

Greening the Urban Environment: Trends and Opportunities

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Introduction

Universal quest for green cities

- Urban environmental quality for people and nature
- Quality of life and liveability expectations
- More than the garden city
- **Spatial ecological approach**

Key issues

- Quantity and quality of urban green infrastructure
- Distribution and connectivity pattern of green spaces
- Accessibility and distance to green spaces
- Coverage of greenery
- Biomass structure of greenery
- Multiple ecosystem services (**Nature-based solutions**)
- Social, economic and health benefits
- **Climate-change adaptation**

Maximize ecological functions (ecosystem services)



**Berlin's Biotope Area Factor
(BAF)**

**Nature-based solutions for
sustainable and liveable
cities**

http://www.stadtentwicklung.berlin.de/umwelt/landschaftsplanung/bff/index_en.shtml

BAF: Principles and computation

A green city center - BAF - Biotope area factor

Calculating the BAF

The BAF expresses the ratio of the ecologically effective surface area to the total land area.

$$\text{BAF} = \frac{\text{ecologically-effective surface areas}}{\text{total land area}}$$

In this calculation, the individual parts of a plot of land are weighted according to their "ecological value".

Types of surfaces and weighting factors:

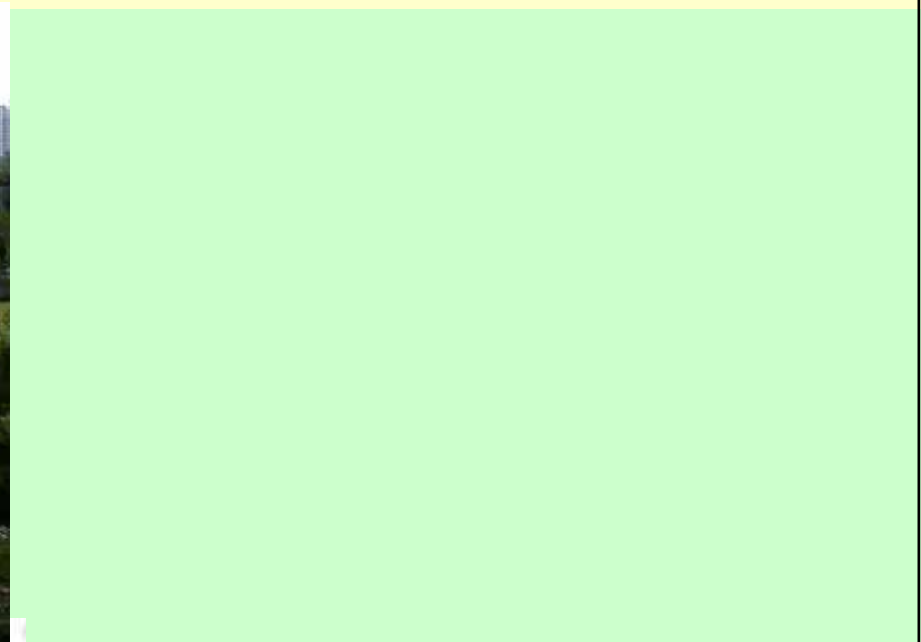
(Surface types not mentioned can be calculated as long as they have a positive effect on the ecosystem)

http://www.stadtentwicklung.berlin.de/umwelt/landschaftsplanung/bff/index_en.shtml

Provide high and complex vegetation cover



Singapore



Singapore



Acapulco

Maximize green plot ratio



Tokyo

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Offer people-friendly green spaces



Tokyo

Cover park surface predominantly with greenery



Leuven



Brussels

Increase green cover of built-up areas



Install urban lawns

Paris



Seoul



Adopt naturalistic park design



Tokyo



Tokyo

Insert greenway or linear park



Tokyo



Vancouver



Leuven



Kagoshima

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Design blueway-cum-greenway



Dublin

Maximize street greening in compact city areas



Tokyo

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Install roadside soil corridor



Chicago



Berlin

Widen pavement for trees

Singapore



Lanzho

Plant multiple tree rows



Bruges



Rome



San Francisco



Taipei

Green pedestrianized shopping streets



Barcelona



Frankfurt

Insert trees at roadside parking spaces



Saint Gallen



Brussels



Zurich

Convert tramways into turf strips

Barcelon



Dublin



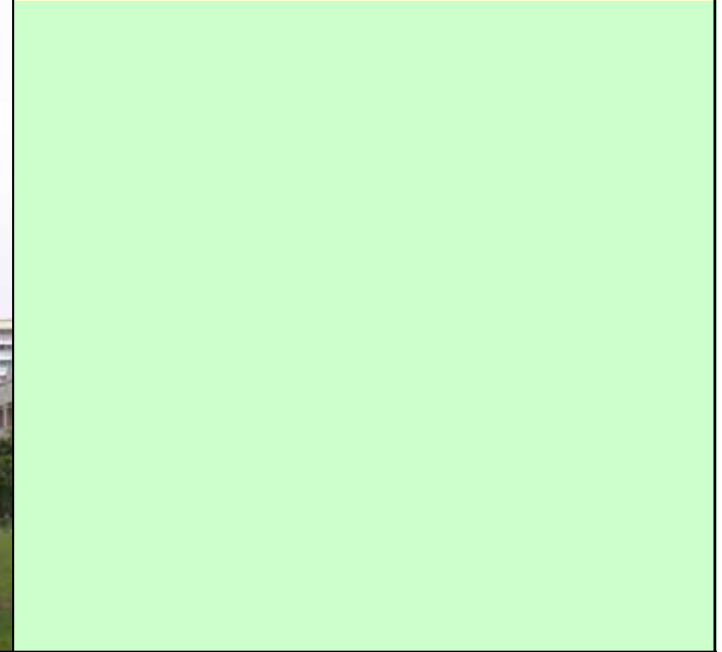
Vienna



Zurich



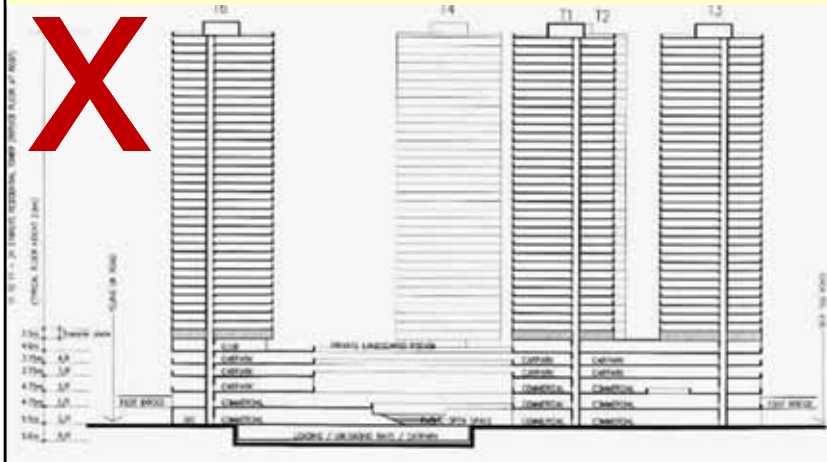
Green spaces below flyovers



Singapore



Aim at ground-level greening



Introduce temporary greening of vacant lots



Singapore

Create world class highway greening



Singapore

Green tunnel effect

Protect greenery in urban development



Nice

Kuala Lumpur

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Respect existing nature



Preservation of
existing urban
woodland, Sapporo



Create large urban forest park



Yoyogi Park, Tokyo

Create mini-woodland patches



Paris



Osaka



Singapore



Bruges

Conserve heritage & champion trees



Osaka



Vertimiglia

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Enhance nature-in-city functions



Create natural pockets in green spaces



London

Urban biodiversity enhancement



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Preserve food and primary production

Allotment garden &
urban agriculture

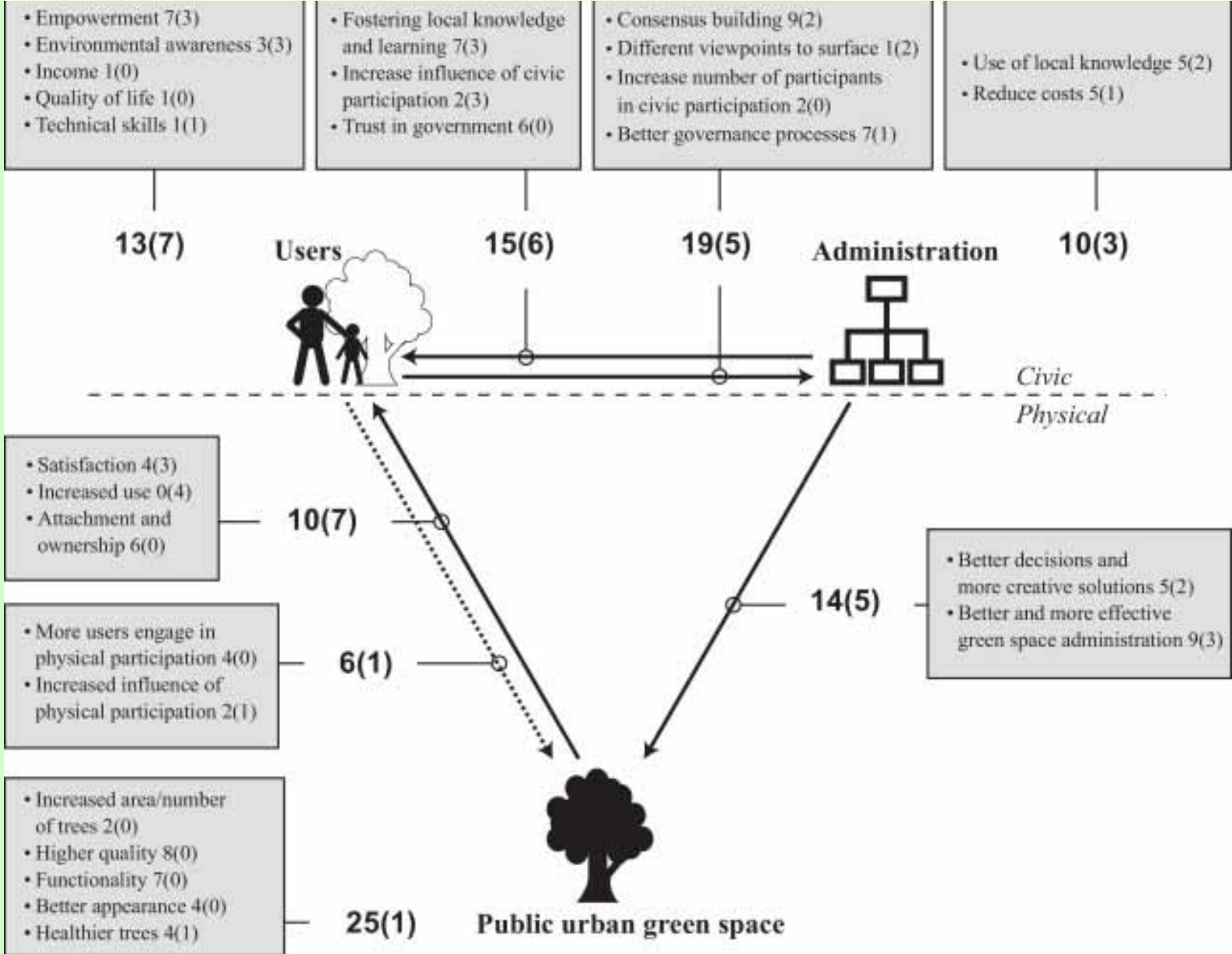


Foster social functions & interactions



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Facilitate citizen participation in UGS planning



Plan for green and blue infrastructure network

Greenways & blueways



edvrpo

edvrpo | CONNECTIONS 2040 PLAN FOR GREATER PHILADELPHIA

Philadelphia

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Allow green fingers to penetrate the city

Moscow



Xiamen



Hong Kong



adapted from image at jpl.nasa.gov

Green roof: Urban renaissance

ECOROOOF



Environmentally friendly and holistic urban design



Green roof: University building



Nanyang Technical University, Singapore

Green roof: Residential building



Waldspirale, Darmstadt

Returning nature to city

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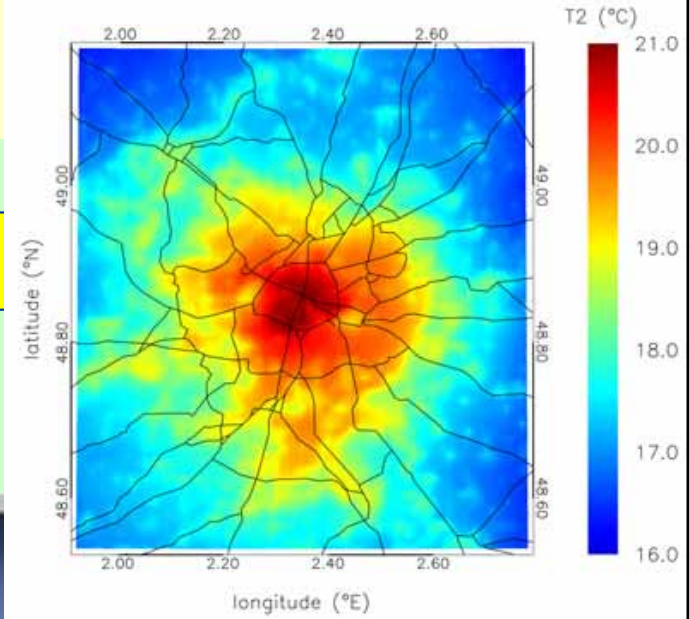
Sky woodland & green wall: Electricity substation



Tseung Kwan O, Hong Kong

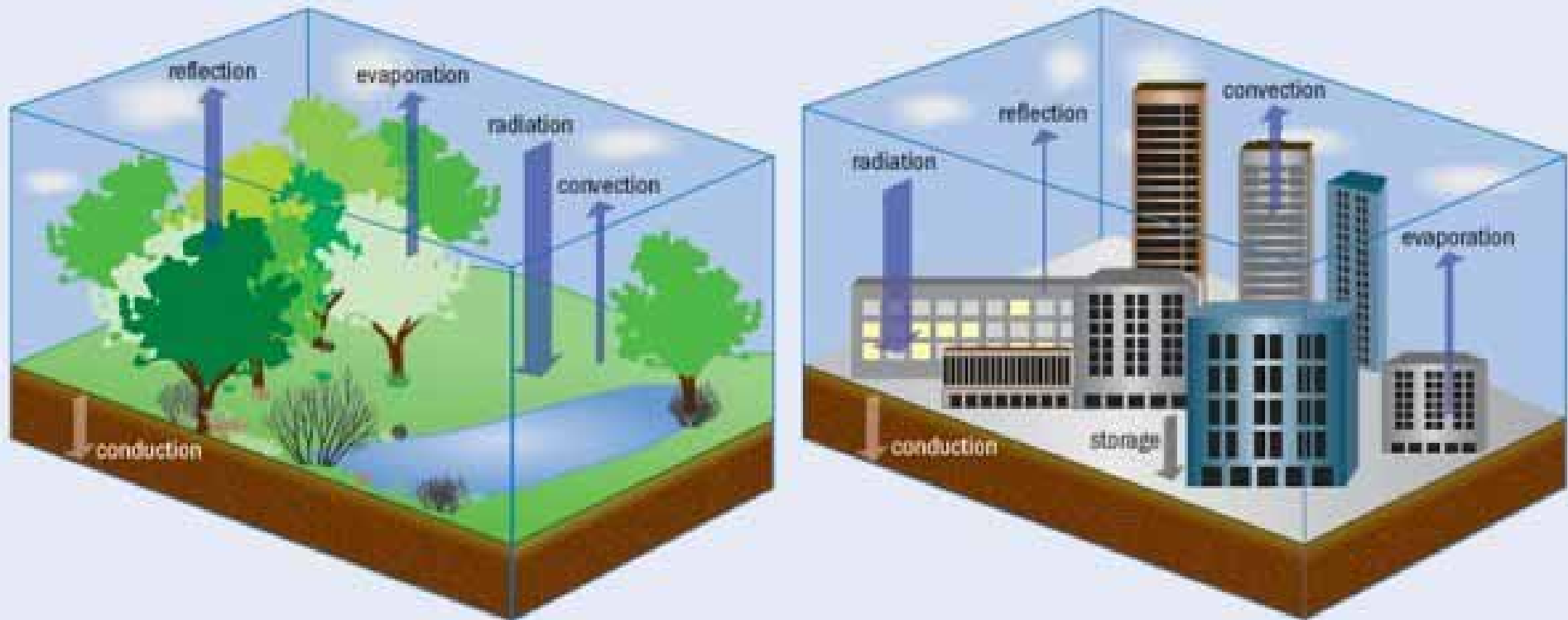
Mitigate urban heat island effect

Paris



Install cool islands (green spaces)

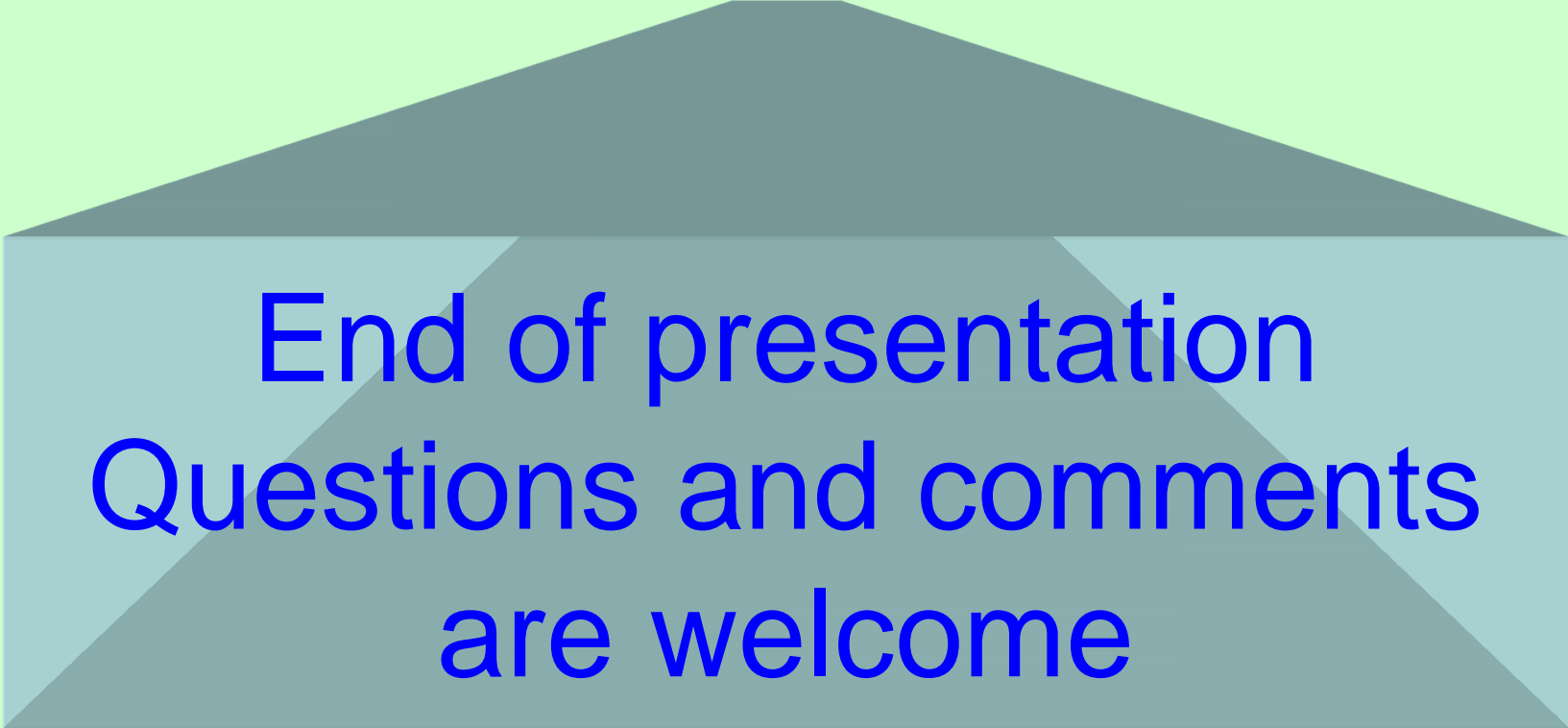
Thermal behaviour of green and built-up areas
Climate change adaptation and proofing of cities



Conclusion

- Nurture a culture of meritorious urban greening
- Innovative solution to constraints of compact city greening
- Create opportunities in new urban and urban renewal areas
- Institute enabling planning and development policies
- Rectify bias towards development at the expense of nature
- Integrate greenery into sustainable and liveable cities
- Treat greening as an indispensable UGI





End of presentation
Questions and comments
are welcome