

Cities Alive

Green Building Envelope

Launch of Research Results



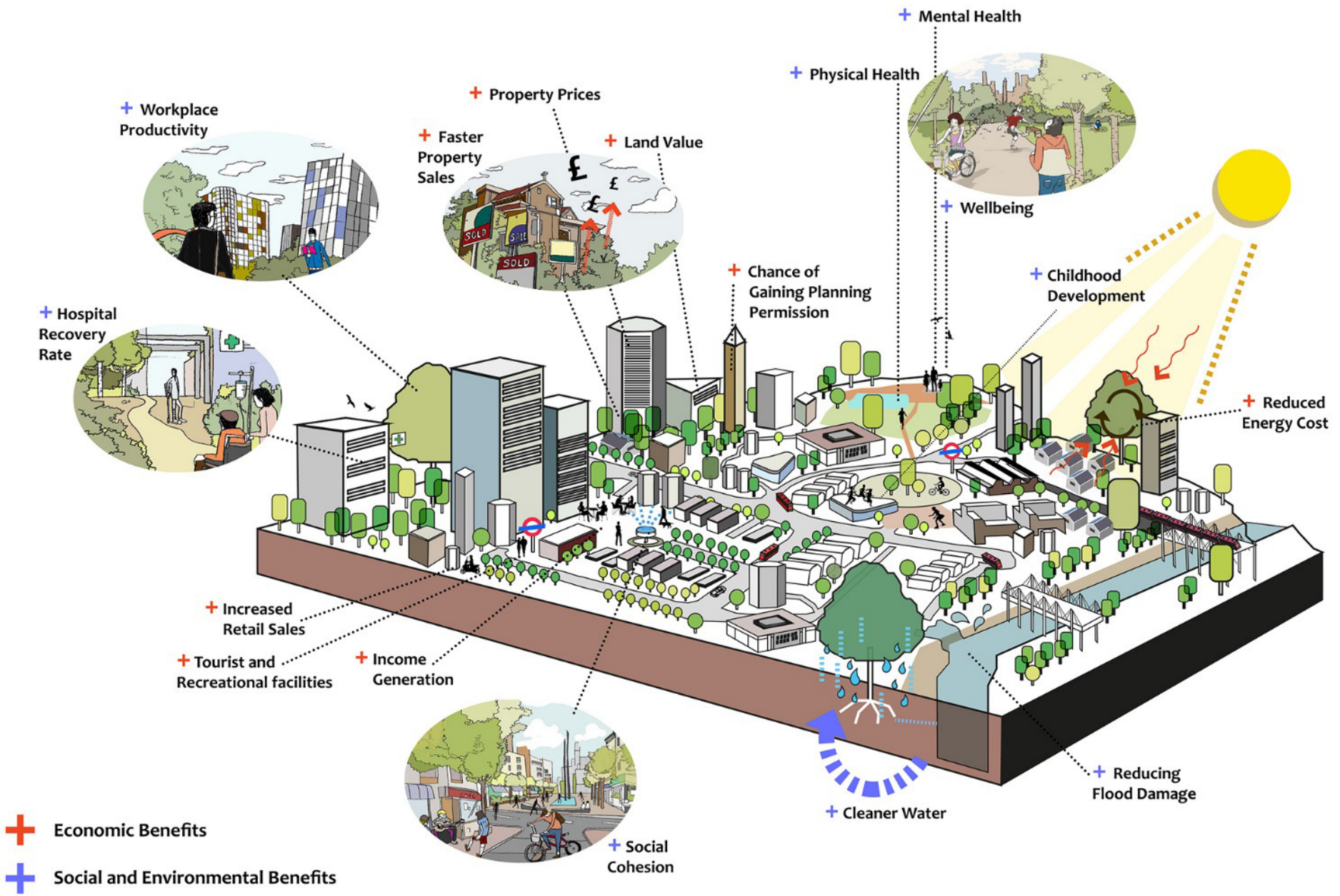
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foresight

Cities Alive

Rethinking green infrastructure

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Towards a Walking World

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Cities Alive

Rethinking the Shades of Night

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Cities Alive

Green Building Envelope





„Cities need green sizes S, M, L and XL otherwise the human ecosystem is incomplete.“

Gil Peñalosa, CEO „8-80 Cities“ quoted in „Happy City“ by Charles Montgomery (2013)







Green Building Envelope
... Why bother?
... Why bother in Berlin?

...Berlin is a green City!

1.78 bn

People have inhaled polluted air over the past decade; this has led to multiple diseases

12°C

hotter evening temperatures in urban areas with a population exceeding 1 million than in surrounding areas

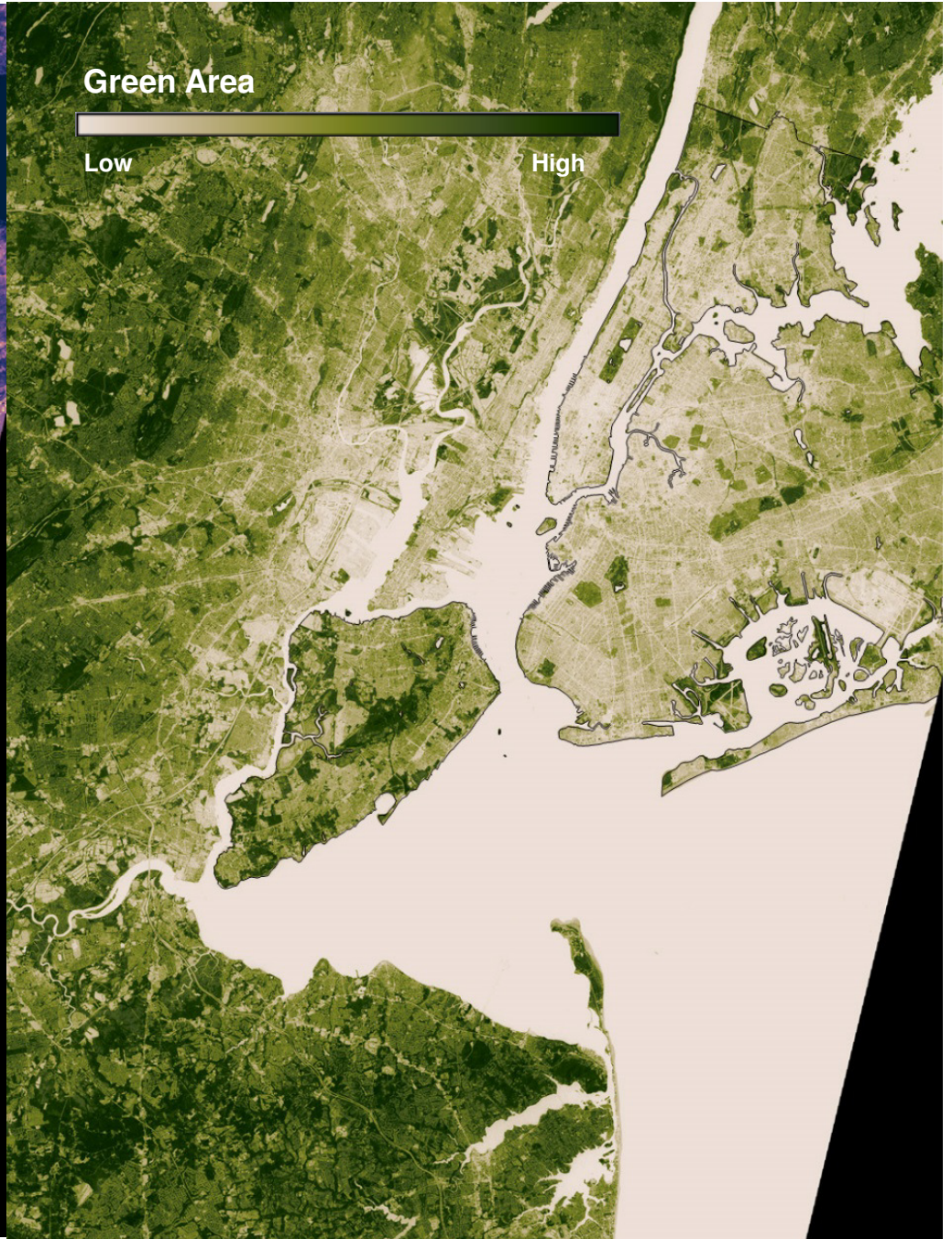
6-10 dB(A)

reductions are feasible in ambient noise levels



Three major recognitions which are well known,
but have not been quantified.....
.....a challenge which we have resolved







Global Contributors



Temperature difference from
city to surrounding areas

2°C

Air Quality Index Scale based
on US EPA Standard

34

BERLIN

Temperature difference from
city to surrounding areas

3°C

Air Quality Index Scale based
on US EPA Standard

31

LOS ANGELES

Temperature difference from
city to surrounding areas

12°C

Air Quality Index Scale based
on US EPA Standard

130

HONG KONG

Temperature difference from
city to surrounding areas

12°C

Air Quality Index Scale based
on US EPA Standard

20

MELBOURNE

Temperature difference from
city to surrounding areas

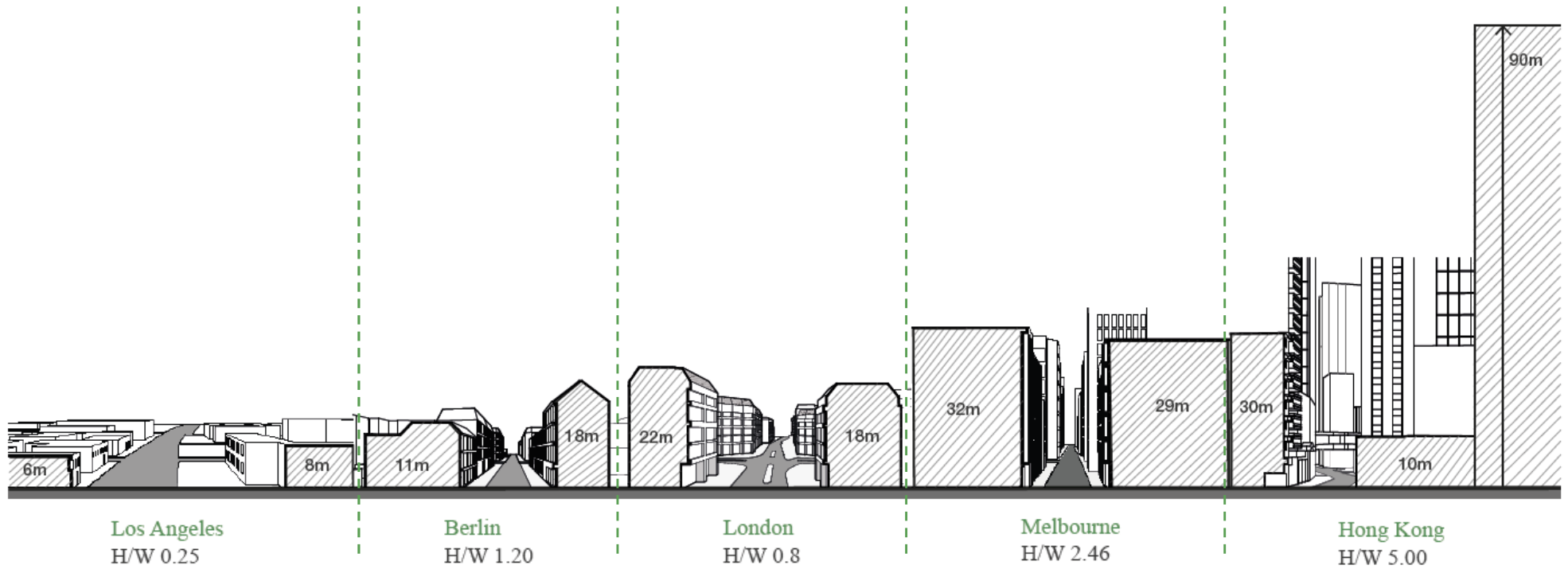
12°C

Air Quality Index Scale based
on US EPA Standard

67

LONDON

Five Global Case Studies – Morphology

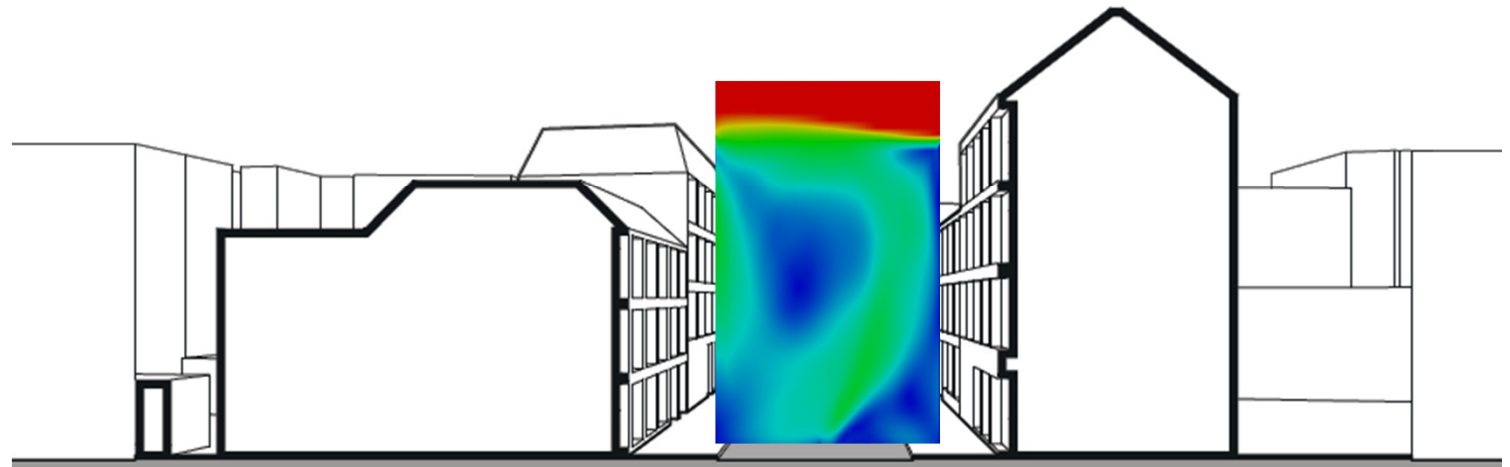


Air Pollution Conclusion

10-20%

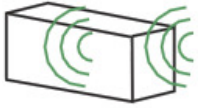
Local reduction in concentration of PM

Height to Width Ratio as well as orientation is key for reduction

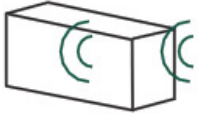


Acoustics Methodology

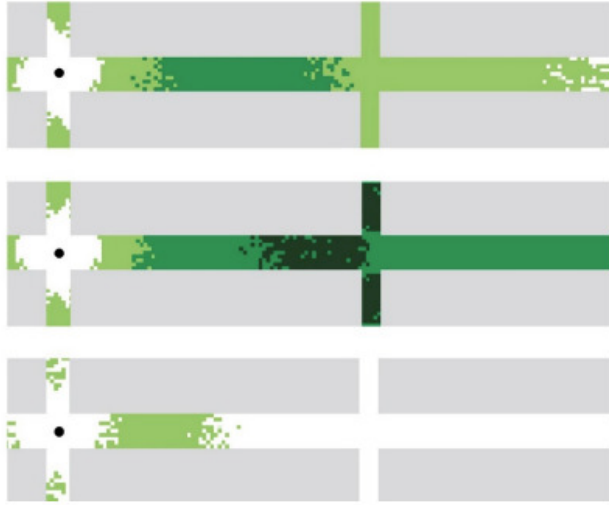
Base: 72 dB(A) ambient



62 dB(A) ambient

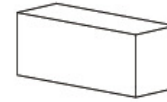


82 dB(A) ambient

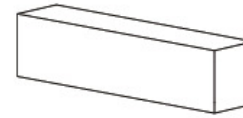


● 100dB(A) source 1-3 dB(A) reduction 3-6 dB(A) reduction 6-10 dB(A) reduction 0 25 50

Base:
50 m-long block



250 m-long block



50 m-long block

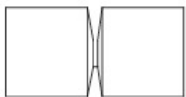


● 100dB(A) source 1-3 dB(A) reduction 3-6 dB(A) reduction 6-10 dB(A) reduction 0m 25m 50m

Base:
19 m-wide canyon



9 m-wide canyon

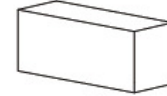


29 m-wide canyon



● 100dB(A) source 1-3 dB(A) reduction 3-6 dB(A) reduction 6-10 dB(A) reduction 0m 25m 50m

Base:
60 m building height



35 m building height



10 m building height



● 100dB(A) source 1-3 dB(A) reduction 3-6 dB(A) reduction 6-10 dB(A) reduction 0m 25m 50m

Acoustics Conclusion

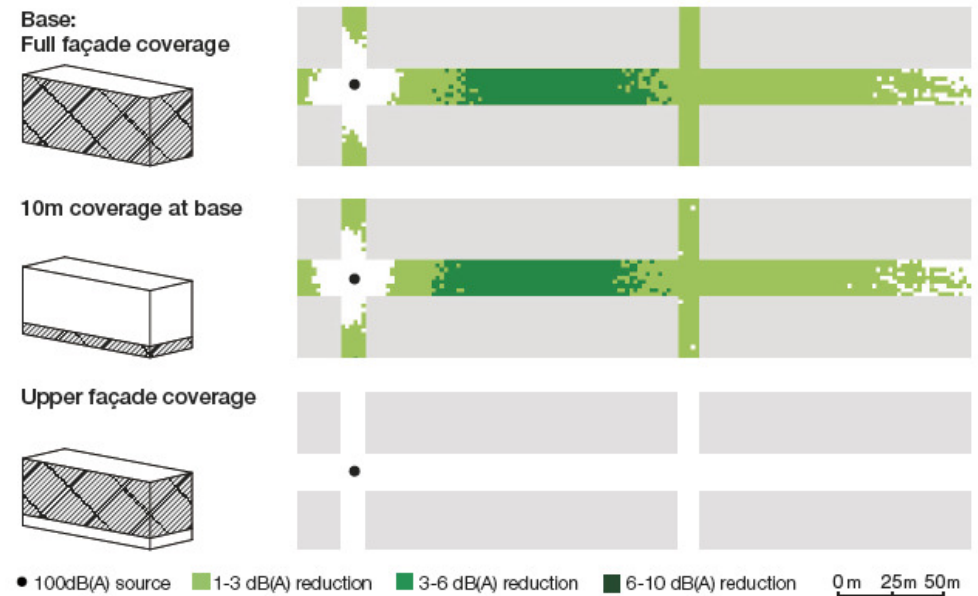
10 dB(A)

Sound level reduction from emergent traffic noise

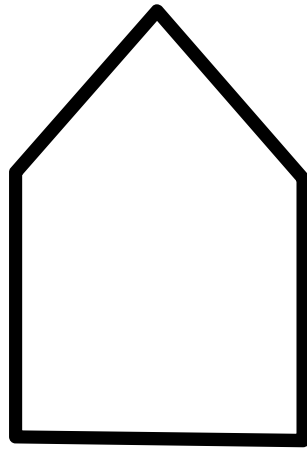
Greater impact during night when ambient noise level is lower.

Greater impact with increasing distance from noise source

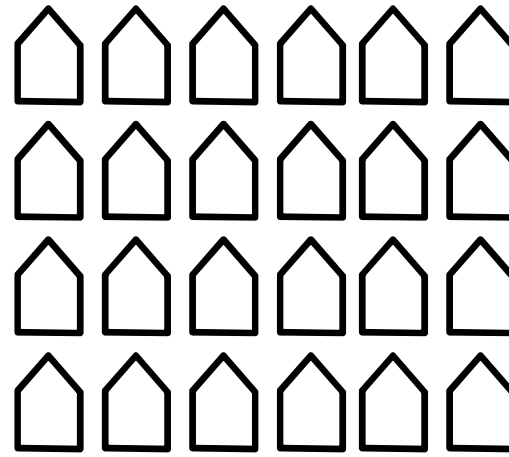
Only if the base of the building is covered, significant reductions can be achieved



Urban Heat Island

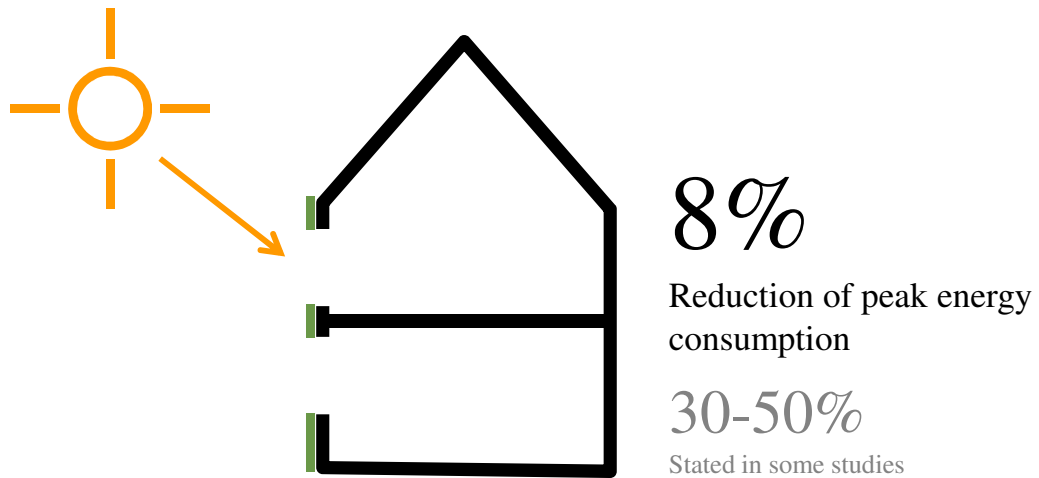


Building



City

Urban Heat Island Conclusion Building

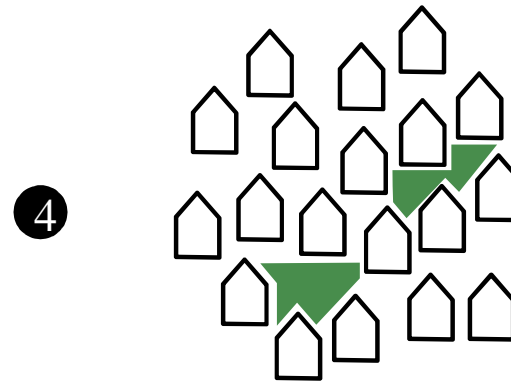
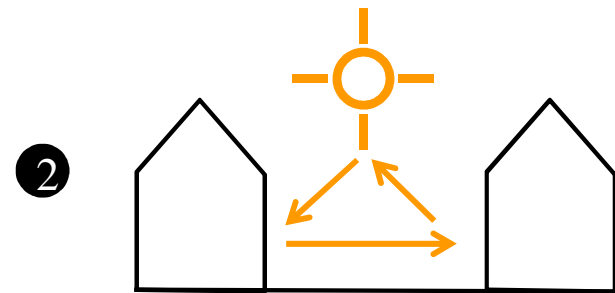
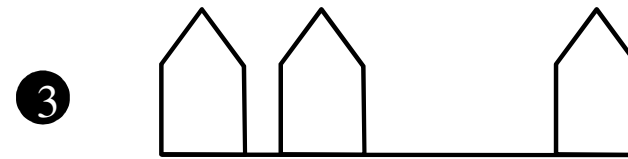
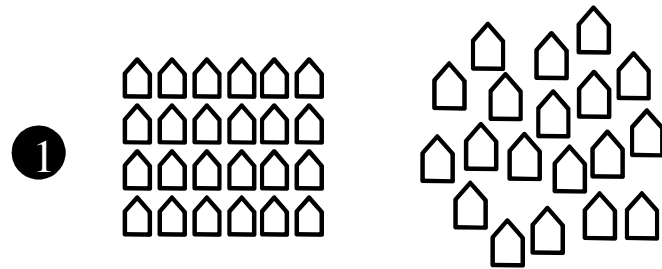


Insulation

Windows

Internal Loads

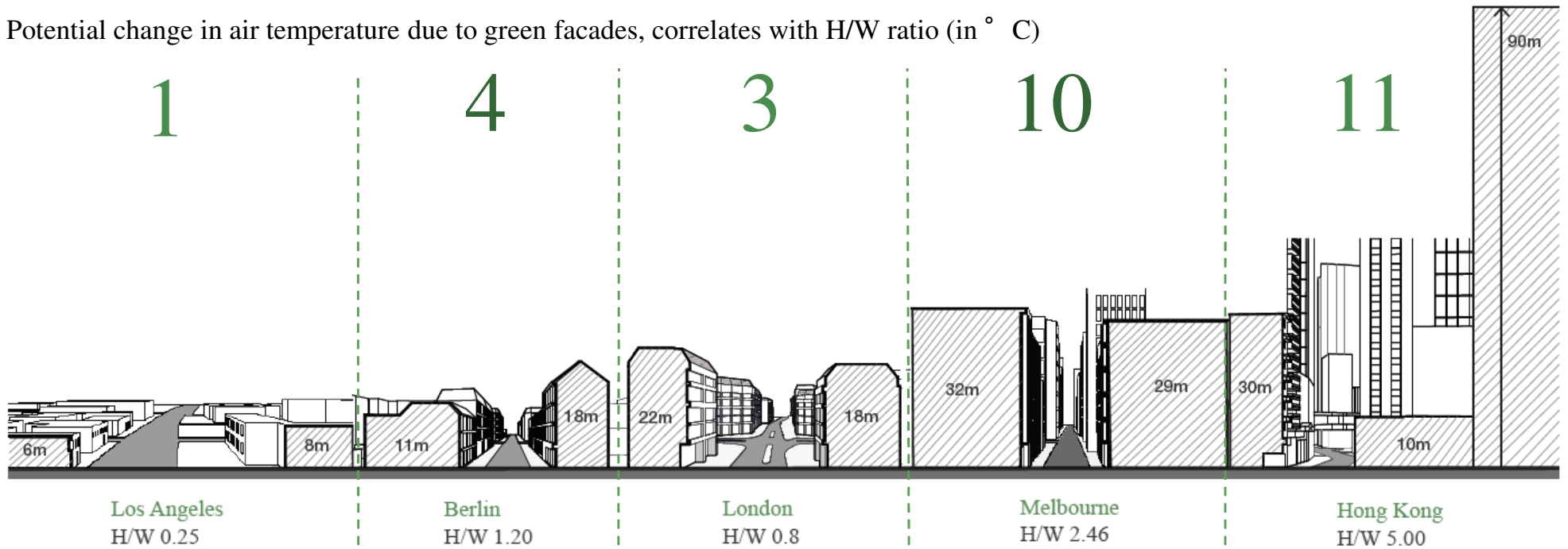
Urban Heat Island City



- ① City Grid
- ② Solar Radiation
- ③ Height to Width Ratio
- ④ Percentage of green space

Urban Heat Island

Potential change in air temperature due to green facades, correlates with H/W ratio (in ° C)





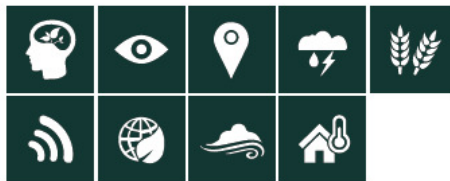


Placemaking

Tree façade



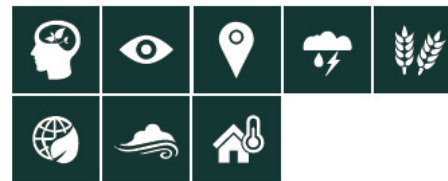
Benefits:



Green roof



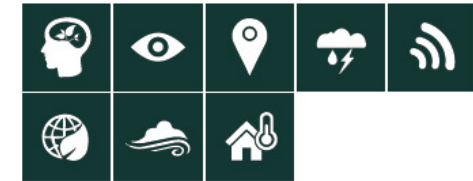
Benefits:



City gardens



Benefits:





© eyeQ



Biodiversity

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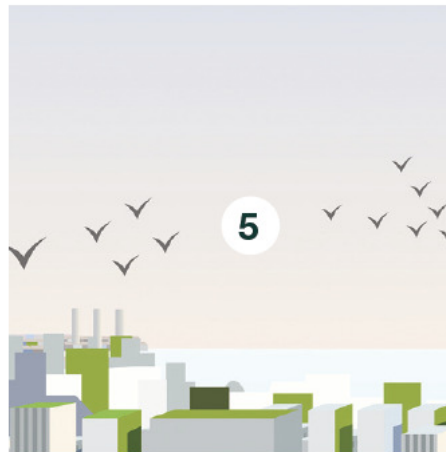
Beehives and highways



Benefits:



Wildlife corridors



Benefits:



Integrated habitat creation



Benefits:





© studio2013



Urban Agriculture

Urban farm



Benefits:



Greenhouses



Benefits:



Vertical farming



Benefits:





Air Quality

© Ollyy

Modular plant walls



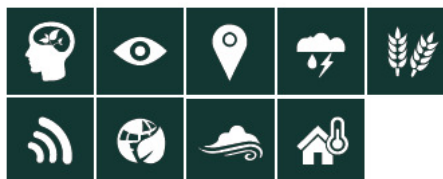
Benefits:



Seeded Living walls



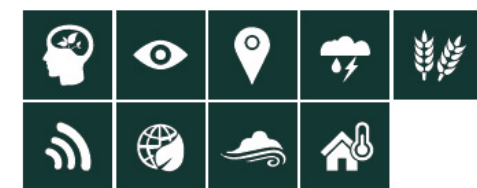
Benefits:



Tree façade



Benefits:



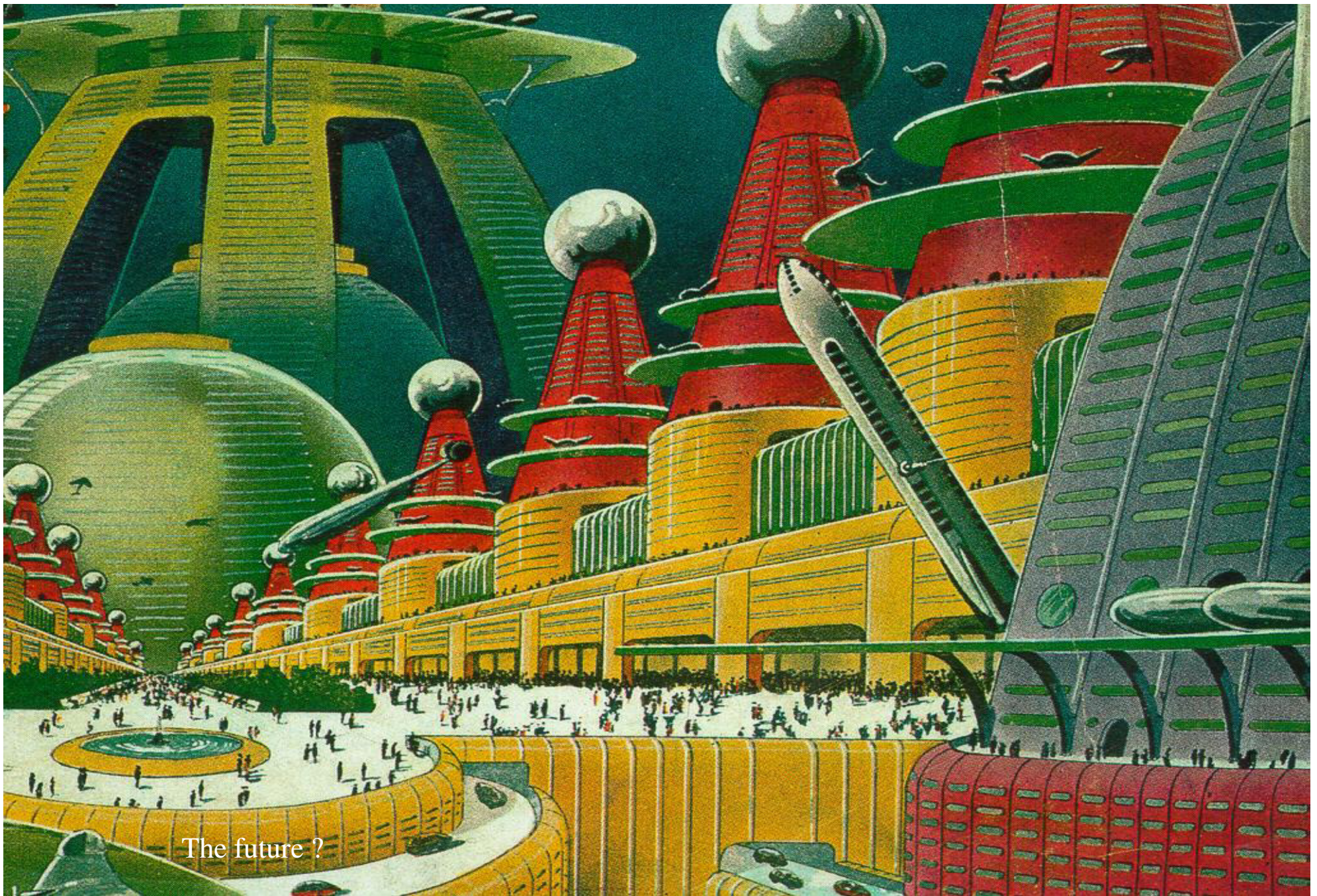




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The future ?









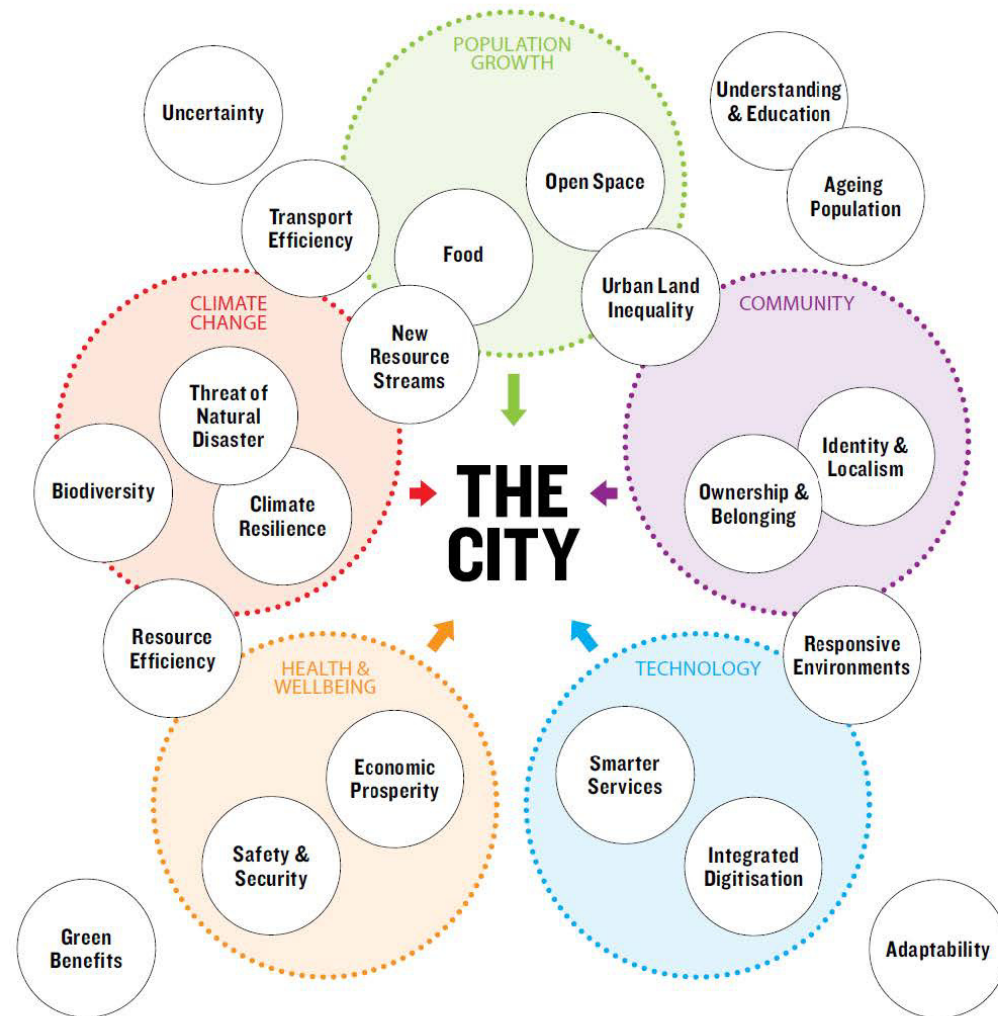














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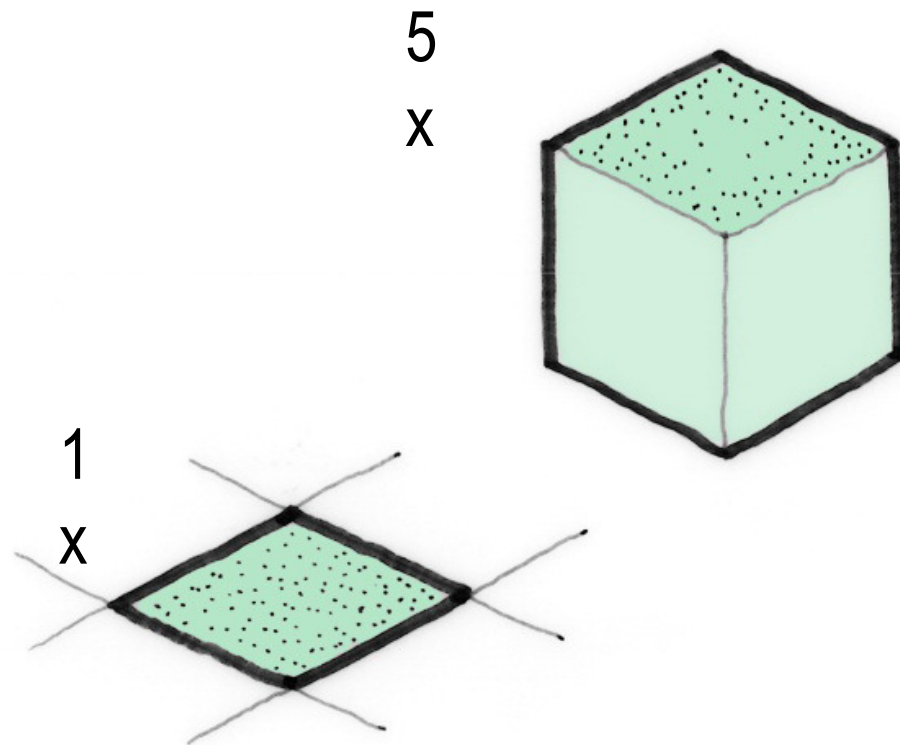


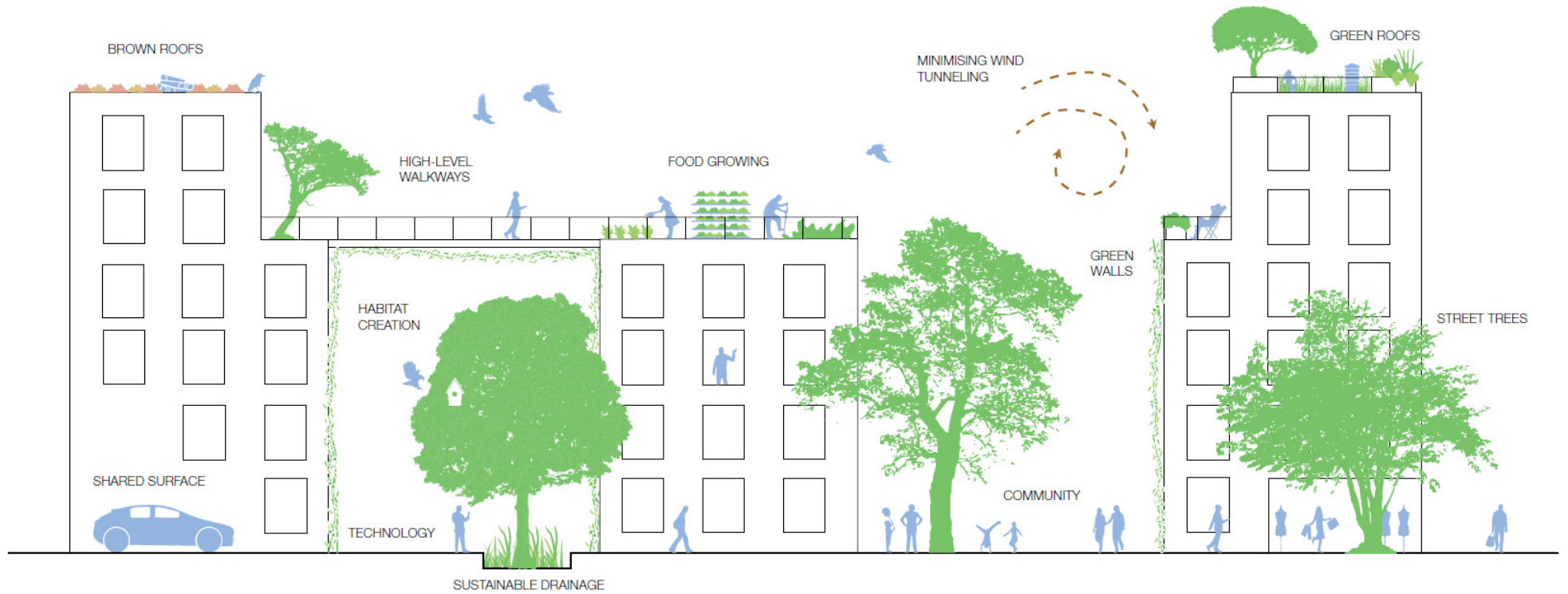
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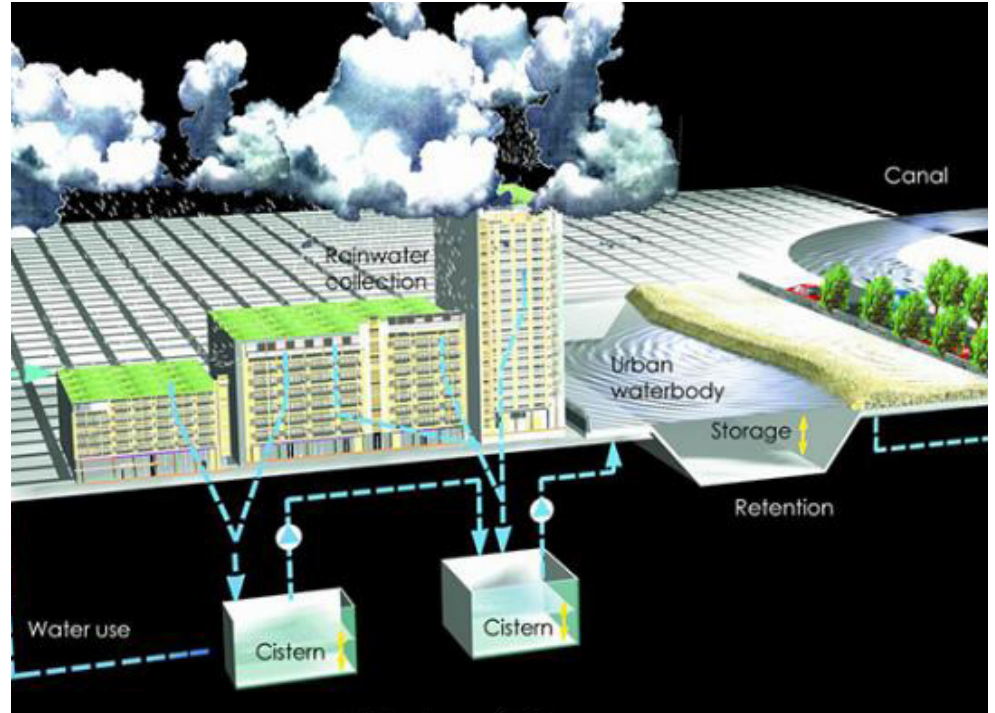


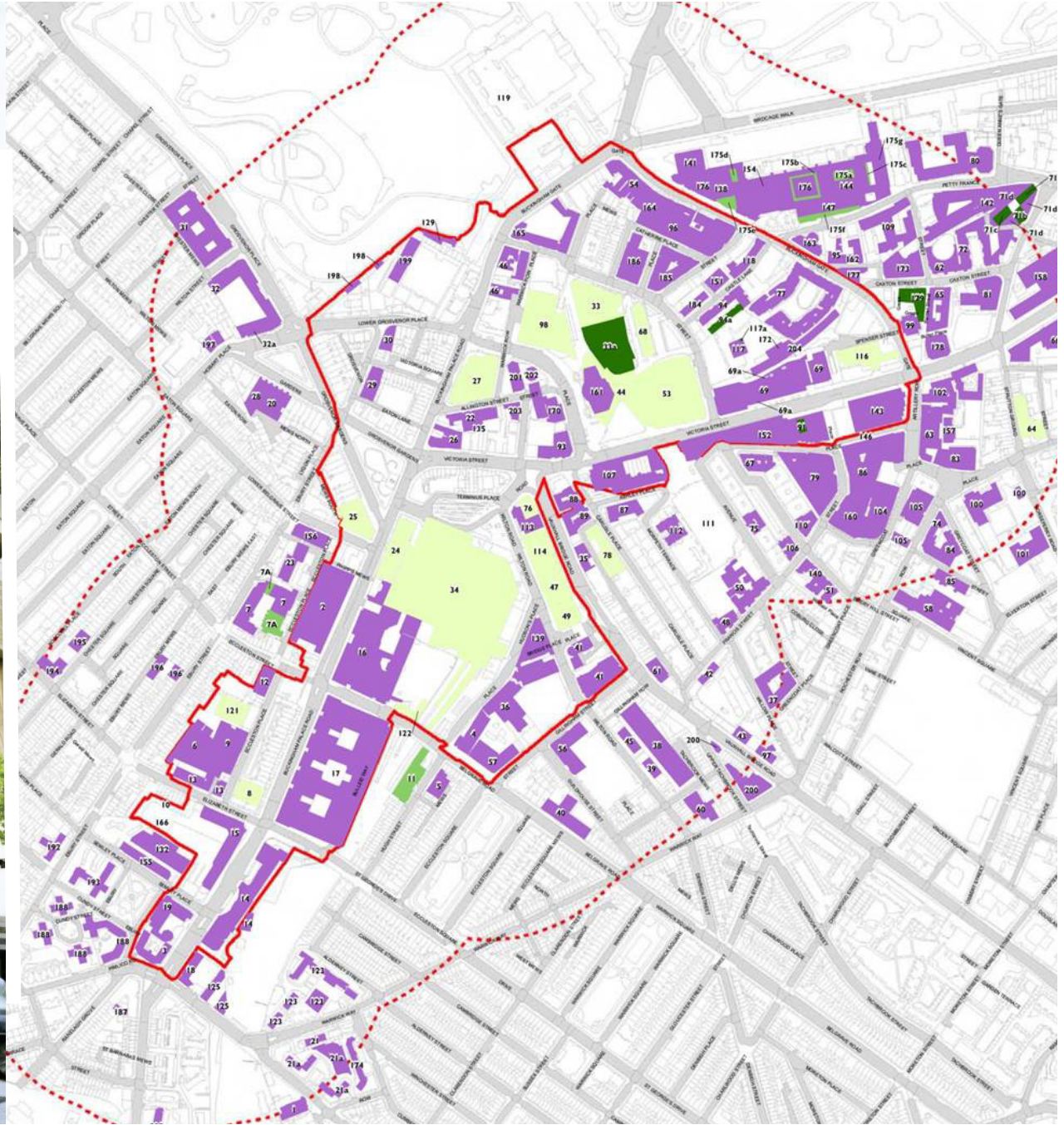
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“Humans evolved in a natural setting so a connection to nature is at the core of our identity as species and of our well-being“

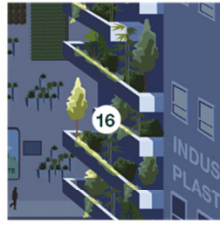
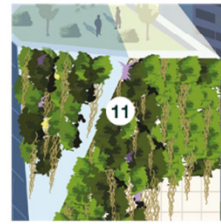
PROFESSOR HOWARD FRUMKIN – DEPARTMENT OF ENVIRONMENT & OCCUPATIONAL HEALTH – EMORY UNIVERSITY







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1. Urban agriculture
2. Greenhouses
3. Vertical farming
4. Beehives and highways
5. Wildlife corridors
6. Integrated habitat creation
7. Flood resilience
8. Water storage
9. Sustainable urban drainage
10. Bioremediation
11. Green wall –top down
12. Green wall
13. Modular plant walls
14. Seeded living walls
15. Moss walls
16. Tree facade
17. Bioreactive facade
18. Green roofs
19. Wildlife roofs
20. Wet roofs
21. Urban forestry
22. City gardens
23. Photovoltaic roofs
24. Energy generation

