



Sustainability and Urban Density

# Garden City Mega City

The explosion of mega cities globally is not only putting immense pressure on non-renewable natural resources, but also creating mounting tension in the way land is allocated and used. In response, architectural firm **WOHA** puts forth its vision of a mega city that is shared, sociable and sustainable.

Cities are growing at a phenomenal rate, with the number of megacities in the world having more than tripled in the past 25 years. Caught in an unprecedented growth spurt, these cities are undergoing an “urban puberty” phase and rapidly outgrowing their infrastructure.

Since 2001, WOHA has designed and built a series of prototypes as part of a process

of urban re-evaluation, adopting the Asian megacity as an ideal testing ground for new urban typologies and architectural strategies. Re-imagining the early 20<sup>th</sup> century Garden City, WOHA proposes that a multi-layered, high-density, high-amenity 21<sup>st</sup> century Mega City that is dense and vertical, yet sociable and sustainable, is the only way forward.



(Left) **Wong Mun Summ** is a co-founder of WOHA.  
(Right) **Richard Hassell** is a co-founder of WOHA.



An illustration of a high-density, high-amenity 21<sup>st</sup> century Mega City.





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## Layering Cities

Over the last two centuries, land has been taken for granted as an infinite horizontal site for building, farming and mining. With exploding mega-city populations, land scarcity is reflected in the competition to meet the conflicting needs of a city, resulting in high land cost and the stark trade-offs between various land uses.

WOHA envisions a city in terms of layers, as a three-dimensional matrix, rather than a two-dimensional grid. This calls for innovative land use solutions that involve a re-planning of cities—vertically, not horizontally. On top of reclaiming, restoring and re-energising our existing land, new land must be created. The use of land needs to be intensified by layering urban and rural environments—residential, recreational, commercial, agricultural and infrastructural—above and below the existing ground level of the city.



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- 01 An example of layering cities at Vanke Cloud City, China.
  - 02 An example of how “cities within cities” enable a 24/7 live-work-play vibrancy at Vanke Cloud City, China.
  - 03 An illustration of domesticated structures recreating neighbourhood streetscapes at SkyVille @ Dawson, Singapore.
  - 04 An illustration of multiple ground levels to achieve “high-density, high-amenity” developments.





**This not only improves human well-being and comfort, but also restores biodiversity into the city and keeps the natural balance of ecosystems and wild life habitats.**







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### Planting Cities

The relentless tide of rapid urbanisation has caused green, open and civic spaces to shrink at an unprecedented rate, while chronic traffic congestion, vehicular and industrial pollution further compound the city's environmental condition. Cities have become harsh concrete jungles, with hard surfaces directly contributing to the urban heat island effect. Citizens are also leading increasingly insular lives, with minimal contact with nature. WOHA's strategies for "Planting Cities" aim to re-introduce biophilic design into buildings. This not only improves human well-being and comfort, but also restores

biodiversity into the city and keeps the natural balance of ecosystems and wild life habitats.

### Breathing Cities

The archetypal modernist model for high-rise buildings was originally devised for the cold climate of the United States. Regardless of appropriateness, these glossy, hermetically sealed towers have been replicated across the globe, consuming about 40% of the world's energy, without any real re-invention of its basic typology to suit the changing times and local climate.

- 01 A terraced community sky park and community farms at Kampung Admiralty, Singapore.
- 02 An example of topographic architecture at Parkroyal on Pickering, Singapore.
- 03 An illustration of "Breathing Cities".
- 04 An example of a breezeway tower with a breezeway atrium at Oasia Hotel Downtown, Singapore.



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“By opening up internal spaces to the climate and nature, buildings can ‘breathe’ again.”

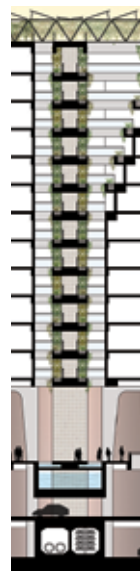
WOHA’s strategies for “Breathing Cities” calls for a return to first principles, with the aim of creating sensible climatic designs that achieve thermal comfort without the need to rely solely on mechanical systems. Vernacular and passive responses to climate are adapted into the tropical high-rise form and translated into contemporary technologies. By opening up internal spaces to the climate and nature, buildings can “breathe” again.

### Rating Cities

WOHA’s strategies must be assessed within a larger picture, with holistic planning of the city being the priority. Cities from the 20<sup>th</sup> century were planned as collections of segregated components, which were measured in terms of their economic productivity. The value of buildings was assessed only by capital cost efficiency—building plot ratios, net to gross floor values, and surface to volume ratios—rather than their overall contribution to the city as components within a self-sufficient system. In contrast, 21<sup>st</sup> century cities must be

about people and integration, with buildings assessed in terms of their contribution to social and environmental sustainability, as well as their economic viability. To gauge this, WOHA has devised a social and ecological rating system for all city buildings, conducted on behalf of a city’s residents, rather than its property developers.

WOHA’s toolbox includes **Green Plot Ratio** to measure the amount of landscaped surfaces within a building over its site area with the aim of re-introducing biodiversity and green relief into the city. **Community Plot Ratio** measures the total amount of community space within a building over its site area with the aim of encouraging social gathering and human interaction at various scales. To measure the extent to which a building encourages and facilitates the public life of a city, WOHA devised a **Civic Generosity Index**. This rewards buildings that exhibit good neighbourliness in the way they gift the city visually or spatially. The adoption of “urban ecological” approaches to support wildlife within cities is also recognised under an **Ecosystem Contribution Index**, which measures the degree to which a building supplements a city’s ecosystem. Aiming for fully sustainable buildings and cities, WOHA also gives high priority to a **Self-Sufficiency Index** that measures a building’s capacity to provide its own energy, food and water.





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### Self-Sufficient City

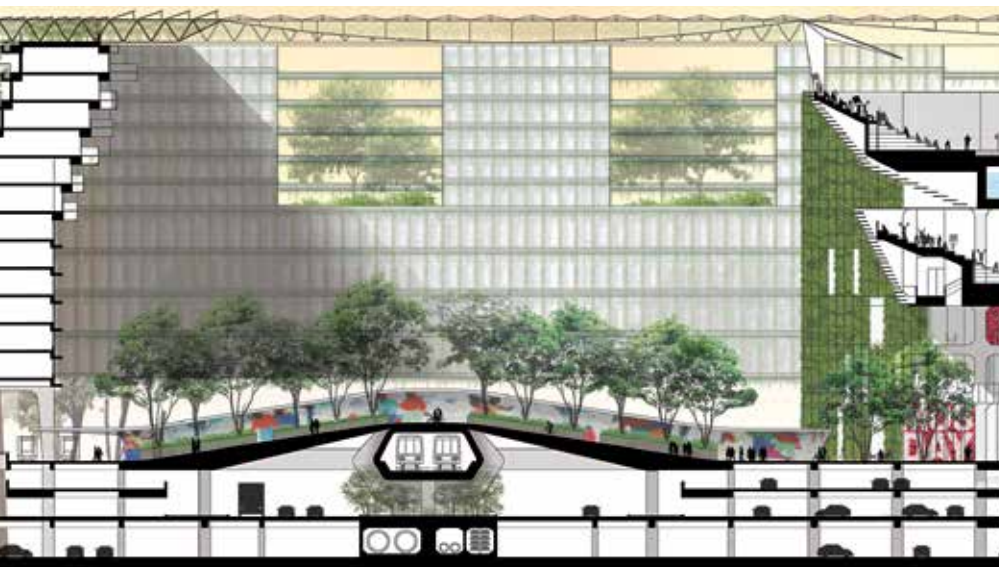
As part of the Icsid World Design Congress 2009, WOHA spearheaded a vertical studio to explore an idealistic self-sufficient city for Singapore in 2050. In 2014, WOHA evolved these ideas and produced a tangible and buildable blueprint for a new town master plan proposal in northern Jakarta.

The design challenge was to house 210,000 people on a 7.3-square kilometre site overgrown with secondary rainforest and constrained by a 60-metre building height

control limit. To create a tropical “eco-town-in-a-forest”, which would retain over half of the existing green landscape, WOHA integrated the site’s horizontal land-use allocations with the stratification of its Self-Sufficient City prototype.

WOHA’s concept of a Self-Sufficient City is not a romantic utopian ideal. It is a realistic vision for our urban future with a blueprint for sustainable development and a progressive philosophy for a dense and vertical, yet sociable and sustainable 21<sup>st</sup> century Garden City Mega City. ●

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#### ROOFTOP CANOPY LAYER:

This layer is both protective and productive, providing shade and shelter as well as solar energy and food harvested from “sky field” crops.

#### RESIDENTIAL AND WORKPLACE LAYER:

This layer is organised into a series of breezeway courtyards or towers with cross-ventilated “One-Unit-Thick” apartments.

#### PARKLAND LAYER:

This layer is beneath buildings and comprises tropical community spaces for public functions and social interaction.

#### TRANSPORTATION AND SERVICES LAYER:

This layer contains all service networks and vehicles.

02 An illustration of Singapore in 2050 designed for the Icsid World Design Congress, 2009.

03 An illustration of self-sufficiency through the use of solar panels and urban farming in the self-sufficient city designed for a new town master plan proposal in northern Jakarta, 2014.

04 An illustration of the layers of amenities within a self-sufficient city designed for a new town master plan proposal in northern Jakarta, 2014.