GREEN ICT for Green Building

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The Scope of Green ICT

1) impact of a specific product itself
2) impact on the surroundings as a result of usage of that particular product
3) socio-economic and structural changes that its usage could result in.
ICT Constraint

• Low awareness on the importance of green ICT → lack of information
• High energy usage from the product → Globally, energy consumption from the application of ICT can reach 40% of total energy consumption (BP Migas, 2010)
• Paradigm of the use of green ICT requires advanced technology and high cost
• E-waste → has become national issues

WHAT WE’LL GET?

Implement Green ICT

Less Carbon Footprint, Energy use, e-waste

Achieve Maximum efficiency

Achieve Environmental Sustainability

Achieve Economical Benefits
### RATING Criteria

<table>
<thead>
<tr>
<th>CRITERIA</th>
<th>POINT</th>
</tr>
</thead>
<tbody>
<tr>
<td>Electrical Sub Metering</td>
<td>P</td>
</tr>
<tr>
<td>Energy Efficiency Measure</td>
<td>20</td>
</tr>
<tr>
<td>Natural Lighting</td>
<td>4</td>
</tr>
<tr>
<td>Climate Change Impact</td>
<td>1</td>
</tr>
<tr>
<td>On Site Renewable Energy</td>
<td>5</td>
</tr>
<tr>
<td>Water Metering</td>
<td>P</td>
</tr>
<tr>
<td>Water Use Reduction</td>
<td>8</td>
</tr>
<tr>
<td>Water Efficiency Landscaping</td>
<td>2</td>
</tr>
<tr>
<td>Outdoor Air Introduction</td>
<td>P</td>
</tr>
<tr>
<td>CO2 Monitoring</td>
<td>1</td>
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</tbody>
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**TOTAL: 41 POINTS**

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### Sample ICT solution: IP based submetering

**Better Control → Energy Efficiency**

- Financial Saving (8%-12%) from energy efficiency
- Capacity Planning (more safety, comfort & productive)

**Others Benefit:**

- **EEC P1 & WAC P1**
  - EEC 1 → 1-20 Points
  - WAC 1 → 8 Points

Intelligent Control

- Less Human Careless
- Easy to Control
- Accurate and fast information

Lighting Sensors

EEC 1 \(\rightarrow\) 1-20 Points
Atau
EEC 1: tolok ukur 3.2.3 (motion Sensors) \(\rightarrow\) 1 Points
EEC 2 (lux sensors) \(\rightarrow\) 4 Points

Source: http://www.lightsearch.com/resources/lightguides/sensors.html
Movement and Lux sensors for optimize
Natural Lighting

Day

Natural lighting > 300 Lux
No presence detected, daylight, lights off
Presence detected, sufficient daylight, lights off

Night

Natural lighting < 300 Lux
Presence detected, insufficient daylight, all lights on
No presence detected, lights off

Informing the Benefits

Year to Date savings over conventional design energy model.
EEC 4 → 1 Point
EEC 5 → 5 Bonus Points

Year to Date savings of output’s actual energy consumption over design model.
Equivalent tons of CO₂ emissions eliminated.
Equivalent trees planted.
Equivalent cars removed from the road.
Intelligent Landscape Irrigation

WAC 1 → 8 Points
WAC 6 → 2 Points

Source: http://www.yuvaengineers.com/?p=583

CO₂ sensors and Ventilation

• Better Health
• Increase Productivity

IHC P1 Ventilation
IHC 1, CO₂ Monitoring → 1 Point

Source: http://www.hydro.mb.ca/your_business/hvac/ventilation_co2_sensor.shtml
# GREENSHIP EB for ICT

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<tr>
<th>RATING Criteria</th>
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<tbody>
<tr>
<td>EEC 1</td>
<td>Optimized Efficiency Building Energy Performance</td>
<td>16</td>
</tr>
<tr>
<td>EEC 4</td>
<td>Energy Monitoring and Control</td>
<td>3</td>
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<tr>
<td>WAC 1</td>
<td>Water Sub-Metering</td>
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<td>WAC 2</td>
<td>Water Monitoring Control</td>
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<td>WAC 3</td>
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<td>IHC 3</td>
<td>CO, and CO Monitoring</td>
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<td>IHC 8</td>
<td>Building User Survey</td>
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<td>MRC 4</td>
<td>Hazardous Waste Management</td>
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<td>MRC 5</td>
<td>Management of Used Good</td>
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<tr>
<td>BEM 1</td>
<td>Innovations</td>
<td>5</td>
</tr>
</tbody>
</table>

**TOTAL:** 43 POINTS

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**Behavior & Culture**
Information & Communication

EEC 1 → 16 Points
EEC 4 → 3 Points

WAC 1 → 1 Point
WAC 2 → 2 Points
WAC 3 → 8 Points

Efficiency Impact

- 2006 Indirect energy consumption (electricity)
- 2007 Indirect energy consumption (electricity)
- 2006 Direct energy consumption (gwp and co2)
- 2007 Direct energy consumption (gwp and co2)

On the Internet, nobody knows you're a dog.
Water leak alarm

CO Sensors

Building User Survey

Comfort?

WAC 2 → 2 Points

WAC 2 → 2 Points

IHC 8 → 3 Points
e-waste!!

Need More Careful Treatment

MRC 4 ➔ 2 Points

Good e-waste Management

RECYCLE

Used Good Management

Longer e-life

MRC 5 ➔ 1 Points

Source: UNEP, 2010
More Ideas??

Tele-conference

BEM 1 → 5 Points

e-parking Management

More wireless

Thank You