

# smart cities australia

ingenhoven architects, Martin Reuter

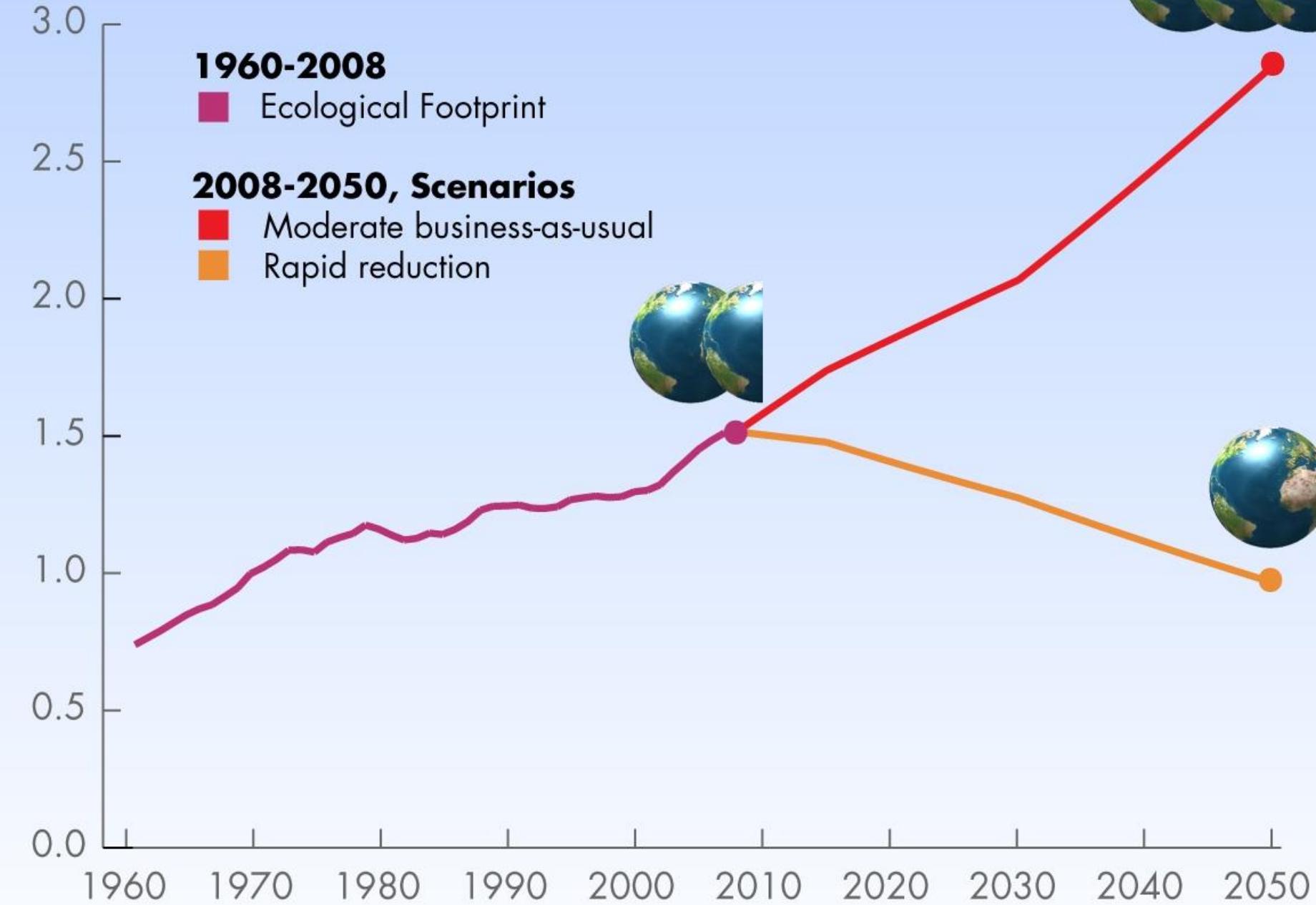
# ingenhoven architects

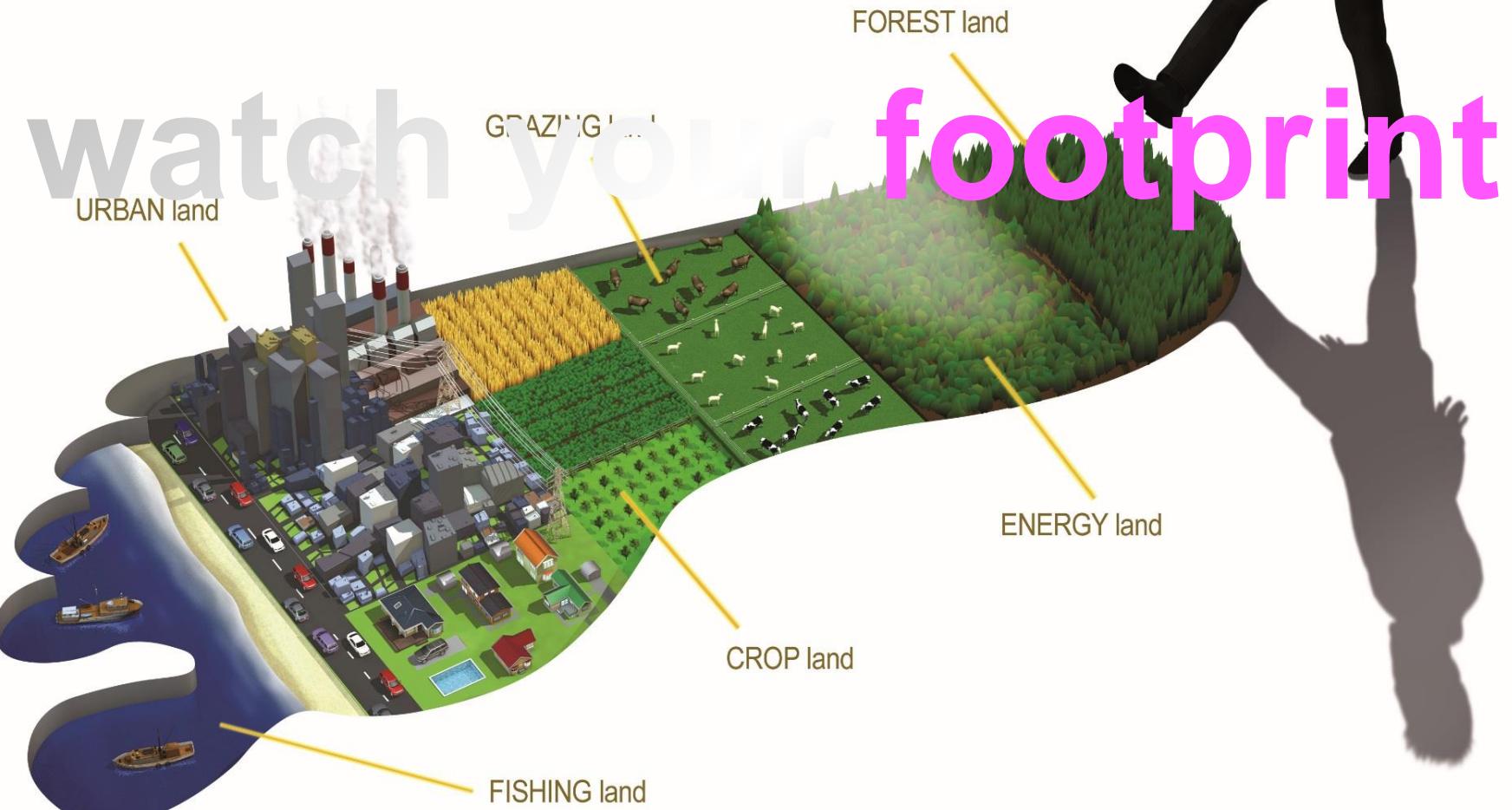






a second planet?



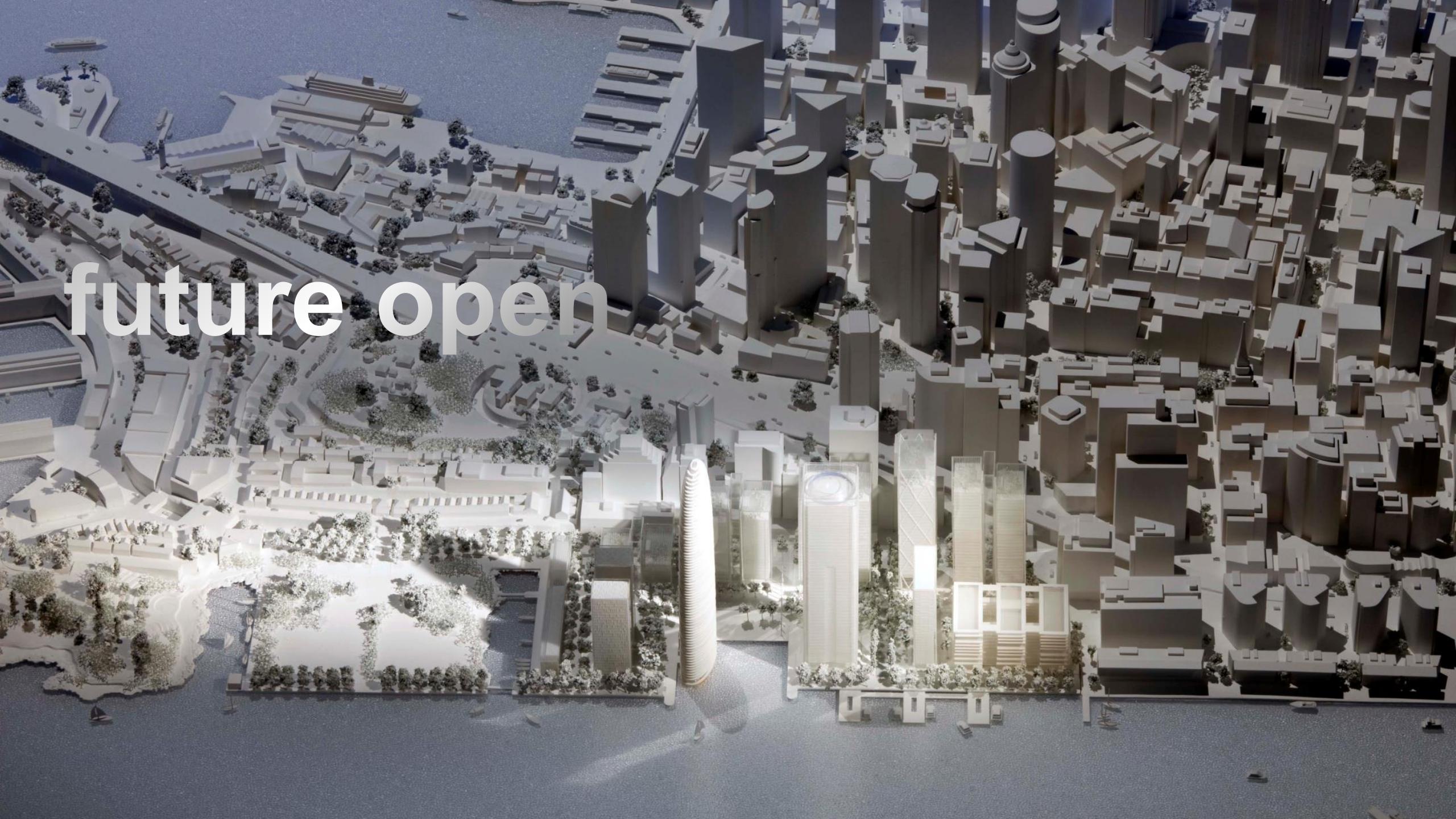




# what's smart

An aerial photograph of a modern architectural complex. The most prominent feature is a large, multi-story building with a facade composed of numerous curved, metallic panels that create a wave-like pattern. In the center of the complex is a large, circular green roof with a winding path and various plants. To the left, there's a smaller building with a glass roof and some greenery. To the right, there's a road and a grassy field. The overall image conveys a sense of sustainable design and integration with nature.

sustainable



future open

An aerial photograph of a modern urban landscape. In the foreground, a large, modern building with a extensive green roof and a glass facade is visible. To its left is a tall, modern residential tower with a blue vertical cladding pattern. The background shows a dense city skyline with various buildings, including a church with a tall spire. The sky is clear and blue.

... one piece of many

A wide-angle photograph capturing a large, diverse group of people gathered on a series of wooden bleachers under a clear blue sky. The bleachers are built of light-colored wood and white metal railings, arranged in a tiered fashion. In the background, a modern building with a massive glass facade reflects the surrounding green trees. The people are dressed in casual summer attire like t-shirts, shorts, and tank tops. Many are sitting, some are standing, and a few are walking through the scene. The overall atmosphere is one of a public, outdoor social gathering.

places for people





A photograph of a forest scene. The foreground is filled with the trunks and branches of many tall, thin trees, mostly in shades of brown and tan. Sunlight filters down from the top right, creating bright highlights on the leaves and branches, and casting long shadows. In the lower right, there's a cluster of green bushes or small trees with white flowers.

caring for resources



renewable energy



zero carbon

# cradle 2 cradle



A wide-angle photograph of the New York City skyline under a clear blue sky. In the foreground, a group of people are sitting on a grassy hill, looking towards the city. The middle ground shows a dense cluster of buildings, including the Chrysler Building and various residential and office towers. The background features several iconic skyscrapers, including the One World Trade Center and the MetLife Building.

greening the city





# intermodal mobility









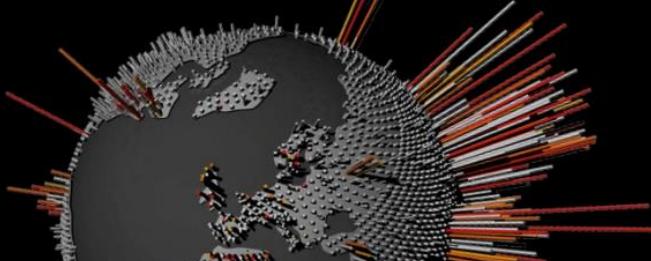




supergreen<sup>©</sup>

## Growth of population worldwide

world population exceeding 9,3 billion in 2050, 70% of which will live in cities.



# integral

40 world's largest cities - home to less than 18% of the world population represent 66% of world economy ...



... and they cover only 3% of the planet's surface ...

... they produce 80% of CO<sub>2</sub> emissions.

Higher density translates directly into drastically reduced CO<sub>2</sub> emissions.

## How Singapore developed

Land area of Singapore has been increased by 8,9% ...

... further land reclamation will increase the area up to 25% by 2030.

Land size

580 km<sup>2</sup>

Population  
GDP per capita

1.7 million

unaccounted

1963

1965

1980

1990

2000

2010

2014

2011

2017

2020

2050

The British arrives in Singapore and establishes the British as a colony

Singapore separates from Malaysia due to political differences

Independence from the British as a Malaysia-Singapore conglomerate known as Malaya

Malaysia-Singapore Points of Agreement (POA) in 1990 elaborating on how Malaysian railway land in Singapore will be returned once the train line is no longer in use.

The difference in interpretation of this POA has led to dispute and has been left unsolved for many years.

Project completion  
Aedes exhibition in Berlin

Piling starts for Marina One

An international architectural competition is held, where ingenhoven won with its partnering consultants  
Setting up of M+S, a joint venture between Singapore and Malaysia, representative of Temasek and Khazanah.

An agreement was found between two sovereign nations: a land swap will occur where the railway land will be returned to Singapore, and in exchange, six land parcels will be given to Malaysia in a 60:40 joint venture between the two countries.



## Strongest population growth in tropical and subtropical regions

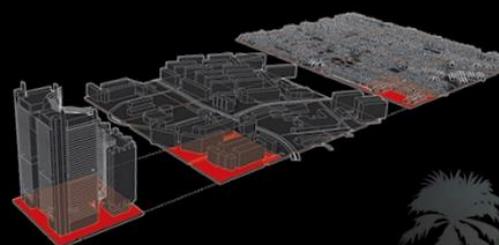


Singapore is a country with the third highest population density

of **7,148 persons/km<sup>2</sup>**.

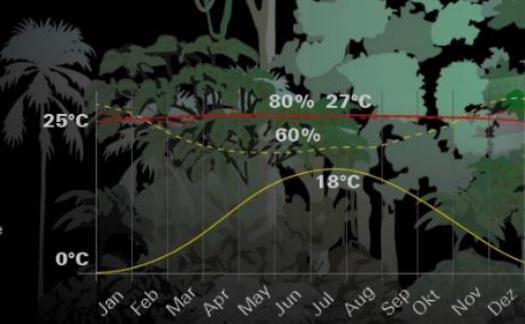
Germany has a density of

**229 persons/km<sup>2</sup>**.



### Climatic Conditions

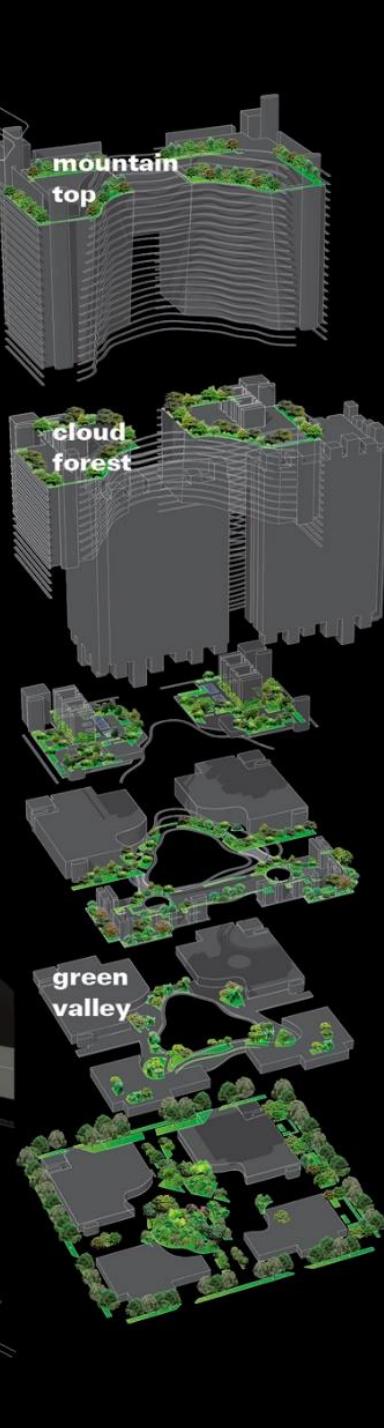
The tropical and humid climate in Singapore causes very constant temperatures and classic seasons are missing. The average temperature is around 31°C all year round.



## A tropical hypercity

High humidity paired with high temperatures require buildings like Marina One that address comfort and cooling needs with ecologically responsible solutions.





**Maximum green!**

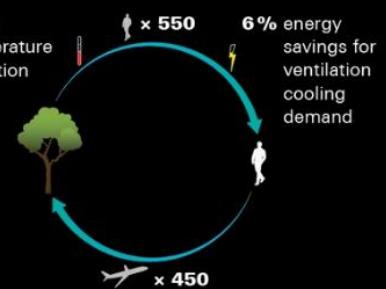
there are in total **717 trees** in marina one with **42 tree species** and **271 species** of shrubs and palms providing a total leaf area of **137,925 m<sup>2</sup>**

**125 %** landscape replacement



## Fighting pollution!

$O_2$  produced is sufficient for 500–600 persons a day.



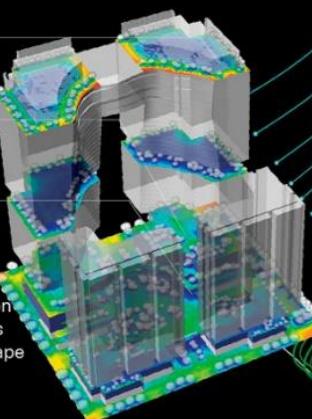
$CO_2$  absorbed by is equivalent to 400–450 long-haul flights

## Planting makes it feel up to 20% cooler!

23°C reduction in roof surface temperature  
Planting reduced local articulate matter by 10–20%

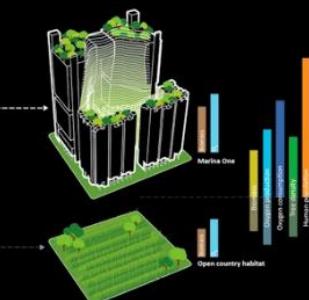
12°C reduction in greenheart surface temperature  
Horizontal surface temperature simulation of Marina One with its lush trees and landscape

Air temperature is reduced by 1.5°C  
Marina One with its lush trees and landscape

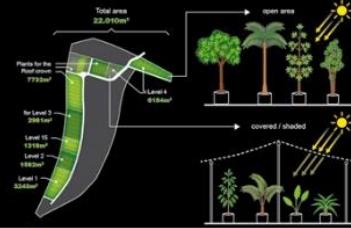


Like a rain forest  
Selection and arrangement of plants follows the structure in a natural setting

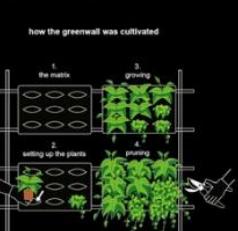
Emergent layer  
Canopy layer  
Understorey layer



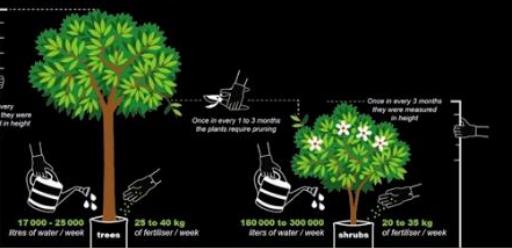
>>> Setting up the nursery <<<



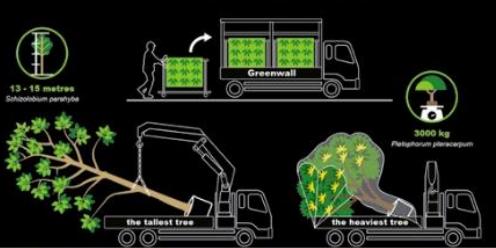
>>> the greenwall <<<



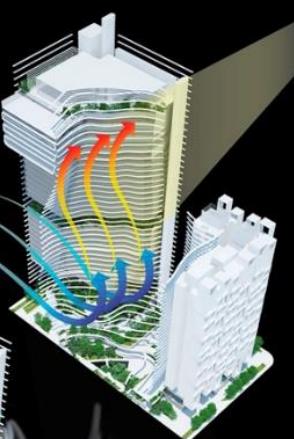
>>> Growing the plants <<<



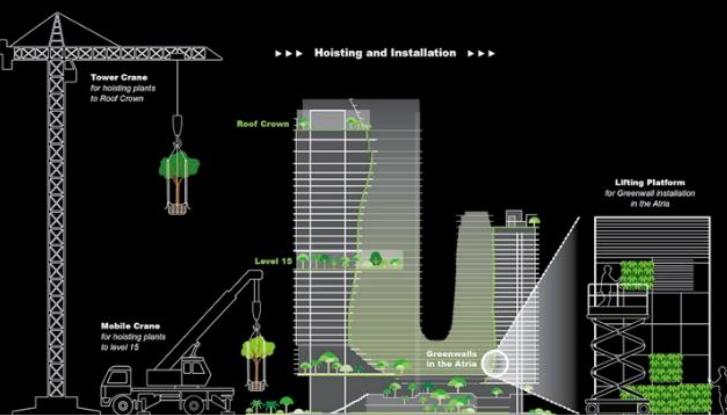
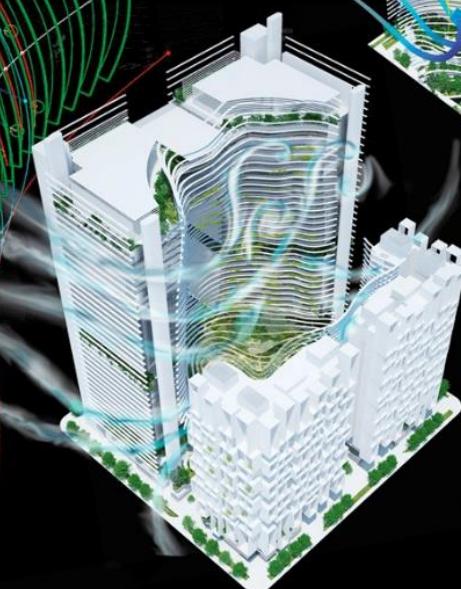
>>> Transporting the Plants to site <<<



Form and section of the green heart enhance the natural air convection as such pulling relatively cooler fresh air through the skygarden into the green heart.



## Catching the breeze



14th July 2014

Latest plant arrived to Marina One Nursery

3 years growing time

13 December 2016  
first plant brought to site for Penthouses

25 July 2017  
the last plant brought to site, for A1 Level 3

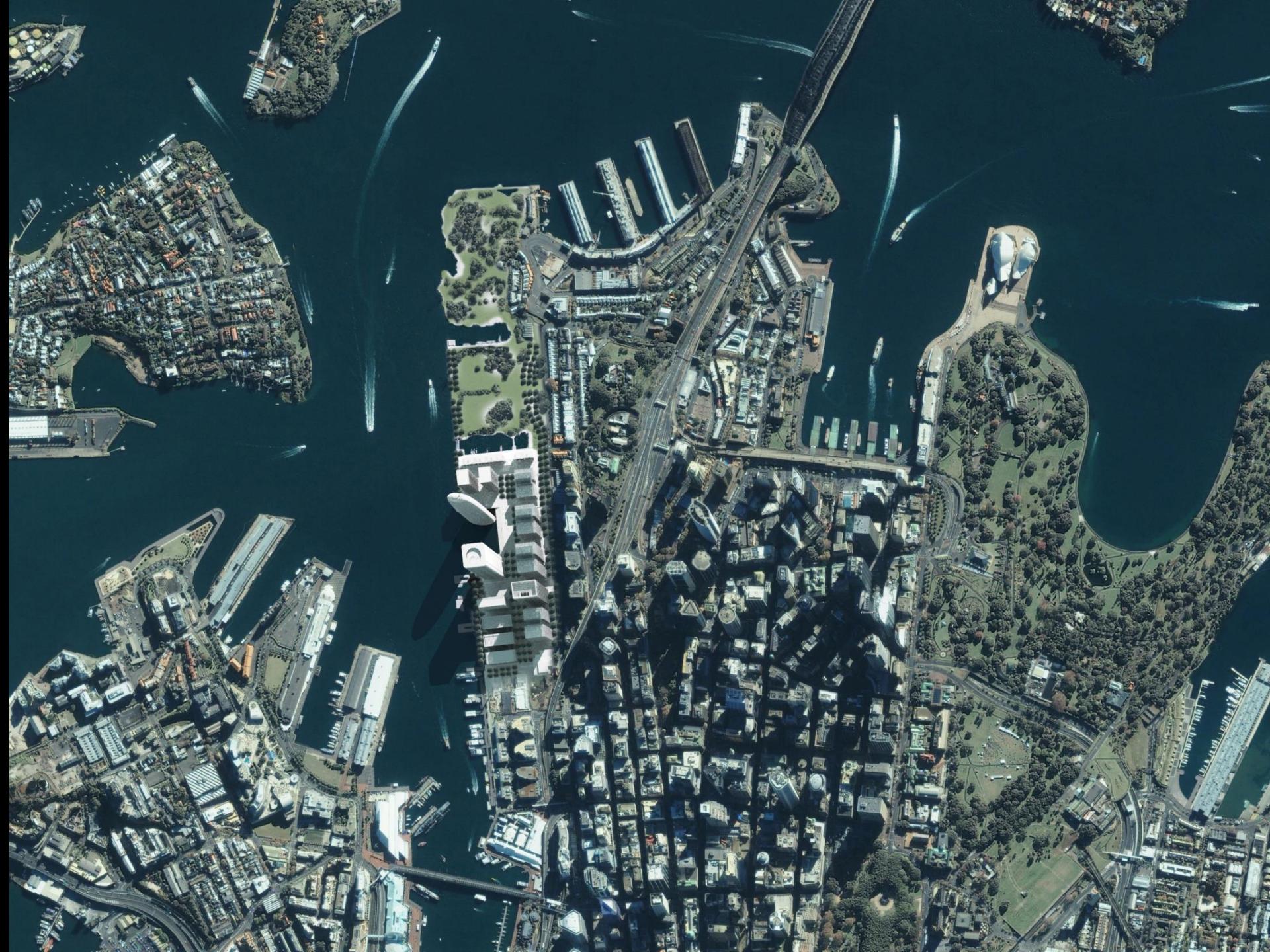
Future



# city fabric















Rock Beach





The background image shows a panoramic view of the Sydney skyline at dusk or night. On the left, the illuminated glass facade of the Opera House is visible. In the center, the iconic Harbour Bridge is brightly lit, with its characteristic steel truss structure. The city skyline is filled with numerous skyscrapers, their windows glowing with lights. The sky is a deep blue, transitioning into a darker shade of purple and black towards the horizon.

# sustainable innovation

# 1 Bligh Sydney

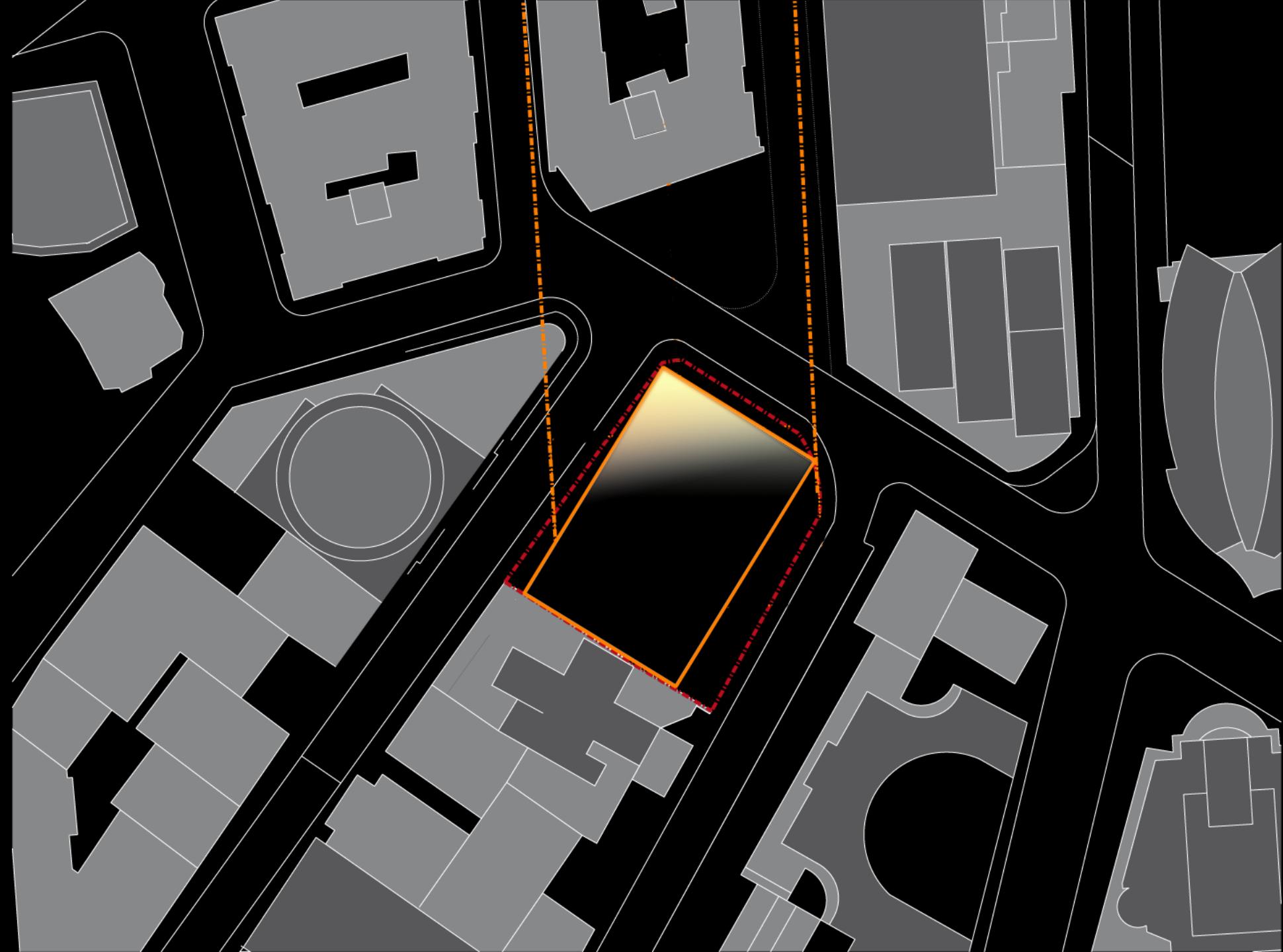


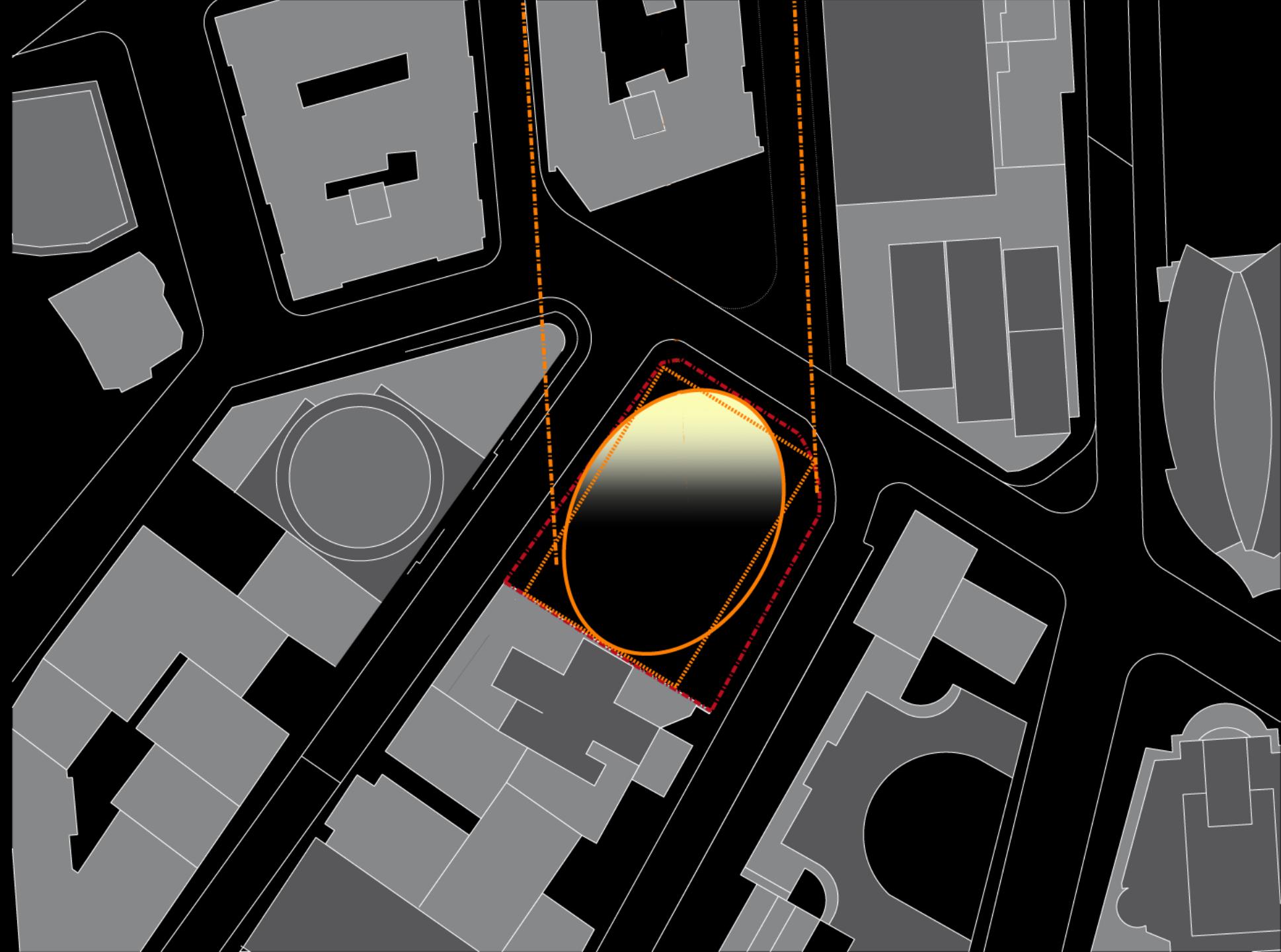


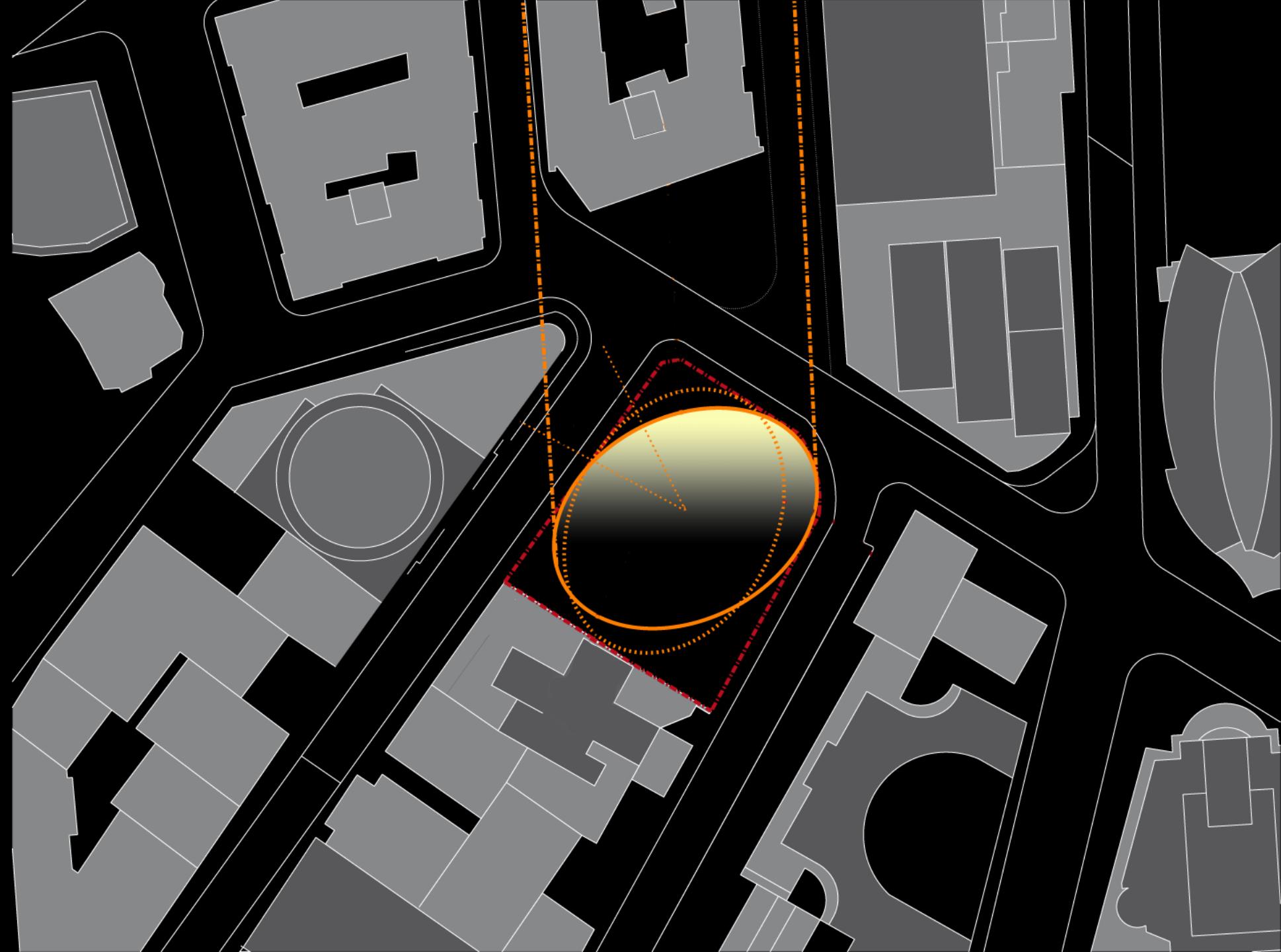


The background features a complex arrangement of interlocking gears and mechanical components in shades of gray and black. A central, semi-transparent yellow rectangular box with a red outline and dashed border is positioned diagonally, containing the text.

out of the box thinking









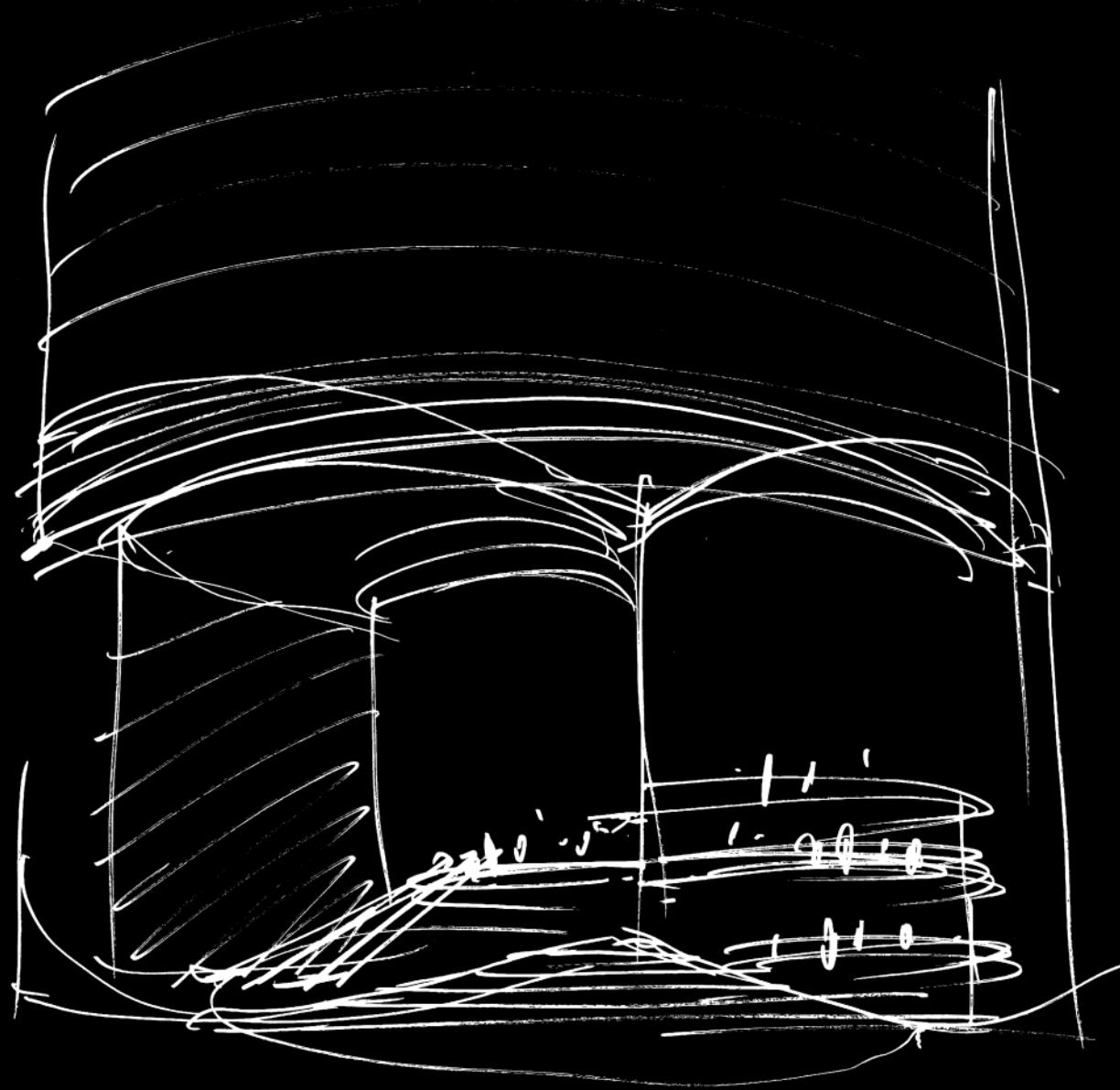


AMP

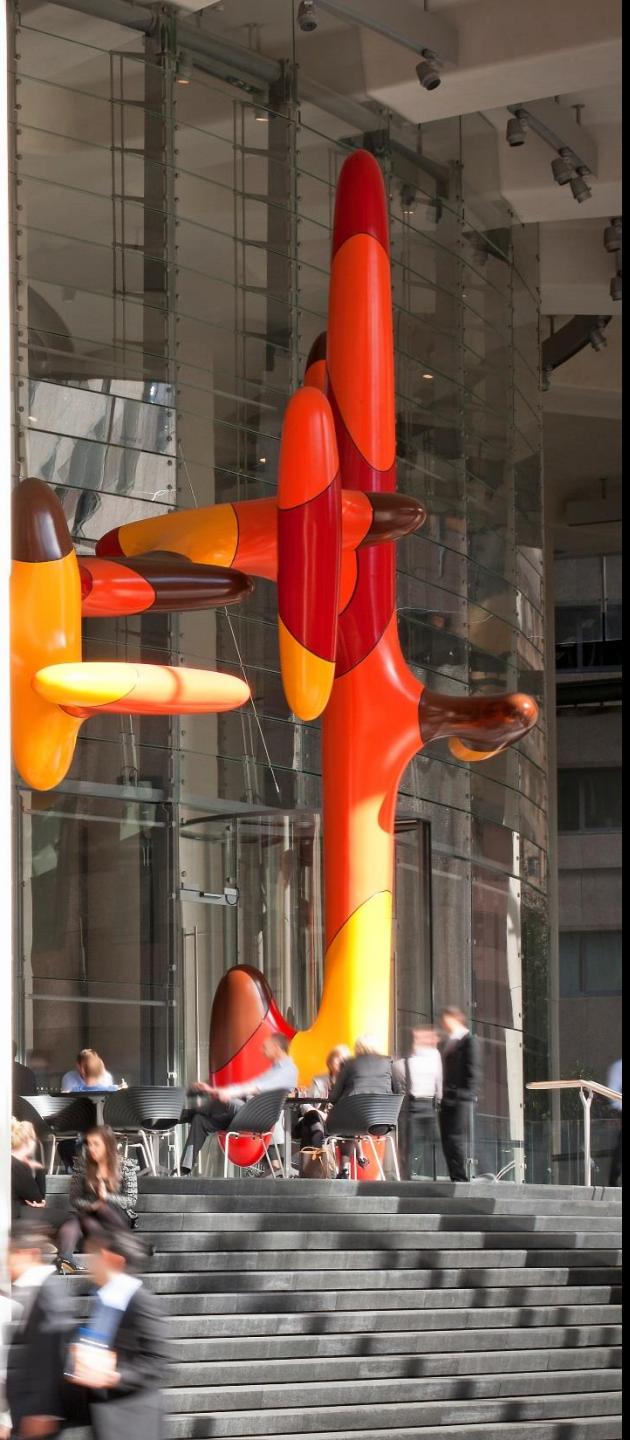
J Marriot

CIRCULAR QUAY RAILWAY STATION





















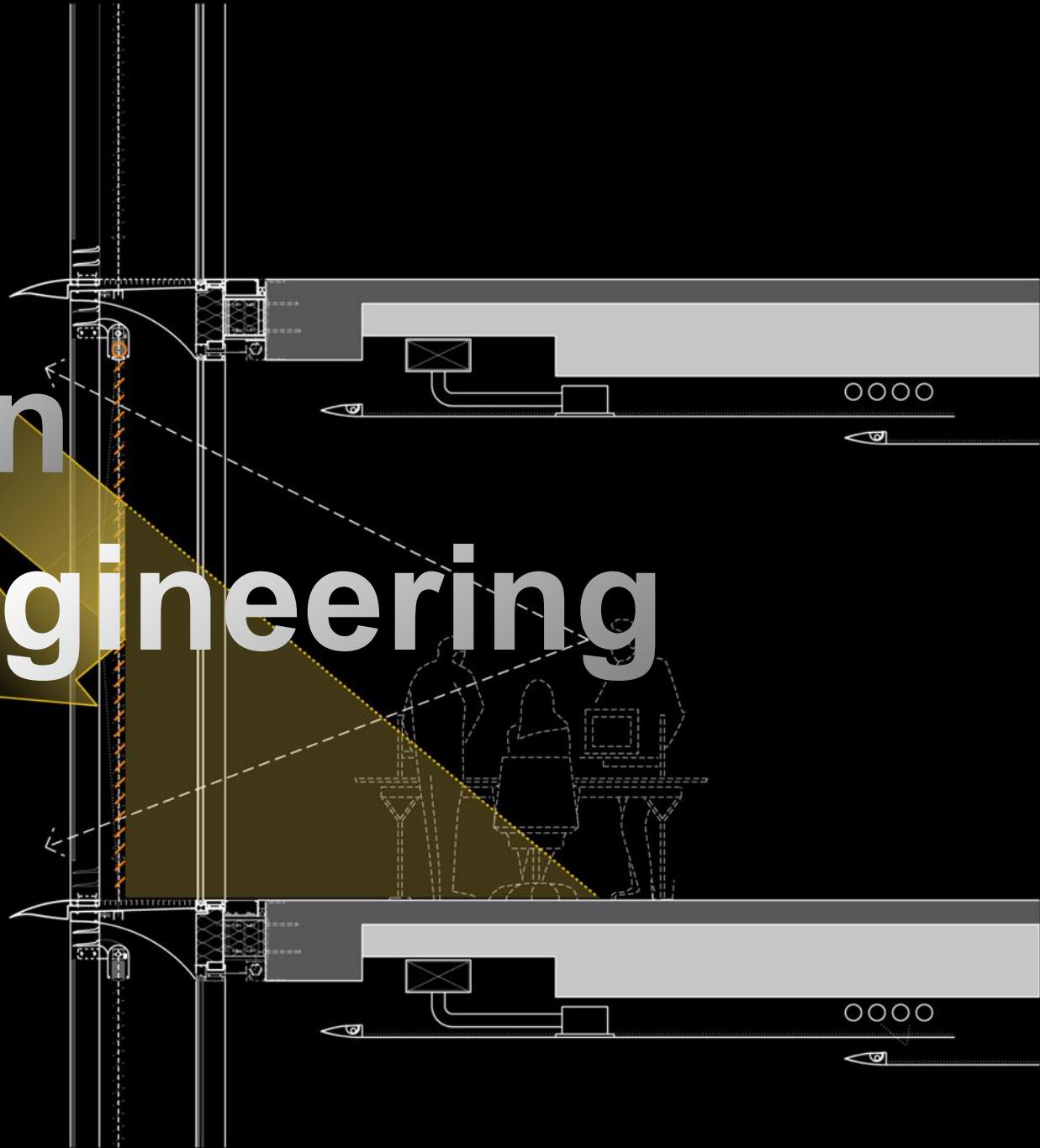
1702

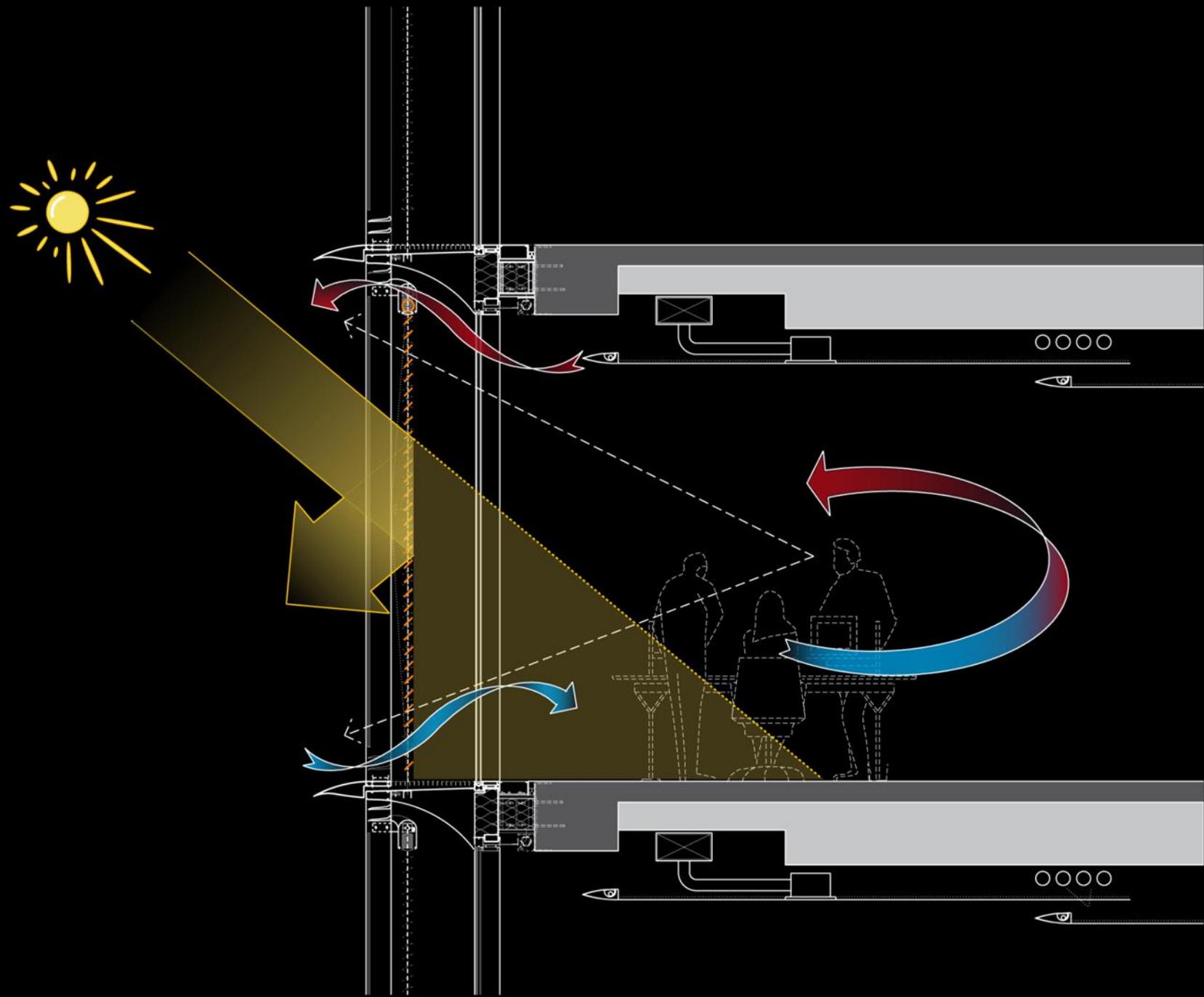
1703

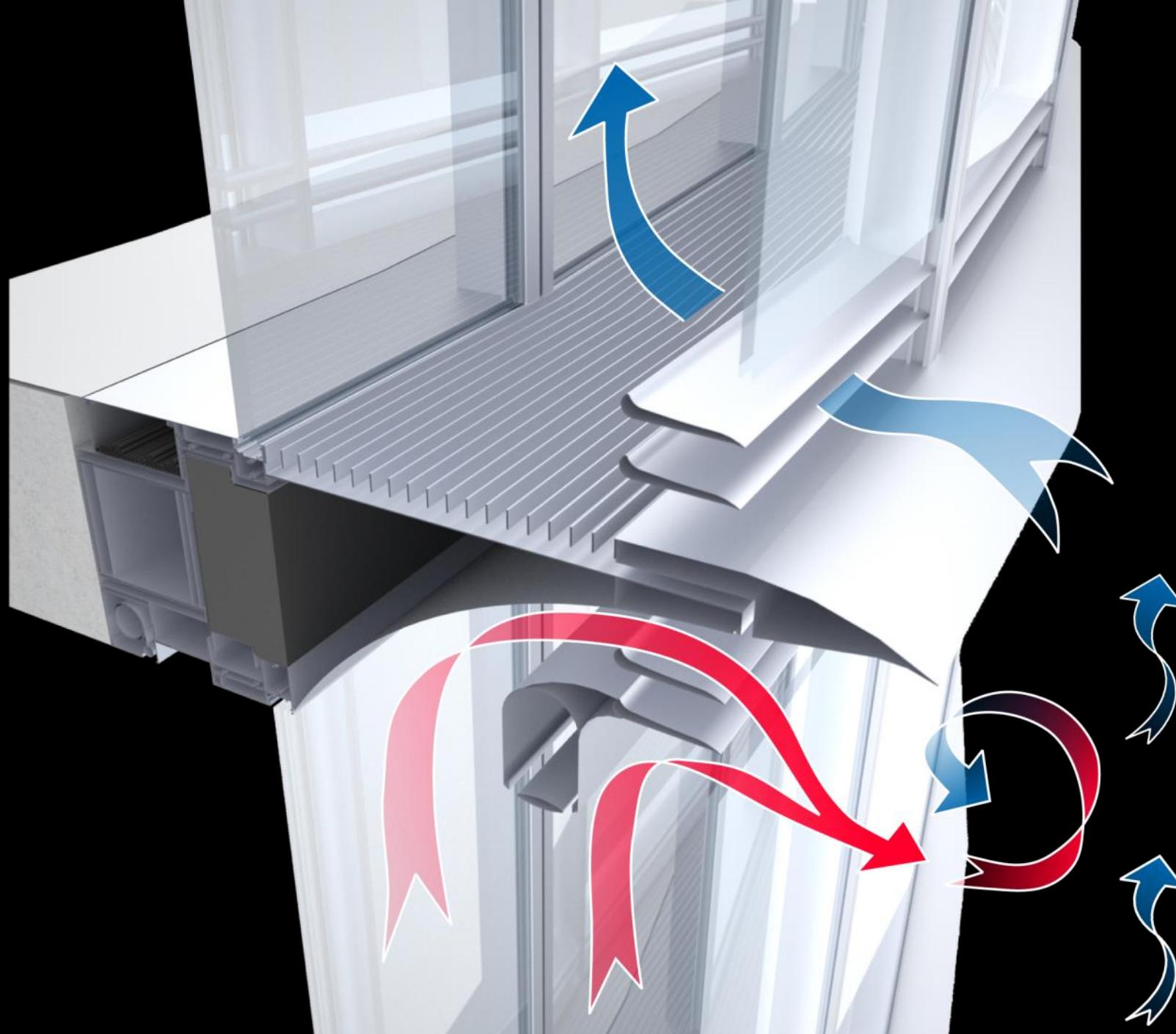




double skin  
german engineering

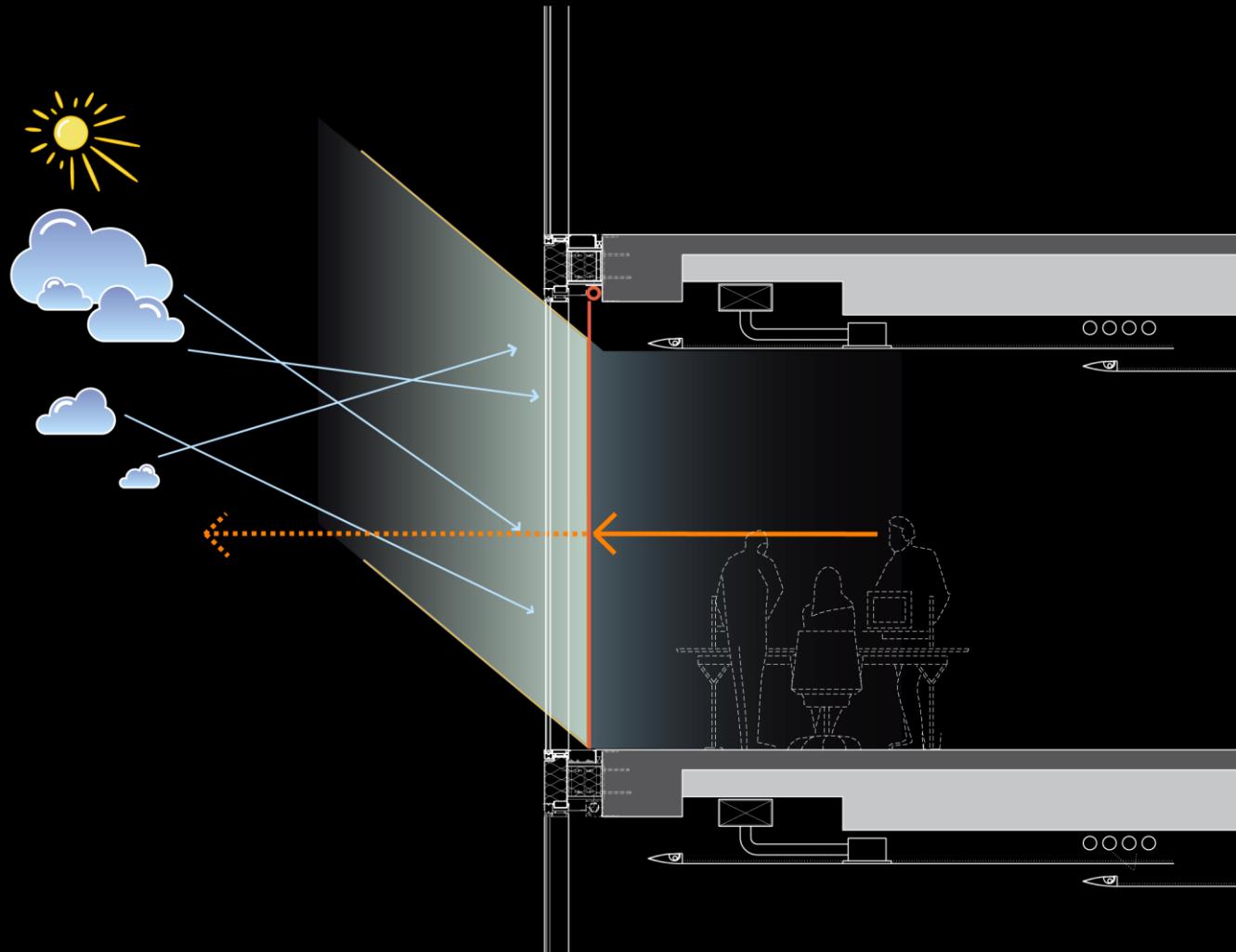






conventional façade design

internal blinds for glare and sun protection    blocked views

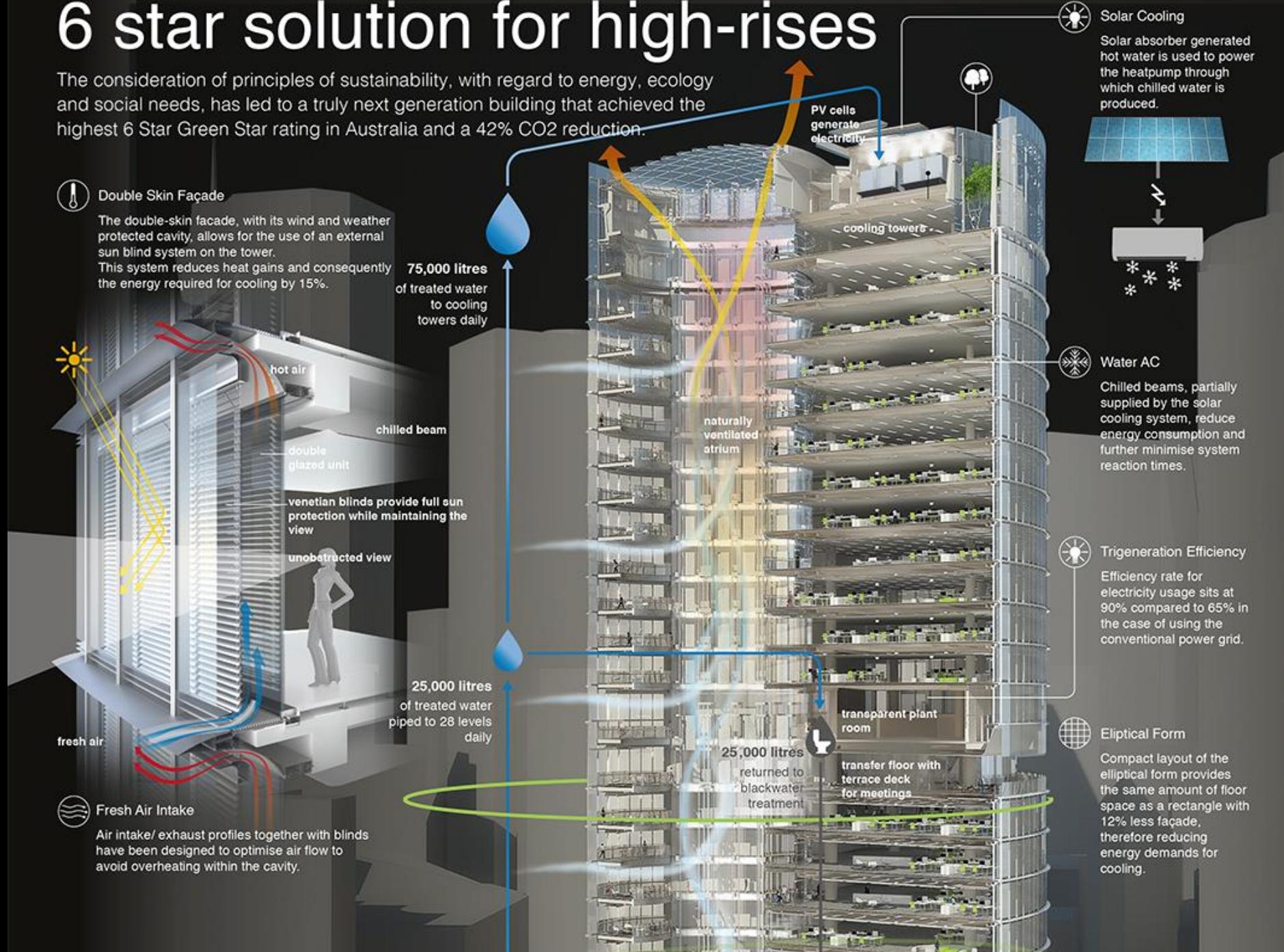






# 6 star solution for high-rises

The consideration of principles of sustainability, with regard to energy, ecology and social needs, has led to a truly next generation building that achieved the highest 6 Star Green Star rating in Australia and a 42% CO<sub>2</sub> reduction.





### Fresh Air-Stream

The south facing atrium serves as a cool air pond for the entire building. Operable glass louvres allow controlled natural air movement within the atrium and throughout the balcony workplaces.



### Sustainable Materials

1 Bligh is the next generation in high performing sustainable office space.

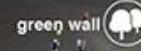


90% of all used steel has a recycled content greater than 50%.

~41% of all cement has been replaced with industrial waste by-products.

20% recycled

20% of all aggregate used in concrete is recycled.



green wall



### Community

The floor plans have been designed around principles of communication. Balcony workplaces enhance vertical communication and glass lifts within the atrium provide tenants and visitors with an understanding of what occurs on other floors.



### Efficient Construction

The position of columns 6m from the facade reduces forces and therefore reduces beam depths for less material use overall.



### Clear Harbour View

100% of the office space faces the harbour, allowing views of the water and the harbour bridge.



### Public Space

The building offers short cuts around and through the atrium. Farrer Place is enlarged through the public steps. The form is a response to the site where two urban grids meet.



summer      winter

### Intelligent Angle

The height of the ground floor has been optimised to shade the public steps in summer and to receive sunlight in winter.



### End of Trip Facilities

Showers and lockers for cyclists, promoting carbon neutral travel.



### Black Water Treatment

In total, 100,000 litres of water is recycled daily. Sewer mining is further employed to optimise efficiency and to use the capacity of the black water plant, by taking and recycling additional waste water from the city sewer.

A photograph of a large-scale vertical garden (green wall) on the side of a building. The wall is covered in a dense variety of green plants, including several large monstera leaves on the left. In the background, a modern building with a curved, light-colored facade and a glass roof is visible. To the right, a tall, red brick residential tower with many windows rises against a bright sky.

green star six star

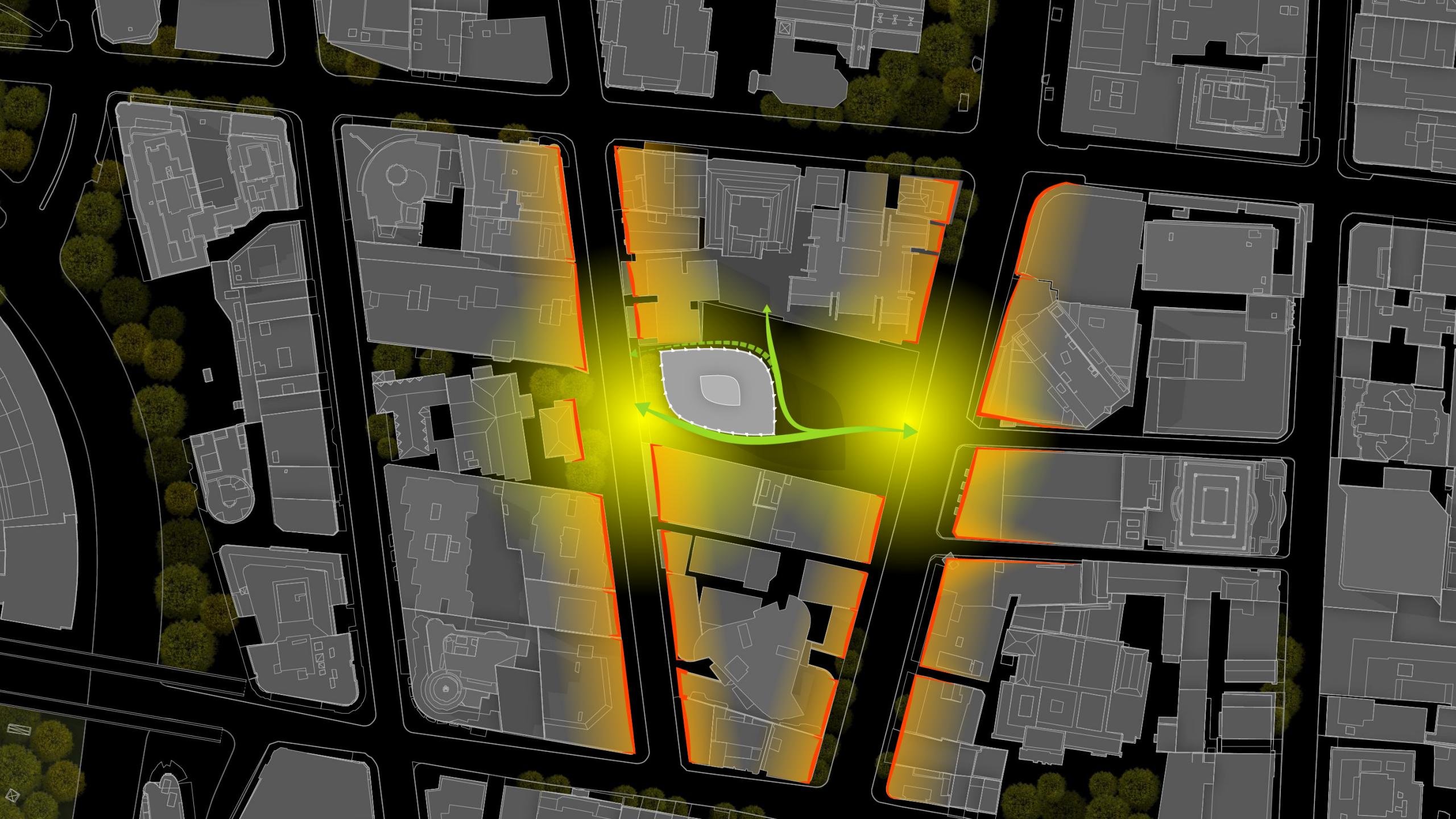


mixed use



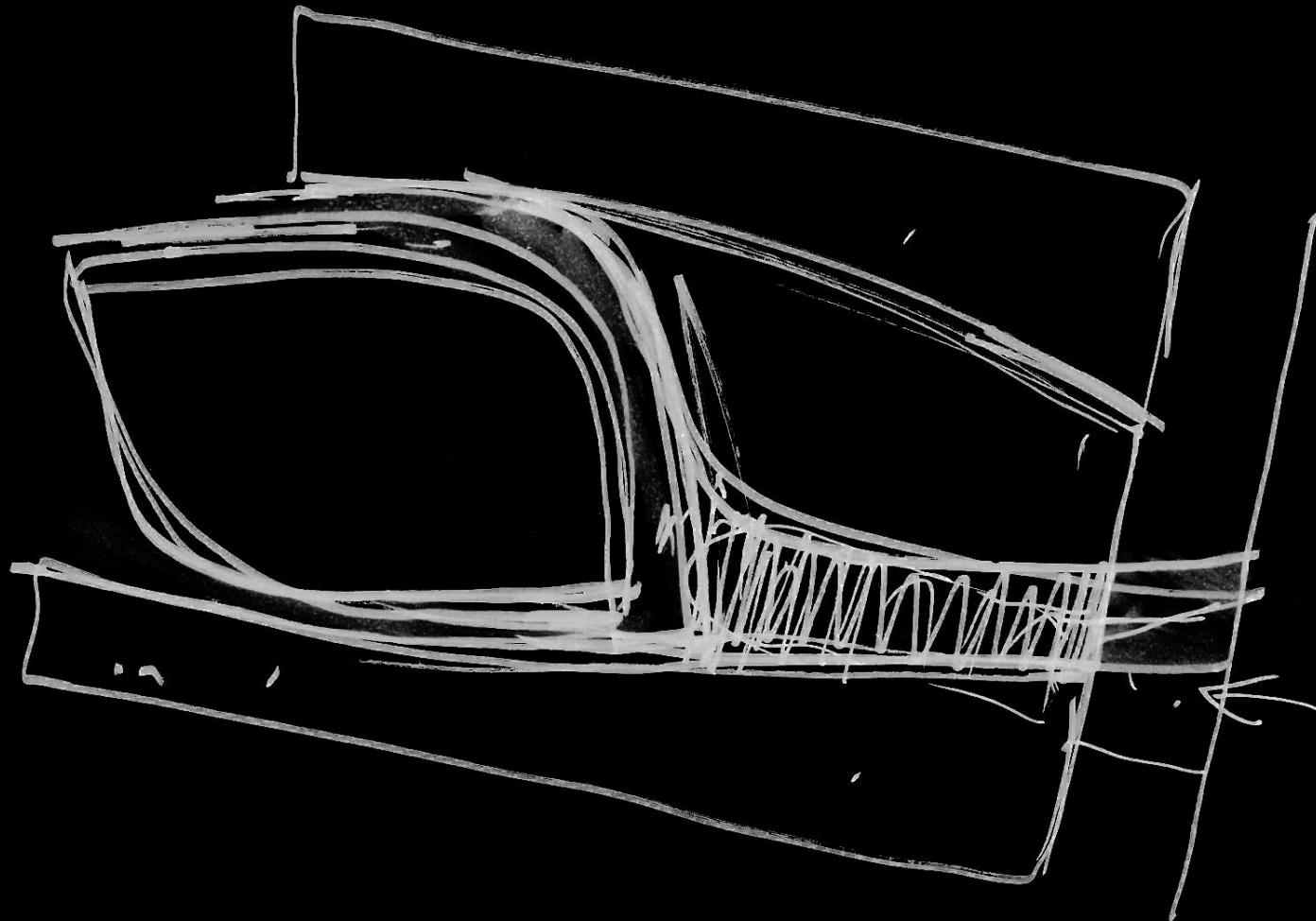
friendly neighbour







# through site link







# street activation







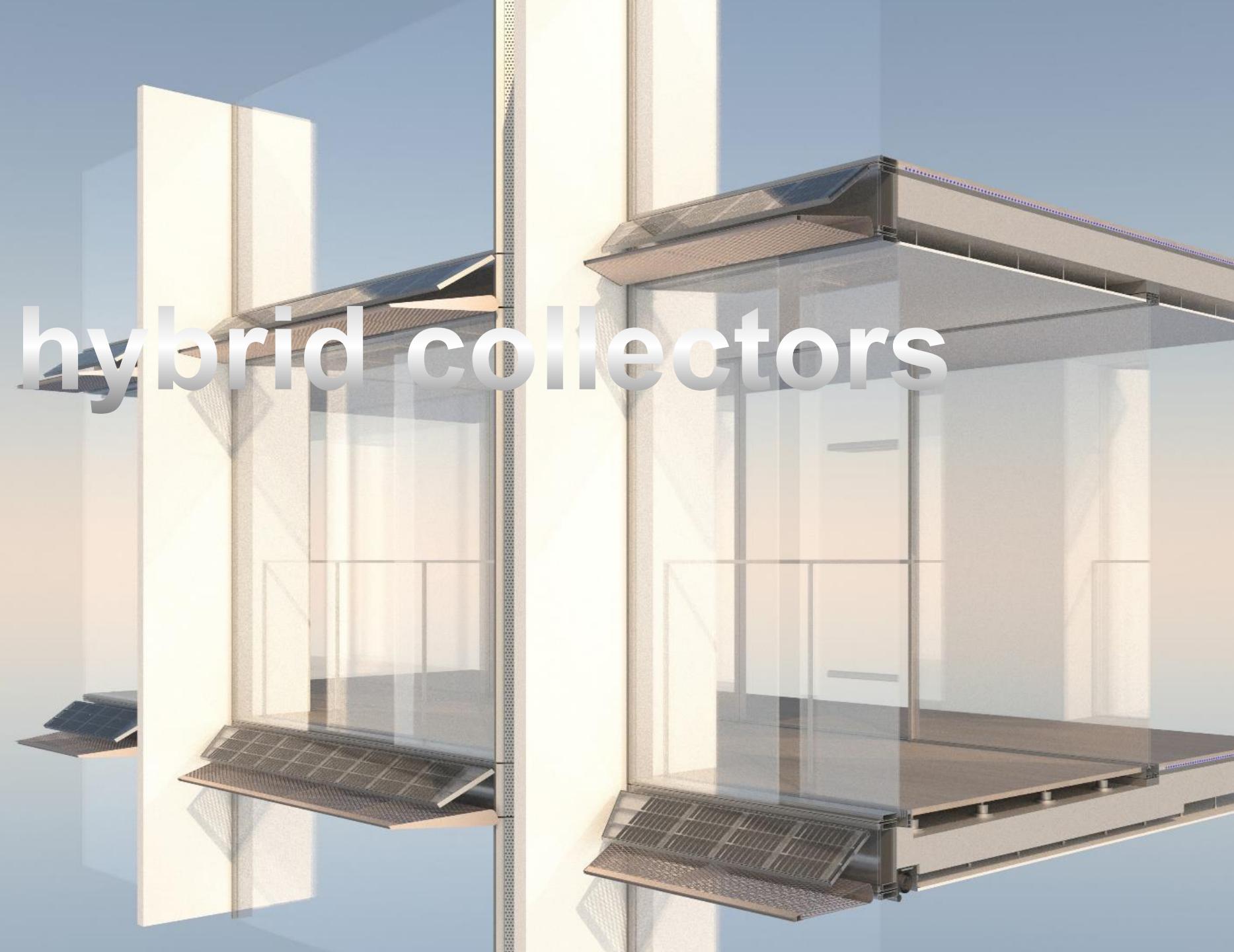




facade innovation

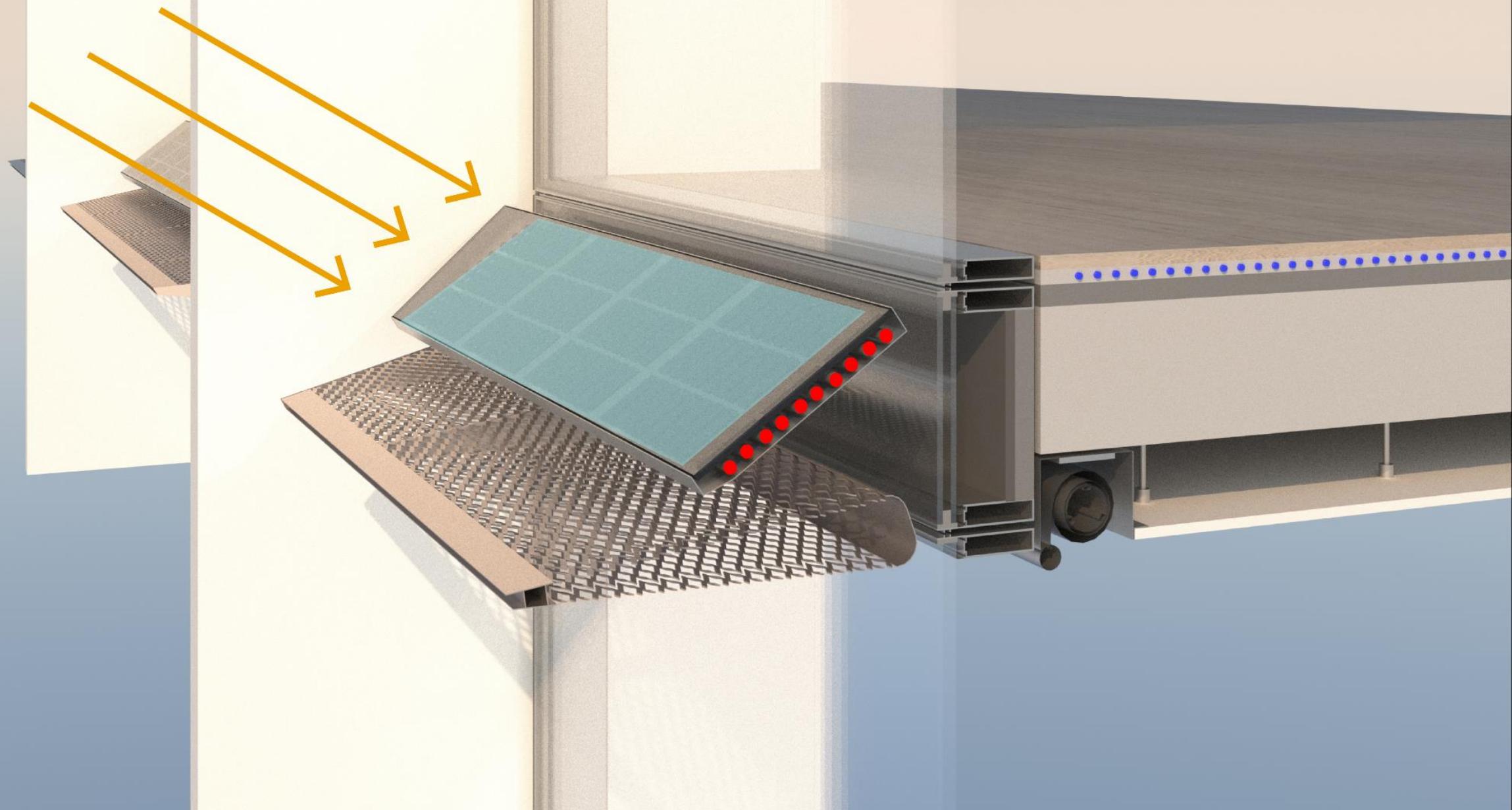
MERITON

# hybrid collectors





## hybrid Kollektoren PV + Solarkollektoren







An aerial photograph of a city skyline during sunset. The foreground is dominated by a dense cluster of modern skyscrapers, their facades reflecting the warm orange and yellow light of the setting sun. In the background, a wide river or harbor stretches across the frame, with several smaller islands and a large cruise ship visible on the water. The overall atmosphere is one of urban development and natural beauty.

combine  
local knowledge  
outside view

team up



# joint ventures



thank you...



