Proposed Nam Cuong Zero Energy Township, outside Hanoi, Vietnam

**DUONG NOI ECO-SMART TOWNSHIP**

- **Location:** Km4 To Hiu, Ha Dong, Hanoi
- **Area:** 197 ha
- **Main functional area:** Hotel, Commercial center, Office, Villas, Luxury apartments

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Research and development on energy efficiency and RE in buildings since 1977 (Joined IEA SHC Task 1 in 1978)

1977 – 2000 Working internationally out of Denmark
2001 – 2017 Working primarily in Malaysia and Vietnam

2001 – 2012: MD of IEN Consultants, Kuala Lumpur Malaysia
A Zero Energy Township is a township that produces all the energy needed in the township from renewable energy.

A combination of energy efficiency in buildings and use of renewable energy.

In the case of a Vietnamese township, the main energy technologies will be:

- **Advanced technologies to reduce energy consumption in buildings**: 50% savings
- **Solar electricity and solar energy for heating of hot water**: 25% savings
- **Hydropower electricity imported from the electric grid**: remainder 25%

- The NamCuong Zero Energy Township must be a **Smart Electricity City**
  - Buildings are designed so that they have a reduced power consumption from the grid when local solar energy is not available,
  - Import of electricity from the grid is reduced and happens only during off peak periods.
Figure A- 15: Hourly load curve of the peak day

Source: EVN (2013b)
Copenhagen has the ambition to become the 1st Carbon Neutral Capital in the World By 2025

Reduce carbon emissions, create green growth, enhance quality of life.

COPENHAGEN - CARBON NEUTRAL BY 2025
Hydroelectricity covers around 20% of total electricity load.

The Zero Energy Community can only draw 20% of normal electricity consumption (kWh/year)

The Zero Energy Community should draw 0% of normal peak power (kW)
Figure 2: Annual electricity demands per control region (above) and peak demands per control region (below).
Solar PV Cost per Kwh

(Projected beyond 2009. All data in 2009 dollars.)

2009 US Average Electricity Cost: $0.12 / kwh

Source Data to 2009: DOE NREL Solar Technologies Market Report, Jan 2010; Projections by Naam 2011
World Solar Energy map

Vietnam
Integration of Solar PV in the facades
Experiences with Energy Efficiency in Malaysia and Vietnam

- Costs for going green: 2 – 5% extra construction costs
- Saving on Energy Bill: 30 – 60%
- Payback period for Green Buildings: 3 – 6 years

Ministry of Energy, Malaysia

Sarawak Energy HQ, Malaysia

FPT Building, Da Nang Vietnam

Energy Commission, Malaysia
Green Buildings are Cheaper than Grey Buildings

10,000 m² office building

- 12% or 1.2 mio US$ - Savings on Energy Consumption (40 – 50%)
- Savings on CO₂ Emissions (40 – 50%)
Estimate of Energy Savings Potential for Domestic Buildings

Preconditions so that *new power plants are not needed*
- The buildings can buy 20% electricity from EVN (Hydropower)
- The buildings must draw minimum power from the grid during peak hours (9.00 – 17.00 hours)

<table>
<thead>
<tr>
<th></th>
<th>Savings on kWh</th>
<th>Savings on peak load</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>10.00 am</td>
</tr>
<tr>
<td>Refrigerator</td>
<td>15</td>
<td>75%</td>
</tr>
<tr>
<td>Television</td>
<td>13</td>
<td>50%</td>
</tr>
<tr>
<td>Lighting</td>
<td>19</td>
<td>75%</td>
</tr>
<tr>
<td>A/C</td>
<td>17</td>
<td>40%</td>
</tr>
<tr>
<td>Rice Cooker</td>
<td>16</td>
<td>0%</td>
</tr>
<tr>
<td>Water Heating</td>
<td>10</td>
<td>100%</td>
</tr>
<tr>
<td>Miscellaneous</td>
<td>10</td>
<td>50%</td>
</tr>
<tr>
<td></td>
<td>100</td>
<td>54%</td>
</tr>
<tr>
<td>Draw from EVN</td>
<td>20%</td>
<td></td>
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</tbody>
</table>
Energy Efficient Buildings is the cheaper solution

It is cheaper to build an Energy Efficient Building than to build power plants

- One MW saved in buildings is cheaper than one MW extra power plant capacity
  + we save on electricity costs for the consumer
  + we save \( \text{CO}_2 \) emissions for the environment

*Effective Financial Instruments must be based on this economic reality*
Proposed Nam Cuong Zero Energy Township, Hanoi, Vietnam

Key prequisites for implementation:

- Saving MW’s is cheaper than building MW’s
- Cooperation with the utilities is critical (EVN: Electricity of Vietnam)
- Support by the Government of Vietnam: Ministry of Industry and Trade MOIT
- Technologies for energy efficiency and solar PV are technologically mature and financially competitive
- Recognition by the International Energy Agency can be most important for further progress

- Advanced technologies to reduce energy consumption in buildings: 50% savings
- Solar electricity and solar energy for heating of hot water: 25% savings
- Hydropower electricity imported from the electric grid: remainder 25%
Figure A-20: Electricity consumption in Viet Nam by sector in 2012

- Industry & construction: 52.70%
- Residential, offices, public lighting: 36.40%
- Residential and Services: 4.70%
- Agriculture: 1.20%
- Other: 5%

Source: EVN (2012)
Examples of Zero Energy Cities in the world

- **Copenhagen**, with 1.2 million inhabitants, is striving to be the world's first Zero Energy Capital by 2025.

Around the world there are several initiatives to develop and demonstrate Zero Energy Townships. Some of these are:

- **Z-Net Uralla in Australia** between Sydney and Brisbane is developing a Zero Energy Township.

- **Crisfield’s community in Maryland US** is developing a Zero Energy Township, primarily based on wind energy.

- **Beddington Zero Energy Development (BedZED)** north of London is an existing Zero Energy Township, based on solar electricity and biomass.