

DOMESTIC DRIVERS FOR ENERGY EFFICIENCY

Efficiency As A Pillar Of Singapore's Competitiveness

Singapore is dependent on imported fossil fuels for its energy. Singapore is a small island state and has limited local energy sources, making energy efficiency a national priority. The government has implemented renewable energy programs, but given Singapore's small size and high density, energy efficiency is a critical national priority and a source of international competitiveness. The national energy efficiency plan "E2 Singapore" targets industry, buildings, and transport.

Increased attention to the built environment

Buildings contribute to one third of domestic energy consumption (20%–40% of the total operating cost for a typical building). A building energy code is in place as well as energy efficiency standards for residential and commercial construction. The requirements cover the building envelope, indoor air quality, lighting, ventilation, air conditioning, water efficiency and other environmental quality aspects. Bonus points are awarded for use of renewable resources.

Benchmarking as starting point

Since 2005 Singapore has developed a certifiable rating system in collaboration with private sector and other government agencies. Underpinning Governmental policy is the national green building rating system also known as the BCA Green Mark scheme.

A holistic approach to buildings

The Inter-Ministerial Committee on Sustainable Development (IMCSD) that was set up in January 2008 designed a national framework and identified priority strategies that the government took on board.



In 2005 Singapore developed a certifiable rating system that created a market for green buildings and was the first step in a longer-term policy pathway.

Underpinning the policy strategy is a unique combination of instruments, including *voluntary* building certification and *legal* requirements for efficiency in new buildings.

Efficiency actions in the built environment are embedded in economy-wide policy that aims to increase energy efficiency of industry, transport and buildings in Singapore.

The focus in Singapore has moved beyond actions for new buildings; the government provides incentives to transform the existing building stock as well.

Capacity building has played a key role in the creation of a market for green buildings.

Singapore aspires to develop a holistic approach to buildings ensuring not only energy efficiency but also broader benefits.

CREATING DEMAND FOR GREEN BUILDINGS

Toward a market for green buildings

- Singapore's Building and Construction Authority (BCA) developed the Green Mark Scheme in 2005, with a strong focus on energy efficiency.
- Buildings can be awarded Certified, Gold, GoldPLUS or Platinum ratings, corresponding to an energy efficiency improvement of about 10-15%, 15-25%, 25-30% or +30% respectively. Other criteria include water efficiency, site/project development and management, indoor environmental quality and environmental protection, as well as innovation.

Pathway to Scale

- Over the years, BCA has worked with other agencies to enhance the BCA Green Mark scheme. The BCA Green Building Master plan outlines the strategic thrusts and key initiatives to green 80% of all buildings.
- BCA has also gone "beyond buildings" to inspire and promote environmental sustainability in parks, districts, rapid transit systems and supporting infrastructure through the various Green Mark schemes. More recently, efforts are made to go "within buildings" to get the end-users to play their part in greening their premises. BCA has developed the Green Mark schemes for Office Interior and now Restaurants to support businesses in driving green initiatives within their premises.
- The market has gone from 17 green buildings in 2005 to 840 in 2011.

Creating technical capacity

- BCA enables the industry to raise its capability to develop more green buildings by providing a comprehensive training framework. This is to ensure an adequate supply of green building professionals to meet the expected strong demand for green buildings.
- Formal training and certification schemes for green building specialists at professional, supervisory and technical level are provided at the BCA Academy, which aim to raise technical competence in the various areas of green building design and practices, such as the Green Mark Managers and Green Mark Professional courses.
- In parallel and complementing the efforts, the National University of Singapore has developed a Singapore Certified Energy Manager program offering formal training and certification system in the area of energy management. They also operate an accreditation scheme for Energy Services Companies (ESCOs) to enhance the professionalism and quality of energy services offered.

ELEMENTS OF THE POLICY PATHWAY

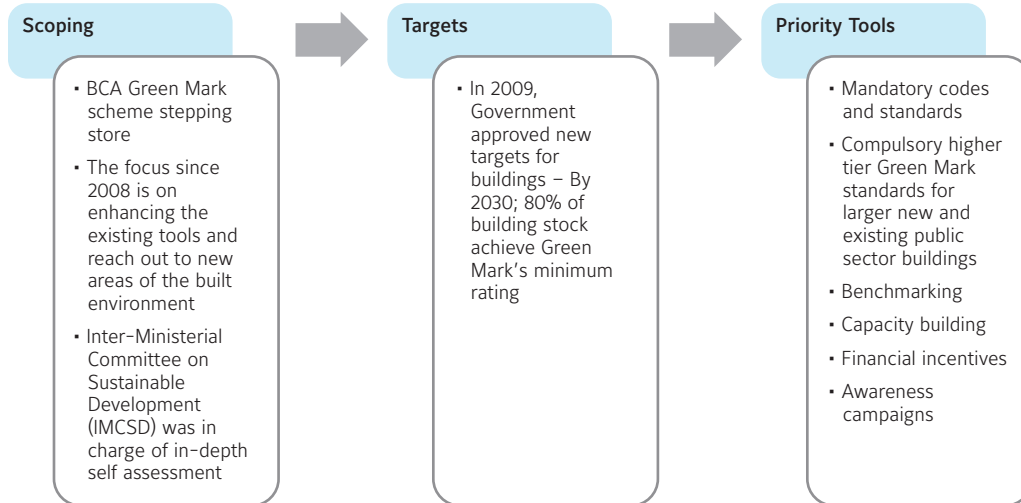
What? A unique combination certification and legal minimum requirements

- Singapore has put together a distinctive mix of policy instruments: on the one hand it tries to create market dynamics offering incentives for business participation but also is one of the few emerging economies, if not the only one, to mandate green building standards. The BCA Green

Mark scheme is a central pillar of the policy strategy. Ambitious targets were set to 2030 and several priority tools were selected.

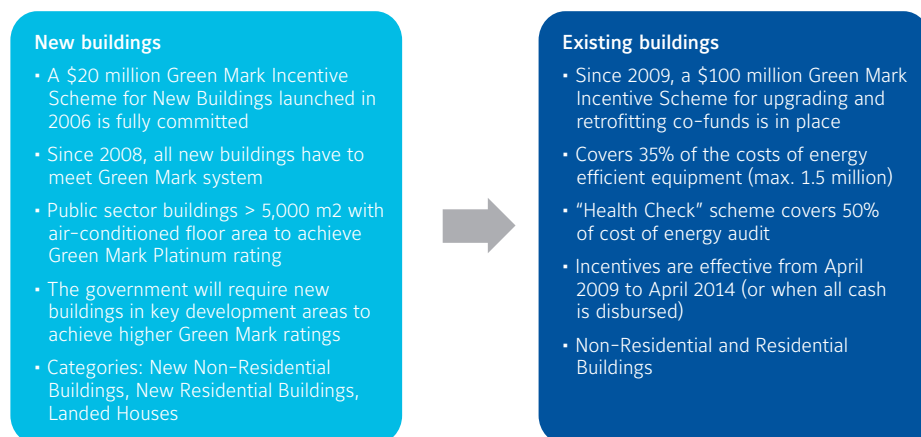
- Governmental incentives include: Gross Floor Area incentive scheme; incentives for existing building retrofit; Research Fund for Built Environment; Incentives for Design Prototypes; Incentives for New Buildings.

Figure 1.
What?



Source: Institute for Building Efficiency (2011)

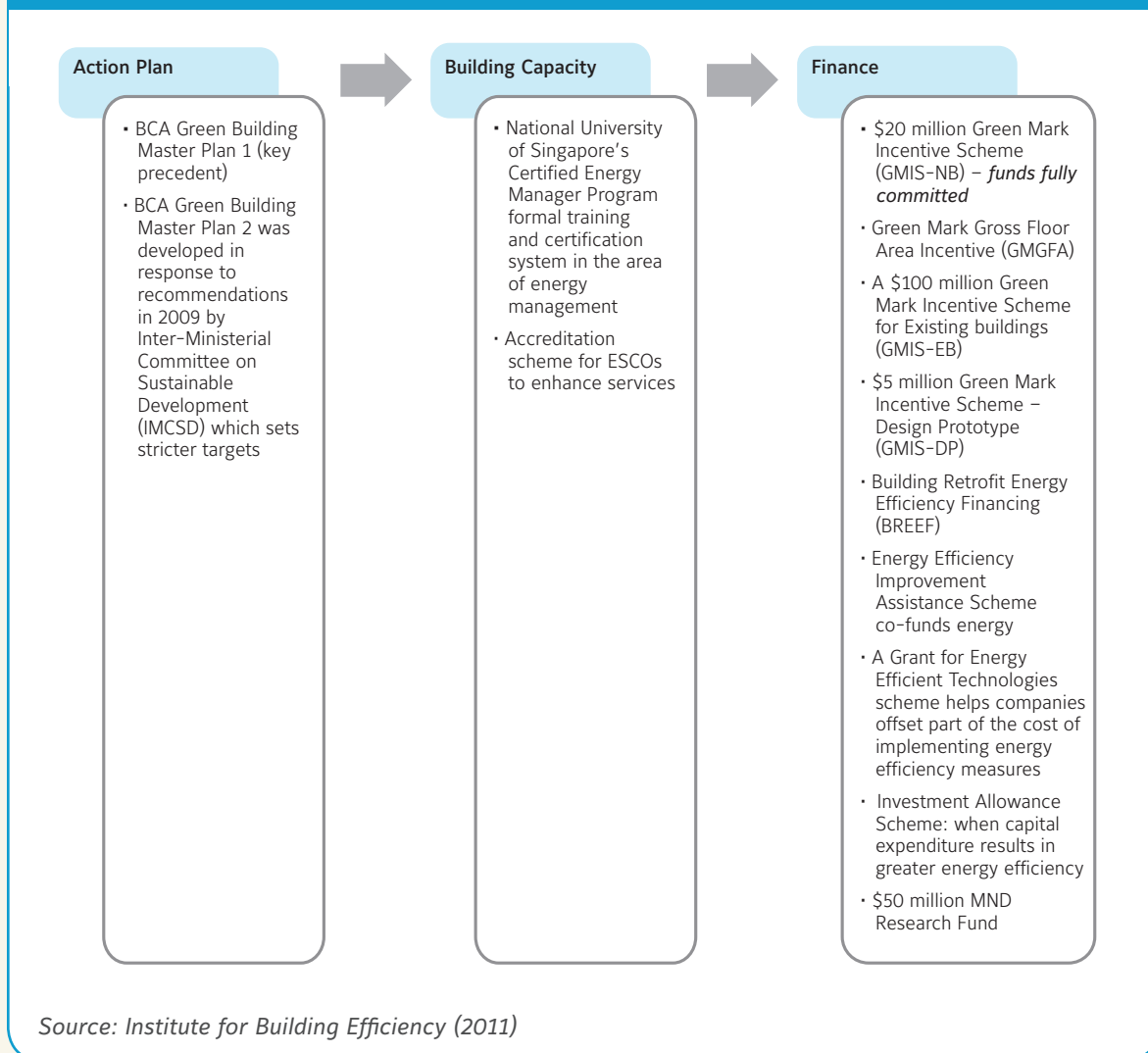
Figure 2.
Incentives for New and Existing Buildings



Source: Institute for Building Efficiency (2011)

- The BCA green building master plan consists of 6 strategic pillars: 1) Public sector taking the lead; 2) Spurring the private sector; 3) Furthering development of Green Building Technology; 4) Building industry capabilities; 5) Profiling Singapore and Raising awareness; and 6) Imposing minimum standards.
- The government has used regulation as well as incentives: The Ministry of National Development and the BCA enhanced the Building Control Act and put in place the “Building Control (Environmental Sustainability) Regulations” in 2008 to require a minimum environmental sustainability standard for new buildings and existing ones going major retrofits.
- Incentives were defined to help tackle the existing building stock.

Figure 3.
How?

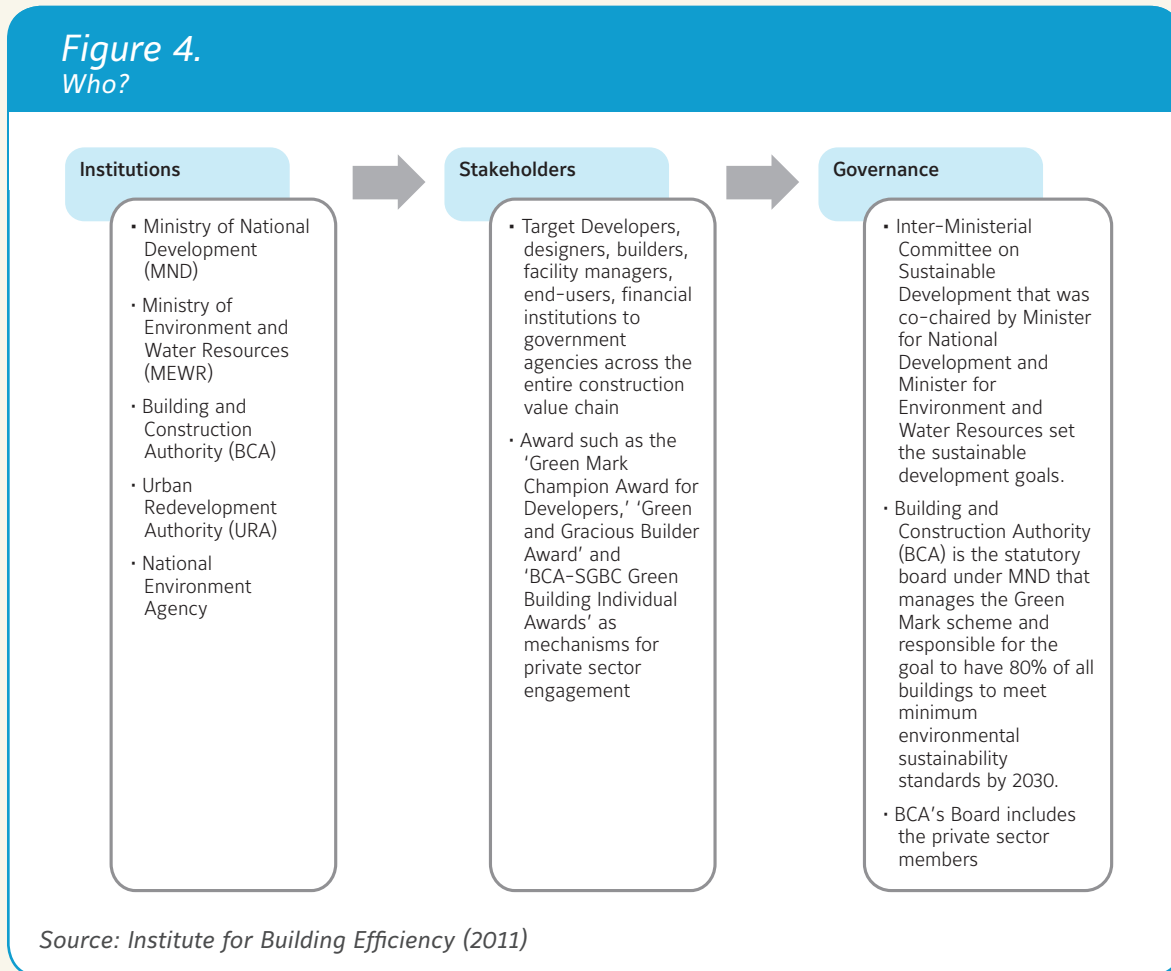


- The system is subject to continuous improvement: A major revision took place in Dec 2010. This requirement is equivalent to the Green Mark Certified Level for new buildings and existing ones that undergo major retrofitting:
 - All new building works with gross floor area of 2,000 m² or more;
 - Additions/extensions to existing buildings by 2000 m² or more;
 - Building works which involve major retrofitting to existing buildings (>2000 m²)
 - Alteration to existing buildings without major retrofitting: not subject to requirement.

How?

- Singapore has a clear, detailed master plan, the BCA Green Buildings Master Plan, which is updated regularly.
- Singapore has dedicated resources to building the technical capacity needed in the market to make buildings more energy efficient.
- Singapore has provided a number of financial incentives to help stimulate the market.

Figure 4.
Who?



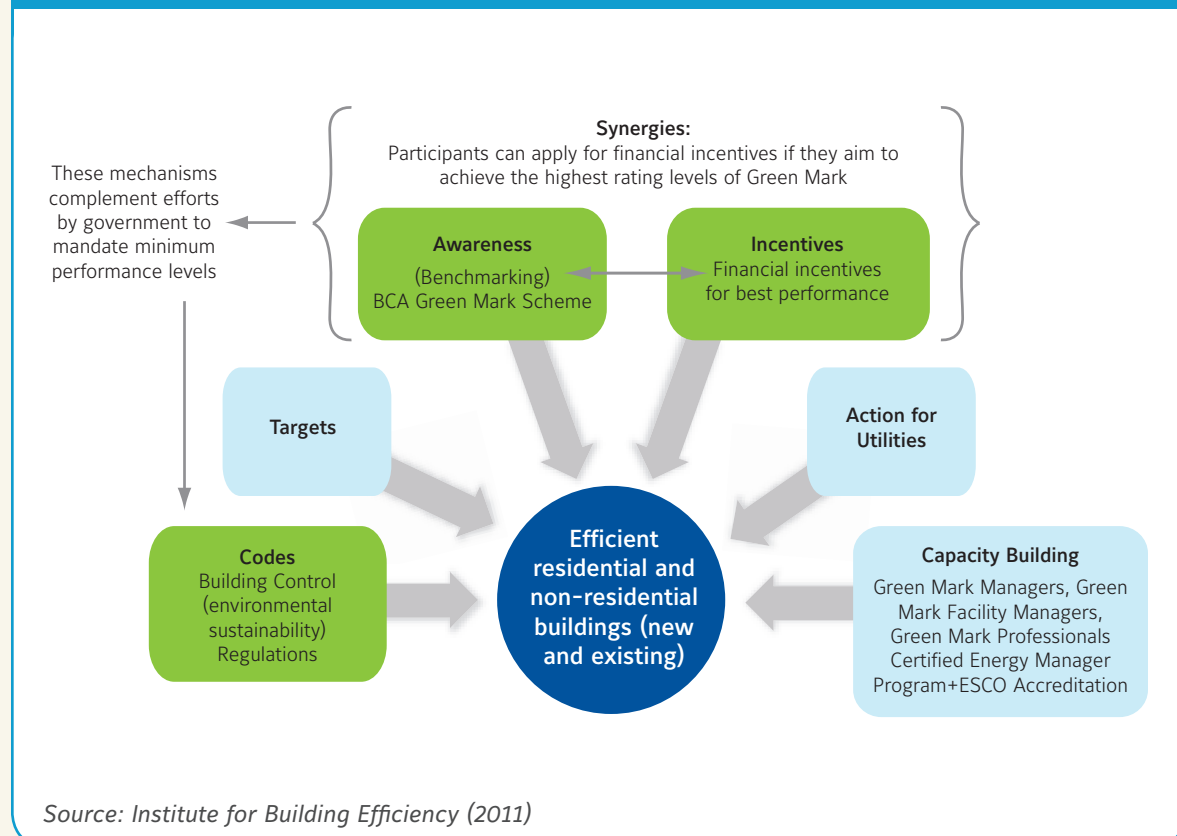
Who?

- Singapore's building efficiency policies are driven forward not only by the Building and Construction Authority (BCA), but also other critical government institutions who have a role in regulating the built environment.
- Singapore has engaged a diverse group of stakeholders, often using awards as a mechanism to engage the private sector.
- An inter-ministerial committee set Singapore's sustainable development goals. The Building and Construction Authority (BCA) is responsible for the goal to have 80% of all buildings meet minimum environmental sustainability standards by 2030. BCA's board is from both the public and private sector.

SUMMARY

Singapore has been a pioneer in the design of a balanced approach to transforming the market for building efficiency combining incentives and regulation—'carrots and sticks'—and engaging key stakeholders in the life-cycle of the buildings.

Figure 5.
Singapore's Approach



REFERENCES AND RESOURCES

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The Institute for Building Efficiency is an initiative of Johnson Controls providing information and analysis of technologies, policies, and practices for efficient, high performance buildings and smart energy systems around the world. The Institute leverages the company's 125 years of global experience providing energy efficient solutions for buildings to support and complement the efforts of nonprofit organizations and industry associations. The Institute focuses on practical solutions that are innovative, cost-effective and scalable.

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