

Journey of Skyrise Greenery in Singapore Growing Our Canopy in the Sky

Text and images by Lok Yan Ling

"I have always believed that a blighted urban landscape, a concrete jungle destroys the human spirit. We need the greenery of nature to lift our spirits."

—Mr. Lee Kuan Yew in 1995

As you stroll amongst verdant ground covers and shrubs, butterflies flutter around you. You feel the gentle breeze, watch flowers bend with the wind, and catch glimpses of birds perched amidst the foliage of trees. One would imagine that such rich environments can only be experienced in parks and gardens situated at the ground level, but this is not the case in Singapore. Such lush landscapes with different forms of biodiversity are now commonplace on our rooftops in urban spaces.

Establishing Strong Greenery Foundations in Our Built Environment

These lush landscapes in our urban spaces can be attributed to our Chief Gardener—the late Mr. Lee Kuan Yew. As the father of the vision of a "Garden City", which subsequently evolved into a "City in a Garden", Mr. Lee nurtured greenery from the ground up and created the strong foundations that support and anchor our pervasive multilevel green matrix at present.

Mr. Lee's initial vision of a green nation was "to distinguish ourselves from other Third World countries" in order to provide a competitive edge. This can be seen thriving till today. With greenery evolving with building façades over the years, the term "skyrise greenery" was coined to describe the incorporation of greenery with high-rise

architecture. Singapore continues to have a vibrant skyrise greenery scene that has achieved 72 hectares of rooftop greenery and 5 hectares of vertical greenery to date. Through a non-mandatory policy, Singapore sets herself apart from other countries such as Germany which boost huge green roof areas, albeit mandated by policies. Distinguishing herself further is the fact that Singapore is home to two of the previous record holders awarded by Guinness World Records for the World's Largest Vertical Garden: Ocean Financial Centre (in September 2013) and Tree House (in April 2014).

In 2009, the late Mr. Lee said, "Green is soothing to the eyes. The more greenery you have, the more people are soothed and the cooler it is. So I said look, try to build it up every wall and every building—greenery, creepers, like the creeping ivy or put the framework over it." The potential of utilising elevated spaces for greening is not a new concept. Recognising that Singapore cannot expand geographically indefinitely, coupled with the increase in built infrastructures and the denudation of natural landscapes to meet the growing nation, Mr. Lee also once mentioned that "Singapore must retain the sense of space. We're going to build taller buildings, but we can't build them closely together. There must be . . . a sense that this is a full country with all the facilities which you expect of a large country but in a confined space . . ."

Hence, such rooftop spaces were deemed as not only potential areas for green spaces, but also functional spaces for healthy communities to be formed. Such

is evident in the existing rooftop spaces at multistorey car parks in residential estates, educational institutions, and community facilities. These have been developed into lively community rooftop gardens housing edible gardens, salad parties, therapeutic spaces, and outdoor learning spaces.

Branching Out Our Skyrise Greenery Matrix Through Initiatives

To continue this legacy of greening, the Sustainable Singapore Blueprint (SSB) was developed to set out goals to ensure a more liveable and sustainable Singapore. In the latest 2015 review, a target of 200 hectares of skyrise greenery by 2030 was fixed, setting the scene for more living architecture to be introduced into our high-rise landscape. In alignment with this national target, National Parks Board (NParks) has developed and continues to implement various initiatives aimed at stimulating the symbiotic relationship between architecture and skyrise greenery.¹

Skyrise Greenery Incentive Scheme

The Singapore government has supported skyrise greening by providing incentives to stimulate the industry. For example, new buildings are given an incentive in gross floor area exemptions for incorporating forms of rooftop greenery within their development under the Landscaping for Urban Spaces and High Rises (LUSH) programme by Urban Redevelopment Authority (URA). In line with this, NParks has developed the Skyrise Greenery Incentive Scheme (SGIS), which provides building owners



1. Vertical greenery at Ocean Financial Centre's car park façade utilises different plant species to depict maps of Singapore, Southeast Asia, and other parts of the World.

with financial incentives to install rooftop and vertical greenery on their existing buildings.

Since its introduction in 2009, the scheme set out with the objective to green up existing buildings that did not provide for landscaping in the initial construction stages, but nonetheless afforded viable spaces for greening. Since then, it has greened up more than 100 existing buildings, which support a variety of uses ranging from extensive green roofs to recreational rooftop gardens with lush verdant green walls. These intensive garden forms challenge the conventional thinking that only lightweight green roofs are applicable for retrofit projects. Many projects however are able to reintegrate intensive gardens into their building form when undergoing Addition & Alteration (A&A) works, opening up opportunities for edible gardens to be created in these rooftop spaces.

Following the success of the initial run, SGIS 2.0 was launched recently in April 2015. This enhanced version features a revised maximum cap for both rooftop greenery and vertical greenery. It subsidises up to 50 percent of the installation costs, with a revised cap of SGD 200 per square metre for rooftop greenery and SGD 500 per square metre for vertical greenery. In line with recent trends, the revisions aim to support more intensive rooftop greenery forms where possible and reflect the fall in vertical greenery costs accordingly. With this revision, this scheme hopes to facilitate the development of lush and more pervasive greenery in our built environment.

Guidelines by Centre for Urban Greenery and Ecology

Skyrise greenery is a contributor to the changing topography of Singapore. Greenery on buildings is a living form, morphing as it grows and matures over

time. With more greenery being planted on structures and surfaces, there is a need to address the sustainability and safety aspect of such landscaping. Hence, building owners should apportion sufficient time and funds to hire skilled practitioners to manage their landscapes.

In order to build upon and improve the knowledge and skills of the industry, the Centre for Urban Greenery and Ecology (CUGE) has developed two new guidelines: *CS E10:2014 Guidelines on Design Loads for Skyrise Greenery* and *CS E11:2014 Guidelines on Design for Safety of Skyrise Greenery*.² These guidelines, as their names suggest, help to mark out the associated loads involved when implementing roof gardens and green walls on building structures. They also address the need to design for the safe maintenance of skyrise greenery installations during the initial planning stage, so as to ensure the plants' performance in subsequent years.

Skyrise Greenery Awards

With so many skyrise greenery projects abound in Singapore, there is a constant need to rethink the traditional methods of greening and how greenery can be incorporated into the building façade creatively. To generate further impetus for architects and landscape architects to innovate in this area, the Skyrise Greenery Awards was launched to encourage and recognise the creative design intentions of integrating rooftop and vertical greenery into Singapore's built environment.

Since its inception in 2008, the awards has celebrated the achievements of various architectural icons and recognised a multitude of architectural innovations in Singapore across a large range. Iconic projects include PARKROYAL on Pickering, 158 Cecil Street, Khoo Teck Puat Hospital, Solaris, Hougang Primary School, and Sky Garden @ Jurong Central.

Landscape Excellence Assessment Framework

Aside from the awards, NParks has developed a greenery certification scheme called the Landscape Excellence Assessment Framework (LEAF). Launched in 2013, it is the first certification that recognises developments for excellence in greenery provision and management. With LEAF, NParks aims to encourage more pervasive and sustainable greenery in Singapore's urban landscape. One of the assessment criteria is the incorporation of skyrise greenery under "Greenery Provision". Having a validity period of three years, this certification demonstrates that sustaining greenery is not a one-off affair

and that effort to maintain greenery, be it on the ground level or building surfaces, must be sustained over time. So far 32 developments have been LEAF-certified.

International Skyrise Greenery Conference

To develop the knowledge and technical capacity of the local skyrise greenery industry, NParks organises the International Skyrise Greenery Conference (ISGC) every two years. This conference aims to create opportunities for interaction across related disciplines locally and internationally. Back for the third year running, ISGC 2015 seeks to address challenges faced by professionals from different fields of expertise to create green and sustainable architecture, while injecting heartware into the hardware.

SG Trail Maps

However, alongside these initiatives and incentives targeted at professionals and practitioners, it would be erroneous to not address the needs of the rest of the community. The bottom line is that the community wants to not only read about skyrise greenery, but also be able to experience it first-hand; people want to be able to view the lushness of a green wall up-close, feel the green roof beneath their feet, and breathe in the smells of flowers and leaves. Hence, NParks has developed a set of trail maps to allow the public to discover and enjoy various skyrise greenery installations in Singapore. The trail maps are viewable and downloadable for free at the NParks skyrise greenery website.

Growing Our Canopy in the Sky

From our modest beginnings, achieving greening on a large-scale urban environment and revitalising our communities through living architecture are no simple feats. Singapore's skyrise greening journey can be encapsulated in an image of a tree—whose strong root foundations symbolise the green vision set decades ago by the late Mr. Lee. The upward growth of its sturdy trunk depicts the steady rise in hectares of skyrise greenery, which in turn supports the tree branches. Like how they uphold the tree's crown, these branches represent the various initiatives that form a pervasive high-rise green matrix. Riding on this green matrix that has been weaved into our urban spaces over the years, Singapore will continue to innovatively push the frontiers of skyrise greening to enhance its status as a liveable city—further growing our canopy in the sky. 

1 National Parks Board (NParks), "Skyrise Greenery," accessed August 4, 2015, <https://www.skyrisegreenery.com>. More details on the various skyrise greening initiatives by NParks may be found on its skyrise greenery website.

2 Centre for Urban Greenery and Ecology (CUGE), "Publications," accessed August 4, 2015, <https://www.cuge.com.sg/research/catalog.php>. CUGE publications, including both guidelines, may be purchased through this page on the CUGE website.

Beneficiaries of the Skyrise Greenery Incentive Scheme

Many buildings in Singapore have benefitted from the Skyrise Greenery Incentive Scheme. Listed are some of these projects:

- Vertical greenery at National University of Singapore (NUS) Ventus building
- Edible rooftop garden at Spectra Secondary School
- Extensive green roof at Hwa Chong Institution
- Extensive green roof at Toa Payoh Polyclinic
- Vertical greenery at Halia at Singapore Botanic Gardens
- Extensive green roof at Singapore Institute of Management
- Rooftop garden and vertical greenery at National Gallery Singapore
- Extensive green roof at National Institute of Education (Administration building)
- Vertical greenery at Singapore General Hospital



Vertical greenery at National University of Singapore (NUS) Ventus building.



Edible rooftop garden at Spectra Secondary School.



Extensive green roof at Hwa Chong Institution.



Extensive green roof at Toa Payoh Polyclinic.



Vertical greenery at Halia at Singapore Botanic Gardens.



Extensive green roof at Singapore Institute of Management.



Rooftop garden and vertical greenery at National Gallery Singapore.



Extensive green roof at National Institute of Education (Administration building).



Vertical greenery at Singapore General Hospital.