems</b>	B
	The Client's Project Brief commits to design the building services systems with a higher level of energy efficiency to minimise energy consumption.	P-Dsn

EN-ENE-3	<b>Use passive cooling strategies</b>	B
	The Client's Project Brief commits to design the building with a higher level of energy efficiency by considering passive cooling strategies to minimise energy consumption.	P-Dsn

EN-ENE-4	<b>Use integrated lighting concept</b>	B
	The Client's Project Brief commits to design the building with optimum access to daylight to minimise energy consumption as well as to improve the environmental quality inside the building.	P-Dsn

EN-ENE-5	<b>Reduce fossil fuel energy consumption</b>	B
	The Client's Project Brief commits to minimise the overall building fossil fuel energy consumption for the whole life of the building by effective design and efficient operation.	P-Dsn

EN-ENE-6	<b>Optimise the size of building systems control zones</b>	B
	The Client's Project Brief commits to minimise energy consumption by means of providing a building with high operational flexibility to suit the variation of the instantaneous demands of the building occupants and facilities.	P-Dsn

EN-ENE-7	<b>Use automatic lighting control system</b>	B
	The Client's Project Brief commits to encourage the use of automatic lighting control system to minimise energy consumption, while providing a high visual quality.	P-Dsn

EN-ENE-8	<b>Install energy sub-metering system for each floor/section/tenancy</b>	B
	The Client's Project Brief commits to provide sufficient provision for the effective measurement and monitoring of energy consumption in the building operation period.	P-Dsn

EN-ENE-9	<b>Facilitate personal control of thermal comfort systems</b>	B
	The Client's Project Brief commits to facilitate personal control over indoor climate to minimise health symptoms, and improve comfort satisfaction and performance of building occupants.	P-Dsn

**WAT: Potable Water Consumption**

EN-WAT-1	<b>Harvest rainwater for later re-use</b>	S
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		The Client's Project Brief commits to minimise potable water consumption and wastage by using captured rainwater.	P-Dsn	
EN-WAT-2		<b>Use water efficient plumbing fixtures and appliances</b>		B
		The Client's Project Brief commits to encourage the implementation of effective water conservation strategies and the application of water conservation measures.	P-Dsn	
EN-WAT-3		<b>Minimise use of potable water for landscaping irrigation</b>		S
		The Client's Project Brief commits to minimise potable water consumption and wastage for landscaping irrigation by implementing effective water conservation strategies and/or using non-potable water.	P-Dsn	
EN-WAT-4		<b>Minimise use of potable water for cooling system</b>		B
		The Client's Project Brief commits to minimise potable water consumption and wastage for cooling system.	P-Dsn	
EN-WAT-5		<b>Install water meters for all major water uses in the project</b>		B
		The Client's Project Brief commits to provide sufficient provision for the effective measurement and monitoring of water consumption in the building operation period.	P-Dsn	

Issue	Sub-Issues	Criteria & Benchmarking	Assessmt. Phase	Spatial Scale
<b>EC: ECONOMIC</b>				
<b>TBL: Triple Bottom Line Accounting – Planet, People, Profit</b>				
EC-TBL-1		<b>Refer to Environmental Impact Assessment (EIA) report</b>		C
		The Client's Project Brief commits to avoid environmental impacts and to minimise and control the adverse effects due to environmental impacts of the building.	P-Dsn	
EC-TBL-2		<b>Assess and evaluate the quality of workmanship of construction works</b>		B
		N.A.		
EC-TBL-3		<b>Consider both capital/construction and operational costs</b>		B
		The Client's Project Brief commits to carry out comprehensive and life-cycle economic considerations in building development.	P-Dsn	
		<i>Note: The economic analysis shall be in form of life-cycle costing (LCC) approach, with the considerations of capital cost, construction and installation cost, operation and maintenance cost, decommissioning cost, life of the building/component/system, interest rates, discount rates and other significant factors that may affect the LCC results. The LCC process shall be a co-operation among the Client, Designer and Quantity Surveyor.</i>		
EC-TBL-4		<b>Conduct Triple Bottom Line before deciding to pursue with the project</b>		O
		At the outset of a project, preferably before a site is even selected, a goal setting session is held with all team members participating to:	P-Dsn	
		- establish the objectives for pursuing a sustainable building project; and		
		- understand the options available under any sustainable building rating system to achieve the desired level of performance coinciding with the project's program; and clearly communicate realistic objectives to those responsible for designing, constructing, or acquiring green assets.		
		ADDITIONAL:		
		Triple Bottom Line (TBL) of the project making transparent the organisation's decisions that explicitly take into consideration impacts on the		

	environment and people, as well as on financial capital, is available in a written report.		
EC-TBL-5	<b>Manage the performance risks associated with new and untested sustainable building products and technologies</b>	O	
	The Client's Project Brief commits to manage the performance risks associated with new and untested sustainable/green building products and technologies incorporated in the building.	P-Dsn	
<b>EEF: Efficiency, Effectiveness and Flexibility</b>			
EC-EEF-1	<b>Develop and implement a long-term maintenance management plan</b>	B	
	The Client's Project Brief commits to develop and implement a long-term maintenance management plan for efficient and effective building operation, maintenance and management.	P-Dsn	
EC-EEF-2	<b>Provide and operate an effective building management control system</b>	B	
	The Client's Project Brief commits to provide effective building management control system for efficient and effective building operation, maintenance and management.	P-Dsn	
EC-EEF-3	<b>Provide comprehensive building records to operating staff and owners</b>	O	
	The Client's Project Brief commits to make available a complete set of building records for efficient and effective building operation, maintenance and management.	P-Dsn	
EC-EEF-4	<b>Spatial flexibility for different users/requirements</b>	B	
	The Client's Project Brief commits to design interior spaces with high adaptability and flexibility for change in usage during the whole life-cycle of the occupied building.	P-Dsn	
EC-EEF-5	<b>Provide building services systems with maximum flexibility for different users/ requirements</b>	B	
	The Client's Project Brief commits to design building services systems with high adaptability and flexibility for change in usage during the whole life-cycle of the occupied building.	P-Dsn	
EC-EEF-6	<b>Perform comprehensive commissioning, and post-occupancy commissioning for all building services</b>	B	
	The Client's Project Brief commits to perform comprehensive pre-commissioning, commissioning and quality monitoring for all building services.	P-Dsn	
EC-EEF-7	<b>Structural design with maximum adaptability for new uses</b>	B	
	The Client's Project Brief commits to design building structure with high adaptability and flexibility for change in usage during the whole life-cycle of the occupied building.	P-Dsn	
EC-EEF-8	<b>Adequate floor-to-floor height to offer high level of functionality for almost any occupancy</b>	B	
	The Client's Project Brief commits to provide floor-to-floor height with high adaptability and flexibility for change in usage during the whole life-cycle of the occupied building.	P-Dsn	
EC-EEF-9	<b>Maximize workspace/directly functional area to total floor are ratio</b>	B	
	The Client's Project Brief commits to provide a building design with maximum spatial efficiency.	P-Dsn	
<b>Issue</b>	<b>Criteria &amp; Benchmarking</b>	<b>Assess. Phase</b>	<b>Spatial Scale</b>



**INN: INNOVATION**

INN-1	<b>Innovative strategies and technologies</b> N.A.	O
INN-2	<b>Exceeding MOBSA benchmarks</b> N.A.	O

**Note:** Assessment Phase: P-Dsn = Pre-design phase; Dsn = Design phase; C&C = Construction & Commissioning phase; Ops = Operations phase  
 Spatial Scale: G = Global level: *Impacts on resources specifically identified to be global*; C = Community and regional level: *Impacts on the neighbourhood, community and region*;  
 S = Site level: *Site-specific attributes*; B = Building level: *Certain construction techniques, attributes of buildings, or types of building materials*; and O = Other: *Criteria that do not fit the above*.

Issue	Sub-Issues	Criteria & Benchmarking	Assess. Phase	Spatial Scale
<b>S: SOCIAL</b>				
<b>EDU: Education and Awareness</b>				
S-EDU-1		<b>Increase awareness of building occupants</b> N.A.		O
S-EDU-2		<b>Readiness and competency of design team members</b> N.A.		O
S-EDU-3		<b>Improve skills and knowledge of maintenance and operation staff</b> Records indicate that Contractors and Suppliers and/or Designers have provided appropriate and effective trainings for the operating and maintenance staff to familiarize them with the building design philosophy, as well as strategies and methods for the operation of various building facilities and building services systems; AND the training scope and information are entirely satisfied by the Client's representatives.  <i>Note: Scope of training shall be appropriate to the scale of the building and the complexity of the building services installations and building facilities. The training shall cover but not limited to the following information:</i> <ul style="list-style-type: none"> <li>- Building design philosophy and characteristics;</li> <li>- Usage and provisions provided in the building;</li> <li>- Operation, troubleshooting and maintenance of all building facilities, systems and equipment.</li> </ul>	C&C	O
S-EDU-4		<b>Improve sustainable construction skills among construction workers</b> The Contractor has valid ISO 14001 Environmental Management System (EMS) accreditation prior to and throughout the construction process. ADDITIONAL: The Contractor has implemented a comprehensive, project-specific Environmental Management Plan (EMP) for the works in accordance with the format set by the Department of Environment (DOE). ADDITIONAL Evidence is provided to demonstrate that efforts have been made to identify the training needs to enhance the level of knowledge and skill of the workers on sustainable construction and the training has been provided at the early stage of construction process for: <ul style="list-style-type: none"> <li>- The major contractors' management and supervisory staff, and construction workers; OR</li> <li>- The major contractors' management and supervisory staff only.</li> </ul>	C&C	O
<b>COH: Support for Social Cohesion</b>				
S-COH-1		<b>Support for inter-disciplinary work right from the beginning of the design process</b> N.A.		O

S-COH-2	<b>Planning to support active streetscape and provisions for community</b> N.A.	C
S-COH-3	<b>Space planning for maximum social interaction</b> N.A.	B
S-COH-4	<b>Increase participation of affected community in development process</b> The Contractor has identified the potential sensitive receivers (e.g. school, hospital, residential flats) nearby the site due to site activities; and avoided site activities with severe nuisance to the identified sensitive receivers where possible, and to provide protective and remedial measures; AND A continuous communication channel between the Developer/Owner, Contractor and the surrounding residents and building users has been established to convey their opinions, complaints and advices such that the Developer/Owner is able to adjust the new building construction method and remedial works to minimize the environmental and safety impacts to the community. ADDITIONAL: The Contractor has designated a person to record and review the opinion, complaints and advices raised by the surrounding residents and building users.  <i>Note: Affected community include tenants, property owners, and businesses within 100m of the project boundary, as well as the recognized community planning group and any other interested persons.</i>	O C&C
S-COH-5	<b>Increase participation of users in development process</b> N.A.	O
<b>ACC: Accessibility</b>		
S-ACC-1	<b>Maximize personal safety and security</b> The Contractor has provided reasonable quantities (in accordance with the scale and complexity of the site) of passive security facilities and provisions in construction site, such as security guard stand, access barrier/gate, security fence. ADDITIONAL: The Contractor has provided reasonable quantities (in accordance with the scale and complexity of the site) of active security facilities and provisions in construction site, such as: - Electronic Access Control Systems; - Closed-circuit television (CCTV) Surveillance System; - Anti-theft Security and Alarm System; - Communication (intercom) system; - Security guards.	B C&C
S-ACC-2	<b>Convenient and safe maintenance access for building facades and other elements or design</b> N.A.	B
S-ACC-3	<b>Adequate access to communication technology</b> N.A.	B
S-ACC-4	<b>Convenient and safe maintenance access for all building services installation.</b>	B

	N.A.	
S-ACC-5	<b>Easy access to nearby services</b>	C
	N.A.	
<b>INC: Inclusiveness of Opportunities</b>		
S-INC-1	<b>Provide for universal access</b>	B
	N.A.	
S-INC-2	<b>Provide facilities for users to perform religious obligations</b>	B
	N.A.	
S-INC-3	<b>Provide facilities for users with children</b>	B
	N.A.	
<b>HUM: Human Health and Well-being</b>		
S-HUM-1	<b>Adapt practices that avoid construction accidents</b>	B
	The Contractor has implemented an effective Occupational Safety and Health Management System (OSHMS) for a conducive working environment so as to ensure safety and health at work of all workers and the general public during project execution. AND All workers have attended the Safety Induction Course.	C&C
S-HUM-2	<b>Optimize the level and quality of fresh air in mechanically ventilated spaces</b>	B
	N.A.	
S-HUM-3	<b>Maximize openings and cross ventilation in naturally ventilated spaces</b>	B
	N.A.	
S-HUM-4	<b>Minimise noise level and provide satisfactory level of acoustic performance</b>	B
	N.A.	
S-HUM-5	<b>Appropriate illumination level and artificial lighting quality</b>	B
	N.A.	
S-HUM-6	<b>Prohibit tobacco smoking in the building</b>	B
	Observations indicate that site workers are not exposed to tobacco smoke because such activities are prohibited anywhere on the site; OR Observations indicate that site workers have possible exposure to tobacco smoke because such activities are only prohibited in enclosed spaces.	C&C
	<i>Note: Smoking substantially increases the perceived pollution burden (to 2-6 times). The deterioration in air quality caused by smoking can only be compensated by substantially increased ventilation. According to international research results 100 m3 fresh air is needed to eliminate the effect of one cigarette smoked.</i>	
S-HUM-7	<b>Use low/zero pollutants cleaning and maintenance products and processes</b>	B

	Documentation indicates that only no/low emission (non-toxic and biodegradable) cleaning products are consumed during construction works.	C&C
S-HUM-8	<b>Use interior finish materials with low- or zero-pollutant off-gassing</b> N.A.	B
S-HUM-9	<b>Provide optimum air movement for thermal comfort in mechanically ventilated spaces</b> N.A.	B
S-HUM-10	<b>Minimise glare conditions in main occupancy areas</b> N.A.	B
S-HUM-11	<b>Increase the practice of building flush-out</b> A building flush-out is performed with new filtration media using 100% outside air supply, 3 months prior to handing over, once a week; OR 1 month prior to handing over, once a week.	C&C B
S-HUM-12	<b>Provide separately ventilated and isolated areas/rooms which generate pollutants and odour</b> N.A.	B
S-HUM-13	<b>Adequate monitoring of occupants' satisfaction with indoor environmental quality</b> N.A.	B
<b>CUL: Cultural and Heritage Aspects</b>		
S-CUL-1	<b>Enhance or maintain the heritage significance of the building or adjoining/nearby heritage buildings</b> <u>For new building on a vacant site in a heritage zone:</u> If the immediate adjacent building(s) are having cultural heritage value, the Contractor has established preventive measures to minimize any adverse structural and environmental impacts towards the adjacent building(s) with cultural heritage value during construction process.	B C&C
<b>LOC: Local People and Employment</b>		
S-LOC-1	<b>Provide training opportunities for unskilled local people (employed for the works) to be future semi-skilled or skilled construction workers</b> At least 40% of all unskilled workers involved in the project are local people; AND They have received competency-based training courses (on-site or off-site) with certification or have undergone any of the related CIDB accreditation programmes for the workers prior to or throughout the project. OR At least 80% of all construction workers involved in the project are local semi-skilled and skilled workers.	C C&C
<i>Note: Based on CIDB record, unskilled (general) workers make up almost half of the total workers registered with CIDB and outnumber semi-skilled and skilled workers by more than 2-to-1. Additionally, around 250,000 of approximately 800,000 construction workforce are foreigners especially from Indonesia and ASEAN region. Foreign workers are usually unskilled when they first arrive in Malaysia. This has impacted the productivity and quality of the construction industry. Unskilled foreign labour is cheaper to employ in the short term than skilled local labour. This labour preference with its associated low wages, lower the incentive for construction companies to migrate to more productive and newer</i>		

*construction technology and methods, and reduces the attractiveness of the industry to employ more highly-skilled or local labour.*

S-LOC-2	<b>Increased use of locally available materials and products</b> N.A.	C
S-LOC-3	<b>Linkage to local service providers</b> N.A.	C
S-LOC-4	<b>Use experienced local design teams</b> N.A.	C
S-LOC-5	<b>Use experienced local contractors</b> At least 80% of construction cost is carried out by local construction companies (within 50km of the building site) who have had good track records in constructing similar type of projects.  If there are no qualified local construction companies available within 50km of the building site; OR If no qualified local construction companies operating within 50km of the building site responded to the invitation to bid, this credit is "Not Applicable". OR Collaborative work with foreign construction companies to improve local know-how.	C&C

Issue	Sub-Issues	Criteria & Benchmarking	Assess. Phase	Spatial Scale
<b>EN: ENVIRONMENTAL</b>				
<b>ECO: Land use and Impacts on Ecology</b>				
EN-ECO-1		<b>Minimise ecological and other damage to existing soil, water bodies and flora and fauna of the site or adjacent lands</b> A total Erosion and Sedimentation Control Plan (ESCP) during construction process (which covers planning considerations, vegetative stabilisation, physical stabilisation, diversion on runoff, flow velocity reduction and sediment trapping/filtering) for all construction activities associated with the project has been implemented. The ESCP is in conformance with the erosion and sedimentation requirements of the approved Earthworks Plans OR Local erosion and sedimentation standards and codes, whichever is more stringent. ADDITIONAL: The Contractor has provided effective tree preservation and protection measures on site for all identified and designated healthy trees within the site to minimize the adverse impact to the preserved trees due to construction activities.	C&C	S
EN-ECO-2		<b>Maximize potential for landscape spaces on the site</b> N.A.		S
EN-ECO-3		<b>Improve the ecological value of natural landscape</b> N.A.		S
EN-ECO-4		<b>Select sites that have low risk of flooding</b>		C

	N.A.	
<b>SRM: Supports Resource Management</b>		
EN-SRM-1	<b>Increase use of materials that have less environmental impact in producing them</b>	G
	N.A.	
EN-SRM-2	<b>Design building for maximum durability</b>	B
	N.A.	
EN-SRM-3	<b>Increase use of bio-based products and materials obtained from managed/sustainable sources</b>	B
	According to the Contractor's material use records and relevant photographic evidence on site, the percentage (by cost) of all timber products used for temporary works (e.g. hoarding, formwork, site office fabrication, site accommodation) that has been sourced from post-consumer recycled timber (must have 50% post-consumer recycled content) and/or re-used timber, is: ≥75% OR 50-74%	C&C
	If the material cost of timber represents less than 0.1% of the project's contract value, this credit is "Not Applicable".	
	ADDITIONAL: No timber products were used for formwork and hoarding on site (e.g. used metal instead).	
EN-SRM-4	<b>Increase use of materials that can be recovered or recycled</b>	B
	N.A.	
EN-SRM-5	<b>Increase use of products and materials with recycled content</b>	B
	According to the Contractor's material use records and relevant photographic evidence on site, the percentage of materials used with recycled content follows the requirements as stipulated in the Designer's specification; AND The Contractor has established and implemented material use strategy by their own initiative such as using recycled bricks and blocks, plastics, packing board of papers, wood chips arid etc.	C&C
	<i>Note: The cycled content of materials shall be determined by dividing the weight/volume of recycled content in the item by the total weight/volume of all materials in the item.</i>	
<b>AIR: Emissions to Air</b>		
EN-AIR-1	<b>Provide pedestrian access to basic services and connect to existing public transportation network</b>	C
	N.A.	
<b>LAN: Emissions to Land/ Solid Waste</b>		
EN-LAN-1	<b>Save handling and storage of hazardous wastes on site</b>	S
	N.A.	
EN-LAN-2	<b>Implement construction waste management program with sorting, reuse and recycling measures</b>	B
	The Contractor has implemented an effective Waste Management Plan and carried out weekly implementation records AND the percentage (by mass) of all demolition and construction wastes that have been reused (on or off site) and/or transferred to a recovery factory, as recorded in	C&C

construction waste management records, is:  
 ≥70% OR  
 50-69%

*Note: Salvageable materials include inert waste, such as metals, bricks and tiles, as well as non-inert waste such as timber, paper and plastic. Waste management plan shall include, but not limited to key types of waste to be reduced, waste reduction targets, waste reduction programmes, packaging waste management and waste disposal procedures. Apart from that, effective implementation is required to ensure strategies (e.g. in the form of educational basis, instructions or guidelines) are applicable to all site workers and cover the entire site area, including site office.*

ADDITIONAL:

An inspection has been conducted every week to ensure that the strategies are implemented according to the procedure and guidelines as stipulated in the waste management plan and keep up-to-date with the waste management records.

*Note: Designated person(s) shall ensure all workers and staff on site acknowledge the target and method of the construction waste management plan. Also, the designated person(s) shall identify any improvement required to enhance the effectiveness of waste management and maximising the recyclable waste collection and reuse.*

EN-LAN-3	<b>Provide spaces for collection of recyclables, recycling storage and staging areas in the building</b>	B
	Evidence indicates that a centralised space has been provided on construction site for sorting and storage of salvageable construction waste; and it is located with convenient waste delivery access and with minimal environmental impact due to waste transportation within the site.	C&C
EN-LAN-4	<b>Maximize recycling of office recyclables</b>	B
	N.A.	
EN-LAN-5	<b>Minimise land pollution from site workers' accommodation</b>	S
	Proper disposal of municipal waste generated from site workers' accommodation is implemented.	C&C
	ADDITIONAL The Contractor has provided training and information on health and hygiene issues to construction site workers.	
	ADDITIONAL The Contractor has designated a member of site staff to inspect the site workers' accommodation once a week, and to identify health and hygiene problem areas, for instance, stagnant water offering a breeding ground for mosquitoes, which may bite site workers and cause transmission of diseases; AND Health risk remedial work, such as stagnant water removal, has been implemented.	
EN-LAN-6	<b>Design for repeatability and increase use of standardized and prefabricated components</b>	B
	Evidence suggests that the Contractor has proposed and provided any combination of the following items which are considered other than specified in the Design Stage to enhance buildability and minimise environmental impacts:	C&C
	<ul style="list-style-type: none"> <li>- Precast structure (such as precast slab, staircase, column and beams);</li> <li>- Standardised components (such as services riser, refuse chute, standardised door leaf, window etc);</li> <li>- Full precast module (such as modular office) and/or integrated services module (such as prefabricated toilet unit, plant room unit, bathroom unit, which completed with full building services equipment, pipes, ducts and cable containments).</li> </ul>	

**EWA: Emissions to Water**

EN-EWA-1	<b>Implement stormwater management strategies</b>	C
	The contractor has formulated and implemented construction site water pollution management plan.	C&C
	ADDITIONAL:	



	Relevant evidence indicates that surface run-off from construction site are discharged into storm drains via adequately designed sand/silt removal facilities such as sand traps, silt traps and sediment basins.	
	ADDITIONAL: Relevant evidence indicates that wastewater generated from general building construction activities, such as concreting, plastering, and cleansing, are discharged into foul sewers with sufficient silt removal facility.	
EN-EWA-2	<b>Minimise storm sewer or stream pollution from site workers' accommodation</b>	C
	Proper septic tank has been installed to prevent pollution of storm sewer or receiving stream generated from site workers' accommodation.	C&C
EN-EWA-3	<b>Utilize on-site wastewater treatment systems using greywater</b>	S
	N.A.	
<b>ADJ: Impacts on Adjacent Properties</b>		
EN-ADJ-1	<b>Reduce noise and vibration generated during construction</b>	C
	The Contractor has formulated and implemented a good management plan for the control of noise pollution at the construction site; AND Field measurements confirm that actual sound levels during day time, evening and night time by receiving land use for the project are lower than the maximum permissible limit stipulated in Schedule 6 of the Planning Guidelines for Environmental Noise Limits and Control by Department of Environment, by: 8% OR 5%	C&C
	<i>Note: All reasonable measures to control the source of, or limit exposure to, noise during the operation of equipment, plant, process or activity with noise generation should be undertaken. Such measures should be proportionate and reasonable, and may include one or more of the following:</i>	
	<ul style="list-style-type: none"> <li>- the size, design and inherent operation characteristics of the plant, equipment, process or activity;</li> <li>- the adjustment of operational parameters to limit the intensity of sound emissions,</li> <li>- the selection and usage of low sound power levels equipment;</li> <li>- the provision if necessary, and appropriate use of sound attenuators, acoustic plenum, and other acoustic filtering devices;</li> <li>- the provision if necessary, and appropriate use of acoustic enclosures and other sound enclosing devices;</li> <li>- the provision if necessary, and appropriate use of screening barriers (man-made, natural or otherwise);</li> <li>- the proper conduct and adequate supervision of operation; and</li> <li>- regular and efficient maintenance of plant and control equipment.</li> </ul>	
<b>ENE: Non-renewable Energy Consumption</b>		
EN-ENE-1	<b>Use energy efficient light fixtures and office appliances</b>	B
	N.A.	
EN-ENE-2	<b>Use highly efficient ventilation and air-conditioning systems</b>	B
	N.A.	
EN-ENE-3	<b>Use passive cooling strategies</b>	B
	N.A.	

EN-ENE-4	<b>Use integrated lighting concept</b> N.A.	B
EN-ENE-5	<b>Reduce fossil fuel energy consumption</b> N.A.	B
EN-ENE-6	<b>Optimise the size of building systems control zones</b> N.A.	B
EN-ENE-7	<b>Use automatic lighting control system</b> N.A.	B
EN-ENE-8	<b>Install energy sub-metering system for each floor/section/tenancy</b> N.A.	B
EN-ENE-9	<b>Facilitate personal control of thermal comfort systems</b> N.A.	B
<b>WAT: Potable Water Consumption</b>		
EN-WAT-1	<b>Harvest rainwater for later re-use</b> Relevant photographic and other evidence suggest that rainwater has been harvested and reused within the construction site and the provision has led to 20% reduction in potable water consumption; OR ...10% reduction...	S C&C
EN-WAT-2	<b>Use water efficient plumbing fixtures and appliances</b> N.A.	B
EN-WAT-3	<b>Minimise use of potable water for landscaping irrigation</b> N.A.	S
EN-WAT-4	<b>Minimise use of potable water for cooling system</b> N.A.	B
EN-WAT-5	<b>Install water meters for all major water uses in the project</b> N.A.	B

Issue	Sub-Issues	Criteria & Benchmarking	Assessmt. Phase	Spatial Scale
<b>EC: ECONOMIC</b>				
<b>TBL: Triple Bottom Line Accounting – Planet, People, Profit</b>				

EC-TBL-1	<b>Refer to Environmental Impact Assessment (EIA) report</b> N.A.	C
EC-TBL-2	<b>Assess and evaluate the quality of workmanship of construction works</b> Evidence suggests that the workmanship of the construction work has been assessed using Quality Assessment System in Construction (QLASSIC) by CIDB prior to hand over; and the score obtained is: ≥80% OR 65-79%	B C&C
EC-TBL-3	<b>Consider both capital/construction and operational costs</b> N.A.	B
EC-TBL-4	<b>Conduct Triple Bottom Line before deciding to pursue with the project</b> N.A.	O
EC-TBL-5	<b>Manage the performance risks associated with new and untested sustainable building products and technologies</b> N.A.	O
<b>EEF: Efficiency, Effectiveness and Flexibility</b>		
EC-EEF-1	<b>Develop and implement a long-term maintenance management plan</b> N.A.	B
EC-EEF-2	<b>Provide and operate an effective building management control system</b> N.A.	B
EC-EEF-3	<b>Provide comprehensive building records to operating staff and owners</b> The Contractor has complied and provided the full set of building records to the satisfaction of the client's representatives, and convey to building operator.  <i>Note: The building records shall comprise, but not limited to the following items:</i> - Documented design intent – building, structural, drainage, site formation, alterations and additions plans approved by the Local Authority. - Building services as-built drawings – fire services, underground drains, drainage, water supply, electrical, lighting, broadcasting, gas supply, HVAC, etc. - Layout plan for hidden utilities – electricity cables, gas pipes, telephone lines etc. - Operations and maintenance manual for building services, mechanical components and installations; Testing and commissioning report	O C&C
EC-EEF-4	<b>Spatial flexibility for different users/requirements</b> N.A.	B
EC-EEF-5	<b>Provide building services systems with maximum flexibility for different users/ requirements</b> N.A.	B
EC-EEF-6	<b>Perform comprehensive commissioning, and post-occupancy commissioning for all building services</b>	B

	The Contractor has carried out comprehensive and effective testing and commissioning works prior to handover to the building operator in exact accordance with ASHRAE Commissioning Guideline and to the satisfaction of the Client's representatives. AND For large projects or buildings with complicated building systems, an independent Commissioning Specialist is appointed at the onset of the design process to verify that comprehensive pre-commissioning and commissioning are performed for all the building services in accordance with ASHRAE Commissioning Guideline.	C&C	
EC-EEF-7	<b>Structural design with maximum adaptability for new uses</b> N.A.		B
EC-EEF-8	<b>Adequate floor-to-floor height to offer high level of functionality for almost any occupancy</b> N.A.		B
EC-EEF-9	<b>Maximize workspace/directly functional area to total floor are ratio</b> N.A.		B
Issue	Criteria & Benchmarking	Assess. Phase	Spatial Scale
<b>INN: INNOVATION</b>			
INN-1	<b>Innovative strategies and technologies</b> The initiative is a technology or process that is considered a 'first' in the World OR The project substantially contributes to the broader market transformation towards sustainable development in the World. OR The initiative is a technology or process that is considered a 'first' in Malaysia OR The project substantially contributes to the broader market transformation towards sustainable development in Malaysia.	C&C	○
INN-2	<b>Exceeding MOBSA benchmarks</b> The solution results in a substantial (e.g. 5% or greater above the specified percentage for the best performance) social/environmental/economic impact targeted by an existing credit.	C&C	○

**Note:** Assessment Phase: P-Dsn = Pre-design phase; Dsn = Design phase; C&C = Construction & Commissioning phase; Ops = Operations phase  
 Spatial Scale: G = Global level: *Impacts on resources specifically identified to be global*; C = Community and regional level: *Impacts on the neighbourhood, community and region*;  
 S = Site level: *Site-specific attributes*; B = Building level: *Certain construction techniques, attributes of buildings, or types of building materials*; and O = Other: *Criteria that do not fit the above.*

Issue	Sub-Issues	Criteria & Benchmarking	Assess. Phase	Spatial Scale
<b>S: SOCIAL</b>				
<b>EDU: Education and Awareness</b>				
S-EDU-1		<b>Increase awareness of building occupants</b>		O
		Property management company has prepared a building-specific user and environmental manual/guideline; AND The manual/guideline has been provided to ALL tenants and building occupants.	Ops	
		<i>The manual/guideline shall include the following information:</i>		
		<ul style="list-style-type: none"> <li>- Facilities and provisions provided in the building;</li> <li>- Services provided by the building and property management company;</li> <li>- Contact persons and methods of contact for the building's major property management staff;</li> <li>- Health, hygiene, fire, safety and security information for the building;</li> <li>- Environmental guidelines, such as the recyclable materials collection and sorting locations, and the basic information introducing the types of recyclable materials;</li> <li>- Guidelines to minimise nuisance to other building occupants and users;</li> <li>- Methods to reduce adverse environmental impacts.</li> </ul>		
		ADDITIONAL:		
		<ul style="list-style-type: none"> <li>- All occupants are exposed on a monthly basis to current, previous and targeted building performance figures (i.e. water, electricity, waste and accidents) via leaflets, posters or intranet; AND</li> <li>- A fixed set of guidelines is posted at prominent places for continuous awareness of the occupants in conserving energy and water as well as reducing waste.</li> </ul>		
S-EDU-2		<b>Readiness and competency of design team members</b>		O
		N.A.		
S-EDU-3		<b>Improve skills and knowledge of maintenance and operation staff</b>		O
		Only certified property management company staff of the building are employed; AND They are provided with training at least once a year.	Ops	
		<i>Note: The training topics shall cover, but not limited to health and hygiene, fire and safety, security, communication method with building occupants and building technology. The training materials shall include basic and latest information on relevant topics.</i>		
		ADDITIONAL:		
		The property management company is accredited with ISO 14001 Environmental Management System (EMS) accreditation prior to and throughout the construction process.		
S-EDU-4		<b>Improve sustainable construction skills among construction workers</b>		O

	N.A.	
<b>COH: Support for Social Cohesion</b>		
S-COH-1	<b>Support for inter-disciplinary work right from the beginning of the design process</b>	O
	N.A.	
S-COH-2	<b>Planning to support active streetscape and provisions for community</b>	C
	<p>Field observations confirm that the building ground floor or podium level supports active streetscape during and after office hours because the following provisions are provided to serve the community:</p> <ul style="list-style-type: none"> <li>- Communal and social service provisions such as healthcare, gallery, library, recreational and leisure facilities;</li> <li>- Convenient commercial service provisions such as restaurant/cafe and retail shops.</li> </ul> <p>OR</p> <p>Acceptable evidence is available to demonstrate that adequate amenity provisions are provided in the immediate neighbouring sites to serve the existing local communities as well as the new building.</p> <p>If there is no existing streetscape or the project is developed on a green site with limited close neighbourhood, amenities are provided to serve the building occupants and users.</p> <p><i>Note: The extent of amenity provision covers various supports for elderly, youth, students, passer-by, building occupants and people from outside the building. Support should be in form of those not addressed by other criteria e.g. healthcare, retail shops, restaurant/cafe, library, leisure &amp; recreational facilities, gallery. Additions to the existing inadequate supports or amenities can be provided in the new building, rather than repeated within the neighbourhood context.</i></p> <p>ADDITIONAL: Field observations indicate that the building has vending machines for food and drinks, post box and cash machine to serve building occupants, users and community.</p>	Ops
S-COH-3	<b>Space planning for maximum social interaction</b>	B
	<p>For a multiple-tenancies building: Field observations indicate that a break-out and group workspace/meeting spaces have been provided for every tenancy or at least on every 3 floors, whichever is smaller.</p> <p>OR</p> <p>For an owner-occupier building: Field observations indicate that a break-out and group workspace/meeting spaces have been provided for every 3 floors.</p> <p><i>Note: A break-out space is a quiet area away from the bustle of the workplace which functions as temporary relaxation zone and to hold less formal client or internal meetings. A group workspace is an area within the zone of individual workspaces to facilitate team cohesiveness and collaboration.</i></p>	Ops
S-COH-4	<b>Increase participation of affected community in development process</b>	O
	N.A.	
S-COH-5	<b>Increase participation of users in development process</b>	O
	N.A.	
<b>ACC: Accessibility</b>		

S-ACC-1	<p><b>Maximize personal safety and security</b></p> <p>Field observations confirm that reasonable quantities of passive security facilities to suit the scale and complexity of the building will be provided, such as access barrier/gate, security fence, fence and barrier for access to the slope, exposed pipes and cables, etc.</p> <p>ADDITIONAL: Field observations confirm that reasonable quantities of active security facilities to suit the scale and complexity of the building have been provided, such as:</p> <ul style="list-style-type: none"> <li>- Electronic Access Control Systems;</li> <li>- Closed-circuit television (CCTV) Surveillance System;</li> <li>- Anti-theft Security and Alarm System;</li> <li>- Security guards.</li> </ul> <p>ADDITIONAL: Building operator (owner/property manager) has formulated and implemented a safety management and fire evacuation plan for building occupants; AND a fire drill is conducted for building occupants not less than once a year.</p>	Ops	B
S-ACC-2	<p><b>Convenient and safe maintenance access for building facades and other elements or design</b></p> <p>System descriptions and drawings (showing the access paths for inspection, cleansing and maintenance indicates that window) and on-site investigation confirm that window, atria and roof glazing cleaning can be carried out safely and without undue disturbance to staff due to the provisions of the following facilities:</p> <ul style="list-style-type: none"> <li>- Permanent window cleaning and maintenance access systems (e.g. cat ladders, roof top support systems for elevating platforms, external shadings that also function as platform for cleaning and maintenance); OR</li> <li>- Sufficient space for platform transportation and erection, and full-coverage of gondola tracks (if movable maintenance platforms and gondolas are to be used). For buildings over 9 m and up to 30 m high, facilities for either manual or power operated gondolas/suspended access are provided; whilst above this height must have the facility for power operated gondolas; AND</li> <li>- A suitable form of restraint – when a cleaner requires to stand on a ladder or other object or lean out of the window in order to carry out the cleaning process; and ladder restraints – when windows are to be cleaned from an external ladder.</li> </ul>	Ops	B
S-ACC-3	<p><b>Adequate access to communication technology</b></p> <p>Every workstation in the building, as indicated by on-site investigation, has access to telephone and internet/email to allow occupants to conduct telephone/computer/video-conferencing over the internet e.g. via skype.</p>	Ops	B
S-ACC-4	<p><b>Convenient and safe maintenance access for all building services installation.</b></p> <p>Convenient and safe access of HVAC delivery systems for repair and maintenance, as indicated by field observations, is assisted by ALL of the followings:</p> <ul style="list-style-type: none"> <li>- Convenient access for maintenance to cable containment, air ducts and pipes where feasible;</li> <li>- Sufficient access doors and panels to services shafts;</li> <li>- Simplified, well-marked signage to clearly indicate purpose, source and destination of specific sections of the delivery system;</li> <li>- Sufficient access platform, or space for temporary maintenance platform erection (for services mounted outdoors);</li> <li>- Minimization of duct run lengths and elbows (with the intent of minimizing pressure losses, reducing surface area and difficulty for ease of cleaning);</li> <li>- Sufficient and convenient maintenance access, such as access panel and cleansing eye to allow cleansing of all sections of air ducts; and access to each straight air duct and damper.</li> </ul>	Ops	B
S-ACC-5	<p><b>Easy access to nearby services</b></p>		C

N.A.

**INC: Inclusiveness of Opportunities**

S-INC-1	<b>Provide for universal access</b>	B
	Observations and occupant surveys indicate that building facilities are accessible to all types of occupants and users, such as disabled, elderly persons and healthy people, in addition to the current minimum requirements of MS1184 as well as the facilities and provisions provided by the Designer/ Developer.	Ops
	<i>Note: Effective inclusion will harmonize all building occupants and users, irrespective whether they are of healthy or disabled, children, adult or elder persons.</i>	
S-INC-2	<b>Provide facilities for users to perform religious obligations</b>	B
	<u>Moslem:</u> Field observations confirm that a facility to pray/common prayer room (separate spaces and ablution areas for ladies and gentlemen staff) has been provided; and in each room, the direction of Kiblat has been clearly indicated, and shared facilities such as praying mats, Qurans/ Surah Yassin have been provided; AND The facility is located at appropriate location as follows: - podium/first floor, if no eating outlet is provided on upper floor; OR - the same floor as and adjacent to washrooms and eating outlet or amenity space. AND <u>Other religions:</u> Having one gathering room per building (may also be served as multi-purpose room or a meeting room)	Ops
S-INC-3	<b>Provide facilities for users with children</b>	B
	Field observations confirm that a crèche area and a mother's room have been provided and operated to cater for building users (and if necessary, users of neighbouring blocks) to enhance their quality of life.	Ops
	<i>Note: Solve the issue of emergency escape for children especially for when the first few floors are car parks and the facilities have to be provided on the upper floor.</i>	

**HUM: Human Health and Well-being**

S-HUM-1	<b>Adapt practices that avoid construction accidents</b>	B
	The property management company is accredited with occupational health and safety management system – OSHMS MS1722:2005 and/or OHSAS 18001:2007.	Ops
S-HUM-2	<b>Optimize the level and quality of fresh air in mechanically ventilated spaces</b>	B
	Field monitoring, undertaken at least one year after occupancy, indicates that the interior of the building is provided with sufficient fresh air and the air distribution effectiveness at the work surface is equivalent to: ≥95% OR 89-94%	Ops
	<i>Note: All fresh air intakes shall be located away from pollutant sources, which included, but not limited to building exhaust air louvers and exhaust outlet from adjacent buildings, air exhaust openings of refuse collection room, enclosed/semi-enclosed car park and public transport terminal, smoke discharge openings, and gas discharges exhaust from toilets and kitchens plumbing vents, etc. Fresh air intake openings shall be protected from rain entrainment and covered by a screen to prevent entry of birds, rodents and extraneous</i>	



articles. ASHRAE 62.1-2010 Ventilation for Acceptable Indoor Air Quality can be referred as design guidelines.

ADDITIONAL:

Field observations indicate that carbon dioxide sensors have been installed in occupied zones to maintain sufficient ventilation at the times of different occupancy; hence, addressing the balance of fresh air supply and energy efficiency.

S-HUM-3	<b>Maximize openings and cross ventilation in naturally ventilated spaces</b>	B
	Covered in S-HUM-13	Ops
S-HUM-4	<b>Minimise noise level and provide satisfactory level of acoustic performance</b>	B
	Covered in S-HUM-13	Ops
S-HUM-5	<b>Appropriate illumination level and artificial lighting quality</b>	B
	Covered in S-HUM-13	Ops
S-HUM-6	<b>Prohibit tobacco smoking in the building</b>	B
	Occupants are not exposed to tobacco smoke or other occupant generated pollutants in public spaces because the entire building adopted a 'No Smoking Policy'; OR Occupants are not exposed to tobacco smoke in public spaces because based on field observations, separate and separately ventilated (i.e. with dedicated exhaust air duct to extract smoke) rooms or areas for such activities have been provided.	Ops
	<i>Note: Smoking substantially increases the perceived pollution burden (to 2-6 times). The deterioration in air quality caused by smoking can only be compensated by substantially increased ventilation. According to international research results 100 m<sup>3</sup> fresh air is needed to eliminate the effect of one cigarette smoked.</i>	
S-HUM-7	<b>Use low/zero pollutants cleaning and maintenance products and processes</b>	B
	Surveys indicate that airborne pollutants caused by the use of building maintenance products and processes cause LEAST or NO dissatisfaction amongst building occupants and users or 85% of occupants are satisfied; OR Surveys indicate that airborne pollutants cause INFREQUENT dissatisfaction amongst building occupants and users or 75% of occupants are satisfied.	Ops
S-HUM-8	<b>Use interior finish materials with low- or zero-pollutant off-gassing</b>	B
	Zero or low VOC paint are used on 95% of all painted surfaces during decoration and refurbishment works during operation stage.	Ops
S-HUM-9	<b>Provide optimum air movement for thermal comfort in mechanically ventilated spaces</b>	B
	Field measurements indicate that the Predicted Mean Vote (PMV) meets the conditions for thermal comfort.	Ops
	<i>Note: Results are calculated from the inputs of air temperature, mean radiant temperature, relative humidity, air velocity, clothing thermal resistance and metabolic rate.</i>	
S-HUM-10	<b>Minimise glare conditions in main occupancy areas</b>	B
	According to field observations, internal (e.g. screens, blinds, light shelves) AND external (fixed or movable, horizontal or vertical) shading devices are fitted to all glazing and atriums that eliminate all direct sun penetration.	Ops
	ADDITIONAL: Motorized blinds on photocell controllers are used in areas where individual control is not desired.	

S-HUM-11	<b>Increase the practice of building flush-out</b>	Ops	B
<p>If building flush-out was not performed at building handover stages, an IAQ testing is conducted within 12 months of occupancy, and results indicate that maximum concentrations for pollutants do not exceed the maximum limit as stipulated in the Code of Practice on Indoor Air Quality by Department of Occupational Safety and Health (DOSH) Malaysia, as follows:</p> <ul style="list-style-type: none"> <li>- Overall carbon dioxide levels: &lt;1000ppm;</li> <li>- Overall carbon monoxide levels: &lt;10ppm;</li> <li>- Dust particulate levels: &lt;0.15mg/m<sup>3</sup>;</li> <li>- Total volatile organic compound levels: &lt;3ppm.</li> </ul> <p>OR</p> <p>Scheduled flush-outs are performed on a continuous basis, by means of natural or mechanical ventilation.</p> <p>ADDITIONAL: Maintenance records indicate that building operator carries out regular visual inspection on the cleanliness of air distribution systems, such as air handling unit, ventilation fan, air filter, air duct, damper, louver etc. Inspection is conducted no more than every 3 months for system operates more than 12 hours a day, and 6 months for system operates less than 12 hours a day.</p>			
S-HUM-12	<b>Provide separately ventilated and isolated areas/rooms which generate pollutants and odour</b>	Ops	B
<p>According to field observations, ALL rooms and spaces in this occupancy that contain equipment or activities generating chemical pollutants and odour (e.g. copier rooms, waste storage areas, janitorial rooms, pantries) are provided with dedicated exhaust air ducts to extract polluted air from these rooms/areas to the outdoors; and isolated from other occupied spaces.</p> <p><i>Note: This credit is not applicable to smoking room which is addressed by other credit.</i></p>			
S-HUM-13	<b>Adequate monitoring of occupants' satisfaction with indoor environmental quality</b>	Ops	B
<p>Surveys have taken place to assess occupant satisfaction with indoor environmental quality no more than every 6 months, and the records are kept by the building operator for at least 3 years (minimum 1 year record shall be provided for the first assessment in operation phase);</p> <p>AND</p> <p>and their independent latest results are as follows:</p> <p><u>Air temperature &amp; relative humidity+ air movement = Thermal Comfort:</u>        ≥90% OR        80-89%</p> <hr/> <p>ADDITIONAL:  <u>Air change &amp; ventilation:</u>        ≥90% OR        80-89%</p> <hr/> <p>ADDITIONAL:  <u>Indoor air quality:</u>        ≥90% OR        80-89%</p> <hr/> <p>ADDITIONAL:  <u>Glare conditions:</u>        ≥90% OR        80-89%</p> <hr/> <p>ADDITIONAL:</p>			

Illumination levels and quality of lighting:  
 ≥90% OR  
 80-89%

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ADDITIONAL:  
Noise level:  
 ≥90% OR  
 80-89%

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ADDITIONAL:  
 A plan for corrective action has been developed to address problem areas indicated by survey results with more than 20% occupants' dissatisfaction. This plan should include field measurement of relevant environmental variables in problems areas.

**CUL: Cultural and Heritage Aspects**

S-CUL-1	<b>Enhance or maintain the heritage significance of the building or adjoining/nearby heritage buildings</b>	B
	<u>Existing non-heritage building in a heritage zone (adaptive reuse):</u> The mode of operation maintains the heritage significance of the building or its sub-systems.	Ops

**LOC: Local People and Employment**

S-LOC-1	<b>Provide training opportunities for unskilled local people (employed for the works) to be future semi-skilled or skilled construction workers</b>	C
	N.A.	
S-LOC-2	<b>Increased use of locally available materials and products</b>	C
	N.A.	
S-LOC-3	<b>Linkage to local service providers</b>	C
	At least 80% of maintenance and repairs (based on cost) of building, furniture and fittings are undertaken by local companies (within 50km).  If there are no local companies with appropriate maintenance and repair skills available within 50km of the building site, this credit is "Not Applicable".	Ops
S-LOC-4	<b>Use experienced local design teams</b>	C
	N.A.	
S-LOC-5	<b>Use experienced local contractors</b>	C
	N.A.	

Issue	Sub-Issues	Criteria & Benchmarking	Assess. Phase	Spatial Scale
<b>EN: ENVIRONMENTAL</b>				
<b>ECO: Land use and Impacts on Ecology</b>				

EN-ECO-1	<b>Minimise ecological and other damage to existing soil, water bodies and flora and fauna of the site or adjacent lands</b>	S
	N.A.	
EN-ECO-2	<b>Maximize potential for landscape spaces on the site</b>	S
	Field observations indicate that a reasonable scale of landscape area (relative to the scale of the building) is provided within the building and/or on the rooftop, such as courtyard gardens, podium roof and sky gardens, to improve the working environment.	Ops
	ADDITIONAL: Field observations and other relevant evidence indicate that proper maintenance and management are carried out to ensure the good condition of the landscape area and open space for the use by the building occupants, users or public.	
	<i>Note: Landscape, in the form of greenery, water features, hard landscape and fixed furniture are recommended in communal open space, podium garden, skygarden, slope, retaining wall and semi-enclosed area. Hard and soft landscape or solely soft landscape is acceptable for both credits.</i>	
EN-ECO-3	<b>Improve the ecological value of natural landscape</b>	S
	The percentage of landscaped area (including on roof if present) planted with non-invasive plantings that are considered as endemic to the area or low irrigation demand, as determined by field observations and landscape plans and specifications, is: 100% OR 70-99%	Ops
	If there is no landscaping, or landscaping represents less than 1% of the site area, this credit is "Not Applicable".	
EN-ECO-4	<b>Select sites that have low risk of flooding</b>	C
	N.A.	
<b>SRM: Supports Resource Management</b>		
EN-SRM-1	<b>Increase use of materials that have less environmental impact in producing them</b>	G
	N.A.	
EN-SRM-2	<b>Design building for maximum durability</b>	B
	N.A.	
EN-SRM-3	<b>Increase use of bio-based products and materials obtained from managed/sustainable sources</b>	B
	According to timber use (location and usage) and delivery records, the timber products used for daily operation and decoration, and minor addition and alteration works after building handover (or in the past 3 years) have been sourced from any combination of the following: - Forest Stewardship Council (FSC) or Malaysia Timber Certification Council (MTCC) Certified Timber - post-consumer recycled timber (must have 50% post-consumer recycled content) - Re-used timber And the percentage (by cost) of these timber products is: ≥75% OR 50-74%	Ops
	If the material cost of timber represents less than 0.1% of the project's contract value, this credit is "Not Applicable".	

EN-SRM-4	<b>Increase use of materials that can be recovered or recycled</b>	B
	N.A.	
EN-SRM-5	<b>Increase use of products and materials with recycled content</b>	B
	According to material use (location and usage) and delivery records, the percentage of materials and components with recycled content used for daily operation (e.g. paper and storage box), maintenance and minor addition and alteration works (e.g. building structure, false ceiling, partition wall, door, window, landscaping materials) after building handover (or in the past 3 years) is $\geq 10\%$ .	Ops
	<i>Note: The recycled content of materials shall be determined by dividing the weight/volume of recycled content in the item by the total weight/volume of all materials in the item.</i>	
<b>AIR: Emissions to Air</b>		
EN-AIR-1	<b>Provide pedestrian access to basic services and connect to existing public transportation network</b>	C
	The distance between the nearby public transport interchange and the building entrances is: $\leq 300\text{m}$ OR $\leq 100\text{m}$	Ops
	ADDITIONAL: A safe, convenient and comfortable on-site footpaths have been provided (elevated, continuous and sheltered walkways OR a pavement along a street), connecting the building to nearby buildings/basic services and public transportation network or local transport nodes.	
<b>LAN: Emissions to Land/ Solid Waste</b>		
EN-LAN-1	<b>Save handling and storage of hazardous wastes on site</b>	S
	The result of an assessment of the safety of hazardous waste storage on the site indicates very minor or no deficiencies. OR The result of an assessment of the safety of hazardous waste storage on the site indicates minor deficiencies.	Ops
EN-LAN-2	<b>Implement construction waste management program with sorting, reuse and recycling measures</b>	B
	N.A.	
EN-LAN-3	<b>Provide spaces for collection of recyclables, recycling storage and staging areas in the building</b>	B
	Field observations confirm that a centralised space and facilities have been provided for sorting and storage of office recyclables generated by building occupants and users.	Ops
	<i>Note: A centralised space can improve the delivery process for large amount of waste and it could be allocated for each building or for the whole development.</i>	
	ADDITIONAL: Designated space(s) and facilities have been provided on each floor for sorting and storage of recyclable and non-recyclable waste.	
EN-LAN-4	<b>Maximize recycling of office recyclables</b>	B
	The building operator has effectively implemented the municipal waste management plan; AND The actual percentage of office recyclables collected, stored and sent to recycling facilities in the past 1 year is, $\geq 90\%$ OR $\geq 60\%$	Ops

*Note: The municipal waste management plan should suit the managed building. Apart from that, effective implementation is required to ensure strategies (e.g. in the form of management procedures, instructions or guidelines) are applicable for all building occupants and property management staff of the building.*

ADDITIONAL:

An inspection has been conducted every week to ensure that the strategies are implemented according to the procedure and guidelines as stipulated in the waste management plan.

*Note: Designated person(s) shall ensure all workers and staff on site acknowledge the target and method of the construction waste management plan. Also, the designated person(s) shall identify any improvement required to enhance the effectiveness of waste management and maximising the recyclable waste collection and reuse.*

EN-LAN-5	<b>Minimise land pollution from site workers' accommodation</b> N.A.	S
EN-LAN-6	<b>Design for repeatability and increase use of standardized and prefabricated components</b> N.A.	B
<b>EWA: Emissions to Water</b>		
EN-EWA-1	<b>Implement stormwater management strategies</b> N.A.	C
EN-EWA-2	<b>Minimise storm sewer or stream pollution from site workers' accommodation</b> N.A.	C
EN-EWA-3	<b>Utilize on-site wastewater treatment systems using greywater</b> All individual occupancies in the project have been provided with separate supplies of potable water for required occupancy uses and greywater for toilets and irrigation. OR All individual occupancies in the project have been provided with separate supplies of potable water for required occupancy uses and greywater for irrigation only.  <i>Note: The greywater system collects drainage from sinks (except for kitchens and clinical areas) and showers, washing machines, condensate from air-conditioning systems and water discharged from cooling towers, swimming pools, fountains and other water sources that do not contain food or human waste. The greywater is filtered and disinfected and then stored in a cistern or tank until needed. It is then piped in a special separate piping system for reclaimed water to the points of use. The on-site sewage treatment system approach can include traditional septic systems or more modern biological treatment systems that create a local natural wetland ecosystem that purifies wastewater after a biological digestion process is applied to the sewage.</i>	Ops S
<b>ADJ: Impacts on Adjacent Properties</b>		
EN-ADJ-1	<b>Reduce noise and vibration generated during construction</b> N.A.	C
<b>ENE: Non-renewable Energy Consumption</b>		
EN-ENE-1	<b>Use energy efficient light fixtures and office appliances</b> All office appliances installed has the power index of:	B Ops

	12W/m <sup>2</sup> OR 16W/m <sup>2</sup>		
EN-ENE-2	<b>Use highly efficient ventilation and air-conditioning systems</b>		B
	N.A.		
EN-ENE-3	<b>Use passive cooling strategies</b>		B
	N.A.		
EN-ENE-4	<b>Use integrated lighting concept</b>		B
	The actual percentage of the NLA that has a Daylight Factor (DF) of 1.0-3.5% at the working plane level (800mm from floor level), as indicated by site measurements, is: 70% OR 50% OR 30%		Ops
	<i>Note: Review sun path diagram relative to the site and building forms to guide development of the daylight design. Consider sun angles throughout the year for the best orientation and shading strategies. Establish daylight strategy early in schematic design, as it influences decision making related to the site plan, building orientation, building massing and fenestration. However, daylighting needs to take into account the sky conditions more than sun movement. Locate program area that benefit most from daylight at perimeter zones with northern and southern exposures to the greatest extent possible. Eastern and western exposures require more careful sun control strategies to control glare and overheating from low angle sun. The requirement for daylight can be effectively controlled by the depth of the room. In general, higher levels of reflectance and higher window head heights allow deeper rooms.</i>		
EN-ENE-5	<b>Reduce fossil fuel energy consumption</b>		B
	<b>Conditional requirement for the whole assessment:</b> The project's actual Building Energy Intensity (BEI) which measures the total energy used in the building for one year (in kilowatts hours) divided by the air-conditioned floor area of the building (in square meters), must not exceed 150 kWh/m <sup>2</sup> /year. 0-89 kWh/m <sup>2</sup> /year; OR 90-120 kWh/m <sup>2</sup> /year; OR 121-150 kWh/m <sup>2</sup> /year		Ops
EN-ENE-6	<b>Optimise the size of building systems control zones</b>		B
	On-site investigation confirms that all individual or enclosed spaces are individually switched; the size of individually switched lighting zones does not exceed 100m <sup>2</sup> for 90% of the NLA; and Switching is clearly labelled and easily accessible by building occupants.		Ops
	ADDITIONAL: An individually addressable lighting system (i.e. the lighting fixtures must be able to be readdressed/regrouped without wiring) is provided for 90% of the NLA.		
	ADDITIONAL: On-site investigation confirms that effective provisions have been provided to enhance the thermal comfort performance at partial operation based on system part-load operation and control strategies of centralized system.		
	<i>Note: For buildings with centralized building services systems, certain level of operational flexibility is restricted. On some occasions, whole floor building systems have to be activated in order to serve single building occupant outside of normal operating hours, such that building system is operated uneconomically and energy is wasted. Hence, the optimum size of control zones shall be determined according to the space usage and floor area.</i>		

EN-ENE-7	<b>Use automatic lighting control system</b>	B
	On-site investigation confirms that automatic lighting control system has been provided in all daylight zones to allow coordinated and active operation between natural and artificial light sources in response to the interior requirements and outdoor daylight conditions.	Ops
	<i>Note: The integrated control shall be able to minimise the operating period of electric lighting and to allow for more use of daylight.</i>	
EN-ENE-8	<b>Install energy sub-metering system for each floor/section/tenancy</b>	B
	According to field observation, sub-metering is provided for substantive energy uses within the building (i.e. all energy uses of 50kW or greater) and the system is linked to BMS to monitor energy consumption data.	Ops
	If the building is less than 500m <sup>2</sup> , this credit is 'Not applicable'.	
	ADDITIONAL: Sub-metering is provided separately for lighting AND separately for power for each floor or tenancy, whichever is smaller.	
	<i>Note: Metering of all individual equipment may not be cost-effective, but metering of particular groups of equipment and major equipment could be sufficient in many cases in order to understand the energy use pattern and for future energy use planning. Also, metering provisions allow regular energy audits to be carried out by building operators or energy audit consultants. Energy metering, monitoring and logging provisions for the continuous recording of energy use are recommended.</i>	
	ADDITIONAL: Evidence revealed that competent in-house energy audit team has been formed or an external energy audit team (e.g. building services consultants and tertiary academic institutions) has been employed to carry out walk-through energy consumption audit for the whole building not less than once for 3 years.	
EN-ENE-9	<b>Facilitate personal control of thermal comfort systems</b>	B
	System descriptions, schematic diagrams together with on-site investigation confirm that individual comfort controls (over air temperature, radiant temperature, air speed or humidity) are provided for ≥50% of the building occupants to enable adjustments to suit individual task needs and preferences, while maintaining the indoor environment within acceptable limits.	Ops
	AND Comfort system controls are provided for all shared multi-occupant spaces (meeting rooms, amphitheatre etc.) to enable adjustments to suit group needs and preferences.	
	<i>Note: Occupants in many building experience an uncomfortable environment when working at odd hours (at night or on weekends) because the HVAC systems have not been designed to permit occupants to control their own needs. This criterion is applicable to personal control over thermal comfort system only as lighting system control zone is addressed in other credit. Also, it applies to the extent to which passive strategies in hybrid ventilated (air-conditioned and natural ventilated) buildings are capable of providing a range of control patterns as it does for fully air-conditioned buildings.</i>	
<b>WAT: Potable Water Consumption</b>		
EN-WAT-1	<b>Harvest rainwater for later re-use</b>	S
	Field observations indicate that a rainwater harvesting system has been provided and the operation and maintenance records for the rainwater recycling and treatment suggests that the provision has led to 20% reduction in potable water consumption; OR ...10% reduction...	Ops
EN-WAT-2	<b>Use water efficient plumbing fixtures and appliances</b>	B



The actual percentage of all lavatory faucets with water flow between 0.5-1.0 GPM, indicated by system descriptions and relevant photos taken during operation phase, is: 100% OR 75-99%

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ADDITIONAL:  
A actual percentage of all toilets with dual-flush or low-flush system (less than or equal to 6 liters) is: 100% OR 75-99%

*Note: Use aerators on lavatory faucets to reduce water flow from 2.5 GPM to 0.5 or 1.0 GPM. Use automated controls for lavatory faucets for water conservation, such as infrared sensor faucets, delayed action shutoff, or automatic mechanical shutoff valves. Use dual-flush or low-flush toilets. Do not use automatic flush toilets and urinals to avoid excessive flushing.*

EN-WAT-3	<b>Minimise use of potable water for landscaping irrigation</b>	S
	<p>Potable water consumption for landscape irrigation is actually reduced by 50% through the following:</p> <ul style="list-style-type: none"> <li>- Installation of water-efficient irrigation systems e.g. sub-soil or drip irrigation and/or</li> <li>- Use of non-potable water (i.e. captured rainwater or greywater) for landscape irrigation</li> </ul> <p>OR</p> <p>According to observations made during operation phase, water-conserving or self-sustaining landscape has been installed which is based on plants tolerant of soils, climate and water availability</p> <p>If there is no landscaping, or landscaping represents less than 1% of the site area, this credit is "Not Applicable".</p>	Ops
EN-WAT-4	<b>Minimise use of potable water for cooling system</b>	B
	<p>Potable water consumption of water-based heat rejection system is actually reduced by 90%; OR According to observations made during operation phase, no water-based heat rejection systems have been provided;</p> <p>OR</p> <p>...reduced by 50%</p>	Ops
EN-WAT-5	<b>Install water meters for all major water uses in the project</b>	B
	<p>Field observation indicates that a water sub-metering system is provided for high water-usage operations (e.g. irrigation, cooling tower) or for tenants.</p> <p>ADDITIONAL: All water sub-meters are linked to BMS to monitor water consumption data and to enable detection of water leakage.</p>	Ops

Issue	Sub-Issues	Criteria & Benchmarking	Assessmt. Phase	Spatial Scale
<b>EC: ECONOMIC</b>				
<b>TBL: Triple Bottom Line Accounting – Planet, People, Profit</b>				
EC-TBL-1		<b>Refer to Environmental Impact Assessment (EIA) report</b>		C
		N.A.		

EC-TBL-2	<b>Assess and evaluate the quality of workmanship of construction works</b> N.A.	B
EC-TBL-3	<b>Consider both capital/construction and operational costs</b> N.A.	B
EC-TBL-4	<b>Conduct Triple Bottom Line before deciding to pursue with the project</b> N.A.	O
EC-TBL-5	<b>Manage the performance risks associated with new and untested sustainable building products and technologies</b> N.A.	O
<b>EEF: Efficiency, Effectiveness and Flexibility</b>		
EC-EEF-1	<b>Develop and implement a long-term maintenance management plan</b> Detailed preventive and corrective maintenance plans for the first 3 years exist to help minimise accidental breakdown of services. <i>Note: Planned preventive maintenance works shall be carried out within the anticipated life cycle of the building components, facilities and services before breakdown or abnormal operation are detected. Since planned preventive maintenance work could not prevent all accidental failure, planned corrective maintenance works are also essential. The corrective maintenance plan shall comprise of accidental system failure response and repairing plan, spare parts and component list, as well as contingency plan for the temporary shut-down of services serving the building occupants.</i> ADDITIONAL: The building inspection checklist as well as inspection and performance/functional testing records for at least 3 years are kept by building operator (minimum of 1 year record shall be provided for the first assessment in operation phase); AND the record indicates that regular inspection and performance testing on building services installations are conducted regularly. <i>Note: Inspection checklist shall include, but not limited to the visual inspection on conditions and performance/functional tests of public lighting, plumbing and drainage systems, HVAC installations serving public areas, and other facilities and building services systems in the building.</i> ADDITIONAL: The building inspection checklist and inspection record for at least 3 years are kept by building operator (minimum of 1 year record shall be provided for the first assessment in operation phase); AND the record indicates that regular inspection is conducted of the followings to ensure proper, effective and safe functioning: - Means of escape and fire resisting construction e.g. walls, floors, staircases, fire-resisting doors, openings, fire-resisting enclosures, etc. - Building fabric, structure and facade; - Slope, retaining wall and private roads.	B Ops
EC-EEF-2	<b>Provide and operate an effective building management control system</b> A systematic tool called Central Control and Monitoring Systems (CCMS) or Building Management System (BMS) has been provided and its capability is consistent with the complexity of building systems; AND the system has enabled the followings: - The operation status monitoring of various major electrical and mechanical installations, such as lift & escalator, electrical system, chiller plant, boiler plant, pumping system, water circulation systems, fire and smoke alarm system, and security system; the daily automatic monitoring of operation such that system faults and abnormal operations can be identified at an early stage; the recording of operating history hence helping the building operator to establish an effective maintenance plan.	B Ops

	<p>ADDITIONAL:</p> <ul style="list-style-type: none"> <li>- The operation control of various major electrical and mechanical installations as described above, to minimise failures due to human errors.</li> </ul> <p><i>Note: If a fire is detected, then the system could be used to prevent the smoke from spreading by opening exhaust dampers and closing outdoor air intake dampers of the fire floor and send all elevators to the ground floor and park them to prevent people from using them in the event of a fire.</i></p>	
	<p>ADDITIONAL:</p> <ul style="list-style-type: none"> <li>- The automatic control and monitoring of lighting installations according to the scheduled occupancy programme.</li> </ul> <p><i>Note: Energy management and control system should be considered in any building exceeding 40,000sqft or 3700 sqm of gross area. A Building Management System (BMS) manages the following systems:</i></p> <ul style="list-style-type: none"> <li>- Building Automation System (BAS) that provides automatic monitoring, interaction and management for electricity, lighting, plumbing, ventilation and air-conditioning, water supply and drainage, and environmental control systems at a simple control centre.</li> <li>- Security Automation System (SAS) – addressed by other credit.</li> <li>- Fire Automation System (FAS) – addressed by other credit.</li> </ul>	
EC-EEF-3	<p><b>Provide comprehensive building records to operating staff and owners</b></p> <p>The property management company and/or Owners' Corporation keep the full set of building records and the updated versions properly.</p> <p><i>Note: The building records shall comprise, but not limited to the following items:</i></p> <ul style="list-style-type: none"> <li>- Documented design intent – building, structural, drainage, site formation, alterations and additions plans approved by the Local Authority.</li> <li>- Building services as-built drawings – fire services, underground drains, drainage, water supply, electrical, lighting, broadcasting, gas supply, HVAC, etc.</li> <li>- Layout plan for hidden utilities – electricity cables, gas pipes, telephone lines etc.</li> <li>- Operations and maintenance manual for building services, mechanical components and installations;</li> </ul> <p>Testing and commissioning report</p>	Ops O
EC-EEF-4	<p><b>Spatial flexibility for different users/requirements</b></p> <p>N.A.</p>	B
EC-EEF-5	<p><b>Provide building services systems with maximum flexibility for different users/ requirements</b></p> <p>N.A.</p>	B
EC-EEF-6	<p><b>Perform comprehensive commissioning, and post-occupancy commissioning for all building services</b></p> <p>Evidences suggest that tuning has been implemented on all building systems after building handover, and the tuning process involved the relevant members of the design team. The Building Tuning Report on the outcomes of the tuning process has been provided to the building owner and made available to the design team.</p> <p>AND</p> <p>Full re-commissioning has been carried out for all building services 12 months after practical completion.</p>	Ops B
EC-EEF-7	<p><b>Structural design with maximum adaptability for new uses</b></p> <p>N.A.</p>	B
EC-EEF-8	<p><b>Adequate floor-to-floor height to offer high level of functionality for almost any occupancy</b></p> <p>N.A.</p>	B

EC-EEF-9	<b>Maximize workspace/directly functional area to total floor are ratio</b> N.A.		B
<b>Issue</b>	<b>Criteria &amp; Benchmarking</b>	<b>Assess. Phase</b>	<b>Spatial Scale</b>
<b>INN: INNOVATION</b>			
INN-1	<b>Innovative strategies and technologies</b> The initiative is a technology or process that is considered a 'first' in the World OR The project substantially contributes to the broader market transformation towards sustainable development in the World. OR The initiative is a technology or process that is considered a 'first' in Malaysia OR The project substantially contributes to the broader market transformation towards sustainable development in Malaysia.	Ops	O
INN-2	<b>Exceeding MOBSA benchmarks</b> The solution results in a substantial (e.g. 5% or greater above the specified percentage for the best performance) social/environmental/economic impact targeted by an existing credit.	Ops	O

## **Appendix G: Overall Stages of Developing and Refining the MOBSA Criteria**

G 2-8

ISSUE	SUB-ISSUES	CRITERIA	Literature (Tentative)	Interview (Stage-1)	Focus Groups (Stage-2)	Pilot Study	Post-survey (Stage-3)	Validation Process
			√ = Included	√ = Confirmed	√ = Agreed & rated	√ = Retained	√ = Important & selected	√ = Retained
NUMBER OF CRITERIA IN EACH STAGE OF DEVELOPMENT								
			Included = 102	Confirmed=65 Refined = 4 Not cited = 33	Agreed = 106 Refined = 7 Omitted = 2	Retained=116 Refined = 4	Selected = 80 Refined = 8 Excluded =32	Retained = 66 Refined = 15 Combined= 6 (to become 3) Omitted = 1
			Total = 102	Total = 102 Added = 13	Total = 115 Added = 7	Total = 120	Total = 120	Total = 88 Added = 2
			Absent = 20	Note cited = 7				
			Total for next stage = 102	Total for next stage = 102+13=115	Total for next stage = 107+6+7=120	Total for next stage = 120	Total for next stage = 80+8=88	FINAL TOTAL = 75+6+3+2=86
<b>SOCIAL</b>								
<b>Education and Awareness</b>								
		Increase of <b>occupants' awareness</b> on consumption and waste production <i>Refined to: Increase awareness of building occupants in conserving energy and water as well as reducing waste</i>	√	√	√	√	√ Refined	√
		Improve <b>knowledge on sustainable development issues among design team members</b> <i>Refined to: Readiness and competency of design team members on sustainable design and development issues</i>	√	√	√ Refined	√	√	√
		Improve <b>skills and knowledge of maintenance and operation staff</b>	√	√	√	√	√	√
		Improve <b>sustainable construction skills among construction workers</b>	√	√	√	√	√	√
		Provide <b>spaces for education</b>	√	√	√	√	Excluded	-
<b>Support for Social Cohesion</b>								
		Support for <b>inter-disciplinary work</b> right from the beginning of the design process	√	√	√	√	√	√
		Provide <b>mixed uses within the project</b> to support active streetscape and to reduce the need for commuting transport <i>Refined to: Planning to support active streetscape and provisions for community</i>	√	√	√	√	√	√ Refined
		Balance between provision of workspaces and <b>common spaces for social interaction</b> <i>Refined to: Space planning for maximum social interaction</i>	√	√	√ Refined	√	√	√
		Increase <b>participation of affected community in development process</b>	√	Not cited	√ Refined	√	√	√

<i>Refined to:</i> Increase <b>participation of affected community in development process</b> to avoid conflict and ensuring the sustainability of the development						
Increase <b>participation of users in development process</b> to ensure users' requirements are met	√	Not cited	√ Refined	√	√	√
<i>Refined to:</i> Increase <b>participation of users in development process</b> to ensure users' requirements are met						
<b>Accessibility</b>						
Maximize <b>personal safety and security</b> for users to access and use the building	√	√	√	√	√	√
<b>Easy to clean the building facades</b> and other elements or design	√	Not cited	√	√	√	√ Refined
<i>Refined to:</i> Convenient and safe <b>maintenance access for building facades</b> and other elements or design						
Adequate <b>access to communication technology</b>	√	Not cited	√	√	√	√
Easy <b>access to building technical systems</b> for repair and maintenance	√	Not cited	√	√	√	√ Refined
<i>Refined to:</i> Convenient and safe <b>maintenance access for all building services installations</b>						
Select sites that are <b>easily accessible/walking distance to nearby services</b>	√	√	√	√	√	√ Refined
<i>Refined to:</i> <b>Easy access to nearby services</b>						
<b>Inclusiveness of Opportunities</b>						
Ease of <b>access for disabled</b> persons	√	√ Refined	√	√	√	√
<i>Refined to:</i> Provide for <b>universal access</b>						
Provide <b>facilities for users to perform religious and spiritual quotient</b>	√	√	√	√	√ Refined	√
<i>Refined to:</i> Provide <b>facilities for users to perform religious obligations</b> at appropriate location and with appropriate size and design						
Provide <b>facilities for users with children</b>	√	√	√	√	√ Refined	√
<i>Refined to:</i> Provide <b>facilities for users with children</b> in the building and neighbouring blocks if demand is sufficient						
<b>Human Health and Well-being</b>						
Adapt practices that <b>avoid construction accidents</b>	√	Not cited	√	√	√	√
Maximize level and quality of <b>fresh air</b> in the ventilation systems	√	√ Refined	√ Refined	√	√	√ Refined
<i>Finally refined to:</i> Optimise the level and quality of <b>fresh air</b> in mechanically ventilation systems						
Maximize <b>openings and cross ventilation</b> in naturally ventilated spaces	Absent	Added	√	√	√	√
Minimize <b>noise level</b> and provide satisfactory level of <b>acoustic performance</b>	√	√	√	√	√	√
Appropriate <b>illumination level and lighting quality</b> in public and work areas	√	√	√	√	√	√ Refined
<i>Refined to:</i> Appropriate <b>illumination level and artificial lighting quality</b>						
<b>Prohibit tobacco smoking</b> in the building	√	Not cited	√	√	√	√
Use <b>low/zero pollutants cleaning and maintenance products and processes</b>	√	√	√	√	√	√
Use interior finish <b>materials with low- or zero-pollutant off-gassing</b>	√	√	√	√	√	√
Provide optimum <b>air movement for thermal comfort</b> in mechanically	Absent	Added	√	√	√	√

ventilated spaces						
Minimize <b>glare conditions</b> in main occupancy areas	√	Not cited	√	√	√	√
Increase the practice of <b>building flush-out</b> to reduce possible indoor air quality contamination after construction completion and prior to occupancy	Absent	Added	√	√	√	√
Provide <b>separately ventilated and isolated areas/rooms which generate pollutants</b> <i>Refined to: Provide separately ventilated and isolated areas/rooms which generate pollutants and odour</i>	√	√	√	√	√ Refined	√
Adequate <b>monitoring of occupants' satisfaction</b> with indoor environmental quality	√	√	√	√	√	√
Provide <b>recreational facilities</b> for building users	√	√	√	√	Excluded	-
Provide <b>separately ventilated rooms/areas for tobacco smoking</b>	√	√	√	√	Excluded	-
Provide <b>carbon dioxide monitoring and control system</b> for main occupancy areas	√	√	√	√	Excluded	-
Maximize <b>visual access to exterior views</b> or view to an atrium from workstations	√	√	√	√	Excluded	-
Select <b>sites that are walking distance to recreation areas</b> or facilities	Absent	Not cited	Added	√	Excluded	-
<b>Cultural and Heritage Aspects</b>						
Maintain the <b>heritage value of existing buildings</b> for refurbishment project <i>Refined to: Enhance or maintain the heritage significance of the building or adjoining/nearby heritage buildings</i>	√	Not cited	√	√	√	√ Refined
Compatibility of urban design and building architecture with <b>local cultural values</b>	√	√	√	√	Excluded	-
Preserve <b>characteristics of existing streetscapes</b>	√	Not cited	Omitted	-	-	-
<b>Local People and Employment</b>						
Provide <b>training opportunities for local people</b> to be future skilled construction workers <i>Refined to: Provide training opportunities for unskilled local people (employed for the works)</i> to be future semi-skilled or skilled construction workers	√	√	√	√	√	√ Refined
Increased use of <b>locally available materials</b>	√	√	√	√	√	√
Linkage to <b>local service providers</b>	√	Not cited	√	√	√	√
Use experienced <b>local design teams</b>	√	Not cited	√	√	√	√
Use experienced <b>local contractors</b>	√	Not cited	√	√	√	√
Use <b>local labour</b>	√	Not cited	√	√	Excluded	-
<b>CRITERIA</b>	<b>Literature (Tentative)</b>	<b>Interview (Stage-1)</b>	<b>Focus Groups (Stage-2)</b>	<b>Pilot Study</b>	<b>Post-survey (Stage-3)</b>	<b>Validation Process</b>
	√ = Included	√ = Confirmed	√ = Agreed &	√ = Retained	√ = Important	√ = Retained



	rated				& selected	
<b>ENVIRONMENTAL</b>						
<b>Land use and Impacts on Ecology</b>						
Minimize <b>ecological and other damage</b> to existing soil, water bodies and flora and fauna of the site or adjacent lands due to the construction process	√	√	√	√	√	√ Combined*
Maximize <b>potential for green/open spaces</b> on the site for informal recreation <i>Refined to: Maximize potential for landscape spaces on the site</i>	√	√	√	√	√	√ Refined
Improve <b>ecological value of natural landscape</b>	√	√	√	√	√	√
Select <b>sites that have low risk of flooding</b>	Absent	Not cited	Added	√	√	√
Redevelopment of used/ <b>brownfield site</b> rather than green field	√	√	√	√	Excluded	-
Select <b>sites that are within urban areas</b> with existing infrastructure	√	√	√	√	Excluded	-
Select <b>sites that have low ecological value or in non-sensitive areas</b>	√	Not cited	√	√	Excluded	-
Provide <b>greenery</b> within and/or on the rooftop of the building	Absent	Not cited	Added	√	Excluded	-
<b>Supports Resource Management</b>						
Increase use of <b>materials that have less environmental impact in producing them</b>	√	√	√	√	√	√
Use <b>durable materials</b> that require less maintenance <i>Refined to: Design building for maximum durability</i>	√	√	√	√	√	√ Refined
Increase use of <b>bio-based products and materials</b> obtained from managed/sustainable sources	√	√	√	√	√	√
Increase use of <b>materials that can be recovered or recycled</b>	√	√	√	√	√	√
Increase use of <b>products and materials with recycled content</b>	√	√	√	√	√	√
<b>Emissions to Air</b>						
Reduce <b>greenhouse gas emissions</b> from all energy used for <b>building operations</b>	√	Not cited	√	√	√	Omitted
Provide <b>connection from building to existing public transportation network</b>	√	√	√	√	√	
Availability of <b>pedestrian access between building and basic services</b> <i>Finally refined to: Provide pedestrian access to basic services and connect to existing public transportation network</i>	√	√	√	√	√ Refined	√ Combined
Select <b>sites that are near to public transport stops</b>	√	√	√	√	Excluded	-
Provide only <b>minimum allowable parking spaces</b>	√	√	√	√	Excluded	-
Select <b>sites that are reasonably near residential zones</b>	√	Not cited	√	√	Excluded	-
Provide <b>more than minimum allowable motorcycle parking spaces</b> to discourage the use of cars	√	Not cited	√	√	Excluded	-
Minimize <b>air pollution from site workers' accommodation</b>	Absent	Added	√	√	Excluded	-
Provide <b>bicycles and/or bicycle parking spaces</b> for building users	Absent	Added	√	√	Excluded	-
<b>Emissions to Land/ Solid Waste</b>						
<b>Save handling and storage of hazardous wastes on site</b>	Absent	Not cited	Added	√	√	√

Implement <b>construction waste management program</b> with sorting, reuse and recycling measures	√	√	√	√	√	√
Provide <b>spaces for collection of recyclables</b> recycling storage and staging areas in the building	√	√	√	√	√	√
Maximize <b>inorganic wastes</b> sent to recycling facilities <i>Refined to: Maximize recycling of office recyclables e.g. paper, glass bottles, plastic, aluminium cans, cardboard</i>	Absent	Added	√	√ Refined	√	√
Minimize <b>land pollution from site workers' accommodation</b>	Absent	Added	√	√	√	√
Design for repeatability and increase <b>use of standardized and prefabricated components</b> to reduce wastages	Absent	Added	√	√	√	√
<b>Reuse of suitable existing structure(s)</b> on the site, as part of the new project	√	√	√	√	Excluded	-
<b>Design for easy disassembly of components</b> – so that they can be reused or recycled at the end of the service life of the components	√	√	√	√	Excluded	-
Increase use of <b>salvaged, refurbished or used materials</b> from off-site sources	√	√	√	√	Excluded	-
Increase the practice of treating <b>land-clearing debris as a resource</b>	√	Not cited	√	√	Excluded	-
Minimize <b>use of interior finishing materials</b> to minimize the direct and indirect consumption of resources	√	Not cited	√	√	Excluded	-
<b>Emissions to Water</b>						
Select <b>sites with optimum distance from water body</b> to reduce the risk of water contamination <i>Refined to: Reduce the risk of water contamination to nearby water body</i>	√	√	√	√ Refined	√	√ Combined*
Implement <b>stormwater management strategies</b> to control the quantity and quality of stormwater runoff, hence preventing flood and soil erosion	√	√	√	√	√	√
Minimize <b>storm sewer or stream pollution from site workers' accommodation</b>	Absent	Added	√	√	√	√
Utilize <b>on-site wastewater treatment systems</b> using <b>gray water</b> for non-potable uses	√	√	√	√	√	√
Utilize <b>on-site wastewater treatment systems</b> using <b>black water</b> for non-potable uses	√	Not cited	√	√	Excluded	-
<b>Impacts on Adjacent Properties</b>						
Adapt practices that <b>reduce noise pollution</b> from construction site <i>Refined to: Reduce noise and vibration generated during the construction of the project</i>	Absent	Not cited	Added	√ Refined	√	√
Minimize <b>light spillage from exterior lightings</b> into the atmosphere	√	√	√	√	Excluded	-
Reduce possibility of <b>overshadowing adjacent properties</b>	√	Not cited	√	√	Excluded	-
Reduce <b>potential glare to adjacent properties</b>	√	Not cited	√	√	Excluded	-
Reduce impact of <b>excessive wind conditions</b> near the ground floor of high buildings	√	Not cited	Omitted	-	-	-
<b>Non-renewable Energy Consumption</b>						
Use <b>energy efficient light fixtures and office appliances</b>	√	√	√	√	√	√

Use <b>highly efficient ventilation and air-conditioning systems</b>	√	√	√	√	√	√
Use <b>passive cooling strategies</b>	√	√	√	√	√ Refined	
<i>Refined to:</i> Use <b>passive cooling strategies</b>						
Minimize energy transmission through the building skin by a <b>tight, thermally resistant envelope</b>	√	Not cited	√	√ Refined	√	
<i>Refined to:</i> Design for a <b>tight, thermally resistant envelope</b> to prevent leakage of cool draft through building skin						√ Combined
<b>Optimise daylighting</b> in permanently occupied spaces	√	√ Refined	√	√	√	√
<i>Refined to:</i> Use <b>integrated lighting concept</b>						
Reduce fossil fuel <b>energy consumption for building operations</b>	√	√	√	√	√	√
Minimize the <b>size of lighting system control zones</b> to optimize energy savings	Absent	Not cited	Added	√	√	√ Refined
<i>Refined to:</i> <b>Optimise the size of building systems control zones</b>						
Use <b>dimnable and/or auto-sensored lighting system</b>	√	Not cited	√	√	√	√ Refined
<i>Refined to:</i> Use <b>automatic lighting control system</b>						
Install <b>energy sub-metering system</b> for each floor/section/tenancy to monitor energy consumption	√	Not cited	√	√	√	√
Facilitate <b>personal control</b> of the lighting and thermal comfort systems by occupants	√	Not cited	√	√	√	√
Provide <b>on-site power generation systems</b>	√	√	√	√	Excluded	-
<b>Potable Water Consumption</b>						
<b>Harvest rainwater</b> for later re-use to reduce the potable water consumption	√	√	√	√	√	√
Use <b>water efficient plumbing fixtures and appliances</b>	√	√	√	√	√	√
Minimize <b>use of potable water for landscaping irrigation</b>	√	√	√	√	√	√
Minimize <b>use of potable water for cooling system</b>	√	√	√	√	√ Refined	√
<i>Refined to:</i> <b>Minimize use of potable water for cooling system</b>						
Install <b>water meters</b> for all major water uses in the project to <b>monitor water consumption</b> and to locate any leakages in the pipe lines	√	Not cited	√	√	√	√
Minimize <b>use of potable water for the testing of fire fighting system</b>	√	Not cited	√	√	Excluded	-
<b>CRITERIA</b>	<b>Literature (Tentative)</b>	<b>Interview (Stage-1)</b>	<b>Focus Groups (Stage-2)</b>	<b>Pilot Study</b>	<b>Post-survey (Stage-3)</b>	<b>Validation Process</b>
	√ = Included	√ = Confirmed	√ = Agreed & rated	√ = Retained	√ = Important & selected	√ = Retained
<b>ECONOMIC</b>						
<b>Triple Bottom Line Accounting – Planet, People, Profit</b>						
Increase the practice of referring to <b>Environmental Impact Assessment (EIA) report</b> prepared by environmental experts by the project team	Absent	Added	√	√	√	√
Assess and evaluate the <b>quality of workmanship</b> of construction works prior	Absent	Added	√	√	√	√

to hand over						
Consider both <b>capital/construction cost, along with long-term operational costs</b> for both tenant-occupied and leased office building	√	√	√	√	√	√
Conduct <b>triple bottom line (TBL)</b> to the project <i>Refined to:</i> Conduct <b>Triple Bottom Line</b> before deciding to pursue with the project	√	√ Refined	√ Refined	√	√	√
Conduct <b>Risk Analysis</b> <i>Refined to:</i> <b>Manage the performance risks</b> associated with new and untested sustainable building products and technologies	√	Not cited	√	√	√	√ Refined
Minimization of <b>payback period</b>	√	√	√	√	Excluded	-
Increased <b>rental/market value</b> or higher overall property <b>investment returns (ROI)</b> <i>Refined to:</i> High rate of occupancy and low rate of occupancy turnover	√	√	√ Refined	√	Excluded	-
<b>Efficiency, Effectiveness and Flexibility</b>						
Develop and implement a <b>long-term maintenance management plan</b> for efficient building operation	√	√	√	√	√	√
Provide and operate an effective <b>facility management control system</b> to maximize the operational efficiency of building systems <i>Refined to:</i> Provide and operate an effective <b>building management control system</b> to maximize the operational efficiency of building systems and to save energy and water	√	√	√	√	√ Refined	√
Provide <b>as-built drawings and equipment manuals</b> to operating staff and owners to ensure efficient operation <i>Refined to:</i> Provide <b>comprehensive building records</b> to operating staff and owners	Absent	Not cited	Added	√	√	√ Refined
<b>Space planning for maximum flexibility</b> for different users/requirements <i>Refined to:</i> <b>Spatial flexibility</b> for different users/requirements	√	√	√	√	√	√ Refined
Provide <b>building services systems with maximum flexibility</b> for different users/ requirements	√	Not cited	√	√	√	√
Requirement of contracted <b>comprehensive commissioning, and post-occupancy commissioning</b> to be performed for all building services	Absent	Added	√	√	√	√
<b>Structural design with maximum adaptability</b> for new uses	√	Not cited	√	√	√	√
Adequate <b>floor-to-floor height</b> to offer high level of functionality for almost any occupancy	Absent	Added	√	√	√	√
<b>Maximize workspace/directly functional area to total floor are ratio</b>	√	√	√	√	√	√
Maximize <b>plot ratio</b> to generate denser development	√	√	√	√	Excluded	-
<b>INNOVATION</b>						
Innovative strategies & technologies	-	-	-	-	-	Added
Exceeding MOBSA benchmarks	-	-	-	-	-	Added

## Appendix H: Proposed Points System for All Assessment Phases

H-1	Distribution of Total Points Available by Phases of Assessment	H 2 (In CD)
H-2	Proposed Points System for the Validated Comprehensive MOBSA Framework	H 3-40 (In CD)

## Appendix H-1: Distribution of Total Points Available by Phases of Assessment

Sub-Issue	Code	Points Available			
		P-Dsn	Dsn	C&C	Ops
<b>Social</b>	<b>S</b>				
Education & Awareness	EDU	3	8	5	6
Support for Social Cohesion	COH	11	9	2	4
Accessibility	ACC	11	11	3	9
Inclusiveness of Opportunities	INC	7	7	0	7
Human Health & Well-being	HUM	29	27	9	32
Cultural & Heritage Aspects	CUL	2	2	2	2
Local People & Employment	LOC	2	6	5	2
Total EDU+COH+ACC+INC+HUM+CUL+LOC		<b>65</b>	<b>70</b>	<b>26</b>	<b>62</b>
<b>Environmental</b>	<b>EN</b>				
Land Use & Impacts on Ecology	ECO	9	9	3	4
Supports Resource Management	SRM	10	10	4	4
Emissions to Air	AIR	2	2	0	2
Emissions to Land/ Solid Waste	LAN	12	11	7	7
Emissions to Water	EWA	6	5	4	2
Impacts on Adjacent Properties	ADJ	2	2	2	0
Non-Renewable Energy Consumption	ENE	25	25	0	18
Potable Water Consumption	WAT	12	12	3	12
Total ECO+ SRM+AIR+LAN+EWA		<b>78</b>	<b>76</b>	<b>23</b>	<b>49</b>
<b>Economic</b>	<b>EC</b>				
Triple Bottom Line Accounting	TBL	10	10	3	2
Efficiency, Effectiveness & Flexibility	EEF	22	22	5	11
Total TBL+EEF		<b>32</b>	<b>32</b>	<b>8</b>	<b>13</b>
<b>Building Sustainability</b>	Total S+EN+EC	175	178	57	124
<b>Innovation</b>	<b>INN</b>	4	4	4	4

**Note:**  
P-Dsn=Pre-design phase; Dsn=Design phase; C&C=Construction & Commissioning phase;  
Ops=Operations phase

**Note:** Assessment Phase: P-Dsn = Pre-design phase; Dsn = Design phase; C&C = Construction & Commissioning phase; Ops = Operations phase

Issue	Sub-Issues	Criteria & Benchmarking	Assess. Phase	Important level/ Points Available
<b>S: SOCIAL</b>				<b>H</b>
<b>EDU: Education and Awareness</b>				<b>H</b>
S-EDU-1		<b>Increase awareness of building occupants</b>		<b>Max 3</b>
		Property management company has prepared a building-specific user and environmental manual/guideline; AND The manual/guideline has been provided to ALL tenants and building occupants.	Ops	2
		<i>The manual/guideline shall include the following information:</i> <ul style="list-style-type: none"> <li>- Facilities and provisions provided in the building;</li> <li>- Services provided by the building and property management company;</li> <li>- Contact persons and methods of contact for the building's major property management staff;</li> <li>- Health, hygiene, fire, safety and security information for the building;</li> <li>- Environmental guidelines, such as the recyclable materials collection and sorting locations, and the basic information introducing the types of recyclable materials;</li> <li>- Guidelines to minimise nuisance to other building occupants and users;</li> <li>- Methods to reduce adverse environmental impacts.</li> </ul>		
		ADDITIONAL: <ul style="list-style-type: none"> <li>- The point above is achieved; and</li> <li>- All occupants are exposed on a monthly basis to current, previous and targeted building performance figures (i.e. water, electricity, waste and accidents) via leaflets, posters or intranet; AND</li> <li>- A fixed set of guidelines is posted at prominent places for continuous awareness of the occupants in conserving energy and water as well as reducing waste.</li> </ul>		1
S-EDU-2		<b>Readiness and competency of design team members</b>		<b>Max 3</b>
		At least one principal member in the design team has had training and/or experience and/or very knowledgeable in sustainable design and development, hence ready and competent to help develop and support the sustainable design goals for the project from the schematic design phase through to construction completion.	P-Dsn	3
		<i>Note: An expanded design team for a sustainable design with commissioning includes the following members:</i> <ul style="list-style-type: none"> <li>• Owner, architect, design engineers, landscaping/site specialist, interior designer, cost estimator</li> <li>• Energy analyst/engineer – intimately familiar with energy and daylight analysis modelling tools</li> <li>• Environmental design consultant – helps design teams recognize design synergies and opportunities to implement sustainable design features without increasing construction costs.</li> <li>• Commissioning Authority – documents the Owner's Project Requirements (OPRs) starting in the pre-design phase – records the owner's objectives, criteria, and goals and benchmarks for gauging success in achieving the defined requirements. The OPR document forms the basis from which all design, construction, acceptance, and operational decisions are made.</li> </ul>		
		ADDITIONAL:		

	<ul style="list-style-type: none"> <li>- The point above is achieved; and</li> <li>- Workshop has been held to educate the entire team (client and consultants) about the impact of buildings and construction on human health, well-being, and productivity; resource use; community development; ecosystem; and the opportunities for improvement.</li> </ul>		
	At least one of major design companies used has a valid ISO 14001 Environmental Management System (EMS) accreditation throughout the project development.	Dsn	3
S-EDU-3	<b>Improve skills and knowledge of maintenance and operation staff</b>		<b>Max 3</b>
	Tender Specification clearly specifies the requirements for appropriate and effective trainings to be arranged by Contractors and Suppliers for the future operating staff, to allow them to familiarize themselves with the building design philosophy, as well as the strategies and methods for the operation of various building facilities and building services systems.	Dsn	3
	<p><i>Note: Scope of training shall be appropriate to the scale of the building and the complexity of the building services installations and building facilities. The training shall cover but not limited to the following information:</i></p> <ul style="list-style-type: none"> <li>- Building design philosophy and characteristics;</li> <li>- Usage and provisions provided in the building;</li> <li>- Operation, troubleshooting and maintenance of all building facilities, systems and equipment.</li> </ul>		
	Records indicate that Contractors and Suppliers and/or Designers have provided appropriate and effective trainings for the operating and maintenance staff to familiarize them with the building design philosophy, as well as strategies and methods for the operation of various building facilities and building services systems; AND the training scope and information are entirely satisfied by the Client's representatives.	C&C	3
	<p><i>Note: Scope of training shall be appropriate to the scale of the building and the complexity of the building services installations and building facilities. The training shall cover but not limited to the following information:</i></p> <ul style="list-style-type: none"> <li>- Building design philosophy and characteristics;</li> <li>- Usage and provisions provided in the building;</li> <li>- Operation, troubleshooting and maintenance of all building facilities, systems and equipment.</li> </ul>		
	Only certified property management company staff of the building are employed; AND they are provided with training at least once a year.	Ops	1.5
	<p><i>Note: The training topics shall cover, but not limited to health and hygiene, fire and safety, security, communication method with building occupants and building technology. The training materials shall include basic and latest information on relevant topics.</i></p> <p>ADDITIONAL:</p> <p>The property management company is accredited with ISO 14001 Environmental Management System (EMS) accreditation prior to and throughout the construction process.</p>		1.5
S-EDU-4	<b>Improve sustainable construction skills among construction workers</b>		<b>Max 2</b>
	Accreditation to the ISO 14001 Environmental Management System is specified as one of the requirements in the tender pre-qualification of major contractor companies.	Dsn	2
	The Contractor has valid ISO 14001 Environmental Management System (EMS) accreditation prior to and throughout the construction process.	C&C	1
	ADDITIONAL: The Contractor has implemented a comprehensive, project-specific Environmental Management Plan (EMP) for the works in accordance with the format set by the Department of Environment (DOE).		0.5
	ADDITIONAL: Evidence is provided to demonstrate that efforts have been made to identify the training needs to enhance the level of knowledge and skill of the workers on sustainable construction and the training has been provided at the early stage of construction process for:		0.5



- The major contractors' management and supervisory staff, and construction workers; OR
- The major contractors' management and supervisory staff only.

**COH: Support for Social Cohesion**

S-COH-1	<b>Support for inter-disciplinary work right from the beginning of the design process</b>	<b>Max 3</b>
	The Client's Project Brief commits to support multi-disciplinary work between architects, engineers, cost specialists, operation people and other relevant actors right from the beginning of the design process.	P-Dsn 3
	A credible detailed plan exists for the implementation of a high quality Integrated Design Process (IDP) to identify functional and environmental priorities at the initiation of the Project, evaluate options and develop the design.	Dsn 3
	<p><u>Elements of IDP:</u></p> <ul style="list-style-type: none"> <li>• Ensure that as many of the interested parties as possible are represented on the design team as early as possible;</li> <li>• Inter-disciplinary work right from the beginning of the design process;</li> <li>• Discussion and documentation by the owners and the design team of the relative importance of various performance and cost issues and the establishment of a consensus on these matters between client and designers and among the designers themselves;</li> <li>• Provision of a design facilitator (or environmental design consultant) to suggest strategies for the team to consist of, as well as a commissioning authority to raise performance issues throughout the process and to bring specialized knowledge to the table;</li> <li>• Addition of an energy specialist to test various design assumptions through the use of energy and daylight simulations throughout the process, to provide relatively objective information on a key aspect of performance;</li> <li>• Addition of subject specialists (e.g. for daylighting, thermal storage) for short consultations with the design team;</li> <li>• Clear articulation of performance targets and strategies to be updated throughout the process by the owner and the design team.</li> </ul>	
S-COH-2	<b>Planning to support active streetscape and provisions for community</b>	<b>Max 2</b>
	The Client's Project Brief commits to plan the building to support active streetscape by providing spatial and facility provisions that benefit the community.	P-Dsn 1
	If there is no existing streetscape or the project is developed on a green site with limited close neighbourhood, provisions shall be made to serve the building occupants and users.	
	<p>ADDITIONAL:</p> <ul style="list-style-type: none"> <li>- The above point is achieved; and</li> <li>- An amenity conflict appraisal has been carried out with survey on existing amenity/communal service provisions in the surrounding to identify duplication of services/ amenity conflicts, and to identify and evaluate the possible community supports that could be offered by the new building.</li> </ul>	1
	If there is no existing streetscape or the project is developed on a green site with limited close neighbourhood, this credit is 'Not applicable' and is removed from the total number of points available for the sub-issue.	
	<p><u>Note:</u> The extent of amenity provision covers various supports for elderly, youth, students, passer-by, building occupants and people from outside the building. Support should be in form of those not addressed by other criteria e.g. healthcare, retail shops, restaurant/cafe, library, leisure &amp; recreational facilities, gallery. Additions to the existing inadequate supports or amenities can be provided in the new building, rather than repeated within the neighbourhood context.</p>	
	Design documentation indicates that the building ground floor or podium level will support active streetscape during and after office hours because the following provisions are designed to serve the community:	Dsn 1.5
	- Communal and social service provisions such as healthcare, gallery, library, recreational and leisure facilities;	

	<p>- Convenient commercial service provisions such as restaurant/cafe and retail shops.</p> <p>OR</p> <p>Acceptable evidence is available to demonstrate that adequate amenity provisions are provided in the immediate neighbouring sites to serve the existing local communities as well as the new building.</p> <p>If there is no existing streetscape or the project is developed on a green site with limited close neighbourhood, amenity provisions shall be designed to serve the building occupants and users.</p> <p><i>Note: The extent of amenity provision covers various supports for elderly, youth, students, passer-by, building occupants and people from outside the building. Support should be in form of those not addressed by other criteria e.g. healthcare, retail shops, restaurant/cafe, library, leisure &amp; recreational facilities, gallery. Additions to the existing inadequate supports or amenities can be provided in the new building, rather than repeated within the neighbourhood context.</i></p> <p>ADDITIONAL: Design documentation indicates that the building will provide spaces for vending machines for food and drinks, post box and cash machine to serve building occupants, users and community.</p>			0.5
	<p>Field observations confirm that the building ground floor or podium level supports active streetscape during and after office hours because the following provisions are provided to serve the community:</p> <ul style="list-style-type: none"> <li>- Communal and social service provisions such as healthcare, gallery, library, recreational and leisure facilities;</li> <li>- Convenient commercial service provisions such as restaurant/cafe and retail shops.</li> </ul> <p>OR</p> <p>Acceptable evidence is available to demonstrate that adequate amenity provisions are provided in the immediate neighbouring sites to serve the existing local communities as well as the new building.</p> <p>If there is no existing streetscape or the project is developed on a green site with limited close neighbourhood, amenities are provided to serve the building occupants and users.</p> <p><i>Note: The extent of amenity provision covers various supports for elderly, youth, students, passer-by, building occupants and people from outside the building. Support should be in form of those not addressed by other criteria e.g. healthcare, retail shops, restaurant/cafe, library, leisure &amp; recreational facilities, gallery. Additions to the existing inadequate supports or amenities can be provided in the new building, rather than repeated within the neighbourhood context.</i></p> <p>ADDITIONAL: Field observations indicate that the building has vending machines for food and drinks, post box and cash machine to serve building occupants, users and community.</p>	Ops		1.5
S-COH-3	<p><b>Space planning for maximum social interaction</b></p> <p>The Client's Project Brief commits to create an environment in the building that promotes social interaction and communication.</p> <p>For a multiple-tenancies building: The design provides a break-out and group workspace/meeting spaces for every tenancy or at least on every 3 floors, whichever is smaller.</p> <p>OR</p> <p>For an owner-occupier building: The design provides a break-out and group workspace/meeting spaces for every 3 floors.</p> <p><i>Note: A break-out space is a quiet area away from the bustle of the workplace which functions as temporary relaxation zone and to hold less formal client or internal meetings. A group workspace is an area within the zone of individual workspaces to facilitate team cohesiveness and collaboration.</i></p> <p>For a multiple-tenancies building: Field observations indicate that a break-out and group workspace/meeting spaces have been provided for every tenancy or at least on every 3 floors, whichever is smaller.</p>			<b>Max 2</b>
		P-Dsn		2
		Dsn		2
		Ops		2

	OR For an owner-occupier building: Field observations indicate that a break-out and group workspace/meeting spaces have been provided for every 3 floors.		
	<i>Note: A break-out space is a quiet area away from the bustle of the workplace which functions as temporary relaxation zone and to hold less formal client or internal meetings. A group workspace is an area within the zone of individual workspaces to facilitate team cohesiveness and collaboration.</i>		
S-COH-4	<b>Increase participation of affected community in development process</b>		<b>Max 2</b>
	The Client's Project Brief commits to encourage affected community participatory approach building planning to avoid conflict or minimise nuisance generated from the building that cause adverse impacts to the community and surroundings.	P-Dsn	2
	<i>Note: Affected community include tenants, property owners, and businesses within 100m of the project boundary, as well as the recognized community planning group and any other interested persons.</i>		
	The Contractor has identified the potential sensitive receivers (e.g. school, hospital, residential flats) nearby the site due to site activities; and avoided site activities with severe nuisance to the identified sensitive receivers where possible, and to provide protective and remedial measures; AND A continuous communication channel between the Developer/Owner, Contractor and the surrounding residents and building users has been established to convey their opinions, complaints and advices such that the Developer/Owner is able to adjust the new building construction method and remedial works to minimize the environmental and safety impacts to the community.	C&C	1.5
	ADDITIONAL: The Contractor has designated a person to record and review the opinion, complaints and advices raised by the surrounding residents and building users.		1.5
	<i>Note: Affected community include tenants, property owners, and businesses within 100m of the project boundary, as well as the recognized community planning group and any other interested persons.</i>		
S-COH-5	<b>Increase participation of users in development process</b>		<b>Max 2</b>
	The Client's Project Brief commits to encourage user participatory approach building planning to ensure users' requirements are met; hence, minimising nuisance generated from the building usage.	P-Dsn	2
	Representative of clients and/or future users have involved in the design process (workshops/ meetings with models and large format drawings).	Dsn	2
	If the prospective occupants are unknown during the design phase (e.g. for speculative development), this credit is 'Not applicable' and is removed from the total number of points available for the sub-issue.		
<b>ACC: Accessibility</b>			
S-ACC-1	<b>Maximize personal safety and security</b>		<b>Max 3</b>
	The Client's Project Brief commits to provide safe working environment and effective security to the building and its occupants and users, by means of both spatial planning and security facilities.	P-Dsn	3
	Suitable security design measures have been taken to prevent unauthorised entry, impede the removal of stolen goods, and reduce vandalism directed against the building. For example, - Plan buildings to eliminate dark cul-de-sacs and unnecessary recess space; - Provision of wide and open staircases; - Design buildings to provide unobstructed view of people approaching controlled areas and around the buildings;	Dsn	1.5

	- Minimise vehicle access points; and - Plan building to restrict entry to specific zones to selected persons (i.e. depending on the level of security needed in the zone).		
	ADDITIONAL: - The above point is achieved; and - The design provides reasonable quantities of passive security facilities to suit the scale and complexity of the building will be provided, such as access barrier/gate, security fence, fence and barrier for access to the slope, exposed pipes and cables, etc.		0.5
	ADDITIONAL: The design provides reasonable quantities of active security facilities to suit the scale and complexity of the building will be provided, such as: - Electronic Access Control Systems; - Closed-circuit television (CCTV) Surveillance System; - Anti-theft Security and Alarm System; - Communication (intercom) system; - Security guards.		1
	The Contractor has provided reasonable quantities (in accordance with the scale and complexity of the site) of passive security facilities and provisions in construction site, such as security guard stand, access barrier/gate, security fence.	C&C	1
	ADDITIONAL: The Contractor has provided reasonable quantities (in accordance with the scale and complexity of the site) of active security facilities and provisions in construction site, such as: - Electronic Access Control Systems; - Closed-circuit television (CCTV) Surveillance System; - Anti-theft Security and Alarm System; - Communication (intercom) system; - Security guards.		2
	Field observations confirm reasonable quantities of passive security facilities to suit the scale and complexity of the building will be provided, such as access barrier/gate, security fence, fence and barrier for access to the slope, exposed pipes and cables, etc.	Ops	0.5
	ADDITIONAL: Field observations confirm that reasonable quantities of active security facilities to suit the scale and complexity of the building have been provided, such as: - Electronic Access Control Systems; - Closed-circuit television (CCTV) Surveillance System; - Anti-theft Security and Alarm System; - Security guards.		1.5
	ADDITIONAL: Building operator (owner/property manager) has formulated and implemented a safety management and fire evacuation plan for building occupants; AND a fire drill is conducted for building occupants not less than once a year.		1
S-ACC-2	<b>Convenient and safe maintenance access for building facades and other elements or design</b>		<b>Max 2</b>
	The Client's Project Brief commits to design the building elements for ease of effective maintenance during the whole life-cycle of an occupied building.	P-Dsn	2
	Design documentation indicates that the building is designed with self-cleaning facades, skylight, and/or roof; OR Design documentation showing the access paths for inspection, cleansing and maintenance indicates that window, atria and roof glazing cleaning will be capable to be carried out safely and without undue disturbance to staff due to the provisions of the following facilities: - Permanent window cleaning and maintenance access systems (e.g. cat ladders, roof top support systems for elevating platforms, external	Dsn	2

	<ul style="list-style-type: none"> <li>- shadings that also function as platform for cleaning and maintenance); OR</li> <li>- Sufficient space for platform transportation and erection, and full-coverage of gondola tracks (if movable maintenance platforms and gondolas are to be used). For buildings over 9 m and up to 30 m high, facilities for either manual or power operated gondolas/suspended access are provided; whilst above this height must have the facility for power operated gondolas; AND</li> <li>- A suitable form of restraint – if a cleaner requires to stand on a ladder or other object or lean out of the window in order to carry out the cleaning process; and ladder restraints – if windows are to be cleaned from an external ladder.</li> </ul>		
	<p>System descriptions and drawings (showing the access paths for inspection, cleansing and maintenance indicates that window) and on-site investigation confirm that window, atria and roof glazing cleaning can be carried out safely and without undue disturbance to staff due to the provisions of the following facilities:</p> <ul style="list-style-type: none"> <li>- Permanent window cleaning and maintenance access systems (e.g. cat ladders, roof top support systems for elevating platforms, external shadings that also function as platform for cleaning and maintenance); OR</li> <li>- Sufficient space for platform transportation and erection, and full-coverage of gondola tracks (if movable maintenance platforms and gondolas are to be used). For buildings over 9 m and up to 30 m high, facilities for either manual or power operated gondolas/suspended access are provided; whilst above this height must have the facility for power operated gondolas; AND</li> <li>- A suitable form of restraint – when a cleaner requires to stand on a ladder or other object or lean out of the window in order to carry out the cleaning process; and ladder restraints – when windows are to be cleaned from an external ladder.</li> </ul>	Ops	2
S-ACC-3	<p><b>Adequate access to communication technology</b></p> <p>The Client's Project Brief commits to provide adequate access to communication technology to support informal communication and reduce requirements for travel and space among building occupants.</p> <p>Every workstation in the building, as indicated by design documentation, will have access to telephone and internet/email to allow occupants to conduct telephone/computer/video-conferencing over the internet e.g. via skype.</p> <p>Every workstation in the building, as indicated by on-site investigation, has access to telephone and internet/email to allow occupants to conduct telephone/computer/video-conferencing over the internet e.g. via skype.</p>		<b>Max 2</b>
		P-Dsn	2
		Dsn	2
		Ops	2
S-ACC-4	<p><b>Convenient and safe maintenance access for all building services installation.</b></p> <p>The Client's Project Brief commits to design the building technical systems for ease of effective maintenance during the whole life cycle of an occupied building.</p> <p>Convenient and safe access of HVAC delivery systems for repair and maintenance, as indicated by design documentation, will be assisted by ALL of the followings:</p> <ul style="list-style-type: none"> <li>- Convenient access for maintenance to cable containment, air ducts and pipes where feasible;</li> <li>- Sufficient access doors and panels to services shafts;</li> <li>- Simplified, well-marked signage to clearly indicate purpose, source and destination of specific sections of the delivery system;</li> <li>- Sufficient access platform, or space for temporary maintenance platform erection (for services mounted outdoors);</li> <li>- Minimization of duct run lengths and elbows (with the intent of minimizing pressure losses, reducing surface area and difficulty for ease of cleaning);</li> <li>- Sufficient and convenient maintenance access, such as access panel and cleansing eye to allow cleansing of all sections of air ducts; and access to each straight air duct and damper.</li> </ul> <p>Convenient and safe access of HVAC delivery systems for repair and maintenance, as indicated by field observations, is assisted by ALL of the followings:</p> <ul style="list-style-type: none"> <li>- Convenient access for maintenance to cable containment, air ducts and pipes where feasible;</li> <li>- Sufficient access doors and panels to services shafts;</li> <li>- Simplified, well-marked signage to clearly indicate purpose, source and destination of specific sections of the delivery system;</li> </ul>		<b>Max 2</b>
		P-Dsn	2
		Dsn	2
		Ops	2

	<ul style="list-style-type: none"> <li>- Sufficient access platform, or space for temporary maintenance platform erection (for services mounted outdoors);</li> <li>- Minimization of duct run lengths and elbows (with the intent of minimizing pressure losses, reducing surface area and difficulty for ease of cleaning);</li> <li>- Sufficient and convenient maintenance access, such as access panel and cleansing eye to allow cleansing of all sections of air ducts; and access to each straight air duct and damper.</li> </ul>		
S-ACC-5	<b>Easy access to nearby services</b>		<b>Max 2</b>
	The Client's Project Brief commits to allow easy access to nearby services to reduce the need for building occupants to travel by cars.	P-Dsn	2
	Where evidence provided demonstrates that the building is located within 500m of the following accessible local amenities:	Dsn	2
	<ul style="list-style-type: none"> <li>a. Grocery shop/supermarket and/or food outlet</li> <li>b. Post office</li> <li>c. Bank</li> <li>d. Clinic and pharmacy</li> </ul>		
	If ALL of the above amenities are designed to be integrated in the development or provided in the building (as addressed by criterion S-COH-2), this credit is 'Not applicable' and is removed from the total number of points available for the sub-issue.		
	<i>Note: The distance must be measured via safe pedestrian routes e.g. pavements and safe crossing points or, where provided, dedicated pedestrian crossing points.</i>		
<b>INC: Inclusiveness of Opportunities</b>			
S-INC-1	<b>Provide for universal access</b>		<b>Max 3</b>
	The Client's Project Brief commits to provide universal access to enhance the sense of inclusion for all building occupants and users.	P-Dsn	3
	<i>Note: Effective inclusion will harmonize all building occupants and users, irrespective whether they are of healthy or disabled, children, adult or elder persons.</i>		
	<u>CASE 1: The Local Authority does not make mandatory in the use of MS1184 Code of Practice on Access for Disabled People to Public Buildings:</u>	Dsn	
	Spaces are designed to enhance the connectivity for all types of occupants and users, such as disabled and elderly persons as well as healthy people,		3
	- in addition to the current minimum requirements of MS1184;		OR
	OR		1
	- in accordance with the minimum requirements of MS1184		
	<u>CASE 2: The Local Authority makes mandatory in the use of MS1184 Code of Practice on Access for Disabled People to Public Buildings:</u>		
	Spaces are designed to enhance the connectivity for all types of occupants and users, such as disabled and elderly persons as well as healthy people, in addition to the current minimum requirements of MS1184.		3
	<i>Note: Effective inclusion will harmonize all building occupants and users, irrespective whether they are of healthy or disabled, children, adult or elder persons.</i>		
	Observations and occupant surveys indicate that building facilities are accessible to all types of occupants and users, such as disabled, elderly persons and healthy people, in addition to the current minimum requirements of MS1184 as well as the facilities and provisions provided by the Designer/ Developer.	Ops	3
	<i>Note: Effective inclusion will harmonize all building occupants and users, irrespective whether they are of healthy or disabled, children, adult or elder persons.</i>		
S-INC-2	<b>Provide facilities for users to perform religious obligations</b>		<b>Max 2</b>

	The Client's Project Brief commits to provide optimum spatial arrangements and facilities to enhance different religious beliefs among building occupants and users.	P-Dsn	2
	<u>Moslem:</u> The design provides a facility to pray/common prayer room (separate spaces and ablution areas for ladies and gentlemen staff); and in each room, the direction of Kiblat will be clearly indicated; AND The facility is located at appropriate location as follows: - podium/first floor, if no eating outlet is provided on upper floor; OR - the same floor as and adjacent to washrooms and eating outlet or amenity space. AND <u>Other religions:</u> Having one gathering room per building (may also be served as multi-purpose room or a meeting room)	Dsn	2
	<u>Moslem:</u> Field observations confirm that a facility to pray/common prayer room (separate spaces and ablution areas for ladies and gentlemen staff) has been provided; and in each room, the direction of Kiblat has been clearly indicated, and shared facilities such as praying mats, Qurans/ Surah Yassin have been provided; AND The facility is located at appropriate location as follows: - podium/first floor, if no eating outlet is provided on upper floor; OR - the same floor as and adjacent to washrooms and eating outlet or amenity space. AND <u>Other religions:</u> Having one gathering room per building (may also be served as multi-purpose room or a meeting room)	Ops	2
S-INC-3	<b>Provide facilities for users with children</b>		<b>Max 2</b>
	The Client's Project Brief commits to provide optimum spatial arrangements and facilities to cater for building users with children to enhance their quality of life.	P-Dsn	2
	The design provides a crèche area and a mother's room to cater for building users (and if necessary, users of neighbouring blocks) to enhance their quality of life.	Dsn	2
	<i>Note: Solve the issue of emergency escape for children especially for when the first few floors are car parks and the facilities have to be provided on the upper floor.</i>		
	Field observations confirm that a crèche area and a mother's room have been provided and operated to cater for building users (and if necessary, users of neighbouring blocks) to enhance their quality of life.	Ops	2
	<i>Note: Solve the issue of emergency escape for children especially for when the first few floors are car parks and the facilities have to be provided on the upper floor.</i>		
<b>HUM: Human Health and Well-being</b>			
S-HUM-1	<b>Adapt practices that avoid construction accidents</b>		<b>Max 3</b>
	Accreditation to the occupational health and safety management system – OSHMS MS1722:2005 and/or OHSAS 18001:2007 – is specified as one of the requirements in the tender pre-qualification of major contractor companies.	Dsn	3
	The Contractor has implemented an effective Occupational Safety and Health Management System (OSHMS) for a conducive working environment so as to ensure safety and health at work of all workers and the general public during project execution. AND	C&C	1.5

	All workers have attended the Safety Induction Course.		
	ADDITIONAL: The Contractor has valid occupational health and safety management system accreditation – OSHMS MS1722:2005 and/or OHSAS 18001:2007 prior to and throughout the construction process.		1.5
	The property management company is accredited with occupational health and safety management system – OSHMS MS1722:2005 and/or OHSAS 18001:2007.	Ops	3
S-HUM-2	<b>Optimize the level and quality of fresh air in mechanically ventilated spaces</b>		<b>Max 3</b>
	The Client's Project Brief commits to provide optimum design of building systems to enhance the environmental hygiene of mechanically ventilated spaces with good quality fresh air.	P-Dsn	3
	An analysis of proposed ventilation systems in mechanically ventilated areas of the occupancy indicates that sufficient fresh air will be provided in the interior of the building and the air change effectiveness (ACE), as determined by ASHRAE 129-1997, is: ≥95% OR 89-94%	Dsn	2 OR 1
	<i>Note: All fresh air intakes shall be located away from pollutant sources, which included, but not limited to building exhaust air louvers and exhaust outlet from adjacent buildings, air exhaust openings of refuse collection room, enclosed/semi-enclosed car park and public transport terminal, smoke discharge openings, and gas discharges exhaust from toilets and kitchens plumbing vents, etc. Fresh air intake openings shall be protected from rain entrainment and covered by a screen to prevent entry of birds, rodents and extraneous articles. ASHRAE 62.1-2010 Ventilation for Acceptable Indoor Air Quality can be referred as design guidelines.</i>		
	ADDITIONAL: Design documentation indicates that carbon dioxide sensors will be installed in occupied zones to maintain sufficient ventilation at the times of different occupancy; hence, addressing the balance of fresh air supply and energy efficiency.		1
	Field monitoring, undertaken at least one year after occupancy, indicates that the interior of the building is provided with sufficient fresh air and the air distribution effectiveness at the work surface is equivalent to: ≥95% OR 89-94%	Ops	2 OR 1
	<i>Note: All fresh air intakes shall be located away from pollutant sources, which included, but not limited to building exhaust air louvers and exhaust outlet from adjacent buildings, air exhaust openings of refuse collection room, enclosed/semi-enclosed car park and public transport terminal, smoke discharge openings, and gas discharges exhaust from toilets and kitchens plumbing vents, etc. Fresh air intake openings shall be protected from rain entrainment and covered by a screen to prevent entry of birds, rodents and extraneous articles. ASHRAE 62.1-2010 Ventilation for Acceptable Indoor Air Quality can be referred as design guidelines.</i>		
	ADDITIONAL: Field observations indicate that carbon dioxide sensors have been installed in occupied zones to maintain sufficient ventilation at the times of different occupancy; hence, addressing the balance of fresh air supply and energy efficiency.		1
S-HUM-3	<b>Maximize openings and cross ventilation in naturally ventilated spaces</b>		<b>Max 3</b>
	The Client's Project Brief commits to provide optimum building design to enhance the environmental hygiene and thermal comfort of naturally ventilated spaces with good cross ventilation.	P-Dsn	3
	The building or part of the building (e.g. toilets, carparks, lobby) is naturally ventilated.	Dsn	2
	ADDITIONAL: - The above points are achieved; and - Evidence is provided to demonstrate that the opening area in naturally ventilated space is adequate to comply with the natural ventilation requirements of ASHRAE 62.1-2007.		1



	<i>Addressed by criterion S-HUM-13</i>	Ops	N.A.
S-HUM-4	<b>Minimise noise level and provide satisfactory level of acoustic performance</b>		<b>Max 3</b>
	The Client's Project Brief commits to minimise noise nuisance affecting building occupants.	P-Dsn	3
	The system design follows the ASHRAE's Practical Guide to Noise and Vibration Control for HVAC Systems resulting in ambient noise levels (with all engineering services operating normally but with no activity in the area) not exceeding the following:	Dsn	3
	- Cellular offices, interview rooms, first aid rooms, conference rooms : 40 dB(A)		
	- Open plan offices : 45 dB(A)		
	<i>Addressed by criterion S-HUM-13</i>	Ops	N.A.
S-HUM-5	<b>Appropriate illumination level and artificial lighting quality</b>		<b>Max 3</b>
	The Client's Project Brief commits to create a high quality visual environment in occupied spaces by means of providing good artificial lighting comfort and quality.	P-Dsn	3
	The office lighting design has a maintained illuminance level of no more than specified in MS1525:2007 for 90% of NLA as measured at the working plane (900mm AFFL).	Dsn	1
	ADDITIONAL:		
	- The point above is achieved; and		1
	- Provision is made for task lighting in each 15m <sup>2</sup> or less.		
	ADDITIONAL:		
	- The first point is achieved; and		1
	- High frequency ballasts are installed in fluorescent luminaries over a minimum of 90% of NLA.		
	<i>Addressed by criterion S-HUM-13</i>	Ops	N.A.
S-HUM-6	<b>Prohibit tobacco smoking in the building</b>		<b>Max 2</b>
	The Client's Project Brief commits to provide a non-smoking building OR a building with dedicated smoking facilities.	P-Dsn	2
	The design does not provide dedicated rooms or areas because such activities are prohibited in the building;	Dsn	2
	OR		OR
	The design provides separate and separately ventilated rooms or areas for tobacco smoking in the building.		1
	<i>Note: Smoking substantially increases the perceived pollution burden (to 2-6 times). The deterioration in air quality caused by smoking can only be compensated by substantially increased ventilation. According to international research results 100 m3 fresh air is needed to eliminate the effect of one cigarette smoked.</i>		
	Observations indicate that site workers are not exposed to tobacco smoke because such activities are prohibited anywhere on the site;	C&C	2
	OR		OR
	Observations indicate that site workers have possible exposure to tobacco smoke because such activities are only prohibited in enclosed spaces.		1
	<i>Note: Smoking substantially increases the perceived pollution burden (to 2-6 times). The deterioration in air quality caused by smoking can only be compensated by substantially increased ventilation. According to international research results 100 m3 fresh air is needed to eliminate the effect of one cigarette smoked.</i>		
	Occupants are not exposed to tobacco smoke or other occupant generated pollutants in public spaces because the entire building adopted a 'No Smoking Policy';	Ops	2
	OR		OR
	Occupants are not exposed to tobacco smoke in public spaces because based on field observations, separate and separately ventilated (i.e. with dedicated exhaust air duct to extract smoke) rooms or areas for such activities have been provided.		1

<p><i>Note: Smoking substantially increases the perceived pollution burden (to 2-6 times). The deterioration in air quality caused by smoking can only be compensated by substantially increased ventilation. According to international research results 100 m3 fresh air is needed to eliminate the effect of one cigarette smoked.</i></p>			
S-HUM-7	<b>Use low/zero pollutants cleaning and maintenance products and processes</b>		<b>Max 2</b>
	The Client's Project Brief commits to minimise the threat of health and hygiene problems arising from building operation and usages, particularly during cleaning and maintaining the building.	P-Dsn	2
	Documentation indicates that only no/low emission (non-toxic and biodegradable) cleaning products are consumed during construction works.	C&C	2
	Surveys indicate that airborne pollutants caused by the use of building maintenance products and processes cause LEAST or NO dissatisfaction amongst building occupants and users or 85% of occupants are satisfied; OR Surveys indicate that airborne pollutants cause INFREQUENT dissatisfaction amongst building occupants and users or 75% of occupants are satisfied.	Ops	2
S-HUM-8	<b>Use interior finish materials with low- or zero-pollutant off-gassing</b>		<b>Max 2</b>
	The Client's Project Brief commits to minimise the use of high emission interior finish materials for the whole life of the building.	P-Dsn	2
	Tender Specification clearly specifies the use of low- or zero-emission finishing materials; AND According to design documentation, <u>Paints</u> Zero or low VOC paint and coating are used on 95% of all painted surfaces; OR No paint is used in the project.	Dsn	0.5
	<u>Carpets</u> Only zero or low VOC carpets are used; OR Where no carpet has been installed in the project and projects wish to use low-VOC flooring, all flooring installed in the project meet the emissions limits.		0.5
	<u>Adhesives and sealants</u> 95% of all adhesives and sealants have zero or low VOC content; OR No adhesives or sealants are used.		0.5
	<u>Wood products</u> All composite wood products (including exposed or concealed applications) either contain low-emission formaldehyde or contain no formaldehyde.  If no engineered wood products are used within the project, this credit is "Not Applicable" and is removed from the total number of points available for the sub-issue.		0.5
	Zero or low VOC paint are used on 95% of all painted surfaces during decoration and refurbishment works during operation stage.	Ops	2
S-HUM-9	<b>Provide optimum air movement for thermal comfort in mechanically ventilated spaces</b>		<b>Max 2</b>
	The Client's Project Brief commits to provide optimum design of building systems to enhance the thermal comfort in mechanically ventilated spaces with optimum air movement.	P-Dsn	2
	The air movement/ air velocity of 95% of the NLA are designed in accordance with MS1525:2007 (i.e. 0.15 m/s – 0.5 m/s).	Dsn	2

	<i>Note: Ventilation effectiveness accounts for the path that supply air moves through an occupied space and reaches an exhaust or return; directness of delivery of ventilation air to the occupants, i.e., diffuser type and location; and placement of obstructions to air movement such as partitions and acoustic barriers.</i>		
	Field measurements indicate that the Predicted Mean Vote (PMV) meets the conditions for thermal comfort.	Ops	2
	<i>Note: Results are calculated from the inputs of air temperature, mean radiant temperature, relative humidity, air velocity, clothing thermal resistance and metabolic rate.</i>		
S-HUM-10	<b>Minimise glare conditions in main occupancy areas</b>		<b>Max 2</b>
	The Client's Project Brief commits to create a high quality visual environment by means of creating building details that minimise discomfort caused by excessive glare.	P-Dsn	2
	According to design documentation, internal (e.g. screens, blinds, light shelves) AND external (fixed or movable, horizontal or vertical) shading devices will be fitted to all glazing and atriums that eliminate all direct sun penetration.	Dsn	1
	ADDITIONAL: Motorized blinds on photocell controllers will be used in areas where individual control is not desired.		1
	According to field observations, internal (e.g. screens, blinds, light shelves) AND external (fixed or movable, horizontal or vertical) shading devices are fitted to all glazing and atriums that eliminate all direct sun penetration.	Ops	1
	ADDITIONAL: Motorized blinds on photocell controllers are used in areas where individual control is not desired.		1
S-HUM-11	<b>Increase the practice of building flush-out</b>		<b>Max 2</b>
	The Client's Project Brief commits to minimise possible indoor air quality contamination prior to occupancy and during the whole life cycle of the occupied building.	P-Dsn	2
	Evidence suggests that permanent air flushing system of at least 10 airchanges/hour operation will be provided.	Dsn	2
	OR Tender Specification clearly specifies the requirements for air duct cleanliness and building flush out at building handover stages.		
	A building flush-out is performed with new filtration media using 100% outside air supply, 3 months prior to handing over, once a week;	C&C	2
	OR 1 month prior to handing over, once a week.		OR 1
	If building flush-out was not performed at building handover stages, an IAQ testing is conducted within 12 months of occupancy, and results indicate that maximum concentrations for pollutants do not exceed the maximum limit as stipulated in the Code of Practice on Indoor Air Quality by Department of Occupational Safety and Health (DOSH) Malaysia, as follows:	Ops	
	- Overall carbon dioxide levels: <1000ppm;		2
	- Overall carbon monoxide levels: <10ppm;		
	- Dust particulate levels: <0.15mg/m3;		
	- Total volatile organic compound levels: <3ppm.		
	OR Scheduled flush-outs are performed on a continuous basis, by means of natural or mechanical ventilation.		
	ADDITIONAL: Maintenance records indicate that building operator carries out regular visual inspection on the cleanliness of air distribution systems, such as air handling unit, ventilation fan, air filter, air duct, damper, louver etc. Inspection is conducted no more than every 3 months for system operates more than 12 hours a day, and 6 months for system operates less than 12 hours a day.		2
S-HUM-12	<b>Provide separately ventilated and isolated areas/rooms which generate pollutants and odour</b>		<b>Max 2</b>

	The Client's Project Brief commits to minimise pollutants and odour dispersion problems arising from building operation and usages.	P-Dsn	2
	According to design documentation, ALL rooms and spaces in this occupancy that contain equipment or activities generating chemical pollutants and odour (e.g. copier rooms, waste storage areas, janitorial rooms, pantries) are designed with dedicated exhaust air ducts to extract polluted air from these rooms/areas to the outdoors; and isolated from other occupied spaces.	Dsn	2
	According to field observations, ALL rooms and spaces in this occupancy that contain equipment or activities generating chemical pollutants and odour (e.g. copier rooms, waste storage areas, janitorial rooms, pantries) are provided with dedicated exhaust air ducts to extract polluted air from these rooms/areas to the outdoors; and isolated from other occupied spaces.	Ops	2
	<i>Note: This credit is not applicable to smoking room which is addressed by other credit.</i>		
S-HUM-13	<b>Adequate monitoring of occupants' satisfaction with indoor environmental quality</b>		<b>Max 3</b>
	The Client's Project Brief commits to maintain the environment of occupied spaces with good indoor environmental quality by means of undertaking adequate monitoring and corrective actions during the whole life cycle of the occupied building.	P-Dsn	3
	Surveys have taken place to assess occupant satisfaction with indoor environmental quality no more than every 6 months, and the records are kept by the building operator for at least 3 years (minimum 1 year record shall be provided for the first assessment in operation phase); AND and their independent latest results are as follows: <u>Air temperature &amp; relative humidity+ air movement = Thermal Comfort:</u> ≥90% OR 80-89%	Ops	0.4 OR 0.2
	ADDITIONAL: <u>Air change &amp; ventilation:</u> ≥90% OR 80-89%		0.4 OR 0.2
	ADDITIONAL: <u>Indoor air quality:</u> ≥90% OR 80-89%		0.4 OR 0.2
	ADDITIONAL: <u>Glare conditions:</u> ≥90% OR 80-89%		0.4 OR 0.2
	ADDITIONAL: <u>Illumination levels and quality of lighting:</u> ≥90% OR 80-89%		0.4 OR 0.2
	ADDITIONAL: <u>Noise level:</u> ≥90% OR 80-89%		0.4 OR 0.2
	ADDITIONAL: A plan for corrective action has been developed to address problem areas indicated by survey results with more than 20% occupants' dissatisfaction. This plan should include field measurement of relevant environmental variables in problems areas.		0.6

<b>CUL: Cultural and Heritage Aspects</b>		
S-CUL-1	<b>Enhance or maintain the heritage significance of the building or adjoining/nearby heritage buildings</b>	<b>Max 2</b>
	The Client's Project Brief commits to provide a building design that enhances or maintains the heritage significance of the building or adjoining/nearby heritage buildings.	P-Dsn 2
	<u>For existing non-heritage building in a heritage zone (adaptive reuse):</u> The entire building, or a large portion (minimum 50%) of the building, such as building envelope, courtyard is reused; AND The design of external and internal features enhances or maintains the heritage significance of the building, and new features, systems and materials are so well integrated into the existing fabric; OR Only the design of external features enhances or maintains the heritage significance of the building, and new features, systems and materials are so well integrated into the existing fabric.	Dsn 2 OR 1
	<u>For new building on a vacant site in a heritage zone:</u> The design of external features enhances or maintains the heritage significance of adjoining/nearby buildings, and new features, systems and materials are so well integrated into the existing fabric. AND If the immediate adjacent building(s) are having cultural heritage value, the building foundation and structure of the new building are designed to minimize any adverse structural and environmental impacts towards the adjacent building(s) with cultural heritage value during construction process.	2
	<u>For new building on a vacant site in a heritage zone:</u> If the immediate adjacent building(s) are having cultural heritage value, the Contractor has established preventive measures to minimize any adverse structural and environmental impacts towards the adjacent building(s) with cultural heritage value during construction process.	C&C 2
	<u>Existing non-heritage building in a heritage zone (adaptive reuse):</u> The mode of operation maintains the heritage significance of the building or its sub-systems.	Ops 2
<b>LOC: Local People and Employment</b>		
S-LOC-1	<b>Provide training opportunities for unskilled local people (employed for the works) to be future semi-skilled or skilled construction workers</b>	<b>Max 3</b>
	At least 40% of all unskilled workers involved in the project are local people; AND They have received competency-based training courses (on-site or off-site) with certification or have undergone any of the related CIDB accreditation programmes for the workers prior to or throughout the project. OR At least 80% of all construction workers involved in the project are local semi-skilled and skilled workers.	C&C 3
	<i>Note: Based on CIDB record, unskilled (general) workers make up almost half of the total workers registered with CIDB and outnumber semi-skilled and skilled workers by more than 2-to-1. Additionally, around 250,000 of approximately 800,000 construction workforce are foreigners especially from Indonesia and ASEAN region. Foreign workers are usually unskilled when they first arrive in Malaysia. This has impacted the productivity and quality of the construction industry. Unskilled foreign labour is cheaper to employ in the short term than skilled local labour. This labour preference with its associated low wages, lower the incentive for construction companies to migrate to more productive and newer construction technology and methods, and reduces the attractiveness of the industry to employ more highly-skilled or local labour.</i>	
S-LOC-2	<b>Increased use of locally available materials and products</b>	<b>Max 2</b>

	The Client's Project Brief commits to utilize locally available materials and products, as much as possible, for the whole life of the building.	P-Dsn	2
	The percentage (by weight), of the aggregate, sand, concrete, masonry, steel and glass used in the project produced within the greater urban region is: ≥80% OR 50-79%.	Dsn	1 OR 0.5
	ADDITIONAL: ≥80% of finishes (based on cost) are made in the country.		0.5
	ADDITIONAL: ≥80% of fittings (based on cost) are made in the country		0.5
S-LOC-3	<b>Linkage to local service providers</b>		<b>Max 2</b>
	At least 80% of maintenance and repairs (based on cost) of building, furniture and fittings are undertaken by local companies (within 50km).	Ops	2
	If there are no local companies with appropriate maintenance and repair skills available within 50km of the building site, this credit is "Not Applicable" and is excluded from the total number of points available for the sub-issue.		
S-LOC-4	<b>Use experienced local design teams</b>		<b>Max 2</b>
	At least 80% of design teams (including planners, architects, engineers, landscape architects, interior designers and environmental consultants) appointed for the project are local companies who have had good track records in designing similar type of projects;	Dsn	2
	OR Collaborative work with foreign design teams to improve local know-how only on specialised knowledge where local talent is not available.		OR 1
S-LOC-5	<b>Use experienced local contractors</b>		<b>Max 2</b>
	Experienced local contractor who have good track records in constructing similar type of projects is specified as one of the requirements in the tender pre-qualification of major contractor companies.	Dsn	2
	At least 80% of construction cost is carried out by local construction companies (within 50km of the building site) who have had good track records in constructing similar type of projects.	C&C	2
	If there are no qualified local construction companies available within 50km of the building site; OR If no qualified local construction companies operating within 50km of the building site responded to the invitation to bid, this credit is "Not Applicable" and is excluded from the total number of points available for the sub-issue.		
	OR Collaborative work with foreign construction companies to improve local know-how.		OR 1

Issue	Sub-Issues	Criteria & Benchmarking	Assess. Phase	Important level/ Points Available
<b>EN: ENVIRONMENTAL</b>				
<b>ECO: Land use and Impacts on Ecology</b>				
EN-ECO-1		<b>Minimise ecological and other damage to existing soil, water bodies and flora and fauna of the site or adjacent lands</b>		<b>Max 3</b>

	The Client's Project Brief commits to minimise ecological and other damage on the site or adjacent lands by protecting the ecological value of the site and implementing effective preventive works before site formation works.	P-Dsn	3
	A total Erosion and Sedimentation Control Plan (ESCP) during construction process (which covers planning considerations, vegetative stabilisation, physical stabilisation, diversion on runoff, flow velocity reduction and sediment trapping/filtering) for all construction activities associated with the project is captured in the tender for the works.	Dsn	2
	ADDITIONAL: - The above point is achieved; and - The Designers have conducted a field survey to existing trees within the site; and designated all existing healthy trees with high amenity value for preservation and/or transferred to other site for reuse.		1
	This credit is "Not Applicable" for projects built on a used site with no existing trees or trees with high amenity value, and is excluded from the total number of points available for the sub-issue.		
	A total Erosion and Sedimentation Control Plan (ESCP) during construction process (which covers planning considerations, vegetative stabilisation, physical stabilisation, diversion on runoff, flow velocity reduction and sediment trapping/filtering) for all construction activities associated with the project has been implemented. The ESCP is in conformance with the erosion and sedimentation requirements of the approved Earthworks Plans OR Local erosion and sedimentation standards and codes, whichever is more stringent.	C&C	2
	ADDITIONAL: The Contractor has provided effective tree preservation and protection measures on site for all identified and designated healthy trees within the site to minimize the adverse impact to the preserved trees due to construction activities.		1
EN-ECO-2	<b>Maximize potential for landscape spaces on the site</b>		<b>Max 2</b>
	The Client's Project Brief commits to design and provide greenery and landscape features within the site to enhance living quality.	P-Dsn	2
	According to design documentation, land that is allocated as landscape space for project users, has an area, expressed as a percent of the total site area, of: ≥20% OR 17-19%	Dsn	1 OR 0.5
	This credit is "Not Applicable" for urban infill projects or projects built on a confined site with no external areas, and the is excluded from the total number of points available for the sub-issue.		
	ADDITIONAL: Design documentation indicates that a reasonable scale of landscape area (relative to the scale of the building) will be provided within the building and/or on the rooftop, such as courtyard gardens, podium roof and sky gardens, to improve the working environment.		1
	<i>Note: Landscape, in the form of greenery, water features, hard landscape and fixed furniture are recommended in communal open space, podium garden, skygarden, slope, retaining wall and semi-enclosed area. Hard and soft landscape or solely soft landscape is acceptable for both credits.</i>		
	Field observations indicate that a reasonable scale of landscape area (relative to the scale of the building) is provided within the building and/or on the rooftop, such as courtyard gardens, podium roof and sky gardens, to improve the working environment.	Ops	1
	ADDITIONAL: Field observations and other relevant evidence indicate that proper maintenance and management are carried out to ensure the good condition of the landscape area and open space for the use by the building occupants, users or public.		1
	<i>Note: Landscape, in the form of greenery, water features, hard landscape and fixed furniture are recommended in communal open space, podium garden, skygarden, slope, retaining wall and semi-enclosed area. Hard and soft landscape or solely soft landscape is acceptable for both credits.</i>		

EN-ECO-3	<b>Improve the ecological value of natural landscape</b>		<b>Max 2</b>
	The Client's Project Brief commits to enhance the ecological value of natural landscape by using non-invasive plantings	P-Dsn	2
	The percentage of landscaped area (including on roof if present) planted with non-invasive plantings that are considered as endemic to the area or low irrigation demand, as per landscaping plans and specifications, is: 100% OR 70-99%	Dsn	2 OR 1
	If there is no landscaping, or landscaping represents less than 1% of the site area, this credit is "Not Applicable" and is excluded from the total number of points available for the sub-issue.		
EN-ECO-4	<b>Select sites that have low risk of flooding</b>		<b>Max 2</b>
	The Client's Project Brief commits to avoid the risk of flooding on site during construction and the whole life cycle of the occupied building.	P-Dsn	2
	The height of the minimum elevation of the site above the elevation of the 100-year flood plain is 2.5m and comply to MASMA guidelines OR ...1m...	Dsn	2 OR 1
	If there is no landscaping, or landscaping represents less than 1% of the site area, this credit is "Not Applicable" and is excluded from the total number of points available for the sub-issue.		
<b>SRM: Supports Resource Management</b>			
EN-SRM-1	<b>Increase use of materials that have less environmental impact in producing them</b>		<b>Max 2</b>
	The Client's Project Brief commits to minimise the environmental impact by using materials with low-embodied energy for structure and building envelope.	P-Dsn	2
	The predicted embodied energy for materials used in the structure and building envelope, as determined an acceptable LCA-based estimating method, is: 2.0 GJ/m <sup>2</sup> or 27 MJ/m <sup>2</sup> /year; OR 2.8 GJ/m <sup>2</sup> or 37 MJ/m <sup>2</sup> /year	Dsn	2 OR 1
	<i>Note: This indicator assesses the estimate of embodied primary energy used for structure, envelope (excl. glazing), and major interior components, as determined by a program designed to estimate embodied energy and emissions through Life Cycle Analysis; also, estimate of lifespan.</i>		
EN-SRM-2	<b>Design building for maximum durability</b>		<b>Max 2</b>
	The Client's Project Brief commits to minimise material consumption and wastage for the whole life of the building by designing the building for maximum durability.	P-Dsn	2
	Drawings and specifications indicate that all building envelope materials are durable (i.e. require less maintenance, repair and replacement) that can withstand sunlight, temperature and humidity changes, and condensation.	Dsn	0.5
	ADDITIONAL: All building materials used in high pedestrian traffic areas (i.e. main entrance, public areas and thoroughfares i.e. corridors, lifts, stairs, doors etc)		0.5



	are durable and low-maintenance that can withstand wear-and-tear.		
	ADDITIONAL: Internal and external areas of the building where vehicular, trolley and pedestrian movement occur have been identified; AND Suitable durability and protection measures or design features have been specified to prevent damage to the vulnerable parts of these building areas from such traffic. This must include, but not be limited to: - Protection from the effects of high pedestrian traffic in main entrances, public areas and thoroughfares (corridors, lifts, stairs, doors etc). - Protection against any internal vehicular/trolley movement within 1m of the internal building fabric in storage, delivery, corridor and kitchen areas. - Protection against, or prevention from, any potential vehicular collision where vehicular parking and manoeuvring occurs within 1m of the external building façade for all car parking areas and within 2m for all delivery areas.		0.5
	ADDITIONAL: Details roof and wall sections, and other critical aspects such as roof overhangs show that effective measures have been incorporated to limit water entry and migration of moisture (e.g. continuity of air/vapour barrier, exterior detailing weather membranes etc.)		0.5
EN-SRM-3	<b>Increase use of bio-based products and materials obtained from managed/sustainable sources</b>		<b>Max 2</b>
	The Client's Project Brief commits to encourage the use of timber obtained from managed/sustainable sources.	P-Dsn	2
	According to technical specifications and/or drawings, timber products used for permanent construction (e.g. permanent framing, flooring, finishes, partitions) are sourced from any combination of the following: - Forest Stewardship Council (FSC) or Malaysia Timber Certification Council (MTCC) Certified Timber - post-consumer recycled timber (must have 50% post-consumer recycled content) - Re-used timber And the percentage (by cost) of these timber products is: ≥75% OR 50-74%	Dsn	2 OR 1
	If the material cost of timber represents less than 0.1% of the project's contract value, this credit is "Not Applicable" and is removed from the total number of points available for the sub-issue.		
	According to the Contractor's material use records and relevant photographic evidence on site, the percentage (by cost) of all timber products used for temporary works (e.g. hoarding, formwork, site office fabrication, site accommodation) that has been sourced from post-consumer recycled timber (must have 50% post-consumer recycled content) and/or re-used timber, is: ≥75% OR 50-74%	C&C	2 OR 1
	If the material cost of timber represents less than 0.1% of the project's contract value, this credit is "Not Applicable" and is removed from the total number of points available for the sub-issue.		
	ADDITIONAL: No timber products were used for formwork and hoarding on site (e.g. used metal instead).		
	According to timber use (location and usage) and delivery records, the timber products used for daily operation and decoration, and minor addition and alteration works after building handover (or in the past 3 years) have been sourced from any combination of the following: - Forest Stewardship Council (FSC) or Malaysia Timber Certification Council (MTCC) Certified Timber - post-consumer recycled timber (must have 50% post-consumer recycled content) - Re-used timber And the percentage (by cost) of these timber products is:	Ops	

	≥75% OR 50-74%		2 OR 1
	If the material cost of timber represents less than 0.1% of the project's contract value, this credit is "Not Applicable" and is removed from the total number of points available for the sub-issue.		
EN-SRM-4	<b>Increase use of materials that can be recovered or recycled</b>		<b>Max 2</b>
	The Client's Project Brief commits to minimise material consumption and wastage by encouraging the use of materials that can be recovered or recycled at the end of the building useful life.	P-Dsn	2
	Percentage (by cost) of building materials that can be recovered or recycled is: 30% OR 20%	Dsn	2 OR 1
	<i>Note: Example of building materials that can be recovered or recycled are:</i>		
	<ul style="list-style-type: none"> <li>- Bricks and concrete used for clean-fill;</li> <li>- Timber to be salvaged for new structural or material use; timber waste ground into mulch or garden compost;</li> <li>- Crushed concrete used as road-base;</li> <li>- Plasterboard crushed for soil container or for use in the manufacture of new plasterboard;</li> <li>- Steel, aluminium and other metals for reuse in the manufacture of new metal products.</li> </ul>		
EN-SRM-5	<b>Increase use of products and materials with recycled content</b>		<b>Max 2</b>
	The Client's Project Brief commits to minimise material consumption and wastage by encouraging the use of materials with recycled content.	P-Dsn	2
	<u>Concrete:</u> According to design report, technical specifications and/or drawings, ≥10% (by weight/volume) of all aggregates used for structural purposes are recycled; AND 100% of aggregates used in non-structural uses are recycled.	Dsn	1
	If the material cost of new concrete represents less than 1% of the project's contract value, this credit is "Not Applicable" and is removed from the total number of points available for the sub-issue.		
	ADDITIONAL:		
	<u>Steel:</u> ≥80% of all steel, by weight/volume, in the project has a post-consumer recycled content greater than 50%; OR ≥50% of all steel, by weight/volume, in the project has a post-consumer recycled content (i.e. product composition that contains some percentage of material diverted from the product user's waste stream).		1 OR 0.5
	If the material cost of steel represents less than 1% of the project's contract value, this credit is "Not Applicable" and is removed from the total number of points available for the sub-issue.		
	<i>Note: The recycled content of materials shall be determined by dividing the weight/volume of recycled content in the item by the total weight/volume of all materials in the item.</i>		
	According to the Contractor's material use records and relevant photographic evidence on site, the percentage of materials used with recycled content follows the requirements as stipulated in the Designer's specification; AND The Contractor has established and implemented material use strategy by their own initiative such as using recycled bricks and blocks, plastics, packing board of papers, wood chips and etc.	C&C	2

<p><i>Note: The cycled content of materials shall be determined by dividing the weight/volume of recycled content in the item by the total weight/volume of all materials in the item.</i></p>		
	According to material use (location and usage) and delivery records, the percentage of materials and components with recycled content used for daily operation (e.g. paper and storage box), maintenance and minor addition and alteration works (e.g. building structure, false ceiling, partition wall, door, window, landscaping materials) after building handover (or in the past 3 years) is ≥10%.	Ops 2
<p><i>Note: The cycled content of materials shall be determined by dividing the weight/volume of recycled content in the item by the total weight/volume of all materials in the item.</i></p>		
<b>AIR: Emissions to Air</b>		
EN-AIR-1	<b>Provide pedestrian access to basic services and connect to existing public transportation network</b>	<b>Max 2</b>
	The Client's Project Brief commits to minimise and mitigate air pollution by encouraging walking and the use of public transportation among building occupants and users.	P-Dsn 2
	The distance between the nearby public transport interchange and the building entrances is: ≤300m OR ≤100m	Dsn 1 OR 0.5
	ADDITIONAL: The design provides a safe, convenient and comfortable on-site footpaths (elevated, continuous and sheltered walkways OR a pavement along a street), connecting the building to nearby buildings/basic services and public transportation network or local transport nodes.	1
	The distance between the nearby public transport interchange and the building entrances is: ≤300m OR ≤100m	Ops 1 OR 0.5
	ADDITIONAL: A safe, convenient and comfortable on-site footpaths have been provided (elevated, continuous and sheltered walkways OR a pavement along a street), connecting the building to nearby buildings/basic services and public transportation network or local transport nodes.	1
<b>LAN: Emissions to Land/ Solid Waste</b>		
EN-LAN-1	<b>Save handling and storage of hazardous wastes on site</b>	<b>Max 3</b>
	The Client's Project Brief commits to plan and implement effective hazardous waste management strategies.	P-Dsn 3
	There is a detailed and credible plan to minimise the danger of improper storage of hazardous wastes on the site in accordance with EMS 14001:2004. OR There is a credible plan to minimise the danger of improper storage of hazardous wastes on the site.	Dsn 3 OR 1
	The result of an assessment of the safety of hazardous waste storage on the site indicates very minor or no deficiencies. OR The result of an assessment of the safety of hazardous waste storage on the site indicates minor deficiencies.	Ops 3 OR 1
EN-LAN-2	<b>Implement construction waste management program with sorting, reuse and recycling measures</b>	<b>Max 2</b>
	The Client's Project Brief commits to minimise construction waste generation by planning and implementing effective waste management strategies, including sorting, reusing, recycling and disposal of construction and demolition waste.	P-Dsn 2
	Design specification and relevant contract documents clearly indicate the requirement for an effective implementation of construction and demolition waste management plan by the Contractor; AND	Dsn

	<p>The Contractor has formulated a comprehensive Waste Management Plan that, at a minimum identifies the salvageable materials to be diverted from landfills and whether the salvageable materials are sorted on site or commingled; AND The percentage (by mass) of all demolition and construction wastes that are reused (on or off site) and/or transferred to a recovery factory, as predicted in the construction waste management plan, is: ≥70% OR 50-69%</p> <p><i>Note: Salvageable materials include inert waste, such as metals, bricks and tiles, as well as non-inert waste such as timber, paper and plastic. Waste management plan shall include, but not limited to key types of waste to be reduced, waste reduction targets, waste reduction programmes, packaging waste management and waste disposal procedures. Apart from that, effective implementation is required to ensure strategies (e.g. in the form of educational basis, instructions or guidelines) are applicable to all site workers and cover the entire site area, including site office.</i></p>		2 OR 1												
	<p>The Contractor has implemented an effective Waste Management Plan and carried out weekly implementation records AND the percentage (by mass) of all demolition and construction wastes that have been reused (on or off site) and/or transferred to a recovery factory, as recorded in construction waste management records, is: ≥70% OR 50-69%</p> <p><i>Note: Salvageable materials include inert waste, such as metals, bricks and tiles, as well as non-inert waste such as timber, paper and plastic. Waste management plan shall include, but not limited to key types of waste to be reduced, waste reduction targets, waste reduction programmes, packaging waste management and waste disposal procedures. Apart from that, effective implementation is required to ensure strategies (e.g. in the form of educational basis, instructions or guidelines) are applicable to all site workers and cover the entire site area, including site office.</i></p>	C&C	1 OR 0.5												
	<p>ADDITIONAL:</p> <ul style="list-style-type: none"> <li>- The point above is achieved; and</li> <li>- An inspection has been conducted every week to ensure that the strategies are implemented according to the procedure and guidelines as stipulated in the waste management plan and keep up-to-date with the waste management records.</li> </ul> <p><i>Note: Designated person(s) shall ensure all workers and staff on site acknowledge the target and method of the construction waste management plan. Also, the designated person(s) shall identify any improvement required to enhance the effectiveness of waste management and maximising the recyclable waste collection and reuse.</i></p>		1												
EN-LAN-3	<b>Provide spaces for collection of recyclables, recycling storage and staging areas in the building</b>		<b>Max 2</b>												
	<p>The Client's Project Brief commits to minimise municipal waste generation by providing spatial and facility provisions for collecting, sorting and storing recyclable and non-recyclable waste during the whole life cycle of the occupied building.</p>	P-Dsn	2												
	<p>The Design provides a centralised space for sorting and storage of office recyclables generated by building occupants and users and it is:</p> <ul style="list-style-type: none"> <li>- adequately sized in accordance with table below:</li> </ul> <table border="1" style="margin-left: 40px;"> <thead> <tr> <th>GFA (m<sup>2</sup>)</th> <th>Min area of recyclable storage space (% of GFA)</th> </tr> </thead> <tbody> <tr> <td>≤500</td> <td>1.50%</td> </tr> <tr> <td>1,000</td> <td>0.80%</td> </tr> <tr> <td>5,000</td> <td>0.35%</td> </tr> <tr> <td>10,000</td> <td>0.25%</td> </tr> <tr> <td>≥20,000</td> <td>0.1</td> </tr> </tbody> </table> <ul style="list-style-type: none"> <li>- located in the same level as the loading dock with a clearly marked, sign-posted, convenient and guaranteed access route within one of the following walking distances: <ul style="list-style-type: none"> <li>o 20m of the exit used for recycling pick-up; OR</li> </ul> </li> </ul>	GFA (m <sup>2</sup> )	Min area of recyclable storage space (% of GFA)	≤500	1.50%	1,000	0.80%	5,000	0.35%	10,000	0.25%	≥20,000	0.1	Dsn	1
GFA (m <sup>2</sup> )	Min area of recyclable storage space (% of GFA)														
≤500	1.50%														
1,000	0.80%														
5,000	0.35%														
10,000	0.25%														
≥20,000	0.1														

	<ul style="list-style-type: none"> <li>o 20m of the lift core serving all floors; OR</li> <li>o 3m of the shortest route connecting the lift core serving all floors and the exit used for recycling pick-up.</li> </ul>		
	<i>Note: A centralised space can improve the delivery process for large amount of waste and it could be allocated for each building or for the whole development.</i>		
	ADDITIONAL:		
	- The point above is achieved; and		1
	- The Design provides designated space(s) and facilities per floor for sorting and storage of recyclable and non-recyclable waste.		
	Evidence indicates that a centralised space has been provided on construction site for sorting and storage of salvageable construction waste; and it is located with convenient waste delivery access and with minimal environmental impact due to waste transportation within the site.	C&C	2
	Field observations confirm that a centralised space and facilities have been provided for sorting and storage of office recyclables generated by building occupants and users.	Ops	1
	<i>Note: A centralised space can improve the delivery process for large amount of waste and it could be allocated for each building or for the whole development.</i>		
	ADDITIONAL:		1
	Designated space(s) and facilities have been provided on each floor for sorting and storage of recyclable and non-recyclable waste.		
EN-LAN-4	<b>Maximize recycling of office recyclables</b>		<b>Max 2</b>
	The Client's Project Brief commits to minimise municipal waste generation by planning and implementing effective plan that maximises the recycling of office recyclables among building occupants and users during the whole life cycle of the occupied building.	P-Dsn	2
	A detailed and comprehensive municipal waste management plan exists to collect, store and send at least 90% of office recyclables to recycling facilities;	Dsn	2
	OR		OR
	A detailed plan exists to collect, store and send at least 60% of office recyclables to recycling facilities.		1
	<i>Note: The municipal waste management plan should suit the managed building. Apart from that, effective implementation is required to ensure strategies (e.g. in the form of management procedures, instructions or guidelines) are applicable for all building occupants and property management staff of the building.</i>		
	The building operator has effectively implemented the municipal waste management plan; AND	Ops	
	The actual percentage of office recyclables collected, stored and sent to recycling facilities in the past 1 year is,		1 OR
	≥90% OR		0.5
	≥60%		
	<i>Note: The municipal waste management plan should suit the managed building. Apart from that, effective implementation is required to ensure strategies (e.g. in the form of management procedures, instructions or guidelines) are applicable for all building occupants and property management staff of the building.</i>		
	ADDITIONAL:		
	- The point above is achieved; and		1
	- An inspection has been conducted every week to ensure that the strategies are implemented according to the procedure and guidelines as stipulated in the waste management plan.		
	<i>Note: Designated person(s) shall ensure all workers and staff on site acknowledge the target and method of the construction waste management plan. Also, the designated person(s) shall identify any improvement required to enhance the effectiveness of waste management and maximising the recyclable waste collection and reuse.</i>		
EN-LAN-5	<b>Minimise land pollution from site workers' accommodation</b>		<b>Max 1</b>
	The Client's Project Brief commits to minimise and mitigate land pollution and the subsequent health and environmental impacts generated from site workers' accommodation.	P-Dsn	1

	Proper disposal of municipal waste generated from site workers' accommodation is implemented.	C&C	0.5
	<b>ADDITIONAL</b> The Contractor has provided training and information on health and hygiene issues to construction site workers.		0.25
	<b>ADDITIONAL</b> The Contractor has designated a member of site staff to inspect the site workers' accommodation once a week, and to identify health and hygiene problem areas, for instance, stagnant water offering a breeding ground for mosquitoes, which may bite site workers and cause transmission of diseases; AND Health risk remedial work, such as stagnant water removal, has been implemented.		0.25
<b>EN-LAN-6</b>	<b>Design for repeatability and increase use of standardized and prefabricated components</b>		<b>Max 2</b>
	The Client's Project Brief commits to design and construct the building and its facilities for ease of construction and less materials use, and with consideration of innovative construction technology.	P-Dsn	2
	Design documentation indicates that any combination of the following items will be used in the building construction to enhance buildability and minimize environmental impacts: - Precast structure (such as precast slab, staircase, column and beams); - Standardised components (such as services riser, refuse chute, standardised door leaf, window etc); - Full precast module (such as modular office) and/or integrated services module (such as prefabricated toilet unit, plant room unit, bathroom unit, which completed with full building services equipment, pipes, ducts and cable containments).	Dsn	
	<b>AND</b> The design has been assessed using IBS Content Scoring System (IBS Score) by the Malaysia CIDB and the score obtained is: ≥75% OR 60-74%		2 OR 1
	Evidence suggests that the Contractor has proposed and provided any combination of the following items which are considered other than specified in the Design Stage to enhance buildability and minimise environmental impacts: - Precast structure (such as precast slab, staircase, column and beams); - Standardised components (such as services riser, refuse chute, standardised door leaf, window etc); - Full precast module (such as modular office) and/or integrated services module (such as prefabricated toilet unit, plant room unit, bathroom unit, which completed with full building services equipment, pipes, ducts and cable containments).	C&C	2
<b>EWA: Emissions to Water</b>			
<b>EN-EWA-1</b>	<b>Implement stormwater management strategies</b>		<b>Max 3</b>
	The Client's Project Brief commits to plan and implement effective stormwater management strategies to control the runoff volumes and pollutant loads to the waterways of the municipality.	P-Dsn	3
	<u>CASE 1: Previously undeveloped site (or the site consists of less than 50% impervious surface in its pre-development state):</u> Stormwater management strategies are implemented in accordance with Stormwater Management Manual for Malaysia (MASMA) that prevent the post-development peak flow rate from the outlet point(s) of the site to the downstream public drainage system or receiving water from exceeding the pre-development rate.	Dsn	
	<u>CASE 2: Previously developed site (or the site already consists of more than 50% impervious surface in its pre-development state):</u> Stormwater management strategies are implemented in accordance with MASMA that result in a 25% decrease in the volume of stormwater runoff.		3
	<i>Note: Often the techniques used are architectural (e.g. vegetative roofs), landscaping (pervious pavements, bioswales), and civil (detention basins, filtration). Other technique includes collecting the stormwater and storing it for future use on-site.</i>		
	The contractor has formulated and implemented construction site water pollution management plan.	C&C	1

	ADDITIONAL: Relevant evidence indicates that surface run-off from construction site are discharged into storm drains via adequately designed sand/silt removal facilities such as sand traps, silt traps and sediment basins.		1
	ADDITIONAL: Relevant evidence indicates that wastewater generated from general building construction activities, such as concreting, plastering, and cleansing, are discharged into foul sewers with sufficient silt removal facility.		1
EN-EWA-2	<b>Minimise storm sewer or stream pollution from site workers' accommodation</b>		<b>Max 1</b>
	The Client's Project Brief commits to minimise and mitigate water pollution and the subsequent health and environmental impacts generated from site workers' accommodation.	P-Dsn	1
	Proper septic tank has been installed to prevent pollution of storm sewer or receiving stream generated from site workers' accommodation.	C&C	1
EN-EWA-3	<b>Utilize on-site wastewater treatment systems using greywater</b>		<b>Max 2</b>
	The Client's Project Brief commits to minimise potable water consumption and wastage by recycling and reusing greywater.	P-Dsn	2
	The design provides all individual occupancies in the project with separate supplies of potable water for required occupancy uses and greywater for toilets and irrigation.	Dsn	2
	OR		OR
	The design provides all individual occupancies in the project with separate supplies of potable water for required occupancy uses and greywater for irrigation only.		1
	<i>Note: The greywater system collects drainage from sinks (except for kitchens and clinical areas) and showers, washing machines, condensate from air-conditioning systems and water discharged from cooling towers, swimming pools, fountains and other water sources that do not contain food or human waste. The greywater is filtered and disinfected and then stored in a cistern or tank until needed. It is then piped in a special separate piping system for reclaimed water to the points of use. The on-site sewage treatment system approach can include traditional septic systems or more modern biological treatment systems that create a local natural wetland ecosystem that purifies wastewater after a biological digestion process is applied to the sewage.</i>		
	All individual occupancies in the project have been provided with separate supplies of potable water for required occupancy uses and greywater for toilets and irrigation.	Ops	2
	OR		OR
	All individual occupancies in the project have been provided with separate supplies of potable water for required occupancy uses and greywater for irrigation only.		1
	<i>Note: The greywater system collects drainage from sinks (except for kitchens and clinical areas) and showers, washing machines, condensate from air-conditioning systems and water discharged from cooling towers, swimming pools, fountains and other water sources that do not contain food or human waste. The greywater is filtered and disinfected and then stored in a cistern or tank until needed. It is then piped in a special separate piping system for reclaimed water to the points of use. The on-site sewage treatment system approach can include traditional septic systems or more modern biological treatment systems that create a local natural wetland ecosystem that purifies wastewater after a biological digestion process is applied to the sewage.</i>		
<b>ADJ: Impacts on Adjacent Properties</b>			
EN-ADJ-1	<b>Reduce noise and vibration generated during construction</b>		<b>Max 2</b>
	The Client's Project Brief commits to minimise and mitigate noise pollution affecting the community and surroundings due to construction process.	P-Dsn	2
	Contract documents clearly spell out the requirement for noise and vibration that may be caused by the works to be lower than the maximum permissible limit stipulated in Schedule 6 of the Planning Guidelines for Environmental Noise Limits and Control by Department of Environment.	Dsn	2

	The Contractor has formulated and implemented a good management plan for the control of noise pollution at the construction site; AND Field measurements confirm that actual sound levels during day time, evening and night time by receiving land use for the project are lower than the maximum permissible limit stipulated in Schedule 6 of the Planning Guidelines for Environmental Noise Limits and Control by Department of Environment, by: 8% OR 5%	C&C	2 OR 1
	<p><i>Note: All reasonable measures to control the source of, or limit exposure to, noise during the operation of equipment, plant, process or activity with noise generation should be undertaken. Such measures should be proportionate and reasonable, and may include one or more of the following:</i></p> <ul style="list-style-type: none"> <li>- <i>the size, design and inherent operation characteristics of the plant, equipment, process or activity;</i></li> <li>- <i>the adjustment of operational parameters to limit the intensity of sound emissions,</i></li> <li>- <i>the selection and usage of low sound power levels equipment;</i></li> <li>- <i>the provision if necessary, and appropriate use of sound attenuators, acoustic plenum, and other acoustic filtering devices;</i></li> <li>- <i>the provision if necessary, and appropriate use of acoustic enclosures and other sound enclosing devices;</i></li> <li>- <i>the provision if necessary, and appropriate use of screening barriers (man-made, natural or otherwise);</i></li> <li>- <i>the proper conduct and adequate supervision of operation; and</i></li> <li>- <i>regular and efficient maintenance of plant and control equipment.</i></li> </ul>		
<b>ENE: Non-renewable Energy Consumption</b>			
EN-ENE-1	<b>Use energy efficient light fixtures and office appliances</b>		<b>Max 3</b>
	The Client's Project Brief commits to encourage the use of energy efficient fixtures, appliances and equipment to minimise energy consumption.	P-Dsn	3
	Design documentation indicates that the lighting load or power density (including ballast loss) for 90% of the NLA meet the following criteria at 720mm AFFL: 5 W/ m <sup>2</sup> OR 7.5 W/ m <sup>2</sup> OR 10 W/ m <sup>2</sup>	Dsn	3 OR 2 OR 1
	ADDITIONAL: All office appliances installed has the power index of: 12W/m <sup>2</sup> OR 16W/m <sup>2</sup>	Ops	3 OR 1
EN-ENE-2	<b>Use highly efficient ventilation and air-conditioning systems</b>		<b>Max 3</b>
	The Client's Project Brief commits to design the building services systems with a higher level of energy efficiency to minimise energy consumption.	P-Dsn	3
	Energy efficient ventilation and air-conditioning systems are selected in accordance with the Energy Efficiency and Conservation Guidelines for Malaysian Industries Part 1: Electrical Energy-use Equipment.	Dsn	3
EN-ENE-3	<b>Use passive cooling strategies</b>		<b>Max 4</b>
	The Client's Project Brief commits to design the building with a higher level of energy efficiency by considering passive cooling strategies to minimise energy consumption.	P-Dsn	4
	The Designers have conducted a site investigation on local topographic conditions and building arrangements in the surrounding area for site layout planning.	Dsn	1



	<p><i>Note: The topographic conditions shall include nearby hills/mountains, vegetation and water ponds which may affect the natural ventilation and evaporative cooling effectiveness. Also, the building height, dimensions and separation of surrounding buildings shall also be identified to evaluate the effectiveness of daylight access, solar shading, wind permeability and noise source.</i></p> <p>ADDITIONAL: Building envelop is designed to cut down external heat gain and hence reduce cooling load of the air-conditioning system, and meet the following criteria:</p> <ul style="list-style-type: none"> <li>- The overall thermal transfer value (OTTV) of building envelope for a building having a total air-conditioned area exceeding 4000m<sup>2</sup> and above, does not exceed 50 W/m<sup>2</sup> as stipulated in MS1525.</li> </ul> <p>AND</p> <ul style="list-style-type: none"> <li>- The roof thermal transfer value (RTTV) of building roofs with skylight and the entire enclosure below is fully air-conditioned, does not exceed 25 W/m<sup>2</sup> as stipulated in MS1525; OR</li> <li>- The thermal transmittance (U-value) of the roof of a conditioned space does not exceed 0.4 W/ m<sup>2</sup>K (for light weight roof under 50kg/ m<sup>2</sup>) or 0.6 W/ m<sup>2</sup>K (for heavy weight roof above 50kg/ m<sup>2</sup>) as stipulated in MS1525.</li> </ul>		3
EN-ENE-4	<b>Use integrated lighting concept</b>		<b>Max 3</b>
	The Client's Project Brief commits to design the building with optimum access to daylight to minimise energy consumption as well as to improve the environmental quality inside the building.	P-Dsn	3
	The percentage of the NLA that has a Daylight Factor (DF) of 1.0-3.5% at the working plane level (800mm from floor level), as indicated by design and relevant simulation results, is: 70% OR 50% OR 30%	Dsn	3 OR 2 OR 1
	<p><i>Note: Review sun path diagram relative to the site and building forms to guide development of the daylight design. Consider sun angles throughout the year for the best orientation and shading strategies. Establish daylight strategy early in schematic design, as it influences decision making related to the site plan, building orientation, building massing and fenestration. However, daylighting needs to take into account the sky conditions more than sun movement. Locate program area that benefit most from daylight at perimeter zones with northern and southern exposures to the greatest extent possible. Eastern and western exposures require more careful sun control strategies to control glare and overheating from low angle sun. The requirement for daylight can be effectively controlled by the depth of the room. In general, higher levels of reflectance and higher window head heights allow deeper rooms.</i></p>		
	The actual percentage of the NLA that has a Daylight Factor (DF) of 1.0-3.5% at the working plane level (800mm from floor level), as indicated by site measurements, is: 70% OR 50% OR 30%	Ops	3 OR 2 OR 1
	<p><i>Note: Review sun path diagram relative to the site and building forms to guide development of the daylight design. Consider sun angles throughout the year for the best orientation and shading strategies. Establish daylight strategy early in schematic design, as it influences decision making related to the site plan, building orientation, building massing and fenestration. However, daylighting needs to take into account the sky conditions more than sun movement. Locate program area that benefit most from daylight at perimeter zones with northern and southern exposures to the greatest extent possible. Eastern and western exposures require more careful sun control strategies to control glare and overheating from low angle sun. The requirement for daylight can be effectively controlled by the depth of the room. In general, higher levels of reflectance and higher window head heights allow deeper rooms.</i></p>		
EN-ENE-5	<b>Reduce fossil fuel energy consumption</b>		<b>Max 3</b>

	The Client's Project Brief commits to minimise the overall building fossil fuel energy consumption for the whole life of the building by effective design and efficient operation.	P-Dsn	3
	<b>Conditional requirement for the whole assessment:</b> The project's predicted/actual Building Energy Intensity (BEI) which measures the total energy used in the building for one year (in kilowatts hours) divided by the air-conditioned floor area of the building (in square meters), must not exceed 150 kWh/m <sup>2</sup> /year. 0-89 kWh/m <sup>2</sup> /year; OR 90-120 kWh/m <sup>2</sup> /year; OR 121-150 kWh/m <sup>2</sup> /year	Dsn Ops	3 OR 2 OR 1
EN-ENE-6	<b>Optimise the size of building systems control zones</b>		<b>Max 3</b>
	The Client's Project Brief commits to minimise energy consumption by means of providing a building with high operational flexibility to suit the variation of the instantaneous demands of the building occupants and facilities.	P-Dsn	3
	Design documentation indicates that all individual or enclosed spaces are individually switched; the size of individually switched lighting zones does not exceed 100m <sup>2</sup> for 90% of the NLA; and Switching is clearly labelled and easily accessible by building occupants;	Dsn	1
	ADDITIONAL: - The point above is achieved; and - An individually addressable lighting system (i.e. the lighting fixtures must be able to be readdressed/regrouped without wiring) is provided for 90% of the NLA.		1
	<i>Note: 'Easily accessible switch' = wired for each zone of 100m<sup>2</sup> and must be located as follows:</i> <ul style="list-style-type: none"> <li>• within the 100m<sup>2</sup> zone and at every entry (2- or 3-way switches may need to be provided) to the floor or tenancy (if known), whichever is smaller; OR</li> <li>• at the entry point to the tenancy or floor (whichever is smaller) if the area controlled by the switching does not exceed 500m<sup>2</sup>.</li> </ul> <i>'Individually addressable lighting system' = the lighting fixtures must be able to be readdressed/regrouped without wiring.</i>		
	ADDITIONAL: Provisions are designed to enhance the thermal comfort performance at partial operation based on system part-load operation and control strategies of centralized system.		1
	<i>Note: For buildings with centralized building services systems, certain level of operational flexibility is restricted. On some occasions, whole floor building systems have to be activated in order to serve single building occupant outside of normal operating hours, such that building system is operated uneconomically and energy is wasted. Hence, the optimum size of control zones shall be determined according to the space usage and floor area.</i>		
	On-site investigation confirms that all individual or enclosed spaces are individually switched; the size of individually switched lighting zones does not exceed 100m <sup>2</sup> for 90% of the NLA; and Switching is clearly labelled and easily accessible by building occupants.	Ops	1
	ADDITIONAL: - The point above is achieved; and - An individually addressable lighting system (i.e. the lighting fixtures must be able to be readdressed/regrouped without wiring) is provided for 90% of the NLA.		1
	ADDITIONAL: On-site investigation confirms that effective provisions have been provided to enhance the thermal comfort performance at partial operation based on system part-load operation and control strategies of centralized system.		1
	<i>Note: For buildings with centralized building services systems, certain level of operational flexibility is restricted. On some occasions, whole floor building systems have to be activated in order to serve single building occupant outside of normal operating hours, such that building system is operated uneconomically and energy is wasted. Hence, the optimum size of control zones shall be determined according to the space usage and floor area.</i>		

EN-ENE-7	<b>Use automatic lighting control system</b>		<b>Max 2</b>
	The Client's Project Brief commits to encourage the use of automatic lighting control system to minimise energy consumption, while providing a high visual quality.	P-Dsn	2
	Design documentation indicates that automatic lighting control system will be provided in all daylight zones to allow coordinated and active operation between natural and artificial light sources in response to the interior requirements and outdoor daylight conditions.	Dsn	1
	<i>Note: The integrated control shall be able to minimise the operating period of electric lighting and to allow for more use of daylight.</i>		
	ADDITIONAL: Design documentation indicates that occupancy sensors which automatically shut off lighting in unoccupied areas will be provided for at least 25% NLA.		1
	<i>Note: Types of sensors include passive infrared sensors (sense the heat radiated by people), ultrasonic sensors (detect motion), and dual-technology occupancy sensors. Integrate occupancy sensors with daylight dimming controls that dim electric lighting levels in response to daylight.</i>		
	On-site investigation confirms that automatic lighting control system has been provided in all daylight zones to allow coordinated and active operation between natural and artificial light sources in response to the interior requirements and outdoor daylight conditions.	Ops	2
	<i>Note: The integrated control shall be able to minimise the operating period of electric lighting and to allow for more use of daylight.</i>		
EN-ENE-8	<b>Install energy sub-metering system for each floor/section/tenancy</b>		<b>Max 2</b>
	The Client's Project Brief commits to provide sufficient provision for the effective measurement and monitoring of energy consumption in the building operation period.	P-Dsn	2
	According to design documentation, sub-metering will be provided for substantive energy uses within the building (i.e. all energy uses of 50kW or greater) and the system will be linked to BMS to monitor energy consumption data.	Dsn	1
	If the building is less than 500m <sup>2</sup> , this credit is 'Not applicable' and is removed from the total number of points available for the sub-issue.		
	ADDITIONAL: - The point above is achieved; and - Sub-metering will be provided separately for lighting AND separately for power for each floor or tenancy, whichever is smaller.		1
	<i>Note: Metering of all individual equipment may not be cost-effective, but metering of particular groups of equipment and major equipment could be sufficient in many cases in order to understand the energy use pattern and for future energy use planning. Also, metering provisions allow regular energy audits to be carried out by building operators or energy audit consultants. Energy metering, monitoring and logging provisions for the continuous recording of energy use are recommended.</i>		
	According to field observation, sub-metering is provided for substantive energy uses within the building (i.e. all energy uses of 50kW or greater) and the system is linked to BMS to monitor energy consumption data.	Ops	1
	If the building is less than 500m <sup>2</sup> , this credit is 'Not applicable' and is removed from the total number of points available for the sub-issue.		
	ADDITIONAL: - The point above is achieved; and - Sub-metering is provided separately for lighting AND separately for power for each floor or tenancy, whichever is smaller.		0.5
	<i>Note: Metering of all individual equipment may not be cost-effective, but metering of particular groups of equipment and major equipment could be sufficient in many cases in order to understand the energy use pattern and for future energy use planning. Also, metering provisions allow regular energy audits to be carried out by building operators or energy audit consultants. Energy metering, monitoring and logging provisions for the continuous recording of energy use are recommended.</i>		

	<p>ADDITIONAL:</p> <ul style="list-style-type: none"> <li>- Any of the above point is achieved; and</li> <li>- Evidence revealed that competent in-house energy audit team has been formed or an external energy audit team (e.g. building services consultants and tertiary academic institutions) has been employed to carry out walk-through energy consumption audit for the whole building not less than once for 3 years.</li> </ul>		0.5
EN-ENE-9	<b>Facilitate personal control of thermal comfort systems</b>		<b>Max 2</b>
	The Client's Project Brief commits to facilitate personal control over indoor climate to minimise health symptoms, and improve comfort satisfaction and performance of building occupants.	P-Dsn	2
	Design reports and relevant technical specification and drawings indicate that individual comfort controls (over air temperature, radiant temperature, air speed or humidity) will be provided for ≥50% of the building occupants to enable adjustments to suit individual task needs and preferences, while maintaining the indoor environment within acceptable limits. AND Comfort system controls will be provided for all shared multi-occupant spaces (meeting rooms, amphitheatre etc.) to enable adjustments to suit group needs and preferences.  <i>Note: Occupants in many building experience an uncomfortable environment when working at odd hours (at night or on weekends) because the HVAC systems have not been designed to permit occupants to control their own needs. This criterion is applicable to personal control over thermal comfort system only as lighting system control zone is addressed in other credit. Also, it applies to the extent to which passive strategies in hybrid ventilated (air-conditioned and natural ventilated) buildings are capable of providing a range of control patterns as it does for fully air-conditioned buildings.</i>	Dsn	2
	System descriptions, schematic diagrams together with on-site investigation confirm that individual comfort controls (over air temperature, radiant temperature, air speed or humidity) are provided for ≥50% of the building occupants to enable adjustments to suit individual task needs and preferences, while maintaining the indoor environment within acceptable limits. AND Comfort system controls are provided for all shared multi-occupant spaces (meeting rooms, amphitheatre etc.) to enable adjustments to suit group needs and preferences.  <i>Note: Occupants in many building experience an uncomfortable environment when working at odd hours (at night or on weekends) because the HVAC systems have not been designed to permit occupants to control their own needs. This criterion is applicable to personal control over thermal comfort system only as lighting system control zone is addressed in other credit. Also, it applies to the extent to which passive strategies in hybrid ventilated (air-conditioned and natural ventilated) buildings are capable of providing a range of control patterns as it does for fully air-conditioned buildings.</i>	Ops	2
<b>WAT: Potable Water Consumption</b>			
EN-WAT-1	<b>Harvest rainwater for later re-use</b>		<b>Max 3</b>
	The Client's Project Brief commits to minimise potable water consumption and wastage by using captured rainwater.	P-Dsn	3
	Design documentation indicates that a rainwater harvesting system will be provided and the calculations provided suggests that the provision will lead to 20% reduction in potable water consumption; OR ...10% reduction...	Dsn	3 OR 1
	Relevant photographic and other evidence suggest that rainwater has been harvested and reused within the construction site and the provision has led to 20% reduction in potable water consumption; OR ...10% reduction...	C&C	3 OR 1

	Field observations indicate that a rainwater harvesting system has been provided and the operation and maintenance records for the rainwater recycling and treatment suggests that the provision has led to 20% reduction in potable water consumption; OR ...10% reduction...	Ops	3 OR 1
EN-WAT-2	<b>Use water efficient plumbing fixtures and appliances</b>		<b>Max 3</b>
	The Client's Project Brief commits to encourage the implementation of effective water conservation strategies and the application of water conservation measures.	P-Dsn	3
	The percentage of all lavatory faucets with water flow between 0.5-1.0 GPM, as indicated by design reports and specifications, is: 100% OR 75-99%	Dsn	1.5 OR 0.5
	ADDITIONAL: The percentage of all toilets with dual-flush or low-flush system (less than or equal to 6 liters) is: 100% OR 75-99%		1.5 OR 0.5
	<i>Note: Use aerators on lavatory faucets to reduce water flow from 2.5 GPM to 0.5 or 1.0 GPM. Use automated controls for lavatory faucets for water conservation, such as infrared sensor faucets, delayed action shutoff, or automatic mechanical shutoff valves. Use dual-flush or low-flush toilets. Do not use automatic flush toilets and urinals to avoid excessive flushing.</i>		
	The actual percentage of all lavatory faucets with water flow between 0.5-1.0 GPM, indicated by system descriptions and relevant photos taken during operation phase, is: 100% OR 75-99%	Ops	1.5 OR 0.5
	ADDITIONAL: A actual percentage of all toilets with dual-flush or low-flush system (less than or equal to 6 liters) is: 100% OR 75-99%		1.5 OR 0.5
	<i>Note: Use aerators on lavatory faucets to reduce water flow from 2.5 GPM to 0.5 or 1.0 GPM. Use automated controls for lavatory faucets for water conservation, such as infrared sensor faucets, delayed action shutoff, or automatic mechanical shutoff valves. Use dual-flush or low-flush toilets. Do not use automatic flush toilets and urinals to avoid excessive flushing.</i>		
EN-WAT-3	<b>Minimise use of potable water for landscaping irrigation</b>		<b>Max 2</b>
	The Client's Project Brief commits to minimise potable water consumption and wastage for landscaping irrigation by implementing effective water conservation strategies and/or using non-potable water.	P-Dsn	2
	Potable water consumption for landscape irrigation is predicted to be reduced by 50% through the following: - Installation of water-efficient irrigation systems e.g. sub-soil or drip irrigation and/or - Use of non-potable water (i.e. captured rainwater or greywater) for landscape irrigation OR According to landscaping plans and specifications, water-conserving or self-sustaining landscape will be installed which is based on plants tolerant of soils, climate and water availability	Dsn	2
	If there is no landscaping, or landscaping represents less than 1% of the site area, this credit is "Not Applicable" and is excluded from the total number of points available for the sub-issue.		

		Potable water consumption for landscape irrigation is actually reduced by 50% through the following: - Installation of water-efficient irrigation systems e.g. sub-soil or drip irrigation and/or - Use of non-potable water (i.e. captured rainwater or greywater) for landscape irrigation OR According to observations made during operation phase, water-conserving or self-sustaining landscape has been installed which is based on plants tolerant of soils, climate and water availability  If there is no landscaping, or landscaping represents less than 1% of the site area, this credit is "Not Applicable" and is excluded from the total number of points available for the sub-issue.	Ops	2
EN-WAT-4		<b>Minimise use of potable water for cooling system</b>		<b>Max 2</b>
		The Client's Project Brief commits to minimise potable water consumption and wastage for cooling system.	P-Dsn	2
		Potable water consumption of water-based heat rejection system is predicted to be reduced by 90%; OR According to design documentation, no water-based heat rejection systems will be provided. OR ...reduced by 50%	Dsn	2 OR 1
		Potable water consumption of water-based heat rejection system is actually reduced by 90%; OR According to observations made during operation phase, no water-based heat rejection systems have been provided; OR ...reduced by 50%	Ops	2 OR 1
EN-WAT-5		<b>Install water meters for all major water uses in the project</b>		<b>Max 2</b>
		The Client's Project Brief commits to provide sufficient provision for the effective measurement and monitoring of water consumption in the building operation period.	P-Dsn	2
		Design documentation indicates that a water sub-metering system will be provided for high water-usage operations (e.g. irrigation, cooling tower) or for tenants. ADDITIONAL: All water sub-meters will be linked to BMS to monitor water consumption data and to enable detection of water leakage.	Dsn	1  1
		Field observation indicates that a water sub-metering system is provided for high water-usage operations (e.g. irrigation, cooling tower) or for tenants. ADDITIONAL: All water sub-meters are linked to BMS to monitor water consumption data and to enable detection of water leakage.	Ops	1  1

Issue	Sub-Issues	Criteria & Benchmarking	Assess. Phase	Important level/ Points Available
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**EC: ECONOMIC**

**TBL: Triple Bottom Line Accounting – Planet, People, Profit**

EC-TBL-1		<b>Refer to Environmental Impact Assessment (EIA) report</b>		<b>Max 3</b>
		The Client's Project Brief commits to avoid environmental impacts and to minimise and control the adverse effects due to environmental impacts of the building.	P-Dsn	3

	Evidence suggests that the preliminary EIA report prepared by environmental experts (if available) has been referred to by the project team during the design process.	Dsn	3																		
EC-TBL-2	<b>Assess and evaluate the quality of workmanship of construction works</b>		<b>Max 3</b>																		
	Evidence suggests that the workmanship of the construction work has been assessed using Quality Assessment System in Construction (QLASSIC) by CIDB prior to hand over; and the score obtained is: ≥80% OR 65-79%	C&C	3 OR 1																		
EC-TBL-3	<b>Consider both capital/construction and operational costs</b>		<b>Max 3</b>																		
	The Client's Project Brief commits to carry out comprehensive and life-cycle economic considerations in building development.	P-Dsn	3																		
	<i>Note: The economic analysis shall be in form of life-cycle costing (LCC) approach, with the considerations of capital cost, construction and installation cost, operation and maintenance cost, decommissioning cost, life of the building/component/system, interest rates, discount rates and other significant factors that may affect the LCC results. The LCC process shall be a co-operation among the Client, Designer and Quantity Surveyor.</i>																				
	LCC has been carried out for major sustainable/green building features and systems and the calculation results of savings by adopting the features and systems, as well as their payback period are available. It shows that the number of major green building features and systems included in the analysis is:  ≥ 10 OR ≤ 5 OR < 5	Dsn	3 OR 2 OR 1																		
	<i>Note: The economic analysis shall be in form of life-cycle costing (LCC) approach, with the considerations of capital cost, construction and installation cost, operation and maintenance cost, decommissioning cost, life of the building/component/system, interest rates, discount rates and other significant factors that may affect the LCC results. The LCC process shall be a co-operation among the Client, Designer and Quantity Surveyor.</i>																				
	<i>Sustainable/Green building features and systems include, but not limited to:</i>																				
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<i>Desiccant dehumidification</i>	<i>Ventilation air heat recovery</i>																				
EC-TBL-4	<b>Conduct Triple Bottom Line before deciding to pursue with the project</b>		<b>Max 2</b>																		
	At the outset of a project, preferably before a site is even selected, a goal setting session is held with all team members participating to: - establish the objectives for pursuing a sustainable building project; and - understand the options available under any sustainable building rating system to achieve the desired level of performance coinciding with the project's program; and clearly communicate realistic objectives to those responsible for designing, constructing, or acquiring green assets.	P-Dsn	1																		
	ADDITIONAL: - The point above is achieved; and - Triple Bottom Line (TBL) of the project making transparent the organisation's decisions that explicitly take into consideration impacts on the environment and people, as well as on financial capital, is available in a written report.		1																		

EC-TBL-5	<b>Manage the performance risks associated with new and untested sustainable building products and technologies</b>		<b>Max 2</b>	
	The Client's Project Brief commits to manage the performance risks associated with new and untested sustainable/green building products and technologies incorporated in the building.	P-Dsn	2	
	If new and untested building products and/or technologies are selected, contract documents expressly state such products and/or technologies are new, and that their selection or recommendation does not constitute a warranty of performance. OR Contract documents clearly spell out who is responsible for the selection of products and technologies to be used, so that the parties can adequately address the risks assumed and planned accordingly, including cost estimates.  <i>Note: Performance risks center around the ability of products, systems and buildings to perform in a sustainable/green environment. New products and technologies are being developed to meet the increasing demand for sustainable/green construction. Many 'environmental-friendly' products and technologies are in their infancy in terms of field testing; hence disputes may arise regarding who bears the risk of failure or poor performance. Only time will tell whether the new products and technologies will actually perform as promised.</i>	Dsn	2	
<b>EEF: Efficiency, Effectiveness and Flexibility</b>				
EC-EEF-1	<b>Develop and implement a long-term maintenance management plan</b>		<b>Max 3</b>	
	The Client's Project Brief commits to develop and implement a long-term maintenance management plan for efficient and effective building operation, maintenance and management.	P-Dsn	3	
	An explicit plan exists for future preventive and corrective maintenance and efficient operation of the facility, covering all technical systems, and providing performance targets, system maintenance and replacement guidance over a 25-year period. OR ... over at least a 10-year period.	Dsn	3 OR 1	
	Detailed preventive and corrective maintenance plans for the first 3 years exist to help minimise accidental breakdown of services.	Ops	1	
<i>Note: Planned preventive maintenance works shall be carried out within the anticipated life cycle of the building components, facilities and services before breakdown or abnormal operation are detected. Since planned preventive maintenance work could not prevent all accidental failure, planned corrective maintenance works are also essential. The corrective maintenance plan shall comprise of accidental system failure response and repairing plan, spare parts and component list, as well as contingency plan for the temporary shut-down of services serving the building occupants.</i>				
ADDITIONAL:				
<ul style="list-style-type: none"> <li>- The above point is achieved; and</li> <li>- The building inspection checklist as well as inspection and performance/functional testing records for at least 3 years are kept by building operator (minimum of 1 year record shall be provided for the first assessment in operation phase); AND the record indicates that regular inspection and performance testing on building services installations are conducted regularly.</li> </ul>				1
<i>Note: Inspection checklist shall include, but not limited to the visual inspection on conditions and performance/functional tests of public lighting, plumbing and drainage systems, HVAC installations serving public areas, and other facilities and building services systems in the building.</i>				
ADDITIONAL:				
<ul style="list-style-type: none"> <li>- The above point is achieved; and</li> <li>- The building inspection checklist and inspection record for at least 3 years are kept by building operator (minimum of 1 year record shall be provided for the first assessment in operation phase); AND the record indicates that regular inspection is conducted of the followings to ensure proper, effective and safe functioning:                             <ul style="list-style-type: none"> <li>o Means of escape and fire resisting construction e.g. walls, floors, staircases, fire-resisting doors, openings, fire-resisting</li> </ul> </li> </ul>				1



	enclosures, etc.		
	<ul style="list-style-type: none"> <li>o Building fabric, structure and facade;</li> <li>o Slope, retaining wall and private roads.</li> </ul>		
EC-EEF-2	<b>Provide and operate an effective building management control system</b>		<b>Max 3</b>
	The Client's Project Brief commits to provide effective building management control system for efficient and effective building operation, maintenance and management.	P-Dsn	3
	A systematic tool called Central Control and Monitoring Systems (CCMS) or Building Management System (BMS) will be provided and its capability is consistent with the complexity of building systems. They also indicate that the system will enable the followings:	Dsn	
	<ul style="list-style-type: none"> <li>- The operating status monitoring of various major electrical and mechanical installations, such as lift &amp; escalator, electrical system, chiller plant, boiler plant, pumping system, water circulation systems, fire and smoke alarm system, and security system; the daily automatic monitoring of operation such that system faults and abnormal operations can be identified at an early stage; the recording of operating history hence helping the building operator to establish an effective maintenance plan.</li> </ul>		1.5
	<b>ADDITIONAL:</b>		
	<ul style="list-style-type: none"> <li>- The operation control of various major electrical and mechanical installations as described above, to minimise failures due to human errors.</li> </ul>		1
	<i>Note: If a fire is detected, then the system could be used to prevent the smoke from spreading by opening exhaust dampers and closing outdoor air intake dampers of the fire floor and send all elevators to the ground floor and park them to prevent people from using them in the event of a fire.</i>		
	<b>ADDITIONAL:</b>		
	<ul style="list-style-type: none"> <li>- The automatic control and monitoring of lighting installations according to the scheduled occupancy programme.</li> </ul>		0.5
	<i>Note: Energy management and control system should be considered in any building exceeding 40,000sqft or 3700 sqm of gross area. A Building Management System (BMS) manages the following systems:</i>		
	<ul style="list-style-type: none"> <li>- Building Automation System (BAS) that provides automatic monitoring, interaction and management for electricity, lighting, plumbing, ventilation and air-conditioning, water supply and drainage, and environmental control systems at a simple control centre.</li> <li>- Security Automation System (SAS) – addressed by other credit.</li> <li>- Fire Automation System (FAS) – addressed by other credit.</li> </ul>		
EC-EEF-3	<b>Provide comprehensive building records to operating staff and owners</b>		<b>Max 3</b>
	The Client's Project Brief commits to make available a complete set of building records for efficient and effective building operation, maintenance and management.	P-Dsn	3
	Tender Specification clearly specifies the requirements comprehensive building records from the Contractor.	Dsn	3
	<i>Note: The building records shall comprise, but not limited to the following items:</i>		
	<ul style="list-style-type: none"> <li>- Documented design intent – building, structural, drainage, site formation, alterations and additions plans approved by the Local Authority.</li> <li>- Building services as-built drawings – fire services, underground drains, drainage, water supply, electrical, lighting, broadcasting, gas supply, HVAC, etc.</li> <li>- Layout plan for hidden utilities – electricity cables, gas pipes, telephone lines etc.</li> <li>- Operations and maintenance manual for building services, mechanical components and installations;</li> <li>- Testing and commissioning report</li> </ul>		
	The Contractor has complied and provided the full set of building records to the satisfaction of the client's representatives, and convey to building operator.	C&C	3
	<i>Note: The building records shall comprise, but not limited to the following items:</i>		

	<ul style="list-style-type: none"> <li>- Documented design intent – building, structural, drainage, site formation, alterations and additions plans approved by the Local Authority.</li> <li>- Building services as-built drawings – fire services, underground drains, drainage, water supply, electrical, lighting, broadcasting, gas supply, HVAC, etc.</li> <li>- Layout plan for hidden utilities – electricity cables, gas pipes, telephone lines etc.</li> <li>- Operations and maintenance manual for building services, mechanical components and installations;</li> </ul> <p>Testing and commissioning report</p>		
	The property management company and/or Owners' Corporation keep the full set of building records and the updated versions properly.	Ops	3
	<p><i>Note: The building records shall comprise, but not limited to the following items:</i></p> <ul style="list-style-type: none"> <li>- Documented design intent – building, structural, drainage, site formation, alterations and additions plans approved by the Local Authority.</li> <li>- Building services as-built drawings – fire services, underground drains, drainage, water supply, electrical, lighting, broadcasting, gas supply, HVAC, etc.</li> <li>- Layout plan for hidden utilities – electricity cables, gas pipes, telephone lines etc.</li> <li>- Operations and maintenance manual for building services, mechanical components and installations;</li> </ul> <p>Testing and commissioning report</p>		
EC-EEF-4	<b>Spatial flexibility for different users/requirements</b>		<b>Max 3</b>
	The Client's Project Brief commits to design interior spaces with high adaptability and flexibility for change in usage during the whole life-cycle of the occupied building.	P-Dsn	3
	No partitions are provided (to be installed by tenants)	Dsn	1.5
	OR		OR
	Saleable/rental areas can easily be reconfigured to suit different users/requirements by providing open ceiling and removable internal partitions		0.5
	ADDITIONAL:		
	Saleable/rental areas are designed with minimum interior finishing and fittings to minimise waste generation.		1.5
	OR		
	Potential buyers and tenants are allowed to provide their own choices of internal finishing and fittings before completion of construction works to minimise waste generation.		
EC-EEF-5	<b>Provide building services systems with maximum flexibility for different users/ requirements</b>		<b>Max 2</b>
	The Client's Project Brief commits to design building services systems with high adaptability and flexibility for change in usage during the whole life-cycle of the occupied building.	P-Dsn	2
	<u>Ease of adapting HVAC systems to changing occupant requirements:</u>	Dsn	1
	With a minimum adjustment, the existing HVAC delivery systems and associated control systems, can accommodate all basic types of layout from open-plan to cellular layout and also accommodate added functions such as copier or meeting rooms, hence changes in layout will result in less disruption to user operations.		
	<p><i>Note: For instance, a standardized layout for air and water distributions, and installing of air ducts in open ceilings are possible methods to enhance adaptability. Reasonable spare space in chiller plant, boiler plant, heat rejection plant, and centralized air handling plant, to cope with additional installations for future demand expansion. Reasonable spare capacity of air duct and water pipes would result in these be able to cope with loading increase and reduce friction loss in distribution process, thus lower pumping/fan power.</i></p>		
	ADDITIONAL:		
	<u>Ease of adapting lighting systems to changing occupant requirements:</u>		1
	The lighting layout, luminaire type and control system permit easy and rapid changes required for minor changes in office layout, such as from open-plan to cellular, or to add or delete other functions, such as copier or meeting rooms.		
	<p><i>Note: For instance, spare capacity of power and control cabling, normal and essential power sources, cable containment, space in distribution boards and switchboards are all</i></p>		

	<i>important in enhancing the electrical services flexibility. Sufficient space and convenient access to cable containment are also necessary to minimize cable wiring/re-wiring works, and minimize subsequent disturbance to the building occupants.</i>		
EC-EEF-6	<b>Perform comprehensive commissioning, and post-occupancy commissioning for all building services</b>	<b>Max 2</b>	
	The Client's Project Brief commits to perform comprehensive pre-commissioning, commissioning and quality monitoring for all building services.	P-Dsn	2
	Tender Specification clearly specifies the requirement for comprehensive pre-commissioning, commissioning and quality monitoring to be performed for all building services (BMS, mechanical, electrical and hydraulic) and the works shall be done in exact accordance with ASHRAE Commissioning Guideline.	Dsn	2
	The Contractor has carried out comprehensive and effective testing and commissioning works prior to handover to the building operator in exact accordance with ASHRAE Commissioning Guideline and to the satisfaction of the Client's representatives. AND For large projects or buildings with complicated building systems, an independent Commissioning Specialist is appointed at the onset of the design process to verify that comprehensive pre-commissioning and commissioning are performed for all the building services in accordance with ASHRAE Commissioning Guideline.	C&C	2
	Evidences suggest that tuning has been implemented on all building systems after building handover, and the tuning process involved the relevant members of the design team. The Building Tuning Report on the outcomes of the tuning process has been provided to the building owner and made available to the design team. AND Full re-commissioning has been carried out for all building services 12 months after practical completion.	Ops	2
EC-EEF-7	<b>Structural design with maximum adaptability for new uses</b>	<b>Max 2</b>	
	The Client's Project Brief commits to design building structure with high adaptability and flexibility for change in usage during the whole life-cycle of the occupied building.	P-Dsn	2
	The location and capacity of the building core and the structural grid have been designed to permit an acceptable level of flexibility in the planning of interior spaces and future uses.	Dsn	2
	<i>Note: Constructing large-span bays, avoiding disproportionately large columns and infrequent changes of floor levels, optimizes the flexibility of the space and increases its appeal for reuse. Placement of shear walls, utility walls and fire separations acknowledges and provides for changing occupant uses.</i>		
EC-EEF-8	<b>Adequate floor-to-floor height to offer high level of functionality for almost any occupancy</b>	<b>Max 2</b>	
	The Client's Project Brief commits to provide floor-to-floor height with high adaptability and flexibility for change in usage during the whole life-cycle of the occupied building.	P-Dsn	2
	Adaptation to another building use would result in a high level of functionality of the new occupancy. Floor-to-floor heights are $\geq 3.6\text{m}$ .	Dsn	2
	OR ... would result in an acceptable level of functionality of the new occupancy. Floor-to-floor heights are $\geq 3.4\text{m}$ .		OR 1
	<i>Note: Structural elements such as beams reduce the overall effective floor-to-ceiling height. If these are continuous over the entire floor, the floor-to-floor height refers to the height between the floor and the underside of the structural elements.</i>		
EC-EEF-9	<b>Maximize workspace/directly functional area to total floor area ratio</b>	<b>Max 2</b>	
	The Client's Project Brief commits to provide a building design with maximum spatial efficiency.	P-Dsn	2
	Design documentation indicates that the ratio of the total net lettable area (NLA) over the total gross floor area (GFA) of the building, is: $\geq 85\%$ OR	Dsn	2 OR

80-84%

1

*Note: Nett lettable area (NLA) is the gross internal area less common areas, ancillary spaces (corridors, plant room, toilet blocks etc.) and structural/ internal party walls (but not partitioning or other non load-bearing walls).*

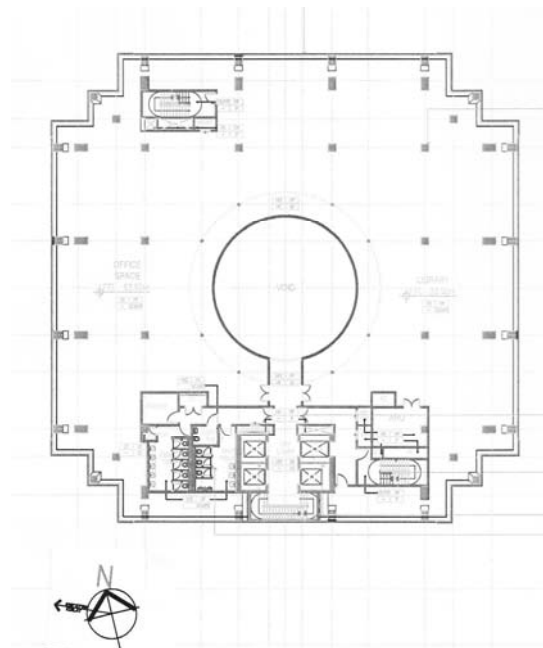
Issue	Criteria & Benchmarking	Assess. Phase	Important level/ Points Available
<b>INN: INNOVATION</b>			<b>Max 4</b>
INN-1	<b>Innovative strategies and technologies</b> The initiative is a technology or process that is considered a 'first' in the World OR The project substantially contributes to the broader market transformation towards sustainable development in the World. OR The initiative is a technology or process that is considered a 'first' in Malaysia OR The project substantially contributes to the broader market transformation towards sustainable development in Malaysia.	Dsn C&C Ops	3 OR 2
INN-2	<b>Exceeding MOBSA benchmarks</b> The solution results in a substantial (e.g. 5% or greater above the specified percentage for the maximum number of points) social/environmental/economic impact targeted by an existing credit.	Dsn C&C Ops	1

## Appendix I: Information on the Case Study Building

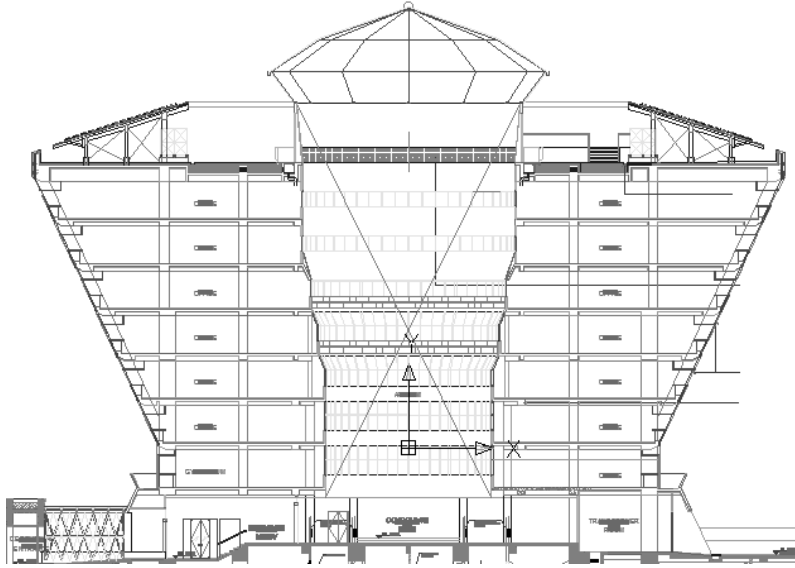
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### Basic information of the Diamond Building

Space Summary	Air-Conditioned Area (m <sup>2</sup> )	Non Air-Conditioned Area (m <sup>2</sup> )	Total Area (m <sup>2</sup> )
Office	5379	0	5379
Car Park	0	5742	5742
Toilet		535	535
Staircase		110	110
Utilities/Storage	681	69	750
Lobby/Corridor/Atrium	4609		4609
Gym	82		82
Data Centre	101		101
Theatrette	194		194
Changing room/Prayer room		209	209
<b>TOTAL</b>	<b>11046</b>	<b>6665</b>	<b>17711</b>
Area	Total Area (m <sup>2</sup> )		
Net Floor Area (NFA)	10732		
Gross Floor Area (GFA)	14229		
Built Up Area, excluded from GFA	8831		
Total Site Area	5000		
Total Green Area, including rooftop garden	7017		
Description	Value		
Construction Cost (A)	RM 72 million		
Construction Floor Area, include external driveway, roof, arcade & exposed area (B)	25142 m <sup>2</sup>		
Unit Construction Cost (A/B)	2870 RM/m <sup>2</sup>		
Payback Period (Incremental Cost/ Potential Saving per year)	13 years		



The Diamond Building typical floor plan



Section of the building with an atrium in the middle



Left: Atrium looking downward; Right: Atrium looking upward



Left: Facade lightshelf with fixed louvers for glare prevention;  
Right: Facade daylight seen from a corridor