Sustainable City Singapore

Related chapter:

**Policy design and implementation**

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Country:

**Singapore**

Sector(s):

**City**

Key words:

**water**  **air**  **climate**  **recycling**  **transport**  **city**  **plan**
Singapore has established a series of long-term goals and ten-year plans to reconcile rapid economic development and environmental sustainability. It has pursued its vision of being a clean, green city using targeted policy portfolios and strong spatial planning.

Context

Singapore is one of the world's leading commercial hubs, with the fourth-biggest financial centre and one of the five busiest ports. Singapore has developed rapidly from a third world to a first world country in five decades by prioritising the twin goals of developing a competitive economy and pursuing environmental sustainability. Both are important in order to attract investors and enhance quality of life. Singapore is resource-constrained, and imports most of its food, water and natural resources. As an island city-state, it has its own share of existing environmental challenges, particularly with air quality levels, in part due to regional transboundary haze.

The first Singapore Green Plan was first released in 1992 by then Ministry of the Environment, followed in 2002 by a new 10-year national plan, developing a national approach of integrated planning and close attention to detail. In 2009, the Ministry of the Environment and Water Resources (MEWR) and the Ministry of National Development (MND) released the Sustainable Singapore Blueprint (SSB), which outlined 5-year plans to make Singapore a liveable and lively city-state, and key strategies for Singapore’s sustainable development in the long-term.

Singapore is also pursuing green growth actively. The National Climate Change Strategy 2012 places emphasis on green growth opportunities. Singapore is developing a Cleantech hub, and is harnessing opportunities in clean and green energy (e.g. solar), waste and water technologies, urban management, green ICT, clean mobility, among others.
Challenge

For Singapore to continue to grow and prosper, it must continue to upgrade the ambition and innovation of its approach to sustainability.

Approach

In 2008 Singapore set up an Inter-Ministerial Committee on Sustainable Development (IMCSD), co-chaired by the Minister for National Development and the Minister for the Environment and Water Resources. The Sustainable Singapore Blueprint was launched by the IMCSD in 2009, which sets out sustainable development goals to 2030. The SSB outlines strategies to achieve twin objectives of economic growth and a good living environment. It includes ambitious targets for energy efficiency; water consumption; local air quality; use of public transportation; green and blue spaces, including park space and water catchment areas; and green buildings. $1 billion was committed by the Government over 5 years from 2009 to support initiatives under the SSB. The SSB is currently under review and the next SSB document will be released by the end of 2014.

Singapore’s land use plans for the next 40-50 years are outlined in a Concept Plan, which is reviewed every decade. This long term plan is then translated into a Master Plan which guides development over the next 10-15 years. Singapore is currently also preparing an underground master plan, to build transportation links, shopping, and other facilities under the existing surface developments so as to ensure room for growth in the future. Singapore’s long-term transportation plans are outlined in the Land Transport Master Plan 2013. The plans outline measures to increase connectivity, improve transport services, and create a more inclusive and liveable community.

Singapore has a broad mix of regulations and standards, pricing systems, technology demonstration projects, consumer awareness programmes, information management, and other policies across environmental issues, including air quality, climate change, energy efficiency, water, waste, nature conservation and public health.

The policy portfolios generally consist of a range of instruments and measures that target a number of goals including:
Air Quality - regulatory measures for stationary and mobile sources of pollutants; co-regulation of pollutants by government, industry, and consumers.

Transport - electronic road pricing (a form of congestion charging in central city areas), cycling networks and pathways, vehicle quota system (i.e. the auctioning of certificates of entitlement for vehicle ownership), a dense and integrated public transport system consisting of the mass rapid transit system and bus network.

Climate Change - demonstration projects on renewable energy (e.g. testing of various solar technologies in public housing precincts), R&D investments and establishment of research institutes dedicated to energy research, climate studies and research, risk assessment and adaptation planning.

Energy Efficiency - promotion of energy efficiency, setting minimum standards, 80% of buildings in Singapore to achieve Green Mark Certification by 2030.

Water - source water from local catchments; recycling and desalination of water; improve water efficiency through water efficient homes programme; mandatory submission of water efficiency management plans for large water users; apply international water standards; provide education on those living in water catchment areas; and long run marginal pricing to encourage water conservation & reflect scarcity value of water.

Waste - incineration; encourage participation in recycling; promote innovative technologies to recycle and reduce waste; infrastructure support for recycling; and voluntary Singapore Packaging Agreement.

Nature Conservation - reforestation and outreach programme for students; nature recreational master plan; 10% of land area committed as green space, of which half is gazette nature reserves.

Provision of green and blue spaces - enhance Singapore’s physical environment through the provision of greenery and green spaces as well as cleaning and opening up water bodies for recreational activities.

Public Health - improve cleanliness and hygiene of public places; control of vector-borne diseases; prohibition of smoking in public places; public education; monitor and improve indoor air quality; research healthy indoor environment.

Singapore’s emphasis on sustainability includes efforts to address climate change, and a whole-of-government approach is taken. The Inter-Ministerial Committee on Climate Change is chaired by
Singapore’s Deputy Prime Minister. The Committee is supported by the National Climate Change Secretariat, which was established in 2010, as a dedicated set-up under the Prime Minister’s Office to ensure effective coordination of Singapore’s domestic and international policies, plans and initiatives on climate change.

Singapore has many initiatives and programmes to address climate change, which are reflected in its National Climate Change Strategy 2012 document, including:

- Carbon Emissions-based Vehicle Scheme (CEVS) to encourage the adoption of low emissions vehicles
- Fuel Economy Labelling Scheme (FELS) to enable customers to make more informed decisions on their vehicle purchase
- Mandatory Energy Labelling Scheme (MELS) for household appliances, namely air-conditioners and refrigerators in 2008, clothes dryers in 2009 and televisions in 2014
- Minimum Energy Performance Standards (MEPS) for refrigerators and air-conditioners in 2011 and clothes dryers in 2014
- Tighter Minimum Energy Performance Standards (MEPS) for household air-conditioners and refrigerators (2013)
- The Energy Conservation Act (ECA) that requires energy intensive companies in the industry and transport sectors to appoint energy managers, monitor and report their energy use and greenhouse gas emissions, and submit energy efficiency improvement plans
- Reform in fuel mix to shift away from fuel oil to natural gas for power generation (about 90% of electricity is generated from natural gas)
- R&D in innovation energy technologies, such as Energy Innovation Programme Office (EIPO), Energy National Innovation Challenge (ENIC), Solar Energy Research Institute of Singapore (SERIS), Energy Research Institute at the Nanyang Technological University (ERI@N)
- Green Building Master Plan which comprises regulatory requirements for minimum environmental sustainability standards in buildings, the development of green rating tools, incentive schemes, research programmes, capability development roadmaps and outreach efforts. Climate change studies to understand potential effects and impacts on the physical environment of Singapore.

Singapore has also provided test-bedding and demonstration platforms to support companies and research institutes to validate new
technologies in a real-world setting (e.g. Cleantech Park for green companies, Punggol Eco-Town to test residential solutions, Electric vehicle test-bed, etc.). The first Zero Energy Building (ZEB) in South-east Asia retrofitted from an existing building is one such example.

Singapore also has several incentive schemes and programmes to promote energy efficiency:

- Design for Efficiency Scheme (DfE)
- Energy Efficiency Improvement Assistance Scheme (EASe)
- Grant for Energy Efficiency Technologies (GREET) scheme and Investment Allowance (IA) for Energy Efficiency Projects
- Energy Efficiency Financing
- Encourage new co-generation plants in energy intensive sectors
- Green Mark Incentive Scheme for Existing Buildings
- Green Mark Gross Floor Area Incentive Scheme
- Green Mark Incentive Scheme – Design Prototype
- MND Research Fund for the Built Environment
- Building Retrofit Energy Efficiency Financing (BREEF) scheme
- SME Energy Efficiency Initiative
- Consumer and small business education programmes
- Energy Efficiency National Partnership (EENP)
- Public Sector Taking the Lead in Environmental Sustainability (PSTLES)

Outcomes

The 2005 review of the previous Green Plan found that targets on air and water quality, waste, recycling and conservation had been met. The evidence suggests that the portfolio of policies and practices in place have made Singapore substantially greener than when it was first established. For example, the Singapore River was severely polluted in the early 1900s that a major cleanup programme was required, starting in 1977. The river is clean now that it forms part of the Marina Reservoir providing domestic water supplies to the city (MEWR 2013).

Other major achievements have been the mass public transit system, which encourages commuters to take public transport, instead of turning to private cars.

This is reflected by a 63% public transport peak period mode share, which increased from 59% in 2008 to 63% in 2012. There is a target to increase this to 75% public transport mode share by 2030. This reduces
congestion on roads, improves air quality, and maximises land use by minimising the need for roads. Energy efficiency, carbon intensity, and waste management are also improving, substantially improving the quality of life in Singapore (BCA 2009).

These positive impacts are recognized by international ratings. For example, the Economist Intelligence Unit’s Asian Green City Index Study in 2011 ranked Singapore as Asia’s greenest metropolis, particularly for its ambitious environmental targets and its efficient approach to achieving them.

**Lessons**

- One feature that has enabled Singapore’s success is the use of a comprehensive mix of regulations, financial incentives, demonstration programmes, capacity building, consumer education and awareness.
- Singapore has been effective in applying a rigorous approach to developing tailored solutions for each environmental goal.
- Singapore's clean and green image has been a critical marketing tool in attracting international investment.

**Summary of GGBP Assessment**

**Robustness**

Singapore’s blueprint for sustainable development is credible and highly relevant. It has evolved over time, based on comprehensive evaluation of which policies and instruments have worked most effectively. Legitimacy is provided by the extensive public consultation that backs the Government’s planning efforts.

**Efficiency**

Efficiency is a core tenet of Singapore’s market oriented policy making. Although Singapore has carried out cost benefit analysis of its policies, these were not examined in this case study, so efficiency has not been assessed.

**Impact**
The evidence suggests that the portfolio of policies and practices in place have made Singapore substantially greener than when it was first established.

*Special contribution was made by the National Climate Change Secretariat of the Government of Singapore to this case study for review and providing references.

Disclaimer: This case is a summary of research input to the overall GGBP report and is not intended as a stand-alone product. The views and information expressed in this case study are not necessarily endorsed by the GGBP sponsors and organizations of the authors.

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Further information:

National Climate Change Strategy 2012

http://www.unccd2012.org/content/documents/The%20Singapore%20Green%20Plan%202012.pdf

Sustainable Singapore Blueprint

Land Use Master Plan 2013

Land Transport Master Plan 2013

Our Water, Our Future 2013 by Singapore’s National Water Agency

Green Building Master Plan

Second Green Building Master Plan, Media Release

Green City Index by the Economist Intelligence Unit
http://81.47.175.201/ETMS/rankings/2012_European_Green_City_Index_sum_report.pdf