ASIA PACIFIC'S TOP 10 GREEN CITIES

A Solidiance study on the top ten green cities in the Asia Pacific region.

Solidiance is an Asia Pacific focused marketing and innovation strategy consulting firm.

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OVERVIEW

What it means to be Green: A green city is more than just an eco-friendly city. Apart from environmental sustainability, a green city has social and economic programs that enhance the environmental and economic health of the community. Being a green city means impacting human behavior to help reduce its carbon footprint and enable its citizens to live and consume in a sustainable and efficient manner.

Many cities in the Asia-Pacific region already have strong local policies and programs in place to reduce pollution and some have demonstrated their commitment to reduce their environmental impact by signing the World Mayors and Local Governments Climate Protection Agreement, launched at the United Nations Climate Change Conference in Bali, Indonesia, in December 2007.

Through this initiative, participating cities commit to take actions to reduce carbon emissions in their cities below 1990 levels, in line with the Kyoto Protocol, through actions ranging from anti-sprawl land-use policies, to forest restoration projects and educating the public on environmental issues.

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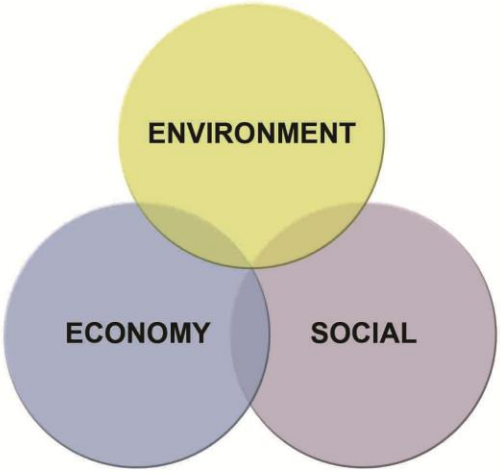
WHAT MAKES A GREEN CITY?



A Green Asia Pacific: The Asia Pacific region has enjoyed brisk economic expansion in recent years. The region's urban population is mirroring this growth, at 2.3% per year, mostly from migration of people from the rural areas. The influx has put pressure on urban infrastructure and resources, resulting in around one-third of the urban population living in slums.

As population and food security is closely linked to the environment, the Asia Pacific region is thus likely to be worst hit by natural disasters and environmental devastation, since the rapid growth naturally comes with an increase in food, energy and water demand. As cities are hit by over-crowding, the number of disaster-related deaths grows.

In Australia, 89% of the population live in urban areas. While in Singapore, 100% of the population live in the city. Japan also faces increasing urbanization, leading to an energy-intensive lifestyle.

"At present more than 1.7 billion people in Asia and the Pacific rely on traditional biomass for their basic energy needs, so we are likely to see energy consumption increase as more people get connected to electricity grids."

- Dr. Heyzer, United Nations Economics and Social Commission for the Asia and the Pacific

Why being Green Matters: Forecasts indicate that the number of megacities — those with at least 10 million inhabitants — will increase from 22 to 26 by 2015, mostly from emerging and developing countries where sustainability has not been a top priority in the past.

The urbanites can account for up to 80% of humanity's global greenhouse gas emissions — major reason why Asia Pacific cities are increasingly turning to green infrastructure projects, such as energy-efficient building systems.

> ***"Blaming cities for greenhouse gas emissions misses the point that cities are a large part of the solution. Well planned, well governed cities can provide high living standards that do not require high consumption levels and high greenhouse gas emissions."***
>
> **- David Satterthwaite, Senior Fellow at the International Institute for Environment and Development (IIED).**

ASIA GREEN CITIES RANKING

Economy	Social	Environmental	Top 10 Asia Pacific Green Cities
1 Tokyo	1 Seoul	1 Melbourne	1 Tokyo
2 Seoul	2 Auckland	2 Singapore	2 Seoul
3 Sydney	3 Tokyo	3 Tokyo	3 Melbourne
4 Osaka	4 Busan	4 Sydney	4 Singapore
5 Melbourne	5 Osaka	5 Auckland	5 Osaka
6 Singapore	6 Singapore	6 Osaka	6 Sydney
7 Busan	7 Melbourne	7 Hong Kong	7 Auckland
8 Taipei	8 Taipei	8 Seoul	8 Busan
9 Auckland	9 Sydney	9 Taipei	9 Taipei
10 Hong Kong	10 Hong Kong	10 Busan	10 Hong Kong

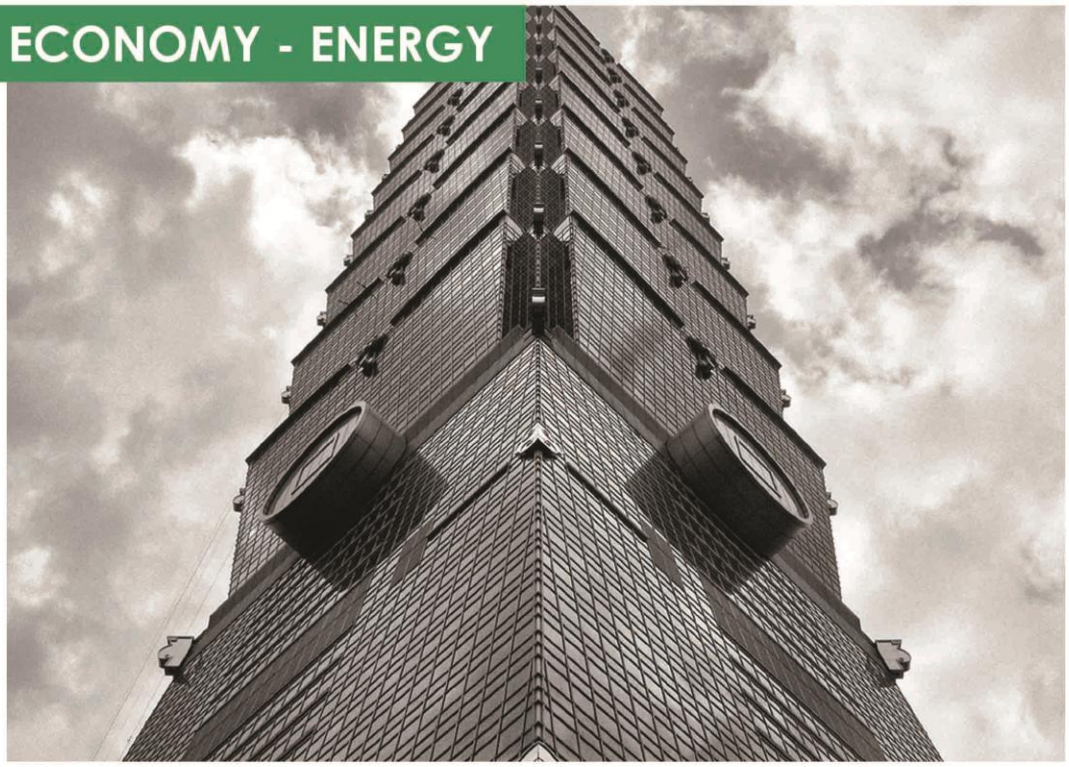
RANKING ACCORDING TO ECONOMIC, SOCIAL & ENVIRONMENTAL FACTORS

Economy	Social	Environmental
1 Tokyo	**1** Seoul	**1** Melbourne
2 Seoul	**2** Auckland	**2** Singapore
3 Sydney	**3** Tokyo	**3** Tokyo
4 Osaka	**4** Busan	**4** Sydney
5 Melbourne	**5** Osaka	**5** Auckland
6 Singapore	**6** Singapore	**6** Osaka
7 Busan	**7** Melbourne	**7** Hong Kong
8 Taipei	**8** Taipei	**8** Seoul
9 Auckland	**9** Sydney	**9** Taipei
10 Hong Kong	**10** Hong Kong	**10** Busan

ECONOMY - CARBON DIOXIDE

CO_2 Emissions	CO_2 Management Policy & Promotion Comprehensiveness	Overall – CO_2
1 Tokyo	**1** Tokyo	1. Tokyo
2 Seoul	**2** Sydney	2. Seoul
3 Busan	**3** Melbourne	3. Sydney
4 Osaka	**4** Seoul	4/5. Melbourne
5 Taipei	**5** Singapore	4/5. Busan
6 Hong Kong	**6** Busan	6. Singapore
7 Singapore	**7** Osaka	7/8. Taipei
8 Auckland	**8** Auckland	7/8. Osaka
9 Melbourne	**9** Taipei	9. Auckland
10 Sydney	**10** Hong Kong	10. Hong Kong

ECONOMY - ENERGY



Renewable Energy Use	Renewable Energy Target	Renewable Energy Investment	Overall - Energy
1. Auckland	1. Sydney	1. Seoul	1. Sydney
2. Osaka	2. Tokyo	2. Tokyo	3. Tokyo
3. Melbourne	3. Osaka	3. Singapore	3. Seoul
4. Seoul	4. Taipei	4. Sydney	4. Osaka
5. Busan	5. Seoul	5. Busan	5. Busan
6. Tokyo	6. Busan	6. Osaka	6. Melbourne
7. Taipei	7. Melbourne	7. Melbourne	7. Auckland
8. Sydney	8/9. Singapore	8. Taipei	8. Taipei
9. Hong Kong	8/9. Auckland	9. Auckland	9. Singapore
10. Singapore	10. Hong Kong	10. Hong Kong	10. Hong Kong

ECONOMY - GREEN SECTOR GROWTH & GREEN BUILDING

Green Jobs	Green Certified Building	Green Building Policy
1. Seoul	1. Singapore	1. Singapore
2. Tokyo	2. Tokyo	2. Tokyo
3. Osaka	3. Taipei	3. Seoul
4. Sydney	4. Sydney	4. Sydney
5. Taipei	5. Seoul	5. Taipei
6. Hong Kong	6. Melbourne	6. Melbourne
7. Busan	7. Osaka	7. Osaka
8. Singapore	8. Busan	8. Busan
9. Melbourne	9. Hong Kong	9. Hong Kong
10. Auckland	10. Auckland	10. Auckland

SOCIAL - TRANSPORT & GREEN SPACE

Public Transport Ridership	Overall - Transportation
1. Hong Kong	1. Tokyo
2. Osaka	2. Hong Kong
3. Tokyo	3. Singapore
4. Singapore	4. Osaka
5. Seoul	5. Seoul
6. Busan	6. Busan
7. Sydney	7. Sydney
8. Taipei	8. Taipei
9. Auckland	9. Auckland
10. Melbourne	10. Melbourne

Wanted: Green Space: The World Health Organization recommends 9 m²/person of green space and some cities in the Asia Pacific region have responded, including vertical cities such as Hong Kong and Singapore, after the realization that green spaces provide social and environmental benefits. The trees absorb greenhouse gases and provide shade that lowers the temperature. Noise pollution is also reduced by dense screens of trees and vegetation. Whether natural or man-made, green spaces such like forests, lawns or parks make a city more appealing and at the same time increase all other aspects of human livelihoods.

"Vertical cities have little available spaces, so green rooftops are a viable solution. I think there is great potential for green rooftops in Asia, as this is a region where there is over 40% high-rise buildings constructed here. Rooftop gardens channel water drainage, dispose of water and add value to the building, which serves an economic function. A café or a sitting out area can also be designed around the rooftop garden, providing a social function. In addition, the vegetation helps to cut down carbon dioxide emissions."

- Dr. Lawal Marafa , Department of Geography and Resource Management, Chinese University of Hong Kong

Availability of Green Space m²/capita
1. Auckland
2. Melbourne
3. Sydney
4. Singapore
5. Osaka
6. Tokyo
7. Seoul
8. Taipei
9. Hong Kong
10. Busan

SOCIAL - WASTE

Waste Produced (Municipal) kg/capita	Recycling Ratio (Municipal) %	Waste Management Strategy	Overall - Waste
1. Auckland	1. Auckland	1. Auckland	1. Auckland
2. Melbourne	2. Seoul	5. Seoul	5. Seoul
3. Taipei	3. Busan	5. Busan	5. Busan
4. Busan	4. Taipei	5. Taipei	5. Melbourne
5. Seoul	5. Melbourne	5. Melbourne	5. Taipei
6. Tokyo	6. Sydney	7. Sydney	7. Sydney
7. Sydney	7. Tokyo	7. Tokyo	7. Tokyo
8. Osaka	8. Osaka		8. Osaka
9 . Hong Kong	9. Hong Kong		9. Hong Kong
10. Singapore	10. Singapore		10. Singapore

ENVIRONMENT - WATER

Water Consumption	Leaks	Water Management Strategy
1. Melbourne	1. Melbourne	1. Singapore
2. Singapore	2. Tokyo	2. Melbourne
3. Auckland	3. Singapore	3. Tokyo
4. Hong Kong	4. Osaka	4. Hong Kong
5. Tokyo	5. Sydney	5. Sydney
6. Osaka	6. Seoul	6. Auckland
7. Sydney	7. Auckland	7. Taipei
8. Busan	8. Busan	8. Osaka
9. Seoul	9. Hong Kong	9. Seoul
10. Taipei	10. Taipei	10. Busan

Overall Water
1. Melbourne
2. Singapore
3. Tokyo
4. Auckland
5. Singapore
6. Hong Kong
7. Osaka
8. Seoul
9. Busan
10. Taipei

ENVIRONMENT - AIR QUALITY & ENVIRONMENTAL REGULATION

Air Quality Pm10, NO_2, O_3, SO_2	Green Action Plan
1. Auckland	1. Tokyo
2. Melbourne	2. Melbourne
3. Sydney	3. Seoul
4. Singapore	4. Sydney
5. Tokyo	5. Singapore
6. Osaka	6. Osaka
7. Taipei	7. Auckland
8. Hong Kong	8. Taipei
9. Busan	9. Busan
10. Seoul	10. Hong Kong

ECONOMY, SOCIAL & ENVIRONMENT

ECONOMY				
	CO_2	ENERGY	GREEN GROWTH	BUILDING
1	Tokyo	Sydney	Seoul	Singapore
2	Seoul	Tokyo/Seoul	Tokyo	Tokyo
3	Sydney	Osaka	Osaka	Sydney/Taipei/Seoul
4	Melbourne/ Busan	Busan	Sydney	Melbourne

SOCIAL			
	TRANSPORTATION	WASTE	GREEN SPACE
1	Tokyo	Auckland	Auckland
2	Hong Kong	Melbourne	Melbourne
3	Singapore	Seoul	Sydney
4	Osaka	Taipei	Singapore

ENVIRONMENT			
	AIR	WATER	REGULATIONS
1	Auckland	Melbourne	Tokyo
2	Melbourne	Singapore	Melbourne
3	Sydney	Tokyo	Seoul
4	Singapore	Auckland	Sydney

Why Green is the New Black: More than half of the world's population live in urban areas and by 2050, it is expected to grow to 70%. Traditionally, products and services are based on what consumers want and need. However, a new market has emerged that is dictated by what consumers do not want - climate change. This largely untapped global market for sustainability crosses all industries – from agriculture to energy and waste – creating huge opportunities for all businesses to innovate and profit from. However, this emerging market is coupled with new and stringent regulations that will force firms to re-evaluate their business models or be left behind.

> ***"If businesses are able to adapt quickly, there is a profound opportunity to re-imagine what is possible and to grow substantially. We know what a lot of the solutions are, we just need to figure out the processes and mechanisms to bring scale to these opportunities and to realize them on an everyday level."***
>
> **- David Ramslie, Manager of the Sustainable Development Program – Vancouver, Canada.**

Firms Turning Green: With increasing awareness of the environment and demand for eco-friendly products, firms need to consider a new bottom line: sustainability. It is no longer enough for companies to only be profitable — they must also take care of the environment.

New regulations and consumer expectations have emerged as a response to climate change, and businesses must to excel on both fronts. Besides adapting to government regulations, firms need to implement a comprehensive and effective sustainability strategy as consumers expect businesses to not only meet regulations, but to exceed them.

According to a recent study, A new Era of Sustainability: UN Global Company-Accenture CEO Study 2010, 93% of CEOs agree that sustainability is important to their success and 81% made sustainability part of their company's core strategy.

Businesses can look at the greenest cities in the Asia-Pacific region as their models for sustainability. The firms will be able to take advantage of the policies in these cities, such as foreign investment and tax incentives, as well as profit from the cities' green knowledge.

> ***"The inner intensity [of a green city] mirrors a business's competitiveness. Being in a green city with comprehensive policies will improve business competitiveness, by driving down costs and improving efficiency. It will give them a first-mover's advantage."***
>
> **- Eva Oberender, South East Asia Regional Director at Renewable Energy & Energy Efficiency Partnership.**

CITY TRENDS

The Green Criteria: The three pillars of being a green city are: environment, economy, and social factors. These three categories are of equal importance, but to have a snap shot of how well the city is doing on the green scale, one must look at the level of its carbon dioxide emissions.

Tokyo: Lowest carbon dioxide emissions: Tokyo is one of the world's largest cities and yet, it has the lowest carbon dioxide emissions in Asia-Pacific. At 4.3 tonnes per capita, Tokyo is striving to be internationally competitive with other green cities worldwide.

Its ambitious carbon dioxide policy plans to reduce emissions by 25% by 2020 from 2000. The city has a carbon trading scheme — the first in the world to do so, and the first of its ki levend in Asia. This cap-and-trade scheme will require excess polluters to buy carbon credits from those firms that are within the emissions limits.

The city also has a comprehensive transportation strategy, which aims to reduce green-house gas emissions, where businesses will receive subsidies for electric vehicle purchases and citizens will be able to enjoy 80 electric vehicle chargers by 2013. Because Tokyo has more taxis than New York City and London combined, contributing to 20% of the city's total emissions, the Japanese capital has converted the old taxi fleet with electric vehicles.

Waste has also been reduced by 50% with the city's new waste management strategy. With its limited land space, the metropolitan has resorted to burning waste, the by product of which is used for asphalt or as a biofuel at nearby factories.

At a Glance:

GDP in 2005: US$ 1,191bn
Population in 2011: 8.7M
Land Area: 2,188km2

SEOUL, SOUTH KOREA

Seoul: Green and growing: With over 10 million people living in the metropolis, Seoul is the fifth-largest city in the world. South Korea's capital has seen rapid urbanization and an explosion in population growth, resulting in a significant increase in air and noise pollution. With more than 82% of the downtown area covered in pavement, residents in this concrete jungle only enjoy half of the World Health Organization's recommended green space per capita at 4.53 m2.

In 2008, Seoul launched a US$45bn master plan for a long-term green policy that provides a blueprint for Seoul to transform itself into an eco-friendly city by 2030. The plan aims to reduce greenhouse gases by 40%, increase renewable energy supply by 20%, and to create 1 million green jobs and promoting green technologies. Seoul's ongoing US$156m investment to replace the existing public transportation vehicles with electric trams and hybrid vehicles is part of this scheme.

Seoul's mayor, Oh See-Hoon, is an outspoken proponent for driving the city's growth through a sustainable environment. Oh has championed green causes globally and even suggested community participation and a green alliance for cities worldwide to share green technology in response to the challenges of climate change.

At a Glance:

GDP in 2005: US$ 218bn
Population in 2011: 11.2M
Land Area: 352.9km2

Melbourne: The green prototype: Melbourne is the second most populous city in Australia and the city has consistently ranked among the world's most livable cities. But the city is not resting on its laurels — the local and state governments aim to retrofit more than two-thirds of Melbourne's commercial buildings in a bold sustainability initiative that will create 800 new jobs, bringing about a green gold rush by generating A$1.3 billion.

At present, Melbourne offers 73.8 m2 of green space/person. But just like many urban areas, the city faces environmental issues due to a large urban footprint and sprawl. Water usage, drought, low rainfall and high temperatures deplete Melbourne's water supplies, leading to the longest drought that began in 1997. Thus, the implementation of restrictions on water use, reducing daily usage from 422 litres to 155 litres per capita.

> ***"The '1200 buildings program' is one of the greatest economic and environmental opportunities we have and will place Melbourne at the cutting edge of the green building movement. It will transform existing commercial buildings into centres of environmental innovation, showcases of engineering excellence and engines of economic growth."***
>
> **- Robert Doyle, Mayor of Melbourne**

At a Glance:

GDP in 2005: US$135bn
Population in 2011: 3.6M
Land Area: 2,080km2

Singapore: The green initiative: The Economist Intelligence Unit ranks Singapore as having the best quality of life in Asia and 11th overall in the world. The island has been focusing its efforts to have a green state and sure enough, green areas in the city have increased by 50% since 1986, even as the population grew by 70%.

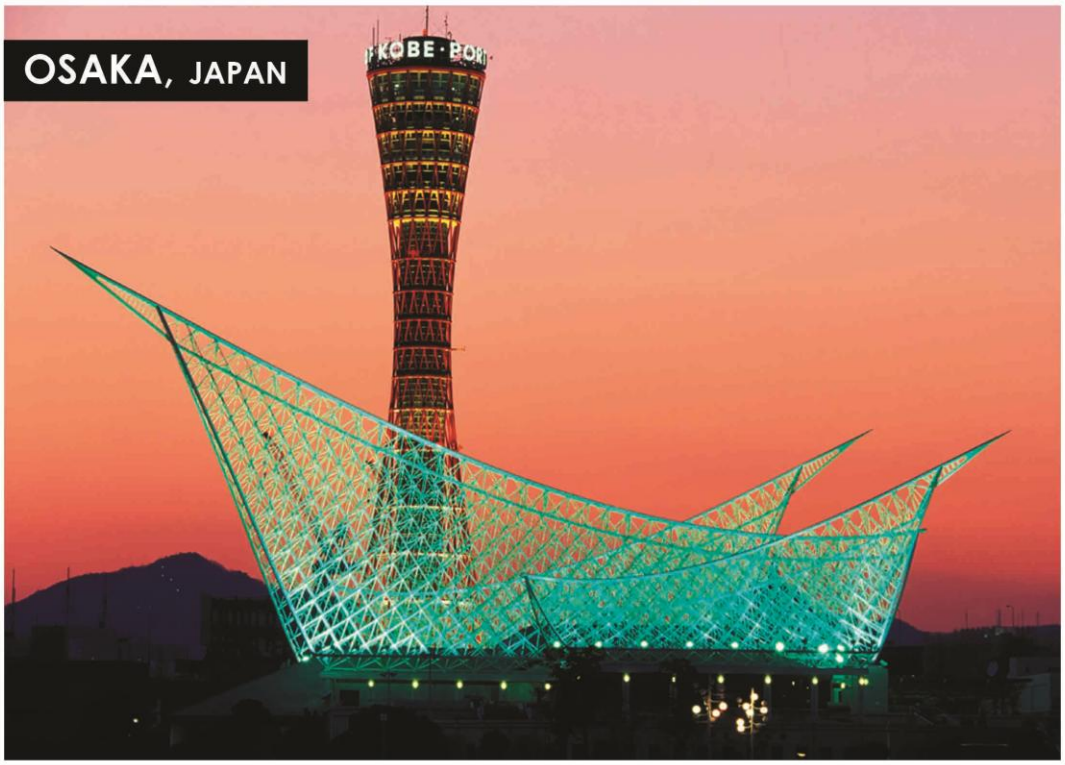
Singapore has 480 green certified buildings – the highest in the region – with the goal of having 80% of all buildings Green Mark rated by 2030.

The government plans to increase Singapore's green spaces by an additional 900ha between now and 2020, and it has come up with "sky-rise gardens" that are meant to serve as natural air conditioners. The government anticipates that the clean-tech sector will create a turnover of roughly €1.6 billion and 18,000 jobs by 2015.

> ***"We've launched a program that supports the planting of green areas on building rooftops. We want to plant 50 ha of greenery on buildings by 2030, including green areas on rooftops, facades, and terraces."***
>
> **- Richard Hoo, Group Director, Strategic Planning, at Singapore's Urban Redevelopment Authority.**

At a glance:

GDP in 2005: US$129bn
Population in 2011: 5M
Land Area: 710.3km2



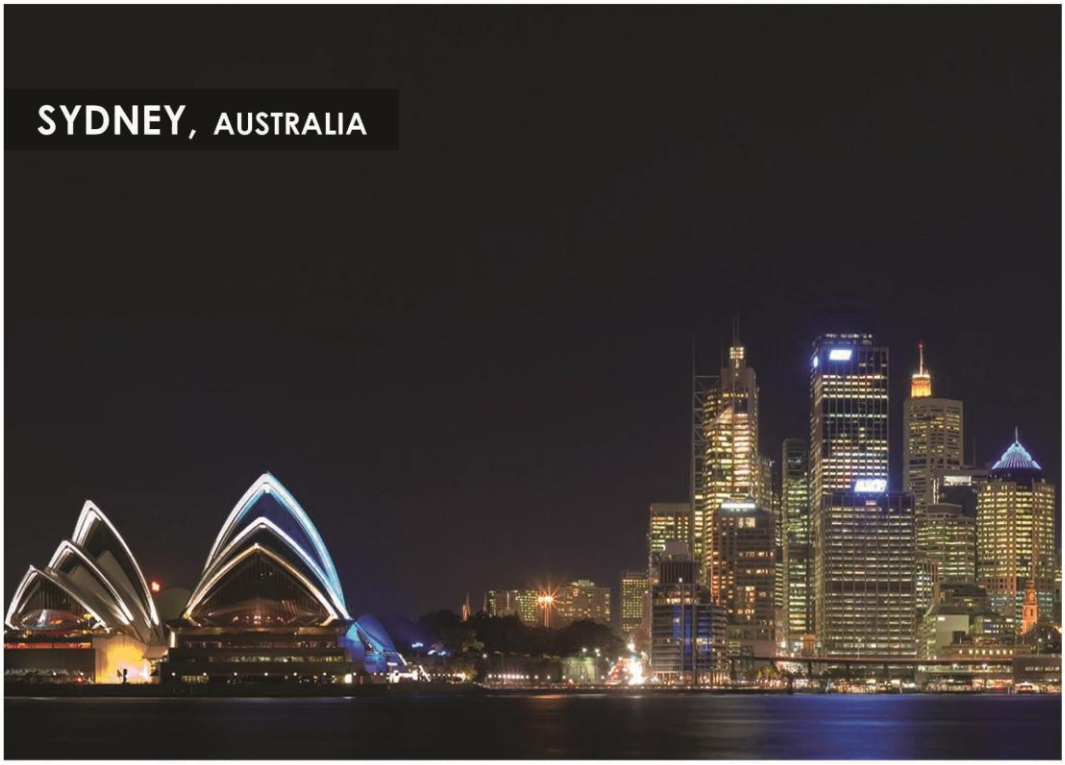
Osaka: Green technology pro-activity: Osaka is the third largest city in Japan, a country well-known for the high environmental awareness of its residents. Yet, rapid industrialization and a population boom at the turn of the last century have caused Osaka's air and water pollution problems. After successful green measures, Osaka now ranks 50th on a list of the world's greenest cities.

So far, Osaka has implemented a myriad of green measures, including growing climbing plants on walls to create 'green curtains', and using water-retentive pavement to ameliorate the urban heat island effect. To improve the waterfront areas, Osaka has deployed unique solar-powered water processing plants to remove pollutants from 2,400 gallons of water per day.

Osaka aims to reduce the amount of incinerated waste from 1.48m tons in 2007 to 1.1m tons by 2015, and reduce greenhouse gas emissions by 10% by 2011 from 1990 levels.

At a glance:

GDP in 2005: US$341bn
Population in 2011: 2.6M
Land Area: 221.96km2



Sydney: Green at all costs: Sydney has an ambitious and comprehensive plan to become a green, low-carbon city by 2030. The 'Sustainable Sydney 2030' plan aims to reduce greenhouse gas emissions by 70% by 2030, using base levels from 2006. As most of these emissions currently come from the production of electricity by coal-fired plants, the plan envisions meeting 100% of the city's energy needs from local generators, utilizing low or zero-carbon fuels.

A decentralized water supply allowing recycled water and rain water to be re-used for industrial purposes is also in the works, reducing the pressure on the main water supply. Sydney also has a target to divert 66% of residential waste from landfill.

At a Glance:

GDP in 2005: US$172bn
Population in 2011: 4.4M
Land Area: 1,687km2

Auckland: Waste the least: The Auckland metropolitan area is the largest and most populous urban area in New Zealand, with 31% percent of the country's total population calling it home. Despite this, Auckland has lower ecological footprints per capita than the national average, and compared with other regions in the country, Auckland recycled the most in 2005.

However, it has higher levels of NO2 compared to other cities, as a higher dependence on private transport increases vehicular emissions. The Auckland region also shows a more significant increase in demand for electricity than in other regions in New Zealand.

At a Glance:

GDP in 2005: US$41bn
Population in 2011: 1.4M
Land Area: 630km2

The Process of going green: To become green, a city must first be economically and politically stable. The government must have a united vision as well as a prosperous economy in order to strategize and execute any green action plans. This feeds into the city's ability to make green changes by dedicating funds and resources to educate and train the workforce and citizens.

Even with a united vision, there must be knowledgeable human resources to execute and implement the plans. There must be education and promotional campaigns on sustainability, as well as incentives to all stakeholders, or else there may be a disruption in the compliance and regulation process.

In California, an emissions reduction law has been stalled by oil refining campaigners, whereas in Tokyo, a similar cap-and-trade program has the go-ahead for 2011.

With financial and intellectual ability comes a responsibility of the city to utilize its resources and knowledge to provide a sustainable living environment for both its residents and the citizens of the world. Even if not for social reasons, the rising global demand for environmentally friendly products and services creates financial opportunities. Sustainability demands will cross all industries and absorb market share, which means significant profits for first-movers and adapters.

Solidiance is a marketing and growth strategy consulting firm with focus on Asia Pacific. We are devoted to working side-by-side with construction industry clients to outpace the competition, close gaps in growth and deliver breakthroughs in performance and profitability. Our Asia focus provides our clients with a better understanding of intrinsic green and urban development regional issues.

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