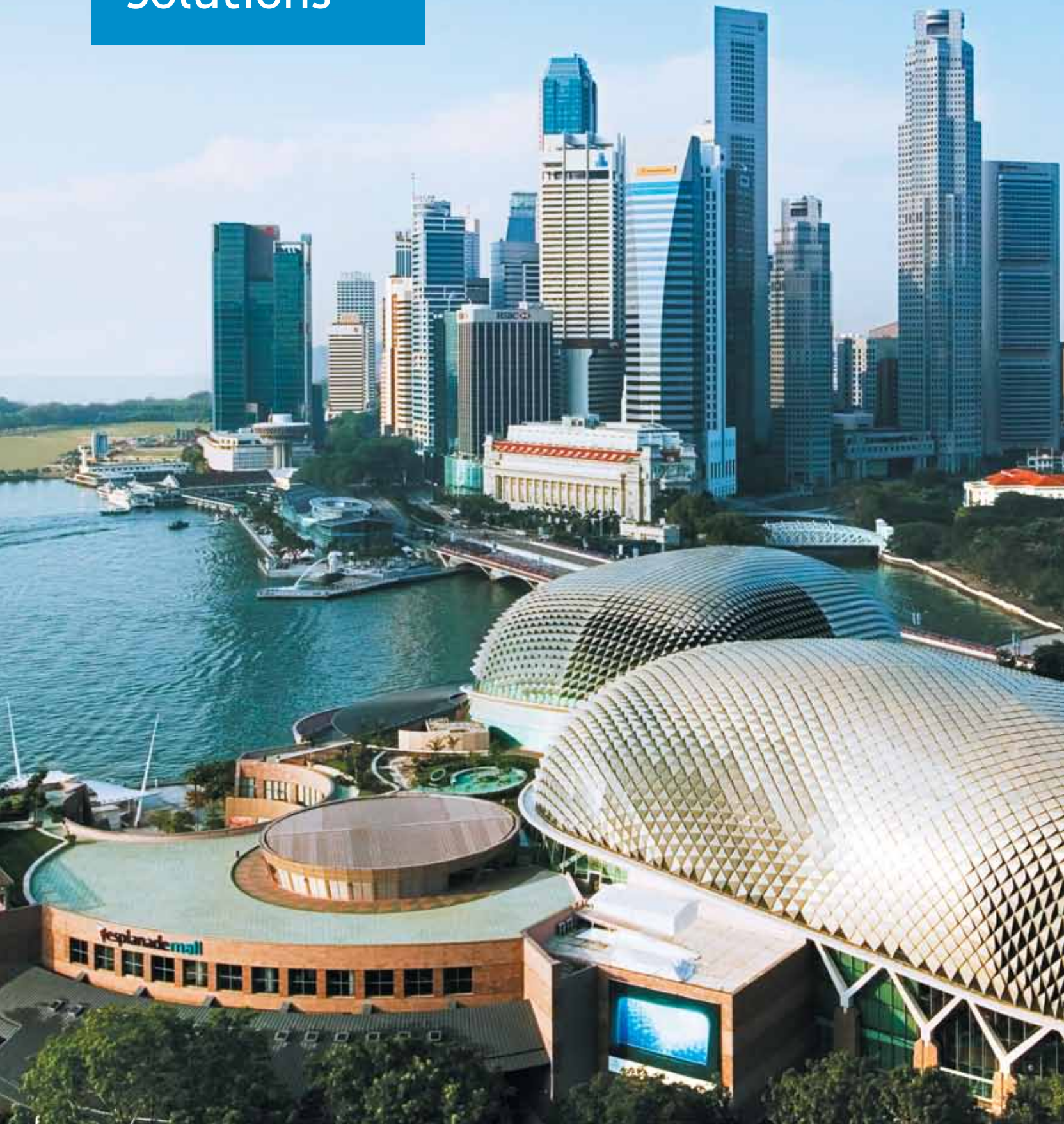


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**EDB**  
SINGAPORE

# Urban Solutions



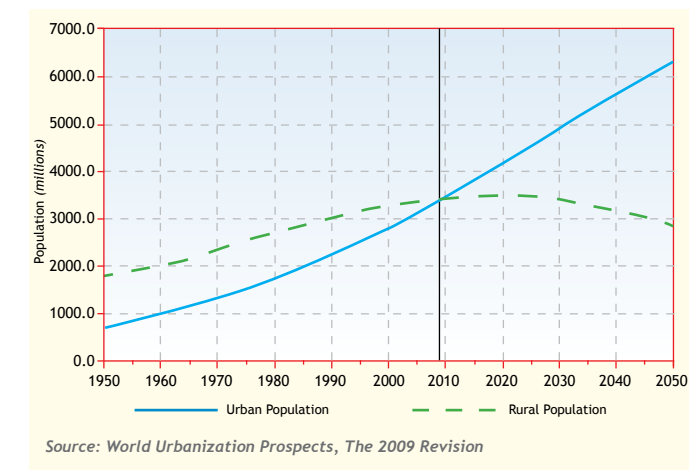
# Singapore: Creating Urban Solutions for Asian Cities

From transportation and public housing, to energy management and water treatment, Singapore has developed and adapted some of the world's most advanced urban solutions. Backed by a progressive leadership and firm commitment to sustainable development, the city has managed to turn the challenges of urban development into rewarding economic opportunities. Some of our solutions have been replicated and implemented successfully in other cities.



The world is experiencing rapid urbanisation. An estimated 60 million people are moving to cities and urban areas every year - more than one million every week. More than half of the world's population now work or live in urban areas, a number expected to top 6.4 billion by 2050. More than one third of this increase will be from Asian countries, with China and India in the lead, followed closely by Southeast Asia.

Urban and rural populations of the world, 1950-2050



Governments and city planners will face the results of increased competition for scarce land and resources brought about by urbanisation. The need for effective “Urban Solutions” to overcome problems such as environmental pollution, traffic congestion and threats to public safety has never been more critical.

Backed by a progressive leadership, Singapore has created resource-efficient policies and technologies through well-placed investments and forward-thinking collaborations. These have helped us achieve both economic development and environmental sustainability, improving the country's overall quality of life. Singapore's efforts have not gone unnoticed; the UN Habitat's State of the Worlds' Cities Report 2008/9 gave us high scores in areas of pollution control, transport management and public housing, citing us as an example of good governance and balanced development. Singapore has also developed expertise in areas such as urban greenery, renewable energy and water management to overcome the limitations of a resource-constrained city-state.

Stemming from our success, we have set targets in the areas of built environment, clean energy, IT, public safety and urban mobility to develop Urban Solutions for a Singapore which is smart, safe and sustainable. To achieve this, our public agencies continue to partner with the private sector to co-develop innovative Urban Solutions.

With our pro-business policies, strategic location, excellent global connectivity and talented workforce, Singapore is a fertile ground for companies and businesses to launch and scale up new and innovative Urban Solutions for Asia and beyond.

Asia-Pacific's urban population is projected to grow by over 580 million or 45% between 2000 and 2020 with China and India in the lead



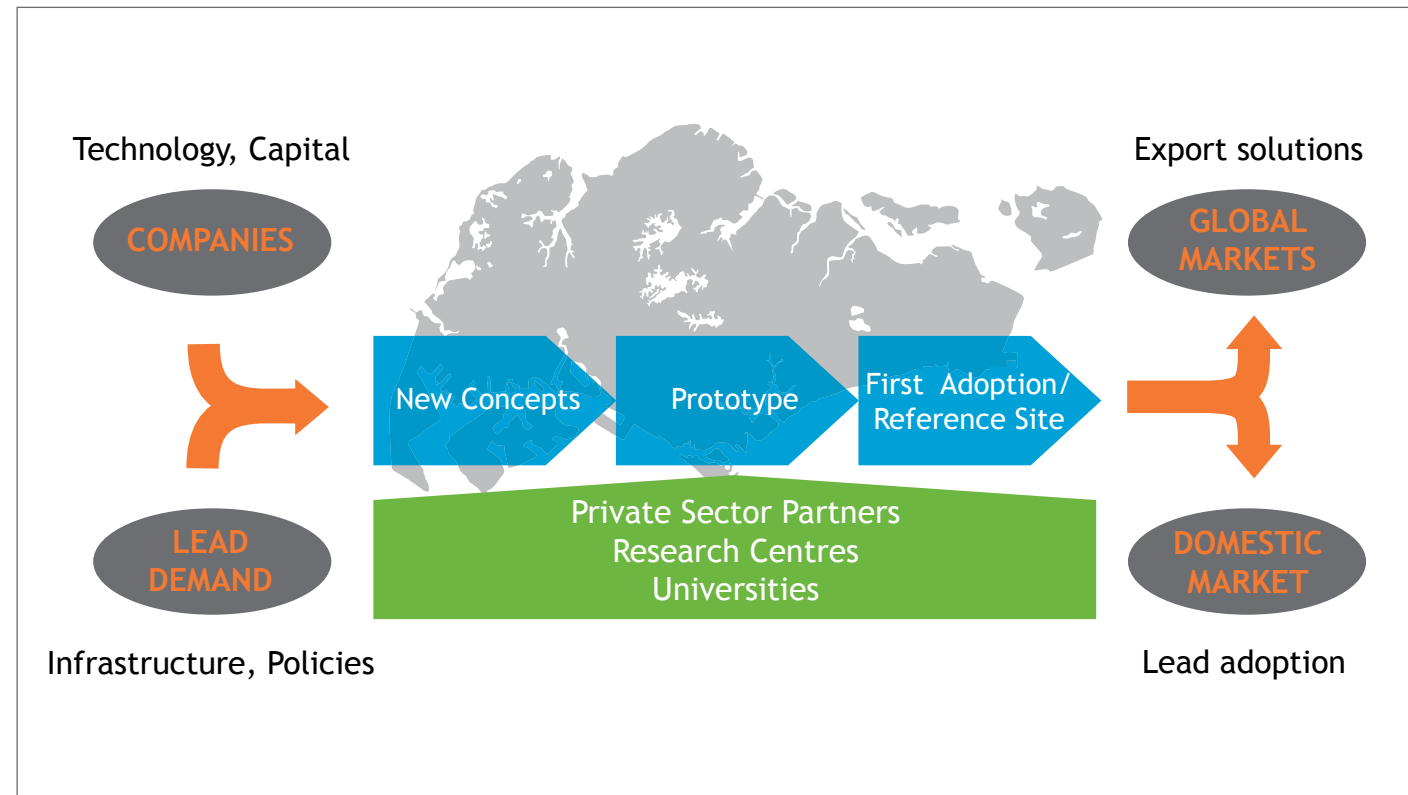
## UN Habitat - State of the World's Cities Report 2008/09

- Singapore is the only city surveyed without slums
- Singapore's greatest achievements are in urban development, including public housing and transport systems
- Singapore has experienced good governance and balanced development

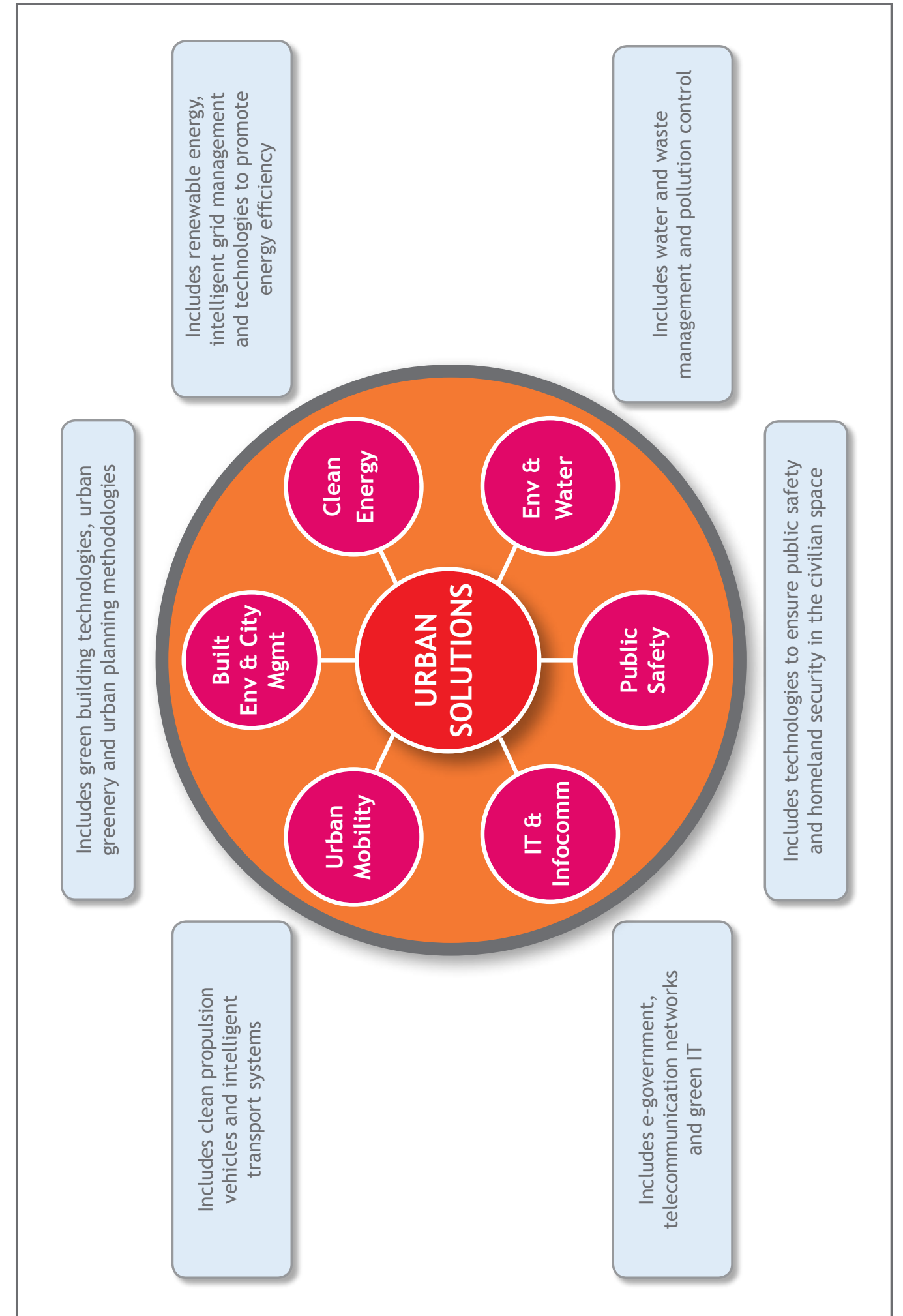
# A City of the Future, A Living Laboratory

Singapore invites companies to partner our government agencies, local companies and research institutes for a diversity of R&D activities, leveraging our excellent public infrastructure for testbedding activities. Singapore will be a “Living Laboratory” to test new concepts, develop and commercialise cutting-edge Urban Solutions, capitalising on Singapore’s experience in systems-level integration across six focus areas.

## Singapore as a Living Laboratory



## Urban Solutions Focus Areas



## Living Labs Across 6 Focus Areas

### Electric Vehicles and Intelligent Transport Systems

A multi-agency Electric Vehicles (EV) Taskforce led by Energy Market Authority (EMA), Land Transport Authority (LTA) and Economic Development Board (EDB) is investing S\$20 million to study the robustness, cost-effectiveness and environmental impact of electric-powered vehicles in a tropical environment from 2010. The taskforce aims to setup a network of charging stations by end 2010, and expand the network as demand grows. Renault-Nissan and Mitsubishi Motors will also deliver test fleets of electric cars to Singapore from 2010-11. Companies that manufacture EVs, develop charging infrastructure or fleet owners are welcome to leverage on Singapore's compact and high-density urban setting to test EVs firstly at the fleet level.

Under the Land Transport 2020 Masterplan, the Land Transport Authority (LTA) looks at innovative ways of creating a people-centric land transport system through adoption of Intelligent Transport Systems (ITS). As part of the Singapore Urban Transport Solution (STARS) initiative, various companies such as Cisco, IBM, 3M, ST Electronics, Steria Asia and Thales, will be collaborating with Singapore on transport optimisation, telematics, integrated user experience, and environment and energy. Companies with expertise in ITS can also explore partnerships with LTA and EDB.



*“Renault and Nissan aim to become leading brands in zero emission vehicles. Singapore is for us a key priority, as the geography of the country and the focus on environment issues can enable fast and strong development of electric cars.”*

Mr Thierry Koskas,  
Renault-Nissan electric vehicles programme director.

### Built Environment & City Management

Under the Sustainable Singapore Blueprint 2009, Singapore has set a target of having 80% of its buildings achieve Building and Construction Authority's (BCA) Green Mark certification by 2030. As part of this vision to develop a sustainable built environment in Singapore, there will be opportunities for companies to test and develop innovative green building design and technologies. Such technologies encompass solutions to ensure energy and water efficiency, indoor environmental quality and environmental protection. Energy management systems are also finding their way into buildings to enhance the efficiency of building automation and controls.

There are early signs of success, as seen in the increase in the number of buildings certified with the Green Mark in recent years, as developers and property owners recognise the commercial, economic and environmental benefits of green buildings. Some iconic Green Mark Platinum buildings include the Ocean Financial Centre and Tampines Grande.



Zero Energy Building @ BCA Academy - the first existing building in Southeast Asia to be fully retrofitted with green building design features and technologies. It is a testbed for innovative building solutions applied at the systems level to achieve net zero energy consumption, e.g. built-in photovoltaic panels, low-emissivity glass and solar chimneys.

### Clean Energy

Today, many Cleantech companies are leveraging Singapore's location in the heart of Asia and our strong reputation in environmental sustainability. For example, the Renewable Energy Corporation (REC) of Norway is setting up the world's largest integrated solar manufacturing complex here, producing up to 1.5 gigawatts of solar products at steady state for global markets. Vestas, the world's leading manufacturer of wind turbines, also established its Asia-Pacific headquarters in Singapore to develop its largest wind technology R&D centre outside of Denmark.

With a strong emphasis on R&D and innovation as growth drivers, Singapore provides Cleantech companies with ample opportunities to forge strong collaborations with local research and educational institutions. They include the Solar Energy Research Institute of Singapore (SERIS) and the Energy Research Institute at NTU (ERI@N). SERIS spearheads Singapore's drive into solar energy research, while ERI@N will develop industry-oriented innovations in clean energy, such as wind and marine renewables, green buildings, energy storage and fuel cells.



### Intelligent Energy Systems

To enhance the efficiency of our power grid, the Intelligent Energy System (IES) pilot testbed was launched by EMA in November 2009. This testbed aims to leverage new Smart Grid technologies to further improve the capabilities of our power grid, thus allowing for greater adoption of renewable energy and offering consumers more choices in energy consumption. Companies with capabilities in advanced metering, demand response, building or distributed sources management systems are partnering EMA to implement the pilot testbed in Nanyang Technological University (NTU).

### Environment & Water

Singapore's national water agency, PUB, opened up its national water infrastructure for companies to testbed their latest technologies. As a result of our commitment to innovation in order to address our water scarcity, Singapore was the first in the world to develop membrane systems for water reclamation on a large scale. These were subsequently scaled up and adopted in PUB's NEWater plants.

Singapore is already home to big names such as General Electric of the US, Nitto Denko of Japan, Siemens of Germany and Veolia of France. Moreover, Singapore has also seen domestic companies become regional leaders. One such champion is Hyflux, which is building the world's largest seawater desalination plant in Algeria. It also currently houses Asia's largest membrane R&D centre outside Japan, with some 150 researchers working in Singapore.

Another company, Keppel Corporation, has an environmental engineering business that has a global footprint spanning China and the Middle East. Sembcorp is also becoming a major exporter of urban solutions, having won various key projects globally after developing capabilities through projects in Singapore. One key project by Sembcorp is the Build, Own and Operate (BOO) contract for a water and power plant worth US\$1 billion in Oman.



The iconic Marina Barrage, Singapore's 15th reservoir and the first in the heart of the city, brings about three benefits - a new source of water supply, flood control and a lifestyle attraction that will offer a host of recreational possibilities.

## Public Safety

Eight seconds - this is the average time taken for immigration clearance at the borders using the Enhanced Immigration Automated Clearance System (eIACS). The system enables more than three million Singapore citizens to enjoy automated clearance at the checkpoints using machine-readable e-passports. With the need to tackle the challenge of ever-increasing passenger traffic, the Immigration and Checkpoints Authority (ICA) had begun issuing biometric e-passports, which incorporated facial and fingerprint information to effectively combat alien smuggling and travel document forgery. The technology provider is a consortium comprising NEC, NCS, SNP Security Printing and Gemplus Technologies. NEC has also setup their Biometrics Centre of Competence in Singapore to take advantage of our sophisticated end user market as well as our talented workforce.

With an open attitude towards adopting innovative security technologies, Singapore is well-poised to set a leading example for cities around the world. Since September 11, domestic, cross-border and international terror threats have taken on an elevated scale as cities become more densely populated, well-connected and open. Hence the protection of strategic assets and infrastructure has become a topmost priority. Driven by heightened global demand, companies can co-locate their R&D activities with Singapore's advanced end-user market so that they can work closely with sophisticated lead customers to formulate effective and reliable solutions.

## Info-communications Technology

As part of Singapore's plans to become an "intelligent island" by 2015, Singapore has been upgrading its communications infrastructure. Tapping on Singapore's plans to set up a "Next Generation Broadband Network" with access speeds of up to 1 Gbps, companies can setup R&D labs to develop and deploy new applications in e-Health, e-Education, network security, tele-presence, and IPTV. In addition, with very high mobile penetration rates of over 137%, Singapore is an excellent location for companies to experiment with new mobile solutions and location based services.

Singapore is a leader in the use of IT for providing government services. Over the last two decades, Singapore introduced many e-Government services - from simple information provision to complex business transactions. Leveraging upon Singapore's capabilities in e-government and urban planning, Siemens has established the Siemens' Global Centre of Competence for City management in Singapore to develop innovative city management solutions for tomorrow's cities.

Together with partners and IDA, EDB is developing a data centre testbed to allow companies to experiment and develop new integrated green IT solutions to maximize energy savings. The average data centre consumes energy equivalent to 25,000 households and is responsible for nearly a quarter of all carbon emissions by IT equipment, hence reducing data centres' energy consumption will make a significant impact both locally and globally.

*"Being in Singapore allows Siemens to source and work in close collaboration with local talented companies who are willing to co-develop successful solutions with us and export them to the global market."*

Dr Gisela Fuchs,  
CEO, Public Sector,  
Siemens IT Solutions and Services



### Urban Solutions Platforms

- ▲ Co-development and testbed platforms
- ★ Co-located research centres



**Water Treatment:**  
PUB's Innovate programme encourages companies to co-develop and testbed their latest technologies in water treatment plants island-wide, e.g. Kranji and Changi Water Reclamation Plants. Some of the technologies tested include various membranes to lower cost and improve water quality, membrane distillation and reverse osmosis membranes.

**Cleantech Park:**  
Singapore's first eco-business park to push the boundaries of sustainability - a large-scale integrated "Living Laboratory" for testing and demonstration of systems-level clean technologies.

- ★ Nanyang Environment & Water Research Institute (NEWRI) - focuses on water and waste management, environmental impact and membrane technology.
- ★ Energy Research Institute at NTU (ERI@N) - focuses on wind and marine renewables, green buildings, energy storage and fuel cells.



**Punggol Eco-Town:**  
Low-cost residential eco-town serving as a live testbed for integrated solutions in sustainable buildings, including energy, waste and water management. HDB aims to lower the implementation cost of these solutions and replicate them island-wide.



**HDB Punggol Eco-Precinct:**

**Sentosa:**  
Sentosa is an attractive offshore residential, commercial and leisure destination. With the increase in visitor-ship, Sentosa needs to improve mobility and connectivity by adopting more environmentally friendly vehicles and traffic optimisation systems. With many attractions drawing high amounts of electricity, Sentosa is also a suitable location to testbed clean energy technologies and management systems, for example solar and tidal power.



**Urban Mobility:**  
Singapore's high-density urban setting makes it a suitable location for testing clean propulsion vehicle fleets like electric vehicles. LTA is also keen to partner industry players to explore innovations toward achieving a people-centred land transport system. The areas of interest include traffic optimisation through predictive modelling, transport telematics, and real-time information platforms.



**NUS:**

**National University of Singapore (NUS) Campus:**  
University campus serving as an R&D centre and testbed for advanced wireless communications, high-bandwidth next-generation mobile applications and future personal mobility solutions.



**Solar Energy Research Institute of Singapore (SERIS):**  
focuses on silicon-based solar cells, new-generation materials for solar energy and integration of solar technologies into buildings.



# Solutions Today for the Cities of Tomorrow

As one of Asia's most dynamic cities, Singapore has earned a reputation for its high level of socio-political stability and conducive living environment, ranking as Asia's most liveable city (Mercer 2009 Quality of Living Survey).

With pro-business policies, good infrastructure and strong intellectual property protection, Singapore is an ideal location for developing new ideas and technologies. It is a perfect "Living Lab" for businesses to partner with like-minded organisations and agencies to develop, test and scale up advanced Urban Solutions for Asia and the world.

Be at the forefront of this exciting initiative, where leading-edge Urban Solutions find sophisticated lead demand and access to a ready global marketplace.



## About the Singapore Economic Development Board

EDB is the lead government agency for planning and executing strategies to enhance Singapore's position as a global business centre and grow the Singapore economy. We dream, design and deliver solutions that create value for investors and companies in Singapore. In so doing, we generate economic opportunities and jobs for the people of Singapore; and help shape Singapore's economic future.

'Host to Home' articulates how EDB is sharpening its economic development strategies to position Singapore for the future. It is about extending Singapore's value proposition to businesses not just in helping them improve their bottom line, but also in helping them grow their top line. EDB plans to build on existing strengths and add new layers of capabilities to enable Singapore to become a 'Home for Business', a 'Home for Innovation' and a 'Home for Talent'.

For more information on how EDB can help your business, please visit [www.sedb.com](http://www.sedb.com)

Pictures courtesy of Building Construction Authority (BCA), Housing Development Board (HDB), JTC Corporation, Land Transport Authority (LTA), Mitsubishi, PUB, Sentosa Development Corporation (SDC) and Solar Energy Research Institute of Singapore (SERIS)

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