

# Singapore: a model for sustainable development?

As a pioneer in sustainable development, Singapore has been approached by the World Bank to provide technical assistance on urban planning in neighbouring countries. **Vicente Carbona** analyses Singapore's successful development and reveals the latest initiatives in the city-state.



Artist's impression of the Conservatory Complex

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Singapore has long understood that as a buoyant, industrialized urban centre with extremely limited resources in water, energy and, especially, land, its sustainability depends on bold urban planning and ambitious environmental controls. In a recent development that recognizes Singapore's outstanding reputation in development, World Bank President Robert Zoellick and George Yeo, Foreign Minister of Singapore, signed an agreement last December to create a joint World Bank-Singapore Urban Hub. This will be tasked with providing expertise and technical assistance on the major urban challenges facing developing countries.

"Through its own unique development experience, Singapore has built a vast knowledge base on meeting these sorts of challenge," says the World Bank's Zoellick. "Bringing this knowledge together with the World Bank Group's development operations in East Asia and around the world creates a vital source of relevant and tested expertise that we believe many countries can benefit from."

The Hub will bring together Singapore's recognized expertise in urban development, education, and public administration, with the Bank's global development knowledge and operational experience. The aim is to provide advice and technical services to South-East Asian countries with plans to expand to other Asian countries including China, and eventually to go truly global into Africa.

#### **New Inter-Ministerial Committee**

Singapore has been a key player in urban development since it became an independent republic in 1965. One of the most recent initiatives was the establishment last year of an Inter-Ministerial Committee on Sustainable Development (IMCSD) to articulate a national strategy and to ensure that Singapore grows as a lively and more livable city, with a Master Plan for the next 10-15 years, and a wider-ranging Concept Plan that has a 40-50 year horizon. The main challenge is to see that continued growth does not come at the expense of quality of life for its citizens.

"We want to position Singapore as a leading, distinctive Eco-City State that is not just economically vibrant but also environmentally sustainable," says Minister for National Development Mah Bow Tan who co-chairs the IMCSD. "This means growing as fast as

we can, whilst ensuring that our good living environment and economic growth potential for future generations are not affected."

After a series of forums and meetings, which has resulted in over 1,300 suggestions obtained through an online consultation initiative, the Inter-Ministerial Committee and other public officials are pleased with the positive public response. Suggestions and views covered a wide range of topics, from recycling, energy efficiency, cycling and clean energy, to marine

housing. Such incorporation not only creates additional social interaction spaces to replace the lost ground, but also brings a unique balance of built and natural environments. The incorporation of greenery also serves to reduce heat gain on the roofs and allows natural rain harvesting."

Part of this new focus includes a return to the fundamentals of good design and architecture, such as north-south orientation of new buildings to minimize solar exposure,

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nature area conservation, solar energy usage as a renewable energy, and the use of more sustainable building construction materials. The Committee has now brought the public consultation process to a close, and will take the next few months to study the feasibility of the suggestions raised and respond to key ideas. The government has recently announced it will set aside USD one billion over the next five years to implement the Committee's recommendations.

#### **A tradition of innovation**

Sustainability in Singapore is centred around three priority areas: resource management, pollution controls and improving the quality of the physical environment. In a densely-packed, high-rise urban centre, this is achieved by making new and existing buildings more resource and energy efficient, and actively promoting these goals among industries, businesses and transport services.

"In Singapore, high density presents not only the most viable housing solution but also creates an opportunity to generate some of the most innovative sustainability ideas," says Tai Lee Siang, President of the Singapore Institute of Architects. "One of the best practices that has emerged is the incorporation of high-rise greenery into high-density

and the use of natural ventilation to reduce reliance on air conditioning. "Such a mindset shift has seen many buildings to be environmental friendly without heavy investment in technology," says Tai.

Promoting an ambitious renewable resources programme requires involving the global business community in innovative ways, and Singapore has undertaken a pioneering strategy of investments in this sector. Renewable Energy Corporation (REC) of Norway, one of the largest solar companies in the world, recently committed to establishing what is envisaged to be the world's largest fully integrated solar manufacturing complex in Singapore, a SGD 6.3 billion (USD 4.1 billion) investment to produce up to 1.5 gigawatts of solar products at steady state. In early 2008, Oerlikon Solar, a leading supplier of equipment for making solar cells, chose Singapore as its Asian manufacturing and R&D hub. And most recently, NorSun AS, a Norwegian firm, announced the construction of a SGD 300 million cutting-edge solar wafer manufacturing facility in the city-state.

In March last year, clean energy was signaled out as a key growth area for Singapore, with a goal to generate up to 7,000 jobs, by 2015, through an infusion of SGD 350 million in public funds. Besides solar energy, which is



Waste Management - Semakau Landfill

PHOTO © NEA

the main focus area, Singapore's industry development efforts in clean energy also cover fuel cells, wind power, tidal power, energy efficiency and carbon services. In a related development, Ms. Grace Fu, Senior Minister of State for National Development, recently announced an ambitious plan to provide training opportunities for 8,000 new, high-skill green collar jobs over the next five years.

To oversee the growth of this industry, the inter-agency Clean Energy Program Office (CEPO) has put forward a set of initiatives including investing SGD 50 million (USD 32.7 million) toward a Clean Energy Research Program (CERP) to support R&D efforts, a SGD 25 million graduate scholarships programme to groom top-notch talent for the industry, and various incentive programmes for clean energy solutions and to assist private sector participants offset part of the capital costs of installing solar technologies in new building projects.

Singapore has long been exemplary in its efforts to institute highly successful water demand and wastewater management practices, taking into consideration quantity and quality, public and private sector participation, equity and efficiency, and strategic and economic considerations. Singapore has managed to attain self-sufficiency by reducing domestic water consumption and unaccounted-for-water. In a 2006 report, Cecilia Tortajada of the Third World Centre for Water Management (Mexico), stated:

"By ensuring efficient use of its limited water resources through economic instruments,

adopting the latest technological developments to produce new sources of water, enhancing storage capacities by proper catchment management, practicing water conservation measures, and ensuring concurrent consideration of social, economic and environmental factors, Singapore has reached a level of holistic water management that other urban centers will do well to emulate."

The effort to increase the city's green spaces has also seen excellent results. Over the past decade, despite the physical development required to accommodate a 70 percent increase in population, the city-state's green cover (percentage of land area with vegetation, as seen from satellite images) has increased by 10 percent, so that almost half of Singapore's main island is now covered with vegetation. Between 1986 and 2007, despite the fact that the population in Singapore grew by 68 percent from 2.7 million to 4.6 million, the green cover in Singapore grew from 35.7 percent to 46.5 percent.

Singapore recycles what can be recycled, and incinerates the rest in state-of-the-art plants. Aside from reducing the need for landfills, the city-state also began to convert waste-to-energy from the incineration process, which currently provides up to three percent of total electricity demand, while at the same time stabilizing carbon emissions into the atmosphere. What they do with all that incinerated rubbish is another of Singapore's success stories.

### The rise of eco-tourism

In 1997, at a cost of SGD 610 million, the government built a seven kilometre rock perimeter enclosing the sea between two southern islands, thus creating the Semakau Landfill, which covers an area with a capacity of 63 million cubic tons. Once this offshore landfill became operational in 1999, the last landfill on the main island was closed. Divided into cells, the seawater is then pumped out, the seafloor lined with thick plastic, and the incinerated ash is then dumped into the cell. Lastly, it is covered with dirt and seeded with grass. Water quality is sampled monthly to check for any seepage.

This has resulted in a new, thriving ecosystem that has been developed into a nature sanctuary and a site for ecotourism. Since mid-2005, Palau Semakau has been open for guided tours of its mangroves, intertidal zones, and coral reefs. It has come to represent a clear example of Singapore's unique, creative way of working toward urban sustainability.

In adopting the next round of priorities and initiatives, the Inter-Ministerial Committee recognizes that the effective implementation of some of the new measures could mean additional costs in the short term, costs that will be offset via longer-term benefits for individuals and businesses. The government has stated that while studying the new recommendations, it will take into consideration the rising costs.

"The IMCSD will be pragmatic and results-oriented," says Minister for Finance Tharman Shanmugaratnam. "It will assess the effectiveness and benefits of the various options against their costs to businesses and consumers. We will set meaningful goals but pace the changes so that everyone can adjust smoothly."

Singapore is on the move in all these fronts, and officials are optimistic. They are actively encouraging people and industries to adopt long-term sustainable practices, and developing new capabilities to optimize resources and improve environmental performance further still. And there is widespread understanding that new technologies will also have to be harnessed to improve performance and mitigate current limits to growth, perhaps the city-state's main constraint, given the difficulty of balancing and accommodating its entire national infrastructure, including housing, recreation, commerce, defence, waste and water treatment, transportation, and airports, within an area of just 700 square-kilometres. ♦