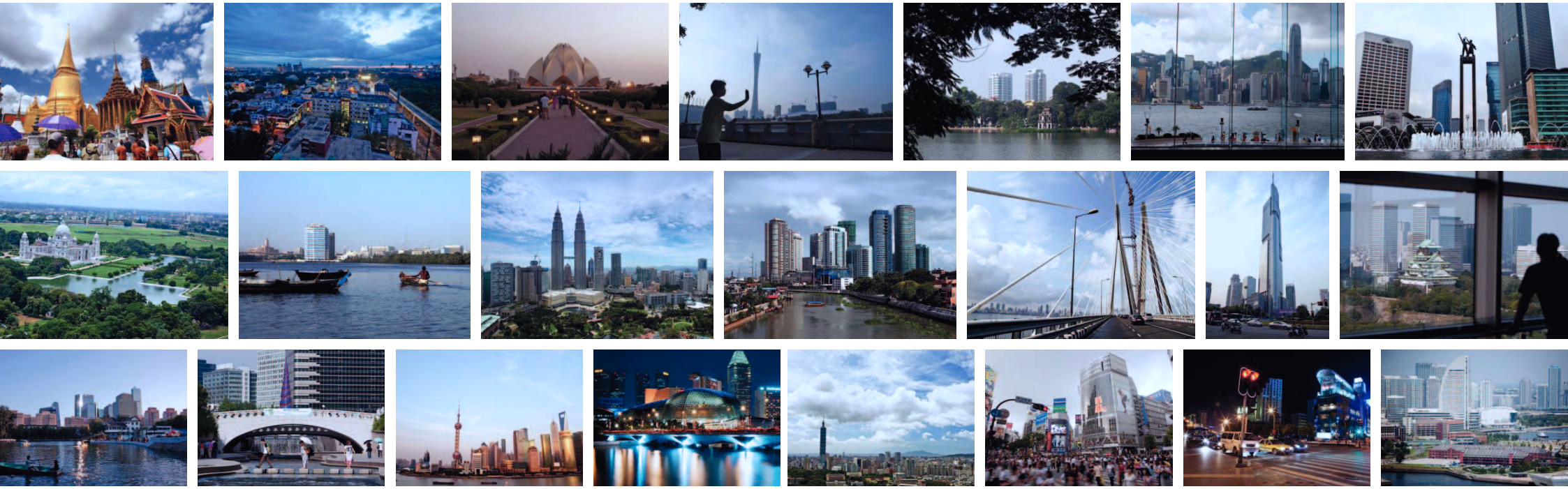
Green City Index



Asian Cities Will Make the Difference

The Asian Green City Index analyzes the environmental sustainability of 22 major Asian cities and finds Singapore to be the greenest city of Asia.

By Karen Stelzner

Asia's growing cities will make the difference for sustainable global development. Most of the global population growth in the next decades will take place in Asian cities. "What we have seen in the developed world will take place in Asia as urbanization gathers momentum across China, India, and Southeast Asia. Rapid urbanization will pose new opportunities and challenges," said Amy Khor, mayor of Singapore's southwestern district, at the press conference on the Asian Green City Index in Singapore. According to the United Nations Population Division, the proportion of Asia's population living in cities has grown by around a third to over 40 percent in the last 20 years. In the past five years, the number of inhabitants in Asian cities has increased by more than 100,000 a day. Experts predict that in China alone, by 2025 there will be well over 200 cities with a population of over one million. As of 2011, there are just under 90, while Europe currently has 25 cities of that size.

The increasing urbanization poses enormous challenges for urban infrastructures. The Asian Development Bank estimates, for example, that 20,000 new homes, 250 kilometers of new roads, and the infrastructure to provide an extra 6 million liters of potable water need to be built – all on a daily basis. Rapid economic growth and increasing wealth add to these challenges by raising consumption levels. "The battle against climate change will be decided in cities. This applies to Asia, with its booming conurbations, more than anywhere else on earth," said Barbara Kux, member of the Siemens Managing Board and Chief Sustainability Officer.

In view of those facts, Siemens commissioned the independent research institute Economist Intelligence Unit to conduct a study about the environmental sustainability of major Asian cities – the Asian Green City Index. It is already the third study in the Green City Index research series, which aims to compare major cities worldwide.

"We want to provide a better understanding of the specific environmental challenges of the cities and support them in their efforts to expand their infrastructures on a sustainable basis," said Stefan Denig, project head at Siemens. Twenty-two Asian cities from eleven countries were assessed in eight environmental categories: energy and CO_2, land use and buildings, transport, waste, water, sanitation, air quality, and environmental governance. The assessment is based on 29 individual qualitative and quantitative indicators. The scope of this research project is unique. It was independently researched, and the methodology was developed in consultation with leading international urban sustainability experts from UN-HABITAT, the OECD, the World Bank, and Asia's regional network of local authorities, CITYNET.

The study has revealed some interesting findings, including:

- Singapore is the leading green city in Asia, standing out in particular for its ambitious environmental targets and its efficient approach to achieving them. The fact that it is a city-state with clear political responsibilities

Photos: Siemens

Overall Results

In general, wealthier cities performed better in the Green City Index. The order of the cities within the performance bands has no bearing on the cities' results.

Singapore, the leading Asian Green City, uses cogeneration power as one way of meeting its energy needs.

well below average	below average	average	above average	well above average
Karachi	Bengaluru Hanoi Kolkata Manila Mumbai	Bangkok Beijing Delhi Guangzhou Jakarta Kuala Lumpur Nanjing Shanghai Wuhan	Hong Kong Osaka Seoul Taipei Tokyo Yokohama	Singapore

Graphic: Siemens, Photo: Siemens

"We want to provide a better understanding of the specific environmental challenges of cities."

Stefan Denig, project head Green Cities Index at Siemens

and a long history in integrated urban planning has helped considerably in achieving this outstanding result.

■ Environmental awareness is growing in all cities, which is why comprehensive environmental policies are found in almost all cities. There are, however, major differences in how effectively those regulations are executed. Often, governments are hampered by competing jurisdictions, e.g., between national and local administrations. A growing consensus is forming among experts that decentralizing authority from national to local governments is essential for effective environmental and climate protection.

■ Wealthier cities generally tend to perform better in the Asian Green City Index. When scrutinized more closely, the results reveal that for the lower-income cities, the consumption of resources rises steadily along with per capita GDP. However, at €15,000 per capita GDP, there is a tipping point. When income rises beyond this point, consumption levels decline again – mainly due to higher environmental awareness and more efficient infrastructures.

The challenge is that the majority of cities in Asia, above all in China and India, have not yet reached this tipping point. As a consequence, levels of resource consumption, especially energy consumption, continue to rise at a breathtaking pace. In 2009, China overtook the USA as the world's largest energy consumer and CO_2 emitter in absolute figures, although on a per capita basis, levels are still much lower than in the USA. The Asian Green City Index shows a similar result: The 22 Asian cities generate on average 4.6 tons of CO_2 per person – which is below the 5.2 tons per capita that cities in the European Green City Index produced on average, but levels in Asia are rising. Indian cities still have the lowest CO_2 emissions in the Index: Mumbai, Delhi, Kolkata, and Bengaluru emit less than 1.5 tons per person. In contrast, Beijing, Guangzhou, and Shanghai, which have high levels of energy consumption for industrial production and rely heavily on carbon-intensive fuels such as coal, produce up to 9.7 tons.

One way of lowering CO_2 emissions is expanding the use of renewable energies – an area in which Asia's metropolises still need to catch up. On average, only 11 percent of the total electricity generated in the 22 cities comes from renewable sources. By comparison, the average in the Latin American Green City Index is 64 percent – due to a high proportion of hydroelectric power. But there are some promising signs: Shanghai, for example, is investing massively in wind power. By 2020, the city expects to have 13 wind farms producing a total of 2.1 GW, providing more than 4 million households with clean electricity.

Siemens is a strong local partner and opened its first rotor blade manufacturing plant in Shanghai in December 2010. And further factories are planned, not only in China, but also in India, where Siemens is investing approximately €70 million in the construction of a wind turbine factory due to open in 2012. Since renewable energy is often not produced and consumed in the same place, efficient power transmission is required.

A 1,400-kilometer-long HVDC line in China demonstrates how hydropower can be transmitted from remote areas over long distances with minimal energy losses. This link, which transmits the electricity at 800 kV to the megacities in the Pearl River Delta such as Guangzhou, is the world's most powerful of its kind.

But renewable energies are only part of the solution. Improving the efficiency of gas- or coal-fired power plants is also important. In Seoul, for example, the world's most efficient gas turbine is scheduled to come online in 2013. Siemens will supply the complete combined cycle power plant with an electrical capacity of 400 MW, providing electricity to more than 300,000 people. Compared to coal-fired power plants, CO_2 emissions will be reduced by as much as 75 percent. Singapore also meets its energy demand with a highly efficient combined cycle power cogeneration plant, whereas China has succeeded in building the most efficient coal-fired power plant in the world near Shanghai. It burns over 1 million tons less coal per year than conventional coal-fired power plants and thus reduces annual CO_2 emissions by roughly 3 million tons.

Last but not least, political will is needed to reduce energy consumption effectively and meet climate targets. For instance, the City of Tokyo, rather than waiting for a national program, introduced its own mandatory cap-and-trade system in spring 2010 – the first in Asia. The system is expected to cut emissions by more than 20 percent in the next ten years.

There are many more interesting green initiatives and best practice projects highlighted in the Asian Green City Index that will help to start a dialogue about best practices. "I trust that the Asian Green City Index will encourage Asian cities to learn from one another as we strive to address the environmental challenges faced by an increasingly urbanized Asia," says Amy Khor in Singapore.

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Further Information

www.siemens.com/greencityindex