

## Energy Efficiency Initiatives in Singapore

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This month must have been exceptionally busy for the National Environmental Agency (NEA) because it launched 3 initiatives and released a report finding all relating to energy efficiency. The 3 initiatives launched were:

- 1) Energy Audits to provide Cost Savings for Charity Beneficiaries and Homes: NEA has customized its educational programme to train 60 volunteers and staff of the Singapore Red Cross to conduct energy audit for its charity beneficiaries and homes.
- 2) On 11 Sep 09, the NEA launched the Voluntary Agreement to promote Energy Efficient Appliances: A total of 12 major suppliers and 4 well-known retailers have signed up as part of the Energy Challenge Week 2009 programme.
- 3) In the same Energy Challenge Week, the North West Community Development Council and the Nee Soon east Constituency jointly launched the "PC Goes Green @ North West – Click & Save" programme on 13 Sep 09. This is in support of the national 10% Energy Challenge campaign which aims to reduce household energy consumption by 10% over the period from 2008 to 2012. This programme will be rolled out to another 13 constituencies under the North West district and by Jun 2010, an estimated 196,000 households and 70 schools within the district would have benefited from this programme.

Since Jan 2008, NEA has mandated the energy labeling of consumer air-conditioners and refrigerators and the results of the 14-month study from Jan 08 to Feb 2009 involving some 11 retailers covering over 57 outlets found that the lifecycle cost (comprises cost of the appliance and the lifespan electricity cost of running it) of air-conditioners (5.5-6 KW) for a 4-tick model (5.5-6KW) is 50% less than those of the 1-tick model. Similar results were also obtained from refrigerators of volumes between 350 to 450 litres in capacity.

### **Why the focus on Energy Efficiency?**

In 2007, Singapore was the world's 3<sup>rd</sup> largest export oil refinery centre and the largest oil trading hub in Asia (3<sup>rd</sup> in the world). Given that the oil industry in Singapore contributes 5% of the island GDP, it is in the interest of the government to continue to refine existing policies and encourage innovations in refinery, trading and logistic activities that are involved in this sector.

Besides oil refinery, power generation consumes about 51% of the total fuel demand in Singapore. Next in line is transportation which accounts for 16% of the total fuel consumed and the government has been encouraging the general public to use public transport such as the MRT and buses. Unknown to many, buildings also account for 16% of Singapore total energy consumption. For a typical building, energy cost constitutes an average 20% to 40% of total operating costs per annum. The remaining energy demands come from the commercial and industrial sectors.

As Singapore seeks to grow its economy and upgrade its infrastructures to support businesses and a growing population (residents and new citizens), there is a pressing need to address the issue of energy efficiency given its scarcity as well as the increased worldwide concern about carbon emissions and climate change. Various past articles on climate change can be found at: [http://www.innovar.com.sg/more.htm#Past\\_Articles](http://www.innovar.com.sg/more.htm#Past_Articles)

## Singapore's First Sustainable Development Blueprint

Given Singapore's development status, the government has been focusing on Sustainable Development (SD) and developing Singapore as an "Eco-Hub". The Inter-Ministerial Committee on Sustainable Development (IMCSD) which was formed in Feb last year is co-chaired by Minister for National Development Mr. Mah Bow Tan and Minister for the Environment and Water Resources Dr. Yaacob Ibrahim. In Apr this year, the IMCSD released Singapore's first Sustainable Development Blueprint. This blueprint is a partnership involving 3 sectors namely, People, Public & Private enterprises (3P) and took in some 1,300 feedbacks from more than 700 people. A copy of the full report can be downloaded from: [http://app.mewr.gov.sg/data/ImgCont/1292/sustainableblueprint\\_forweb.pdf](http://app.mewr.gov.sg/data/ImgCont/1292/sustainableblueprint_forweb.pdf)

In a nutshell, the blueprint covers 4 key areas (see Figure 1):

**1) Resource Efficiency** – under this broad category, improvements in energy efficiency, increases in recycling rate, reduction in domestic water consumption per person and optimum use of land are amongst the key initiatives.

**2) Enhance Urban Environment** – to ensure that Singapore continue to become a sustainable, high-density city that is clean and green; reduction in air pollutants such as fine particles and sulphur dioxide are very important. Likewise, providing green space in high-rise buildings and their surrounding as well as improving accessibility for pedestrians and cyclists and increase usage of public transport are some of the measures that are being undertaken.

**3) Building Capabilities** – to deliver these outcomes, the existing infrastructures in land, water and environment will need to be upgraded through the use of newer technologies to overcome the resource limitation. Simply put, these are the hardware that are required to achieve the hard targets set by the blueprint.

**4) Foster Community Actions** – while capability building is essential, hardware alone will not bring about success and hence, the blueprint calls for the need to encourage community ownership and participation in building a clean, green and resource efficient Singapore. To achieve this, one of the initiatives is the involvement of 3Ps as mentioned earlier.

**Figure 1**



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### **So what specific actions have or are being taken for Energy Efficiency?**

The government has always focus on pricing energy appropriately so that there will be no wastage or over-use. Since there is no subsidy for energy usage in Singapore (Energy subsidy is one of the key issues discussed this week at the UN General Assembly in New York. Energy subsidy is a contentious issue for many developing countries including China & India), the policy will encourage energy conservation but this has to be supplemented by more information being made available so that consumers are better informed of their current energy usage, cost of operating appliances/equipment and the bench marks for comparison. Towards this end, energy labeling for some consumer appliances have been mandated and soon, minimum performance standards for key electrical appliances and industrial processes will also be established.

In the area of power generation, the government has been encouraging the adoption of co-generation and tri-generation technology. In the case of co-generation, simultaneous production of electricity and useful heat (steam) from a single fuel source can reduce the amount of fuel needed by more than 20% compared to generating them separately. Keppel Merlimau Cogen located on Jurong Island is a 500MW natural gas-fired combined cycle co-generation that is an excellent example of the energy savings achieved through co-generation plant. Tri-generation power plants are even more efficient as the same fuel source is also used to produce chilled water. Companies that have combined demand for electricity, steam and chilled water will be able to see significant energy savings if they use tri-generation power plants.

For public transportation, the target is to achieve 70% of the morning peak hour travel to be via public transportation means by 2020. To achieve this objective, the LTA will further refine private vehicle ownership and usage policies as well as introduce new technologies for public transportation. Amongst the measures introduced include the hybrid cars, diesel particle filters as well as electric vehicles. These more energy efficient cars emit less carbon dioxide for the same use.

As part of the various targets under the Sustainability Development Blueprint, 80% of existing buildings are expected to attain at least a Green Mark certification rating by 2030. For new buildings sited in strategic districts, these will have to achieve a higher rating of Green Mark Gold+/Platinum as part of the requirements for land sales. For public housing, energy savings target for common areas include 30% reduction for matured estates and 20% for new estates. Besides the use of more energy efficient light fittings in common areas, investment in solar technology test bedding projects to use solar energy on a large scale basis is being carried out at Serangoon and Wellington precincts. The test bedding for solar panels will eventually be extended to cover 30 precincts.

Since many of these targets require close collaboration amongst the government, corporations and individuals, the government has set aside some funds to promote community involvement and public education. The 3P (Public, Private and People) Partnership Fund is an example of such funding that will be spent over the next few years for this purpose. Besides education, there are also various financial schemes to incentivise corporations to help achieve the nation's goal to reduce energy intensity (per \$ GDP) by 20% from 2005 levels by 2020 and by 35% by 2030.

Some of these incentives and programmes are outlined below:

- S\$680 Million to build new capabilities in Clean Energy and Water Technologies. The government projected that this new Clean Energy and Water Technology sectors can potentially create an economic value-add of S\$3.4B and generate employment of 18,000 by 2015.

- S\$100 Million to encourage existing buildings (target 400 to 600 existing large buildings) to achieve energy efficiency retrofitting, ie Green Mark Certification.
- New public sector buildings with 5,000 sq metres of air-con floor area to achieve Green Mark Platinum rating and existing public sector buildings with over 10,000 sq metres of air-con floor area to attain Green Mark Gold+ rating by 2020.
- S\$5 Million incentive scheme to develop prototype building designs that achieve at least 50% improvement in energy efficiency.

**Sustainable Development is a long-term effort**

Climate change impacts every country and Singapore is not spared especially when the country lacks natural resources and is highly dependent on trade and energy to sustain its economic growth. The Sustainable Development Blueprint is only the first step and the government will need various means including education, incentives and legislation to achieve the targets set out for 2020 and 2030. Given that carbon emission-control measures and energy efficiency improvements will entail costs, the government has set aside S\$1 Billion to help businesses and individuals to make the switch to cleaner and more efficient energy sources. However changes on a voluntarily basis often takes time and it is certain that the government will progressively introduce more stringent standards and policies.

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