Liveable Future - A Paradigm Shift

Ar Sarly Adre Sarkum

President – Malaysian Green Building Confederation
Council Member – Malaysian Institute of Architects
Chief Architecturalist and Managing Director - [SA]² Architecture
## GBI Certified Projects by Categories

<table>
<thead>
<tr>
<th>Update on Green Building Index</th>
<th>TOTAL as of 15 FEBRUARY 2016</th>
<th>NRNC Non Residential New Construction</th>
<th>RNC Residential New Construction</th>
<th>INC Industrial New Construction</th>
<th>NREB Non Residential Existing Building</th>
<th>IEB Industrial Existing Building</th>
<th>Township</th>
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<tbody>
<tr>
<td>Applied</td>
<td>715</td>
<td>374</td>
<td>279</td>
<td>20</td>
<td>21</td>
<td>4</td>
<td>17</td>
</tr>
<tr>
<td>Registered</td>
<td>667</td>
<td>346</td>
<td>264</td>
<td>18</td>
<td>19</td>
<td>3</td>
<td>17</td>
</tr>
<tr>
<td>Total Certified</td>
<td>343 (100%)</td>
<td>173 (50%)</td>
<td>139 (41%)</td>
<td>9 (3%)</td>
<td>12 (3%)</td>
<td>3 (1%)</td>
<td>7 (2%)</td>
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<tr>
<td>Provisional Certification after DA</td>
<td>287</td>
<td>144</td>
<td>122</td>
<td>5</td>
<td>8</td>
<td>1</td>
<td>7</td>
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<tr>
<td>Final Certification after CVA</td>
<td>54</td>
<td>27</td>
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<td>Renewal Certification after RVA</td>
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<td>2</td>
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</tr>
</tbody>
</table>

DA - Design Assessment, CVA - Completion & Verification Assessment.
### GBI Certified Projects by Category

<table>
<thead>
<tr>
<th>Update on Green Building Index</th>
<th>Applied</th>
<th>Registered</th>
<th>Total Certified</th>
<th>Provisional Certification after RA</th>
<th>Final Certification after GVA</th>
<th>Renewal Certification after GVA</th>
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<tbody>
<tr>
<td>NRNC</td>
<td>374</td>
<td>346</td>
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<tr>
<td>RNC</td>
<td>279</td>
<td>264</td>
<td>139(41%)</td>
<td>122</td>
<td>17</td>
<td>0</td>
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<tr>
<td>INC</td>
<td>20</td>
<td>18</td>
<td>9(3%)</td>
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<tr>
<td>NREB</td>
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<tr>
<td>IEB</td>
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<td>3</td>
<td>3(1%)</td>
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<td>2</td>
<td>0</td>
</tr>
<tr>
<td>T</td>
<td>17</td>
<td>17</td>
<td>7(2%)</td>
<td>7</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td><strong>TOTAL as of 15 FEBRUARY 2016</strong></td>
<td>715</td>
<td>667</td>
<td>343(100%)</td>
<td>287</td>
<td>54</td>
<td>2</td>
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### GBI Certified Projects by Rating Categories

<table>
<thead>
<tr>
<th>RATING</th>
<th>NRNC</th>
<th>RNC</th>
<th>INC</th>
<th>NREB</th>
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<th><strong>TOTAL as of 15 FEBRUARY 2016</strong></th>
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<tr>
<td>PLATINUM</td>
<td>9</td>
<td>4</td>
<td>-</td>
<td>1</td>
<td>-</td>
<td>1</td>
<td>15(4%)</td>
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<tr>
<td>GOLD</td>
<td>49</td>
<td>26</td>
<td>1</td>
<td>1</td>
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<td>1</td>
<td>79(23%)</td>
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<tr>
<td>SILVER</td>
<td>20</td>
<td>14</td>
<td>2</td>
<td>2</td>
<td>-</td>
<td>2</td>
<td>40(12%)</td>
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<tr>
<td>CERTIFIED</td>
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<td>95</td>
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<td>8</td>
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<td>3</td>
<td>209(61%)</td>
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<tr>
<td><strong>TOTAL</strong></td>
<td>173</td>
<td>139</td>
<td>9</td>
<td>12</td>
<td>3</td>
<td>7</td>
<td>343</td>
</tr>
</tbody>
</table>

### Gross Floor Area (GFA) of GBI Certified Buildings

- **NRNC**: 5,810,000.65 GBI Certified GFA (Sqm)
- **RNC**: 7,303,628.32 GBI Certified GFA (Sqm)
- **INC**: 919,488.88 GBI Certified GFA (Sqm)
- **NREB**: 229,320.04 GBI Certified GFA (Sqm)

**TOTAL as of 15 FEBRUARY 2016**: 14,290,957.69 (153,826,588.37 sqft)

### Carbon Dioxide (CO2) Emission Reduction of GBI Certified Buildings

- **NRNC**: 458,760.74
- **RNC**: 184,211.61
- **NREB**: 78,722.68
- **INC**: 12,371.70
- **IEB**: 2,480.24

**TOTAL as of 16 FEBRUARY 2016**: 736,546.36

CO2 Emission Reduction: (tCO2e/annum, based on electricity energy reduction only @ 1kWh = 0.741 kg CO2 - Peninsular / 0.872 kg CO2- Sarawak / 0.546 kg CO2 - Sabah)
GROSS FLOOR AREA (GFA) OF GBI CERTIFIED BUILDINGS

NRNC: 5,810,000.65 GBI Certified GFA (Sqm)
RNC: 7,303,628.32 GBI Certified GFA (Sqm)
NREB: 919,488.88 GBI Certified GFA (Sqm)
IEB: 28,519.80 GBI Certified GFA (Sqm)
INC: 229,320.04 GBI Certified GFA (Sqm)

TOTAL as of 15 FEBRUARY 2016: 14,290,957.69 (153,826,588.37sqft)

Over 150 million Sq Ft Certified
CARBON DIOXIDE (CO₂) EMISSION REDUCTION OF GBI CERTIFIED BUILDINGS

CO₂ Emission Reduction: (tCO₂e/annum, based on electricity energy reduction only @ 1kWh = 0.741 kg CO₂ - Peninsular / 0.872 kg CO₂- Sarawak / 0.546 kg CO₂ - Sabah )

736,546.36 tCO₂e/annum
## Quantitative

<table>
<thead>
<tr>
<th>Factors</th>
<th>Qualitative</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lighting</td>
<td>Interior Layout</td>
</tr>
<tr>
<td>Indoor Air Quality</td>
<td>Look &amp; Feel</td>
</tr>
<tr>
<td>Thermal Comfort</td>
<td>Active/Inclusive Design</td>
</tr>
<tr>
<td>Acoustics</td>
<td>Biophilia</td>
</tr>
<tr>
<td></td>
<td>Amenities</td>
</tr>
<tr>
<td></td>
<td>Community Space</td>
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## Result Type

<table>
<thead>
<tr>
<th>Quantitative</th>
<th>Qualitative</th>
</tr>
</thead>
<tbody>
<tr>
<td>Numerical reading or measurement</td>
<td>Descriptive</td>
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## Method

<table>
<thead>
<tr>
<th>Quantitative</th>
<th>Qualitative</th>
</tr>
</thead>
<tbody>
<tr>
<td>Via building management system or via sensors</td>
<td>Via specification review or walk-around</td>
</tr>
</tbody>
</table>
Mental Function & Memory: 10-25% better
Call Processing: 6-12% faster
Hospital Stays: 8.5% shorter

Daylight:
Students achieve 5-14% higher test scores and learn 20-26% faster
Workers are 18% more productive

Systems:
Productivity increases by 23% from better lighting
11% from better ventilation
3% from individual temperature control

Taken from the The Business Case for Green Building: A Review of Cost and Benefits for Developers, Investors, and Occupants' report by the World Green Building Council
Malaysia’s carbon footprint increase outpacing rest of the world...  

Target to achieve 40% voluntary reduction in carbon emission per unit of gross domestic product by 2020, using the 2005 level as a baseline.  

UN Climate Change Conference  
17 December 2009
Pelabuhan Kelang, Selangor, Malaysia AQI: 131

Unhealthy for Sensitive Groups
Updated on Friday 4:00
Temp: 24°C

Weather Information

<table>
<thead>
<tr>
<th>Current</th>
<th>Last 2 days</th>
<th>Min</th>
<th>Max</th>
</tr>
</thead>
<tbody>
<tr>
<td>Temp</td>
<td>24</td>
<td>22</td>
<td>36</td>
</tr>
<tr>
<td>Pressure</td>
<td>1010</td>
<td>1007</td>
<td>1013</td>
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<tr>
<td>Humidity</td>
<td>85</td>
<td>29</td>
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</tr>
<tr>
<td>Wind</td>
<td>1</td>
<td>1</td>
<td>4</td>
</tr>
</tbody>
</table>
**Lingshan Road AQI: Lingshan Road Real-time Air Quality Index (A)**

**153**

*Unhealthy*

*Updated on Friday 5:00*

**Temp:** 18°C  🌞   *(18°C – 25°C)*

<table>
<thead>
<tr>
<th>Current, Last 2 days</th>
<th>Min</th>
<th>Max</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>PM2.5 AQI</strong></td>
<td>74</td>
<td>198</td>
</tr>
<tr>
<td><strong>PM10 AQI</strong></td>
<td>50</td>
<td>103</td>
</tr>
<tr>
<td><strong>O3 AQI</strong></td>
<td>8</td>
<td>79</td>
</tr>
<tr>
<td><strong>NO2 AQI</strong></td>
<td>6</td>
<td>61</td>
</tr>
<tr>
<td><strong>SO2 AQI</strong></td>
<td>6</td>
<td>13</td>
</tr>
<tr>
<td><strong>CO AQI</strong></td>
<td>6</td>
<td>11</td>
</tr>
<tr>
<td><strong>Temp</strong></td>
<td>17</td>
<td>27</td>
</tr>
<tr>
<td><strong>Dew</strong></td>
<td>14</td>
<td>19</td>
</tr>
<tr>
<td><strong>Pressure</strong></td>
<td>1015</td>
<td>1019</td>
</tr>
<tr>
<td><strong>Humidity</strong></td>
<td>47</td>
<td>94</td>
</tr>
<tr>
<td><strong>Wind</strong></td>
<td>1</td>
<td>5</td>
</tr>
</tbody>
</table>
>>contextual issue

PERTAMINA’s net zero skyscraper in Jakarta
contextual issue
contextual issue

Bike

Car

Bus
Puchong Area in the suburbs of Kuala Lumpur
KL GREEN LOOP
officially known as
GO GREEN CAR-FREE MORNING

CLOSED TO TRAFFIC THE 1ST & 3RD SUNDAY OF EVERY MONTH
7AM-9AM
Wellbeing
70% of the world’s population will be living in Asia.

There are more people living inside this circle than outside of it.

To sustain the rapid growth, the rate of homes to be built needs to be in sync with demand. 1 day = 5000 new homes.
Modern Dream
Suburbia/urban sprawl
Growth
Massive traffic jam on China National Highway 110 (G110) and Beijing–Tibet expressway (G6), in Hebei and Inner Mongolia.
Liveability
Managing Growth

NEW URBANISM

- Garden Cities
- Green Cities
- Resilient Cities
- Liveable Cities
- Smart Cities
- Intelligent Cities

Venn Diagram showing intersections of different types of cities.
Managing Growth

Reflective: using past experience to inform future decisions
Resourceful: recognizing alternative ways to use resources
Inclusive: prioritize broad consultation to create a sense of shared ownership in decision making
Integrated: bring together a range of distinct systems and institutions

Robust: well-conceived, constructed, and managed systems
Redundant: spare capacity purposively created to accommodate disruption
Flexible: willingness and ability to adopt alternative strategies in response to changing circumstances
Managing Growth
New Urbanism

**NEW URBANISM** is the most important planning movement this century, and is about creating a better future for us all. It is an international movement to reform the design of the built environment, and is about raising our quality of life and standard of living by creating better places to live.

New Urbanism is the revival of our lost art of place-making, and is essentially a re-ordering of the built environment into the form of complete cities, towns, villages, and neighborhoods - the way communities have been built for centuries around the world. New Urbanism involves fixing and infilling cities, as well as the creation of smarter sustainable compact new towns, villages and cities.
Pillar of New Urban Design

- Enhance Economic Prosperity + Living Affordability
- Demonstrate Leadership + Integrates Design Excellence
- Fosters Environmental Responsibility
- Cultivates Healthy + Cohesive & Robust Communities
1. Walkability
2. Connectivity
3. Mixed-Use & Diversity
4. Mixed Housing
5. Quality Architecture & Urban Design
6. Traditional Neighbourhood Structure
7. Increased Density
8. Smart Transportation
9. Sustainability
10. Quality of Life
11. Food Security
Walkability

• Most things within a 10-minute walk of home and work

• Pedestrian friendly street design (buildings close to street; porches, windows & doors; tree-lined streets; on street parking; hidden parking lots; garages in rear lane; narrow, slow speed streets)

• Pedestrian streets free of cars in special cases

• What you can see you can walk too
TABLE 14. SMARTCODE SUMMARY

Note: Measurements in this table are subject to validation by local context.

<table>
<thead>
<tr>
<th>Street Type</th>
<th>Sidewalk Width</th>
<th>Bike Width</th>
<th>Auto Width</th>
<th>Red Line Width</th>
</tr>
</thead>
<tbody>
<tr>
<td>Residential 1</td>
<td>5'</td>
<td>2'</td>
<td>1'</td>
<td>3'</td>
</tr>
<tr>
<td>Residential 2</td>
<td>6'</td>
<td>3'</td>
<td>1.5'</td>
<td>3.5'</td>
</tr>
<tr>
<td>Commercial</td>
<td>8'</td>
<td>4'</td>
<td>2'</td>
<td>4'</td>
</tr>
<tr>
<td>Industrial</td>
<td>10'</td>
<td>5'</td>
<td>3'</td>
<td>5'</td>
</tr>
</tbody>
</table>

LIVEABLESTREETS ALLIANCE PROPOSAL

Adds wider bike lanes, widens sidewalks, widens Red Line, eliminates one auto lane each direction.

Sidewalk: 13'6" | Bike lane: 2' | Buffer: 7' | Auto lane: 11' | Shoulder: 1' | Red Line: 32' | Crash barrier: 1' |

Diagram showing the proposed changes with dimensions.
Walkability
Connectivity

- Interconnected street grid network disperses traffic & eases walking
- A hierarchy of narrow streets, boulevards, and alleys
- High quality pedestrian network and public realm makes walking pleasurable
- Multimodal modes of transport
Connectivity

FUEL CO₂ EMISSIONS

The amount of CO₂ emissions required to fuel different modes of transport*.
[per passenger kilometres]

229 g

95 g

*Based on average occupancy rate of 1.16 for cars, 10 for buses, 1 for bicycles. - Includes all CO₂ emissions linked to fuel including production, distribution and consumption.
Connectivity
Connectivity

Bicycle Lane and pedestrian linear park with fully landscaped and subrolled natural swale drained

2nd Floor area urban rear, also acts as alternate circulation if above area is unavailable due to rain etc.

Electric Car Lanes on 1st level link directly to residential areas and commercial areas

Mass transport in the form of electric buses and trams, also lanes for electric trucks if required

CCUT - Central Common Utility Trenching, combining services throughout the development

Subterranean Advance Flood Control - In addition to natural swales the central spine has a central flood control system to manage water retention

Central Spine walkway and bicycle path connects all major residential and commercial centres within the development

Clear separation between cyclist and pedestrians

The electric vehicle level also connects to certain car parks and ride catches throughout the development

Perforated plates provide shading and visual variety

Bus and Tram system runs on dedicated lanes which is separate from traffic system

Subterranean Goods Management System - is an automated rail system for the distribution/collection of all goods in the SEZ area
Connectivity
Mixed-Use & Diversity

- Robustness in city use
- A mix of shops, offices, apartments, and homes on site. Mixed-use within neighbourhoods, within blocks, and within buildings
- Diversity of people - of ages, income levels, cultures, and races
- Resilient towards economic cycles
Mixed-Use & Diversity
Mixed-Use & Diversity
Mixed-Use & Diversity
Mixed Housing

• A range of types, sizes and prices in closer proximity
Quality Architecture & Urban Design

• Emphasis on beauty, aesthetics, human comfort, and creating a sense of place; Special placement of civic uses and sites within community. Human scale architecture & beautiful surroundings nourish the human spirit.
Quality Architecture & Urban Design
Quality Architecture & Urban Design

Climatic Design of the Malay House

- Ventilated roof space helps to cool the house
- Allap roofing of low thermal capacity gives good insulation against heat
- Large roof space for effective sunshading
- Lightweight construction using low thermal capacity materials keeps house cool
- Open interior spaces with minimal partitions allow good ventilation in the house
- Fully operable windows allow ventilation at body level
- Stilted house catches wind for higher velocity

Typical Malay Houses
>> Quality Architecture & Urban Design
Quality Architecture & Urban Design
Traditional Neighbourhood Structure

- Discernible centre and edge / Public space at centre
- Importance of quality public realm; public open space designed as civic art
- Contains a range of uses and densities within 10-minute walk
- Transect planning: Highest densities at town centre;
- progressively less dense towards the edge
- The transect is an analytical system that conceptualizes mutually reinforcing elements, creating a series of specific natural habitats and/or urban lifestyle settings.
Traditional Neighbourhood Structure
Increased Density

- More buildings, residences, shops, and services closer together for ease of walking, to enable a more efficient use of services and resources, and to create a more convenient, enjoyable place to live.

- New Urbanism design principles are applied at the full range of densities from small towns, to large cities.
Increased Density

Building tall is a necessity in certain region but it also gives an opportunity to look at concentrating urban density in one area.
## Increased Density

<table>
<thead>
<tr>
<th>City</th>
<th>Peak Density (pp/km²)</th>
</tr>
</thead>
<tbody>
<tr>
<td>HONG KONG</td>
<td>111,065</td>
</tr>
<tr>
<td>NEW YORK CITY</td>
<td>98,530</td>
</tr>
<tr>
<td>LONDON</td>
<td>17,124</td>
</tr>
</tbody>
</table>
Increased Density
Increased Density

HONG KONG

NEW YORK CITY

LONDON

*The modal shares above refer to trips to work only.
Smart Transportation

• A network of high-quality trains connecting cities, towns, and neighbourhoods together

• Pedestrian-friendly design that encourages a greater use of bicycles, rollerblades, scooters, and walking as daily transportation

• Smart information feedback/crowd sourcing to adapt to changing city conditions
Smart Transportation

SINGAPORE: VARIATIONS IN FSI ARE LINKED TO THE LOCATION OF METRO STATIONS AND TO THE NETWORK OF MAIN STREETS.
Smart Transportation
Sustainability

- Minimal environmental impact of development and its operations
- Eco-friendly technologies, respect for ecology and value of natural systems
- Energy efficiency
- Less use of finite fuels
- More local production
- More walking, less driving
Sustainability

Trends in return for various green rated offices
annualised total return to March 2015

- Green Star
- NABERS: 4-6 star
- NABERS: 0-3.5 star
- All office
Sustainability

Integrated Design

Climate, Energy & Water

Environment & Ecology

Community, Planning & Design

Transport & Connectivity

Building & Resources

Business & Innovation

GREEN URBANISM

ENERGY and MATERIALS

WATER and BIODIVERSITY

URBAN PLANNING and TRANSPORT

Interaction between three main pillars

- Embodied energy
- Material specification
- Supply chain
- Renewable energy solutions
- Energy sources and consumption
- Construction systems
- Prefabrication and recycling
- Energy efficiency
- Resource management

- Urban water management
- Water recycling and irrigation
- Urban Farming
- Urban landscape typologies
- Ecosystems' biodiversity maximized
- Grey water recycling
- Storage of urban stormwater
- Climate change impact management
- Waste management

- Urban design
- Social sustainability
- Ecological city theory
- Health and walkability
- Mobility, public Transport
- Infrastructure
- Energy efficient buildings
- Mixed land use
- Housing affordability
- Reducing car dependency
- Subdivisions
Sustainability

2004

2011
Quality of Life/Liveability

- these add up to a high quality of life well worth living, and create places that enrich, uplift, and inspire the human spirit.
Quality of Life/Liveability
>> Quality of Life/ Liveability
Quality of Life/Liveability

IBM Commuter Pain Survey
8,192 motorists
20 cities
5 continents
2 years

Commuter Pain Index

More pain
Less pain

Bangalore 75
Moscow 65
New Delhi 72
Singapore 44
Buenos Aires 42
Los Angeles 34
Paris 31
Madrid 28
New York City 28
Toronto 27
Stockholm 26
Chicago 25
London 23
Montreal 21

Beijing 95
Nairobi 88
Johannesburg 83
Shenzhen 95
Mexico City 108
Quality of Life / Liveability

Health in communities with better transportation options:
- Walkable, bikeable, transit-oriented communities are associated with healthier populations that have:
  - More physical activity
  - Lower body weight
  - Lower rates of traffic injuries
  - Less air pollution
  - Improved mobility for non-drivers

Studies show people will walk to destinations:
- 46% of people walk 1 mile to church or school.
- 1% of people walk 3-4 miles to church or school.
- 35% of people walk 1 mile to work.
- 1% of people walk 3-4 miles to work.

There is a direct connection between countries with lower rates of obesity and higher rates of commuters who walk or bike to work.

Levels of bicycling and walking to work vs. measured obesity levels:
- Share of commuters who bike or walk to work.
- Percent of adults who are obese.
Food Security and Management

Those lost calories could fill hunger gaps in the developing world.

Calories LOST OR WASTED per person, per day
(out of a recommended 2,000)

61% wasted by CONSUMER

North America + Oceania: 1,520
Europe: 748
Industrialized Asia: 746
North Africa, West + Central Asia: 594
Sub-Saharan Africa: 545
Latin America: 453
South/Southeast Asia: 414

87% lost or wasted in PRODUCTION, STORAGE, TRANSPORT, etc.
GBI township

- Climate, Energy & Water: 20
- Ecology & Environment: 15
- Community Planning & Design: 26
- Transportation & Connectivity: 14
- Building & Resources: 15
- Business & Innovation: 10

Categories:
- Climate, Energy and Water
- Ecology & Environment
- Community Planning & Design
- Transportation & Connectivity
- Building & Resources
- Business & Innovation
<table>
<thead>
<tr>
<th>PART</th>
<th>CRITERIA</th>
<th>ITEM</th>
<th>POINTS</th>
<th>TOTAL</th>
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<tr>
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<td>CEN</td>
<td>CLIMATE, ENERGY &amp; WATER</td>
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<td>1</td>
<td>CEN1</td>
<td>HEAT ISLAND DESIGN PRINCIPLES</td>
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<td>CEN2</td>
<td>EFFICIENT STREET AND PARK LIGHTING</td>
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<td>CEN3</td>
<td>ON SITE ENERGY GENERATION</td>
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<tr>
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<td>CEN4</td>
<td>RENEWABLE ENERGY</td>
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>> Low Carbon Cities Framework

LOW CARBON CITIES
FRAMEWORK & ASSESSMENT SYSTEM

4 Elements

13 Performance Criteria

35 Sub-Criteria

Urban Environment (UE)

3 Performance Criteria

14 Sub-Criteria

Urban Transport (UT)

4 Performance Criteria

7 Sub-Criteria

Urban Infrastructure (UI)

4 Performance Criteria

9 Sub-Criteria

Building (B)

2 Performance Criteria

5 Sub-Criteria
>> Low Carbon Cities Framework

**Urban Environment**
- Site Selection
- Urban Form
- Urban Greenery & Environmental Quality

**Urban Transportation**
- Shift of Transport Mode
- Green Transport Infrastructure
- Clean Vehicles
- Traffic Management

**Urban Infrastructure**
- Infrastructure Provision
- Waste
- Energy
- Water

**Building**
- Low Carbon Building
- Community Services

Elements Contribute GHG emission

13 Performance Criteria*

35 Sub Criteria

*Performance Criteria are measurable strategies to reduce carbon emission through:- Policy control, technological dev., better process & product management, change in procurement system, carbon capture, consumption strategies & others.
## Low Carbon Cities Framework

### Urban Environment

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<td>Development within Transit Node and Corridor</td>
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### Urban Greenery and Environmental Quality

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### Urban Infrastructure

#### Infrastructure Provision

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#### Waste

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#### Energy

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#### Water Management

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### Building

#### Low Carbon Buildings

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#### Community Services

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>> Imagining the future

Metropolis

L’Alliance Cinématographique Européenne présente une production UFA réalisée par Fritz Lang d’après le scénario de Thea von Harbou.
Imagining the future

CORUSCANT, THE CAPITAL OF THE REPUBLIC, THE ENTIRE PLANET IS ONE BIG CITY.

SKYSCRAPERS OF CORUSCANT
>> Summary
>> Summary