Expensive Not to Go Green: Proven by case studies

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(* Now with gBEET)
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- Building Sector and CO$_2$ savings potential
- Barriers, incentives, carrots and sticks
- Case studies
  - LEO building (built)
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The Global Sustainable CO$_2$ Emission Goal

GREEN BUILDINGS play a key role in achieving this goal

1 ton CO2 emission challenge at COP15, Copenhagen, 2009

Ton CO2 emissions per person per year

Average Malaysian: 7
Sustainable Level by 2050: 1

World average (2010): 5 ton CO$_2$ per person
IPCC REPORT

Cheapest and largest CO$_2$ savings in building sector

**CO$_2$ savings**

<table>
<thead>
<tr>
<th>Giga-ton of CO$_2$ equivalents per year</th>
<th>US dollars / ton CO$_2$ equivalents</th>
<th>Cost of CO$_2$ savings</th>
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<tbody>
<tr>
<td>Energy supply</td>
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<td>Transport</td>
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<td>Waste</td>
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Energy Efficiency has a good Economic Internal Rate of Return
(Input to 9th Malaysian Plan by Danida, 2005)

Typical EIRR for Selected Technology Option

EE in Residential Buildings

EE in Commercial Buildings

Everything above this 10% line is a good investment

2.1 Electricity and fuel savings in manufacturing (mainly cement, food, iron&steel, rubber, wood)
2.2 Biomass boilers in manufacturing (Coal Substitution w/PKS)
3.1 Electricity savings in new and existing residential buildings (30%/15% electricity savings)
2.1 LPG savings in manufacturing (mainly cement, food, iron&steel, rubber, wood)
2.4 NG-fired CHP in machinery (replacing 10% of process heat)
5.1 Co-firing of coal and PKS
2.4 NG-fired CHP in paper (replacing 10% of process heat)
2.2 Biomass boilers in manufacturing (Coal Substitution w/PKS)
2.4 NG-fired CHP Large-Scale
3.1 Electricity savings in new and existing commercial buildings (30%/15% electricity savings)
2.5 Solar dryer in manufacturing, 4.1, 4.2 waste-to-energy (w/CDM)
2.4 NG-fired CHP in rubber/food (replacing 10% of process heat)
2.4 NG-fired CHP in iron&steel/non-metallic/textile (10%) (replacing 10% of process heat)
1.2 NGV in transportation (20% of gasoline)
1.1 Palm-diesel in transportation (B20)
5.1 Co-firing of coal and EFB-bales, POFF
5.2 BioGen Small-Scale (120 MW)

2.1 NG savings in manufacturing (mainly cement, food, iron&steel, rubber, wood)
2.4 NG-fired CCP in education/"other" (replacing 25% of el. for cooling)
2.1 NG savings in manufacturing (mainly cement, food, iron&steel, rubber, wood)
2.4 NG-fired CCP in education/"other" (replacing 25% of el. for cooling)

mill. toe (Estimated Avoided Fossil Fuel Consumption in 2020 / For NGV Gasoline is Replaced by Natural Gas)
CASE STUDY
LEO building (KeTTHA)

Two tenders
- without energy efficient features
- with energy efficient features

Findings
- 5% extra cost
- 50% energy savings
- 5 year payback

Key data:
- Gross Floor Area: 20,000 m²
- Energy Index: 114 kWh/m²/year
- Additional EE construction cost: 5%
- Payback: 5 years
- Annual energy savings: ~ RM 600,000

2006 Winner of:
ASEAN Building Energy Award
Ministry of Energy, Green Technology and Water, Putrajaya, Malaysia

Energy bill comparison (RM/m² year)
- Two tenders
  - Without energy efficient features
  - With energy efficient features

- 5% extra cost
- 50% energy savings
- 5 year payback

Year of completion: 2004

Ministry of Energy, Green Technology and Water, Putrajaya, Malaysia
Year of completion: 2004

Energy Efficiency (EE) Features:
- Daylighting
- EE lighting
- EE office equipment
- EE ventilation
- Controls & Sensors
- Orientation
- Insulation
- Energy management
CASE STUDY
ST Diamond building

Client’s Need Statement
- landmark building with regards to design
- landmark building with regards to sustainability

3-minute video of sustainable features: www.youtube.com/watch?v=3H_sXCtDayc

Findings
- 6% extra cost
- 66% energy savings
- 3.5 year payback

Year of completion: 2010
Photo credit: ACICC
Good Economy in Energy Efficient and Green Buildings

<table>
<thead>
<tr>
<th>Malaysia</th>
<th>United States</th>
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<tbody>
<tr>
<td>• 5% extra construction cost</td>
<td>• 2-7% extra construction cost</td>
</tr>
<tr>
<td>• 50% reduction in energy use</td>
<td>• 64% higher sales price</td>
</tr>
<tr>
<td>• 60% reduction in water use</td>
<td>• 36% higher rental rates</td>
</tr>
<tr>
<td>• 5 year payback</td>
<td>• 5% higher occupancy rates</td>
</tr>
</tbody>
</table>

Source: IEN Consultants, 2012


NB: Building location skews numbers

Conclusion: Expensive not to be energy efficient
No / Low Cost for Energy Efficiency

BEI vs. Tender Price

(Final 10 tenders for KKR HQ project)

Public tender for Government Office Tower in Kuala Lumpur
No / Low Cost for Energy Efficiency

Public tender for Government Office Tower in Kuala Lumpur

BEI vs. Tender Price

(Final 10 tenders for KKR HQ project)

Another example:

LEED Platinum projects can be 2% cheaper

Bill Odel, HOK Group (WGBC, 2010)
Initial Cost Shifting for Green Buildings

The overall cost for green buildings can remain roughly the same - or even become smaller

Quote:
"LEED Platinum projects can be 2% cheaper"

Bill Odel, HOK Group (WGBC, 2010)
Green Building Drivers & Barriers

Drivers:
- Superior building performance: 51%
- Rising energy costs: 77%
- Environmental conditions: 57%
- Government and building code: 62%
- Industry rating system: 41%
- Increased education: 46%
- Greater availability of green products: 60%
- Lower lifecycle costs: 53%
- Competitive advantage: 45%
- Client demand: 65%
- Tenant satisfaction and productivity: 39%

Barriers:
- Lack of education: 56%
- Perceived higher upfront costs: 92%
- Lack of awareness: 50%
- No fiscal incentive from Government: 58%

BOOT
Build, Own, Operate and Transfer

• A 20-year perspective changes the picture completely
• Promotes green and sustainable building practices to be adopted
• Energy efficient measures are adopted
• Water efficient measures are adopted
• Durable low-maintenance measures are adopted

Quote from BOOT builder at Dubai conference (2009):

“I want a building that is better than LEED Platinum, not only because it is green, but because it is the cheapest option”
Advertising against Energy Efficiency

New Straits Times
January 2002, Malaysia
New and Energy Efficient Approach

Energy Efficiency Label for:
- Air con
- Fridges
- TVs
- Fans
- Motors

Suruhanjaya Tenaga, 2010
Good experience with investment in energy efficiency

Conclusions by 3rd party evaluation report

- Cheaper to save 1 kWh than to produce 1 kWh
- Electricity savings funded by small electric tariff, but consumers get money back 10-fold
- 1,000 GWh electricity saved annually

Investment back 10-fold
Final Slide

Energy Efficient Stamp series from Post Malaysia

"Thank you"