



FUTUROPOLIS

When it comes to sustainable innovations that improve quality of life and enhance tourism, Singapore is a smooth-running green machine. Here's how—and why—the island nation is focusing on smart development, and what its vision can teach the rest of us.

By Jeff Book Photography by Greg White



IN THE 1960S, WHEN Singapore proclaimed itself “The Garden City,” a cynic might have thought it yet another example of development taking the name of what it replaced—in this case, the tropical rain forest that once covered this equatorial island nation. But the government threw its support behind the slogan. A programme that plants at least 10,000 saplings each year was an early instance of what would become a profusion of eco-savvy measures. The greening of Singapore (literal and figurative) expanded even as its GDP jumped and its population more than doubled (from 2.4 million in 1980 to more than 5 million today). Today it leads the world’s major cities in percentage of green space (48 percent, just ahead of Sydney). It’s a hothouse for innovative, resource-efficient buildings and infrastructure.

These achievements are no mere greenwashing: Singapore’s environmental ethos is tightly intertwined with its reputation as a top spot in Asia to live and do business. Perhaps even more important, its holistic approach to sustainable growth may help the rest of the planet deal with an epic, ongoing wave of urbanization.

Cultivating Progress

The island city-state is blessed with a strategic location between the Indian Ocean and the South China Sea—the reason Sir Thomas Stamford Raffles planted a British trading post there in 1819. After gaining full independence in 1965, Singapore became known under long-time prime minister Lee Kuan Yew for severe penalties for drug possession and other violations. Critics decried Lee’s authoritarian rule, but he was intent on forging Singapore’s Chinese, Malay and Indian populations into a cohesive, prosperous society.

Since independence, per capita income (adjusted for inflation) has increased more than tenfold. Crime and corruption are remarkably low. Singapore is number four on the Global Financial Centres Index (after London, New York and Hong Kong). Its port is second only to Shanghai’s in tonnage, while Changi Airport is rated best in the world. Citizens are required to save into a “provident fund,” which pays for health care, housing and retirement benefits. Government-provided universal education yields consistently high scores in math and science. Excellent mass transit helps make up for policies that curb traffic with exorbitant vehicle license fees and electronic tolls. For the vast majority of its people, this clean, orderly country functions very well.

“Since the early days of independence, the government has created a framework to promote sustainable development across the

island,” says Professor Heng Chye Kiang, Dean of the School of Design and Environment at the National University of Singapore. “More than 80 percent of our population lives in public housing, which pioneered sustainable design. In recent years, government programmes have given more incentives to the private sector, for everything from green-design training for workers and professionals to retrofitting buildings to be more energy-efficient.”

“It helps that the government—not some outside organization—administers Green Mark, the system that [like LEED in the U.S.] rates buildings for environmental impact,” notes Nirmal Kishnani, director of the National University’s Integrated Sustainable Design programme and author of *Greening Asia*. “That has allowed a much faster pace than a purely market-driven approach. Now every building above 5,000 square metres [1,000 square yards] in size has to conform to Green Mark standards. The target is that by 2030, 80 percent of the buildings in Singapore will be Green Mark-certified.”

Gardens in the Sky

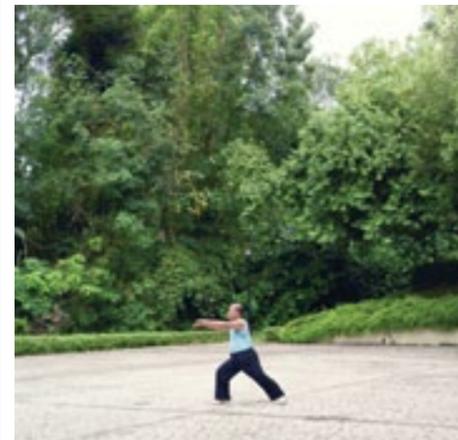
When it comes to green space, the island’s government certainly puts its money where its mouth is, seeking innovative ways to expand natural areas. After establishing more than 300 parks and four nature reserves in Singapore’s 700 square kilometres (270 square miles), government planners might have rested on their laurels. Instead, to find more space for nature, they looked up. Historically, the idea of structures sprouting foliage has brought to mind lost Mayan cities, Piranesian ruins or that wonder of the ancient world, the Hanging Gardens of Babylon. It’s a concept that’s been gaining traction worldwide, for example in Milan, where the Bosco Verticale (vertical forest) residential project is scheduled to open later this year. In Singapore, NParks, the national park agency, oversees a programme that subsidizes the cost of green roofs and walls. At HortPark, standing panels planted by NParks test different versions of vertical gardens. The result: more than 50 projects to date, a bumper crop of verdant architecture.

Entrepreneurial local firms are heeding the government’s call and finding creative means of implementation. The Singapore-based firm WOHA has led the way with buildings such as Newton Suites, 36 storeys of projecting garden terraces and a soaring green wall; the School of the Arts, a multifunction mid-rise with a green façade and a rooftop park; and ParkRoyal Tower, dubbed “a jungle in the sky” for the riotous greenery and water features on its

Previous pages:
(left) Garden variety at 158 Cecil Street; (right) Reflections at Keppel Bay towers

Below: (top) A quiet moment; (bottom) 158 Cecil Street
Right: Gardens by the Bay “supertrees”

“Singapore’s holistic approach to sustainable growth may help the rest of the planet deal with an epic, ongoing wave of urbanization.”





Left: Henderson Waves walkway, midpoint of the Southern Ridges 9-kilometre trail

Right: Visitors lend a sense of scale to one of the supertrees at Gardens by the Bay.

“ Architect Ken Yeang says that the impact of a building can be minimized at the design stage. ‘Green building is not just about eco-technology. It has to do with imitating ecological systems—making our built environment imitate the natural environment insofar as possible.’ ”



ASIA & THE PACIFIC SINGAPORE

Green Is the Colour True appreciation of the island’s eco-savvy spaces comes from experiencing them firsthand. Whether you’re staying at **Four Seasons Hotel Singapore** or **The Regent Singapore (A Four Seasons Hotel)**, these visionary developments are easily accessible.



Illustration: Ole Häntzschel

contoured balconies. WOHA’s 27-storey Oasia Downtown tower, now under construction, will be overrun by foliage, down (or up) to its lofty, open-sided sky gardens.

Integrating flora is part of a growing movement to open up the city’s buildings to the outdoors—as at 158 Cecil Street, where a sealed, barren atrium became a seven-storey vertical garden with a glass wall open to outside air. Far from mere window dressing, planted surfaces provide insulation and serve with other systems to make a building more efficient—for example, helping to capture rainwater for irrigation. They’re usually an outward sign of deeper green design. Architect Ken Yeang’s sinuous Solaris office building features extensive roof and terrace plantings, but also a naturally ventilated atrium, rainwater recycling and sun-shading louvres. Yeang has said that the impact of a building—which he calls “a human-made ecosystem”—can be minimized at the design stage. “Green building is not just about eco-technology,” he says. “It has to do with imitating ecological systems—making our built environment imitate the natural environment insofar as possible.”

Solar panels and LED lights conserve energy at Daniel Libeskind’s residential project, Reflections at Keppel Bay, where six curving towers, topped by open-air gardens and linked by landscaped sky bridges, seem to dance together by the water. Other striking, eco-friendly projects are in progress, reflecting both their success in the real estate market and the requirement that all larger new buildings be certified under the Green Mark programme.

Singapore’s ultimate green domain, Gardens by the Bay, opened last year. Costing US\$8 million, the 250-acre complex on Marina Bay features two vast conservatories, one

containing arid, Mediterranean-climate flora, the other (a vertical garden with misty waterfalls) a cloud forest environment. They're said to house 80 percent of the world's plant species, including many endangered ones. Beside them stand 18 solar-powered, rainwater-collecting "supertrees"—towering, branching structures festooned with plants, LED beacons and high walkways. Gardens by the Bay is a showcase of sustainability, its conservatories cooled by energy from photovoltaic cells and a biomass boiler system fuelled by horticultural waste. Like another attraction, the mammoth aquarium in the city's new Marine Life Park, Gardens by the Bay promotes conservation by enhancing appreciation of nature.

Tourism Al Fresco

More than a decade ago, Singapore decided it should offer visitors more than the favourite pastimes of shopping and eating, and began a concerted effort to celebrate culture and spectacle. The well-received results range from the captivating Asian Civilizations Museum to the waterfront Esplanade performing-arts complex, compared to a durian (a native fruit) because of its prickly cladding. Visitors have flocked to the first and only night-time Formula One race and to the Singapore Flyer, the world's highest observation wheel. The strait-laced city-state has relaxed a bit, even reversing a long-standing ban and authorizing two casinos, which soon after their 2010 openings ranked among the top-grossing in the world.

But it's in turning the spotlight on its natural wonders that the city really shines. Gardens by the Bay and Marine Life Park are merely the newest and most extravagant examples. Nature-minded visitors can benefit from less flashy attractions better known to locals. Bukit Timah Nature Reserve preserves a swath of the island's original rain forest; keep an eye out for long-tailed macaques and flying lemurs. The same habitat envelops the Rain Forest Walking Trail in the impressive Singapore Botanic Gardens, also home to the alluring National Orchid Garden. Among the city's over 200 kilometres (124 miles) of trails and park connectors running through and between its green zones are the dramatic Alexandra Link (walkways ascending from HortPark to splendid city views) and Henderson Waves, an undulating walkway suspended more than 36 metres (100 feet) in the air. And in Singapore's northwestern Kranji district, agritourists discover fish, animal and produce farms, including Sky Greens, which grows leafy edibles in 9-metre-tall (30-foot)

aluminium towers—a vertical solution for urban farms.

Precious Water

A further example of how commitment to green practices has improved local quality of life, as well as adding interest for tourists and inspiration for other cities, can be found in Singapore's water conservation efforts. Tired of importing nearly 40 percent of its water from Malaysia, Singapore mounted an ambitious campaign to boost production and conservation (for example, by raising the price). Dependency on foreign water has dropped as increases in desalinated water and reclaimed wastewater augment the supply from an expanded reservoir system. A dam built in 2008 across the mouth of Marina Bay created a reservoir that provides 10 percent of the country's water.

In 2012, the Bishan Park section of one of the reservoir's sources, the Kallang River, was transformed from a fenced-off concrete channel into a natural waterway. Innovations perfected here, such as the bioengineering of soil to prevent erosion, have provided a blueprint for projects elsewhere in the region. Now the restored riverine setting, a triumph of engineering and nature, attracts people and wildlife. Increased interaction with (and therefore appreciation of) water is encouraged through features like stepping stones and bridges, while the porous, winding banks capture and slow rainwater—a useful model for others who would unpave paradise.

Futuropolis

Necessarily making the most of its small, self-contained area, Singapore had clear advantages to assist with its green agenda, among them an expansive economy, a strong, goal-driven government and a shared Confucian trait of valuing the greater good. "Research and policy have changed everyday buildings, not just the showcase projects," notes Kishnani. But, he says, "there is still a long way to go at the consumer level—to motivate people to be more accountable, to waste less."

Certainly what has worked here might not work every time for cities with different cultures and climates. But any city can benefit from Singapore's model of long-range planning, synergistic policies, openness to innovation, and balancing consumption and conservation. By always looking to the future, Singapore has created a greener, more livable metropolis today. ■

Jeff Book has written about design for Elle Décor, Departures, Preservation and the Los Angeles Times.

Below: (top) The School of the Arts; (bottom) Flower Dome at Gardens by the Bay

Right: High above Marina Bay, the panoramic view from SkyPark is framed in greenery.

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