A Centre Collaborating with UNEP

The BCA Green Mark Scheme

A Driver for Energy-Efficiency Labelling in Singapore

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Synopsis

There is a strong rationale for governments to adopt energy-efficiency labels as part of their initiatives to reduce energy consumption and combat climate change, according to the Collaborative Labelling and Appliance Standards Program[1] (CLASP). Energy-efficiency labels can help do away with unnecessary electricity and fuel consumption by household appliances which in turn reduces overall fuel combustion in electric power plants. This could potentially reduce national investment in energy supply infrastructure and improve economic efficiency through reduced utility bills, both of which are important aspects for growing economies.

There is a positive trend in the number of countries with labelling programmes, which has grown from 50 in 2004 to 81 in 2013, according to a study commissioned by Australia's Department of Industry. However, the success of such labels hinges on support from a combination of voluntary and regulatory programmes. This article explores how Singapore's green building rating tool, the BCA Green Mark scheme has supported the National Environment Agency's (NEA's) Mandatory Energy Labelling Scheme (MELS). It is intended to serve as a case study and resource for governments in the region implementing green building policies and energy-efficiency labelling programmes. Policy makers could draw on or develop further on this study to adopt a Whole-of-Government (WOG) approach for green building policies and embed energy-efficiency labels as criteria and/or pre-requisites within their green building rating tools, building-energy codes or other relevant programmes.

[1] The Collaborative Labeling and Appliance Standards Program (CLASP) is an international non-profit organization with a mission to "serve as the primary resource and voice for appliance, lighting and equipment energy efficiency worldwide". It was established in 1999 as a collaboration of three organizations, namely the Alliance to Save Energy (ASE), the International Institute for Energy Conservation (IIEC), and Lawrence Berkeley National Laboratory (LBNL) and became an independent, non-profit organization in 2005.

Introduction

In general, the building, industry and transportation sectors account for most of the final energy consumption of a country. Buildings characteristically consume energy for lighting, equipment and appliances. Offices use computers, copiers and water coolers while **homes across the globe increasingly use appliances such as air-conditioners**, refrigerators and washing machines. In the US for instance, air conditioners used in homes consume around 5 per cent of all electricity produced, and replacing old units with energy efficient ones could save as much as 20-40 per cent. As developing countries become more affluent, the global demand for such modern appliances is expected to rise steadily over the coming decades.

According to the International Energy Agency, energy consumption in buildings can be addressed by regulatory and information instruments and incentive schemes. **Energy-efficiency labels** and standards for consumer products are important information instruments used by governments within their energy-efficiency and climate change mitigation programmes. However to ensure success, **policy makers need to support such programmes with incentives and measures** to accelerate the removal of cost-ineffective, energy-wasting products from the marketplace and spur the development of cost-effective, energy-efficient technology.

Energy-Efficiency Labels and Supporting Policy Instruments: The Singapore Case Study

Energy-efficiency labelling allows consumers to compare the energy efficiency of similar products. Some of the more well-known energy-efficiency labels in the world include the US Energy Star, the EU Energy Label and Australia's Energy Rating Label. Several Asian countries such as Singapore, the Philippines, Hong Kong, Thailand and Korea also have energy-efficiency labels.

In 2002, a voluntary label called the Singapore Energy Labelling Scheme was introduced for products such as air-conditioners and refrigerators. This paved the way for the **Mandatory Energy Labelling Scheme (MELS)** introduced by Singapore's National Environment Agency (NEA) in 2008, for appliances such as air-conditioners, refrigerators and clothes dryers. The scheme follows an energy efficiency rating system ranging from 0 to 4 ticks, implying "low" to "excellent" ratings, respectively.

According to a CLASP study, energy-efficiency labels were found to be most effective when supported by other policy instruments like research and development, pricing and metering, incentives and financing, and regulatory programmes, to name a few. **Green building rating tools** evaluate buildings based on their environmental impact and performance, and generally include criteria on energy and water efficiency, indoor air quality and other green features. **Building-energy codes**, common in Western countries and Southeast Asia, are regulatory programmes that specify energy performance levels for the building envelope, heating and cooling equipment and lighting of buildings. Green building tools and building-energy codes generally do not set any requirements for

appliances. However, some countries, including the U.S. and Singapore, have mandatory energy labelling for appliances and green building rating tools/ building-energy codes that cover some of the same products.

The **BCA Green Mark Scheme** was launched by the Building and Construction Authority (BCA) in January 2005 as an initiative to drive Singapore's construction industry towards more environment-friendly buildings. It is a green building rating system that evaluates new and existing, residential and non-residential buildings for their environmental impact and performance based on the following key criteria:

Energy Efficiency	Water Efficiency	Environmental Protection
Indoor Environmental Quality	Other Green Features and Innovation	

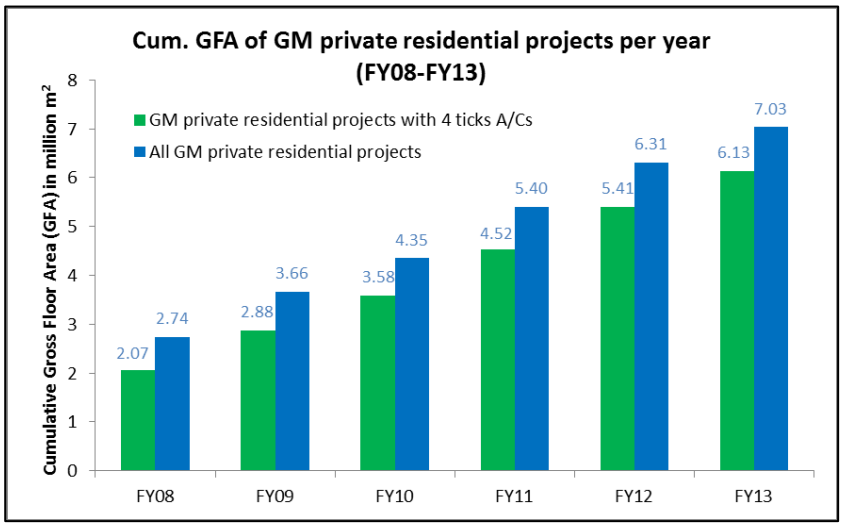
The scheme has four certification levels namely the Certified, Gold, Gold^{Plus} and Platinum ratings, in increasing order of stringency. The basic or Certified level is mandated for all new buildings and existing buildings undergoing major retrofitting, with a gross floor area greater than 2000 m^2, through the Building Control (Environmental Sustainability) Regulations under the Building Control Act. Singapore has also set a target to have 80% of its building stock Green Mark certified by 2030.

Energy-efficiency labels and their supporting programmes in many ways serve to push-and-pull the market towards more energy efficient products. This case study examines how the BCA Green Mark scheme has supported the National Environment Agency's (NEA) Mandatory Energy Labelling scheme for air-conditioners.

The Whole-of-Government (WOG) Approach: Embedding the MELS in Green Mark Criteria

The Green Mark framework does not include in-house energy efficiency labelling for appliances however it endorses NEA's MELS. The BCA Green Mark for new residential buildings awards 4 and 8 points for air conditioners with 3 and 4 ticks, respectively, out of a total of 87 points for the Energy Efficiency section mentioned above, and 155 points overall. It also stipulates **air-conditioners with 4 ticks under the MELS** as a **pre-requisite** for the higher Gold^{Plus} and Platinum ratings.

Over the years, BCA has maintained a record of all Green Mark private residential projects using high efficiency air conditioners, as part of the assessment and verification process. The chart on the right compares the yearly total cumulative gross floor area (GFA) of private residential Green Mark projects to those using 4-ticks air-conditioners, since the MELS came into effect in 2008.

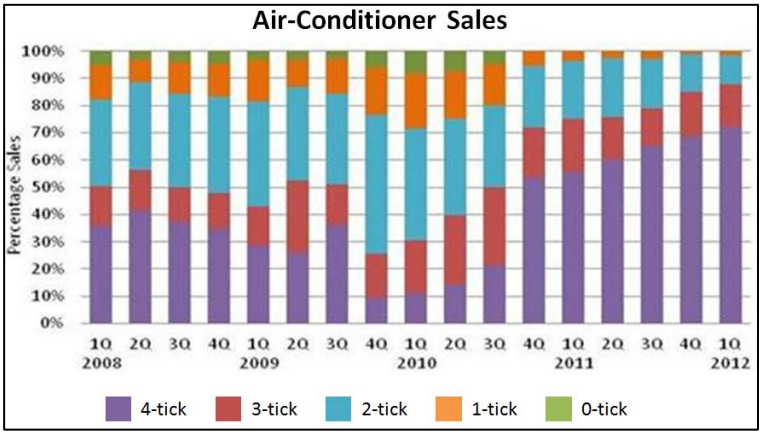


As seen from the graph, 2.07 million m^2 of GM residential projects used 4-ticks air-conditioners in 2008. This was equivalent to 76% of total Green Mark private residential GFA. The GFA of GM private residential projects with 4-ticks A/Cs increased steadily over the years to 6.13 million m^2 in 2013. This amounted to around 87% of total Green Mark private residential GFA and 10.5% of total Green Mark GFA. This is also equivalent to a significant 2.6% of total estimated GFA[2] in Singapore, as of 2013.

It may be observed that the proportion of Green Mark private residential projects using 4-ticks air-conditioners increased from 76% in 2008 to 87% in 2013. In other words, there is a positive trend in the take-up rate of higher efficiency air-conditioners. This could be directly attributed to the Green Mark criteria supporting air-conditioners with 3 and 4 ticks under the MELS. In fact, the Green Mark scheme may have even had a larger impact as the data collected does not include those projects using 3-ticks air-conditioners.

Market Penetration of MELS

From the chart to the right on trends for air-conditioner sales, as provided by NEA, it can be seen that 0-tick A/Cs have been gradually phased out over the 2008-2012 period, while 3-ticks and 4-ticks A/C sales have gone up from 50% to almost 90% of the retail market.



Conclusion

Given the shift in the market towards the more energy efficient models, as shown above, the NEA is currently looking into higher energy efficiency standards for appliances. The BCA Green Mark has contributed to this positive trend and supported the MELS for air-conditioners by pushing new residential buildings towards the more efficient 3-ticks and 4-ticks air conditioners. This case study highlights the importance of a WOG approach to developing green building policies. This approach could support government programmes such as energy-efficiency labelling, and could be applicable to other programmes such as sustainable consumption and green labels.

[2] Estimated total GFA in 2013 was 236 million m^2, assuming estimated increment of 3.5 million m^2per year from 208 million m^2 in 2005.

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