Università di Palermo | Dipartimento di Architettura
Corso di Laurea in Architettura per il Progetto Sostenibile dell'Esistente
Anno accademico 2021-2022

Laboratorio di Progettazione urbana per la città ecologica

Modulo del Corso Integrato Progettazione Urbana per la Città Sostenibile

Prof. Ignazio Vinci

Piani e progetti di adattamento climatico nelle città

Approcci e politiche per la progettazione ecologica della città

UN

EU

SVILUPPO SOSTENIBILE

URBAN-LANDSCAPE ECOLOGY

Piani di Azione per l'Energia Sostenibile
(PAES - SEAP)

Piani Urbani per la Mobilità Sostenibile
(PUMS - SUMP)

Piani di Adattamento Climatico
(PAC - CAP)

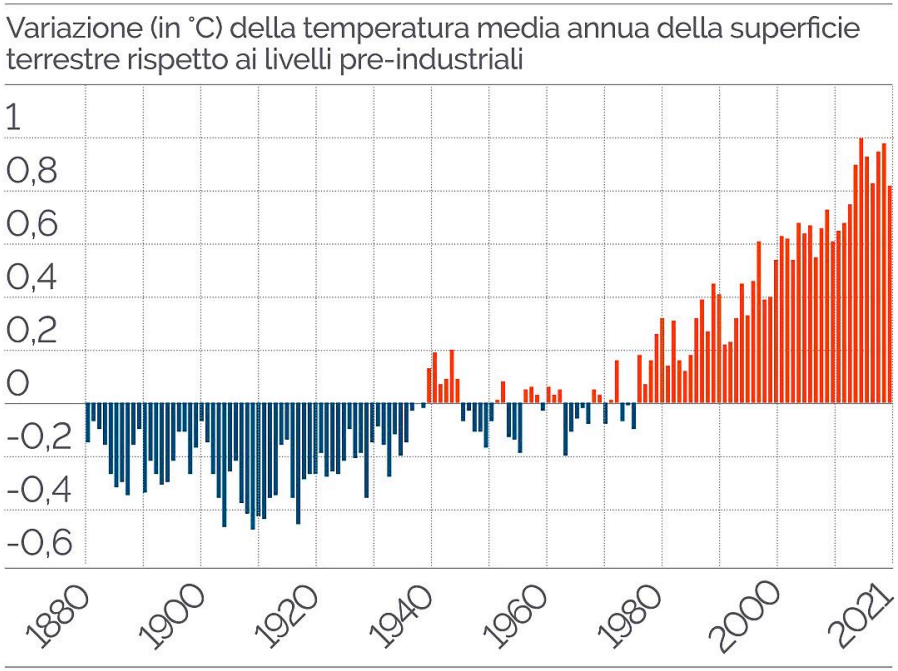
Nature-Based Solution
(NBS)

Green Infrastructure Planning

Ecosystem Services

Città e clima

Crescita delle temperature ed eventi meteorologici estremi



Città e clima

Effetti del cambiamento climatico nelle macroregioni europee

Arctic region
Temperature rise much larger than global average
Decrease in Arctic sea ice coverage
Decrease in Greenland ice sheet
Decrease in permafrost areas
Increasing risk of biodiversity loss
Some new opportunities for the exploitation of natural resources and for sea transportation
Risks to the livelihoods of indigenous peoples

Coastal zones and regional seas
Sea level rise
Increase in sea surface temperatures
Increase in ocean acidity
Northward migration of marine species
Risks and some opportunities for fisheries
Changes in phytoplankton communities
Increasing number of marine dead zones
Increasing risk of water-borne diseases

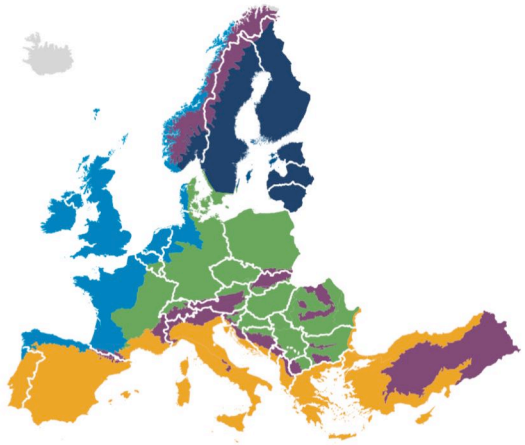
Mediterranean region
Large increase in heat extremes
Decrease in precipitation and river flow
Increasing risk of droughts
Increasing risk of biodiversity loss
Increasing risk of forest fires
Increased competition between different water users
Increasing water demand for agriculture
Decrease in crop yields
Increasing risks for livestock production
Increase in mortality from heat waves
Expansion of habitats for southern disease vectors
Decreasing potential for energy production
Increase in energy demand for cooling
Decrease in summer tourism and potential increase in other seasons
Increase in multiple climatic hazards
Most economic sectors negatively affected
High vulnerability to spillover effects of climate change from outside Europe

Atlantic region
Increase in heavy precipitation events
Increase in river flow
Increasing risk of river and coastal flooding
Increasing damage risk from winter storms
Decrease in energy demand for heating
Increase in multiple climatic hazards

Boreal region
Increase in heavy precipitation events
Decrease in snow, lake and river ice cover
Increase in precipitation and river flows
Increasing potential for forest growth and increasing risk of forest pests
Increasing damage risk from winter storms
Increase in crop yields
Decrease in energy demand for heating
Increase in hydropower potential
Increase in summer tourism

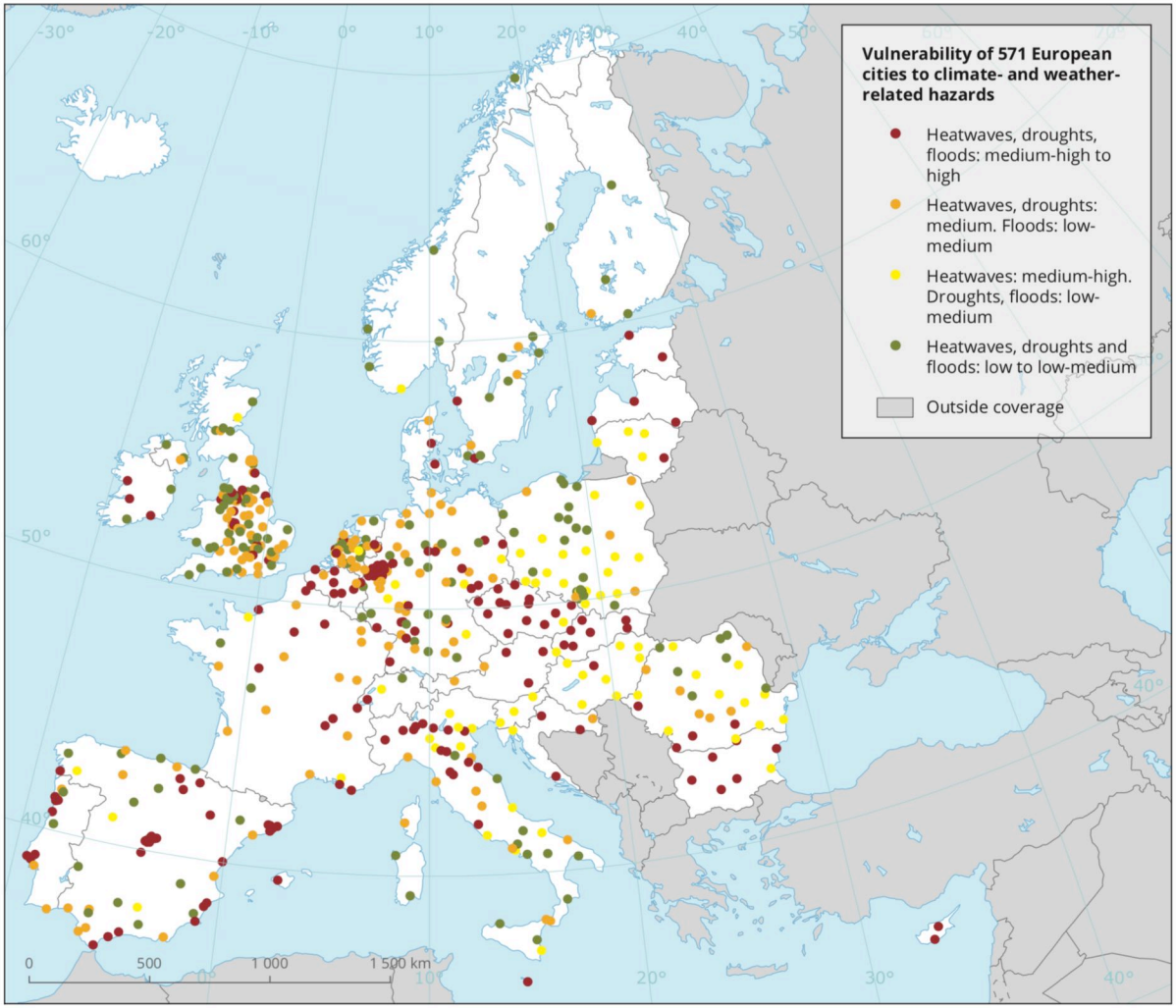
Mountain regions
Temperature rise larger than European average
Decrease in glacier extent and volume
Upward shift of plant and animal species
High risk of species extinctions
Increasing risk of forest pests
Increasing risk from rock falls and landslides
Changes in hydropower potential
Decrease in ski tourism

Continental region
Increase in heat extremes
Decrease in summer precipitation
Increasing risk of river floods
Increasing risk of forest fires
Decrease in economic value of forests
Increase in energy demand for cooling



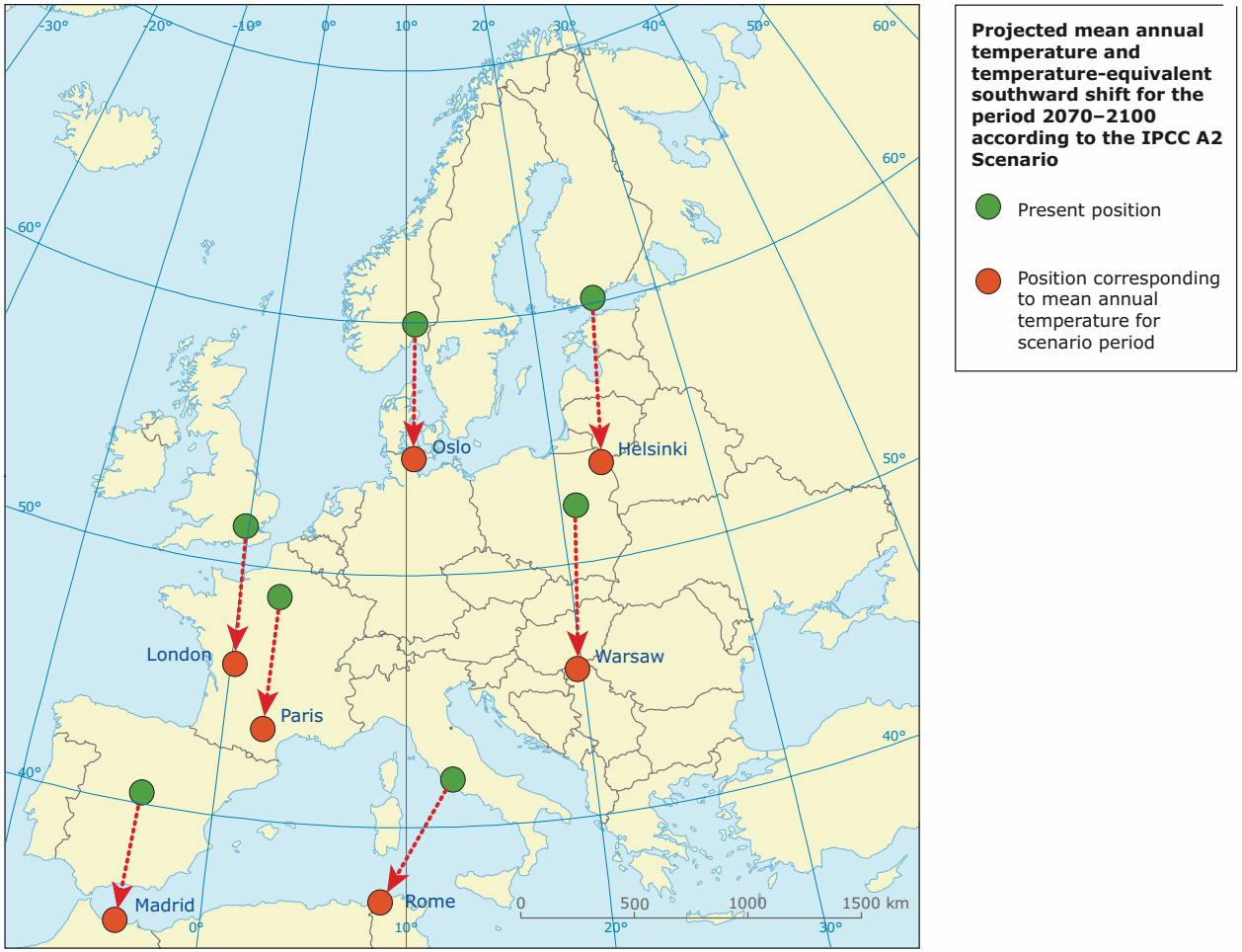
Città e clima

Vulnerabilità al cambiamento climatico delle città europee



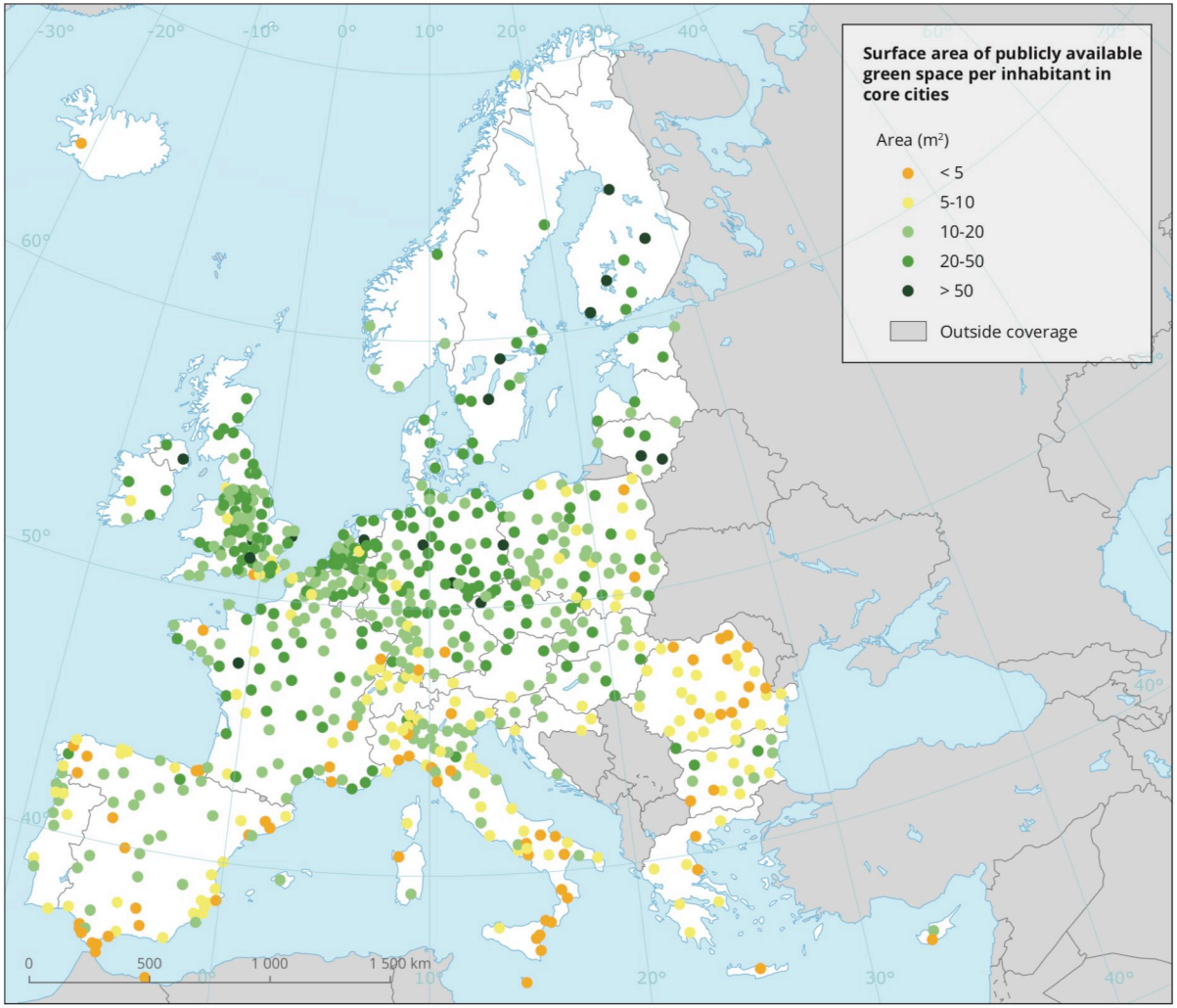
Città e clima

Incremento delle temperature urbane nel lungo periodo



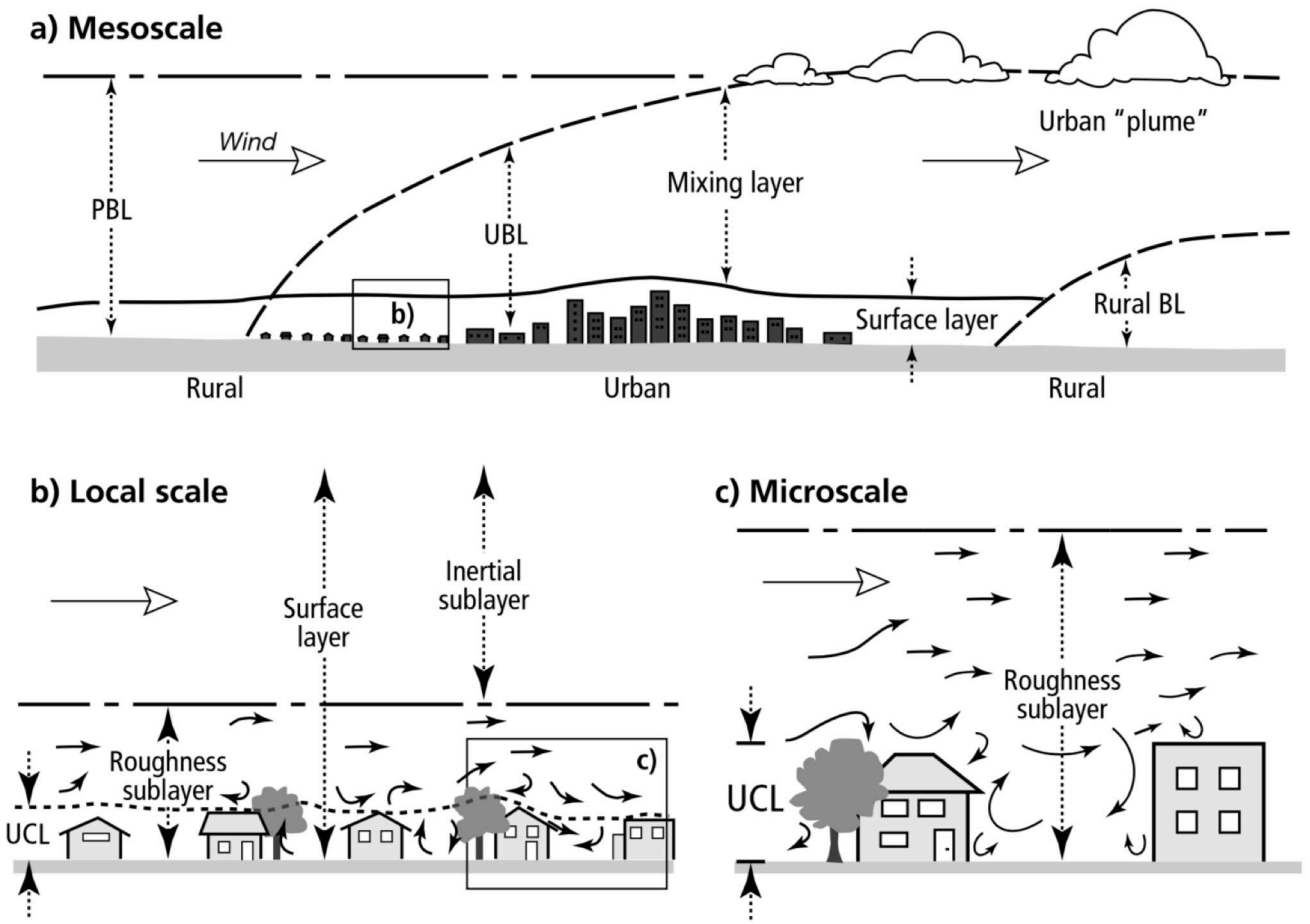
Città e clima

Preparazione all'adattamento climatico nelle città europee



Città e clima

Scale degli effetti climatici nelle aree urbane



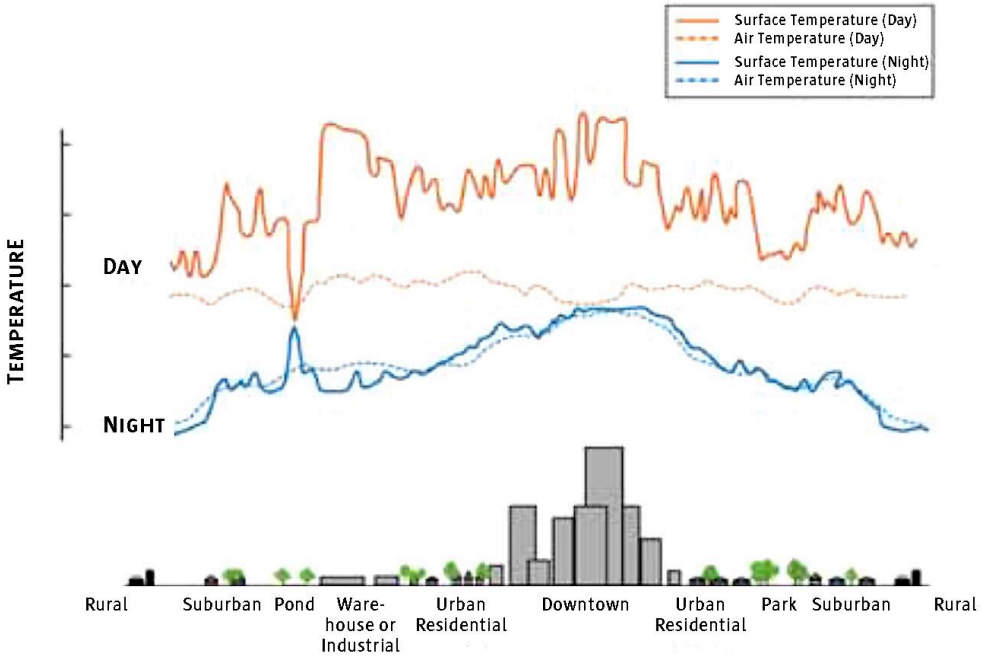
Città e clima

La generazione del calore nelle aree urbane

Il calore nelle aree urbane è generato da due principali fonti:

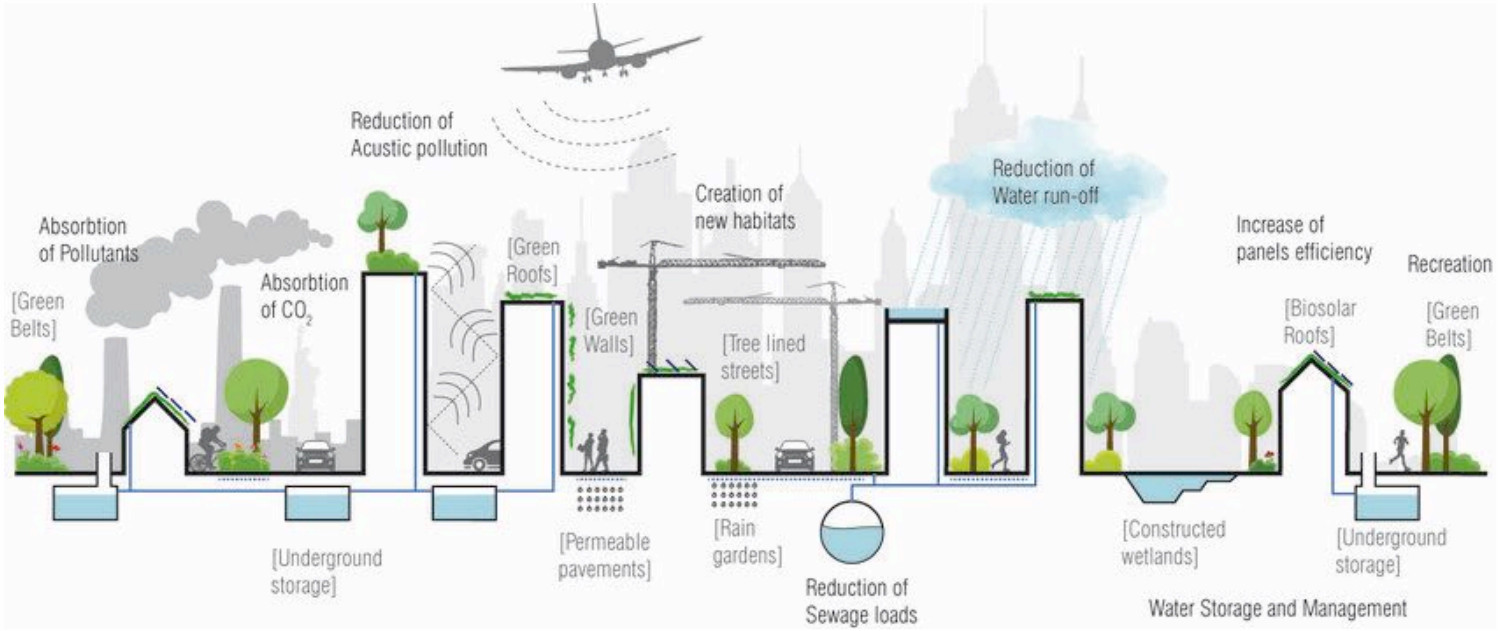
- Le **radiazioni** solari
- Il **calore generato** da edifici, infrastrutture ed dalle attività umane

Il livello di temperatura nelle città dipende dalla **quantità di calore accumulato** e generato dalla città dalla **quantità di calore in grado di disperdersi** per evaporazione, ventilazione e riflessione delle radiazioni.



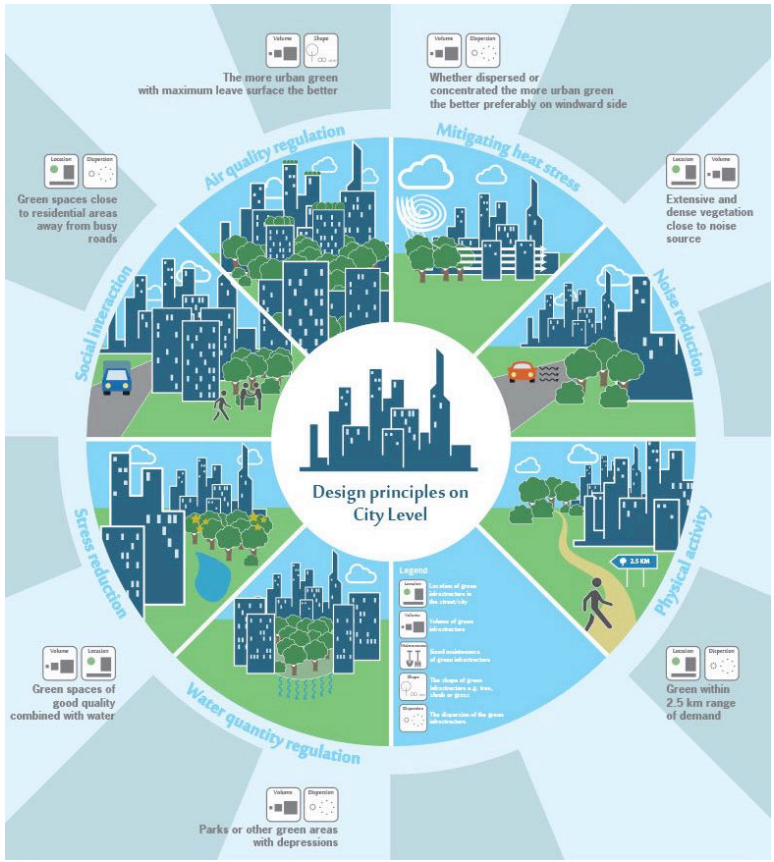
Città e clima: strategie ed azioni di adattamento

La scala urbana

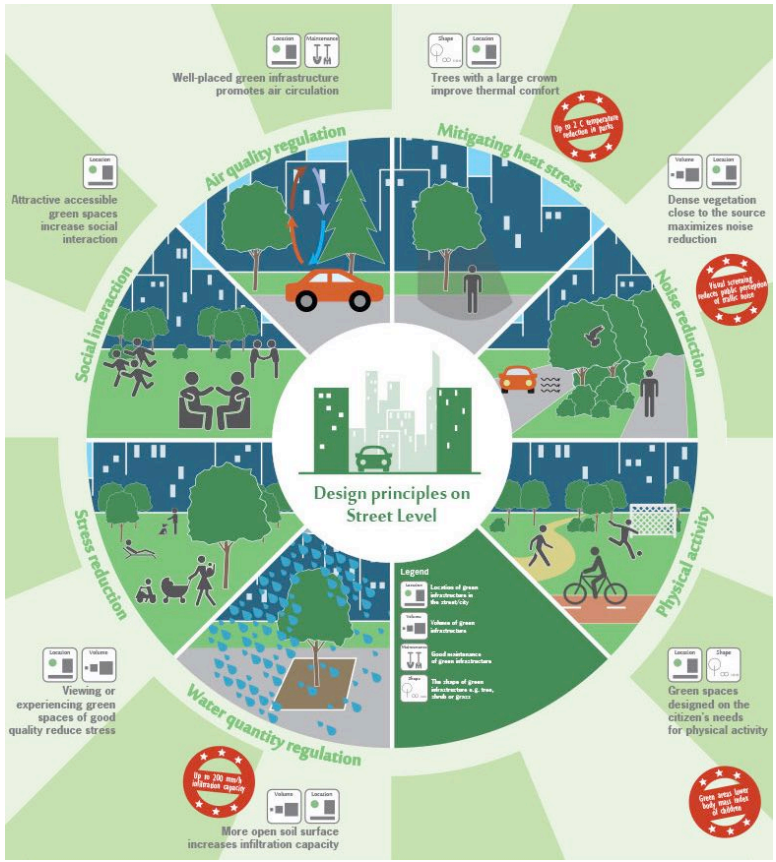


Città e clima: strategie ed azioni di adattamento

La scala urbana e quella di quartiere



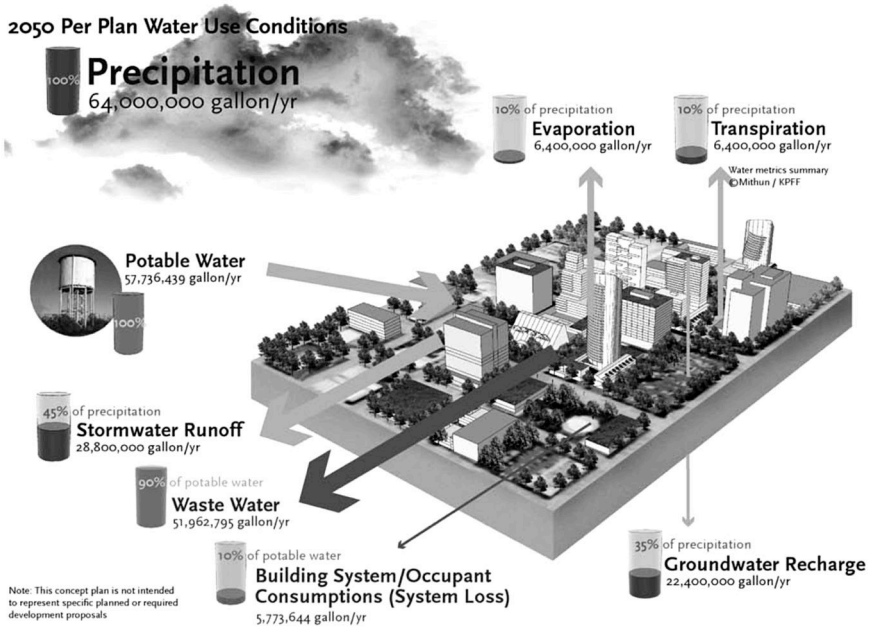
Urban level

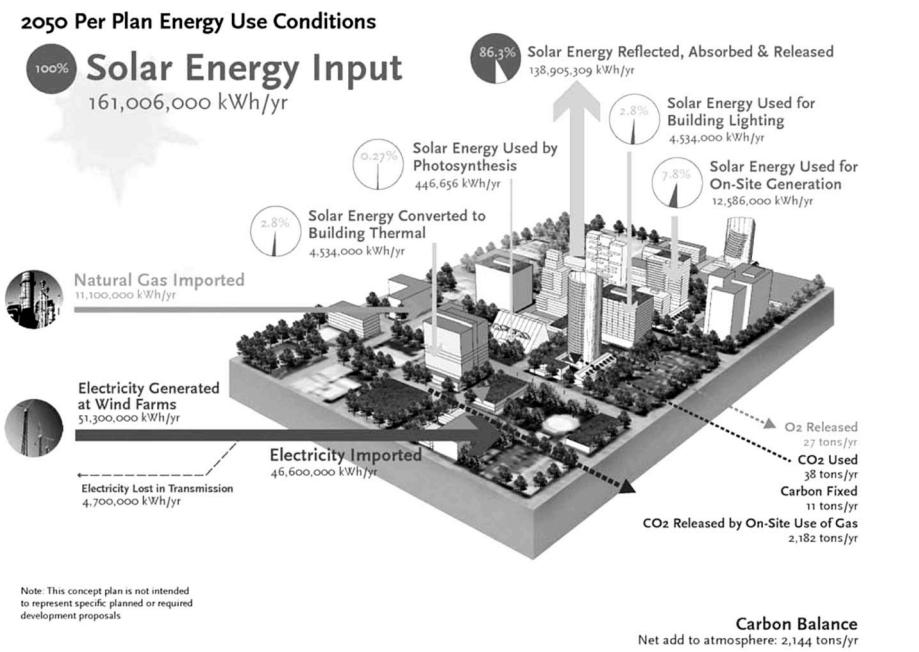


Street level

Città e clima: strategie ed azioni di adattamento

Un quartiere a Portland



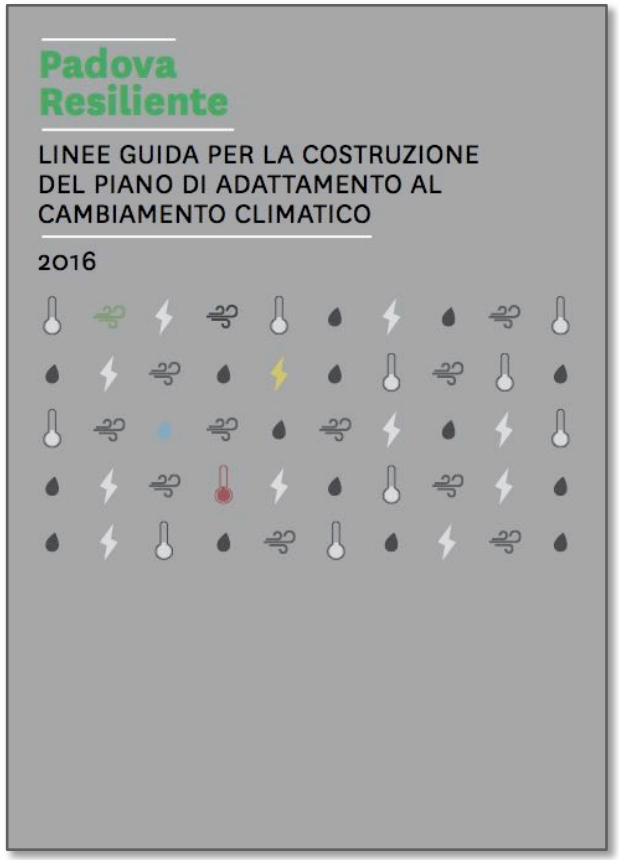


Città e clima: efficacia delle azioni sull'ambiente costruito

Città e clima: efficacia delle azioni sull'ambiente costruito

Piani e progetti di adattamento climatico

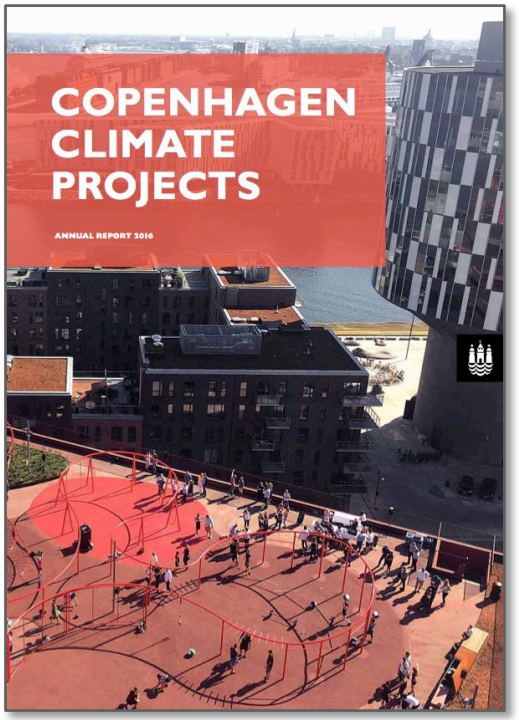
2015



2016

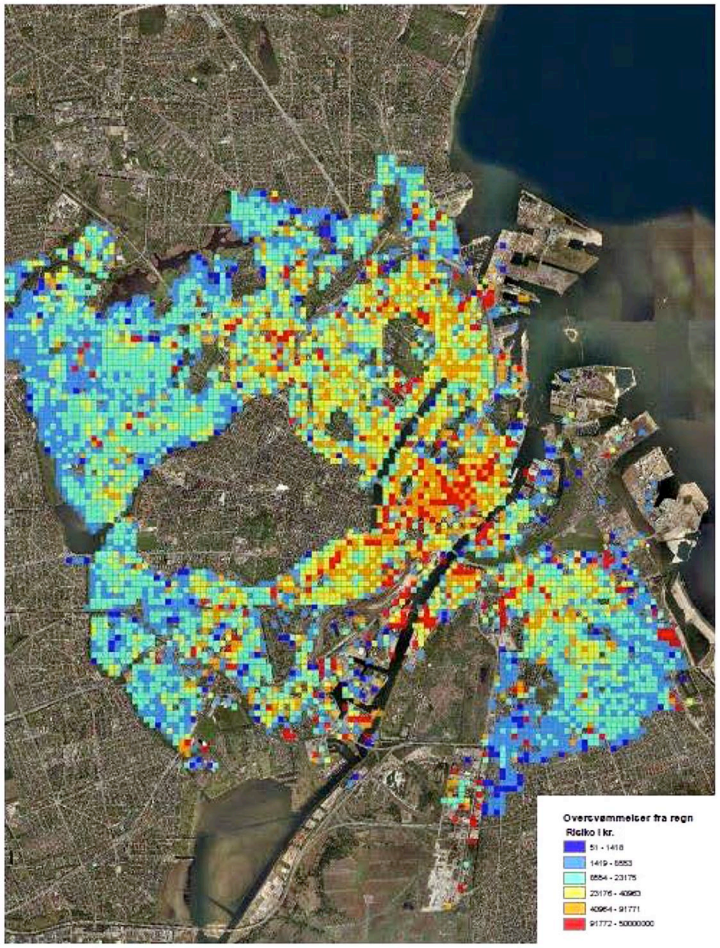
Piani e progetti di adattamento climatico

Il caso di Copenhagen

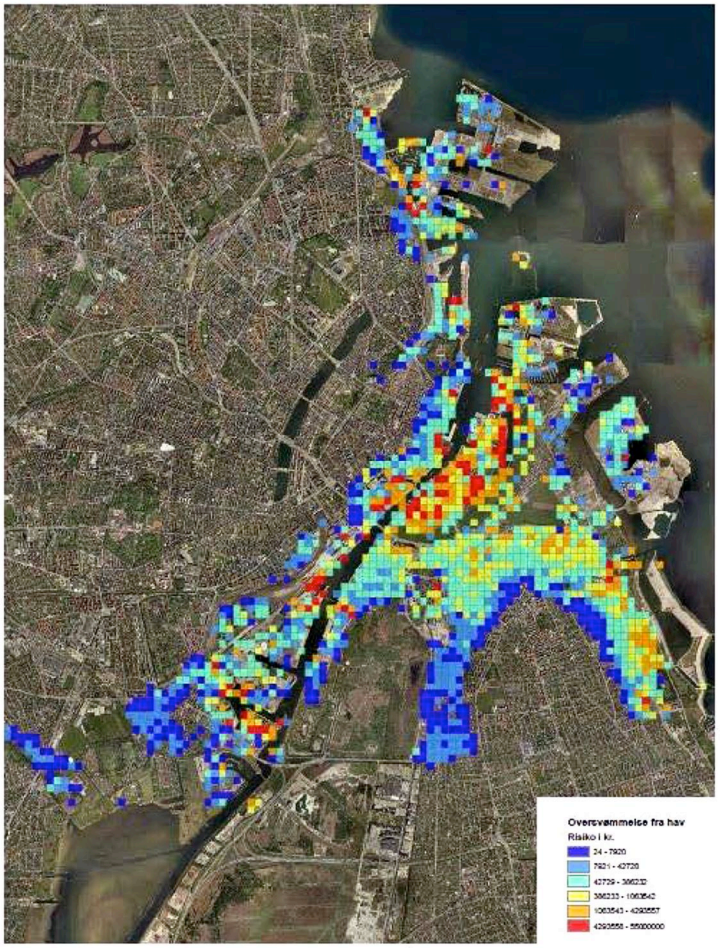


Piani e progetti di adattamento climatico

Copenhagen: il livello urbano



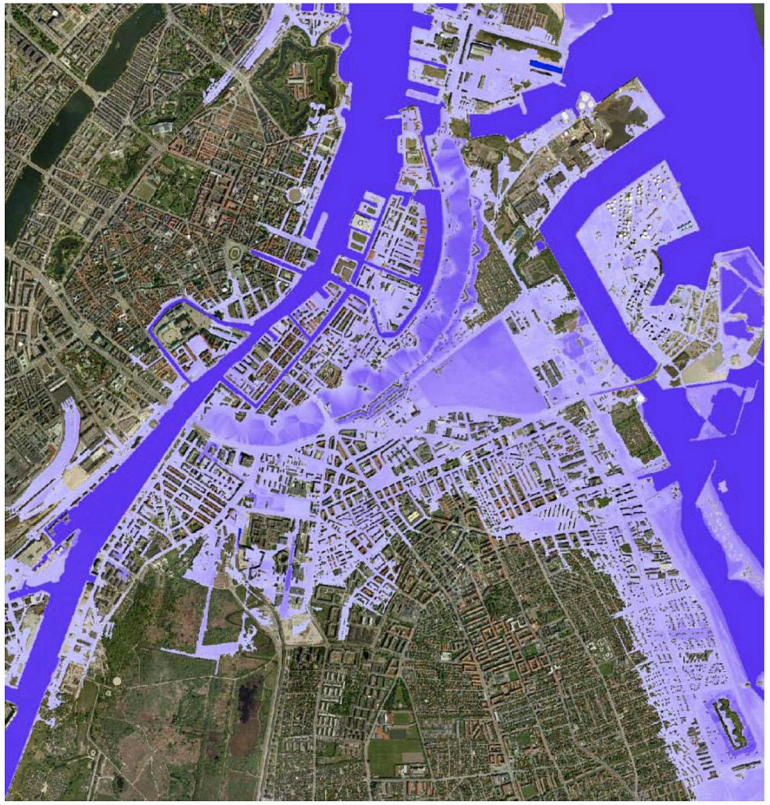
Risk map for flooding caused by rain in 2110



Risk map for storm surges from the sea in 2110

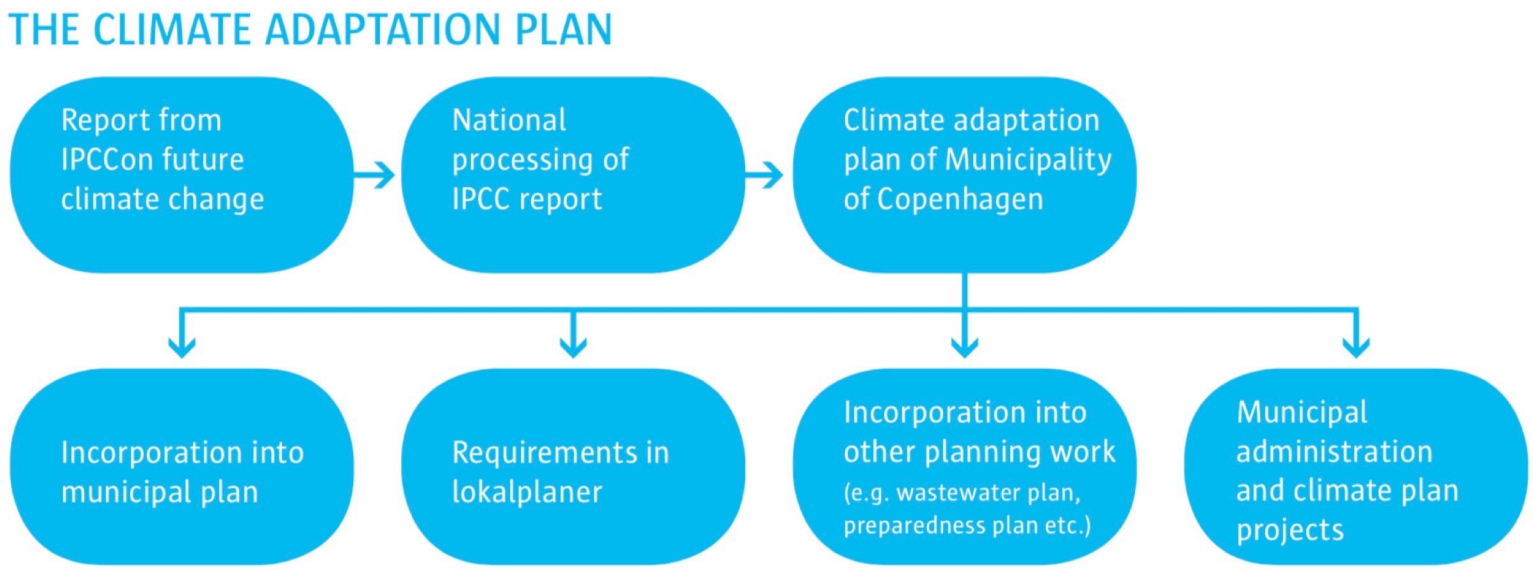
Piani e progetti di adattamento climatico

Copenhagen: il livello urbano



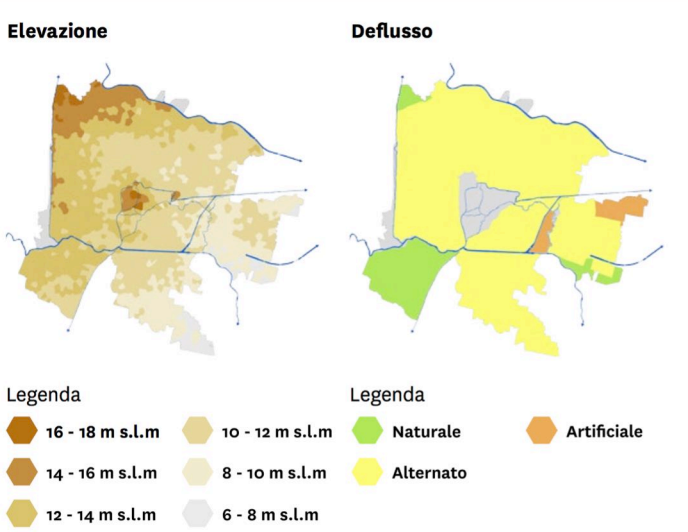
Piani e progetti di adattamento climatico

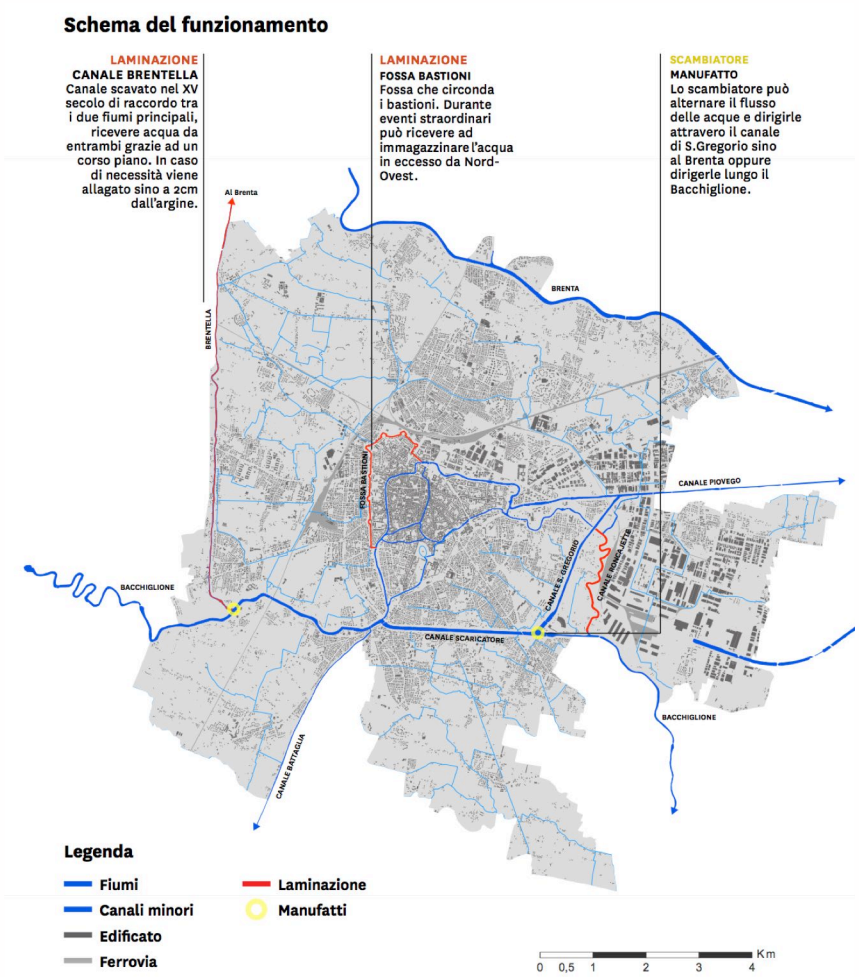
Copenhagen: il livello urbano



Piani e progetti di adattamento climatico

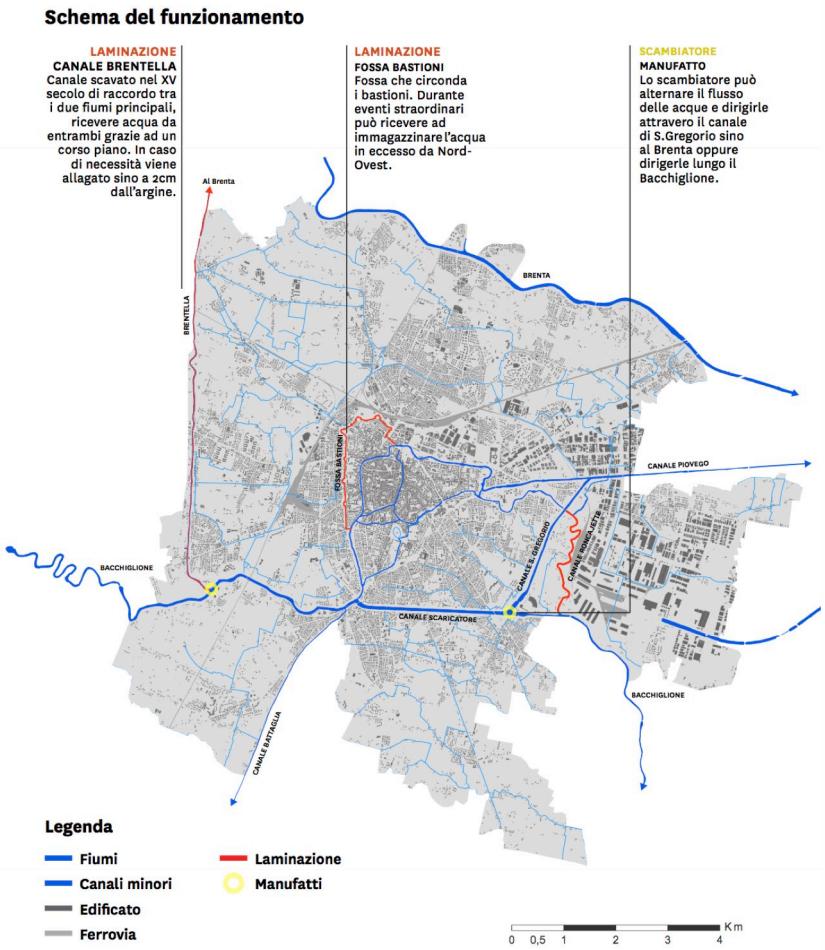
Il caso di Padova: la diagnosi

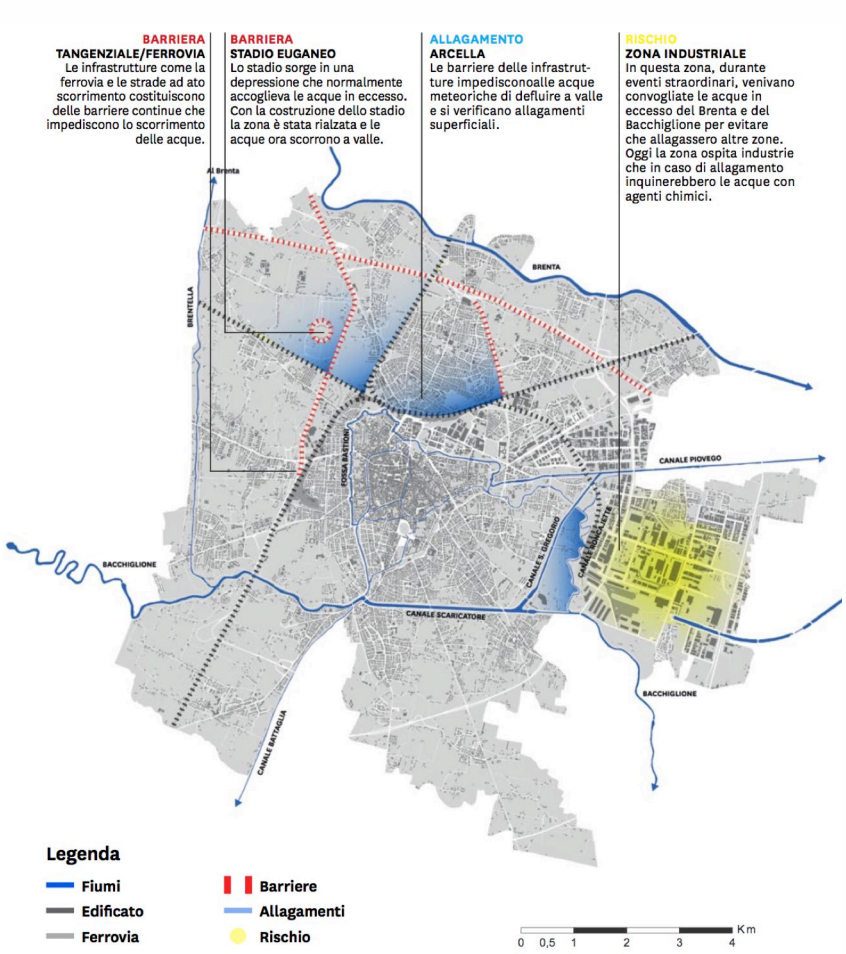




Piani e progetti di adattamento climatico

Il caso di Padova: la diagnosi





Piani e progetti di adattamento climatico

Il caso di Padova: la diagnosi

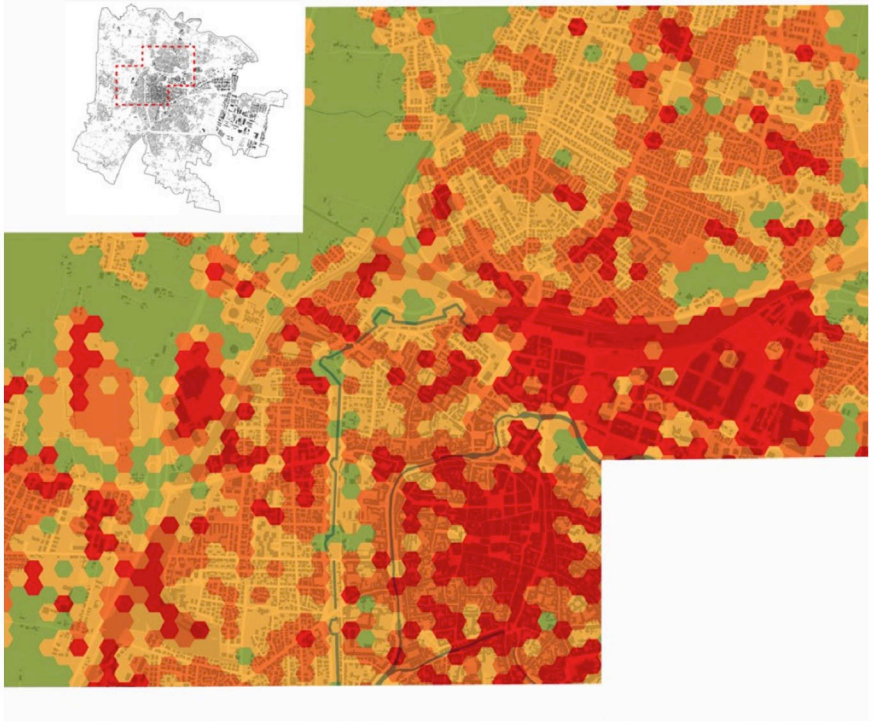
I suoli con una bassa percentuale di impermeabilità hanno un'ottima capacità di assorbire le precipitazioni, generalmente sono parchi e zone agricole.

I suoli con una media percentuale di impermeabilità sono generalmente composti da alcune aree pavimentate, come strade o edifici, e altre di verde.

I suoli con un'alta percentuale di impermeabilità rappresentano aree densamente pavimentate ed edificate. In caso di forti piogge provocano scorrimento superficiale ed allagamenti.

I suoli quasi completamente impermeabili rappresentano aree di grande copertura del suolo, quali aree industriali, svincoli, centri abitati e parcheggi. Ogni pioggia provoca scorrimento superficiale, spesso ricco di inquinanti.

Rappresentazione grafica della percentuale di impermeabilità del suolo

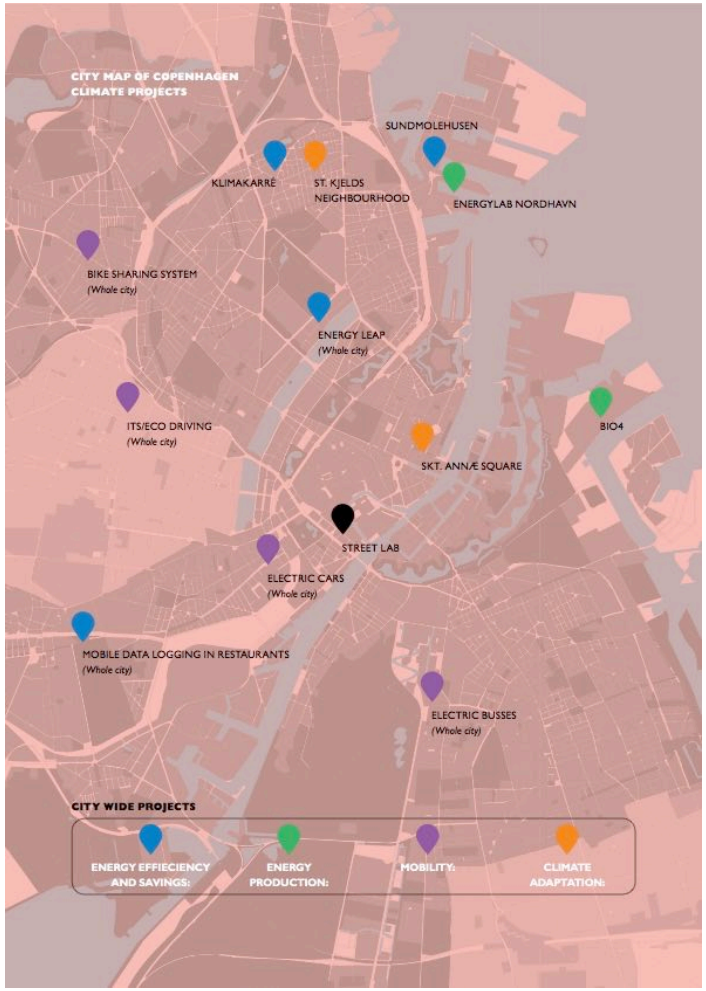


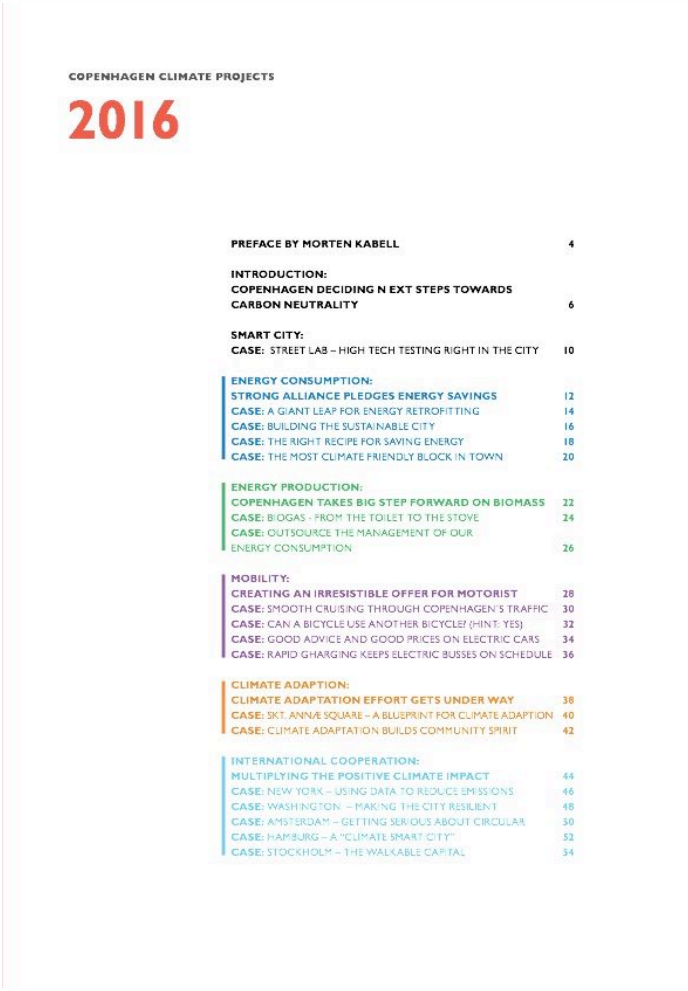
Piani e progetti di adattamento climatico

Il caso di Padova: schemi di trasformazione per le aree pilota

Piani e progetti di adattamento climatico

Copenhagen: climate projects a livello urbano



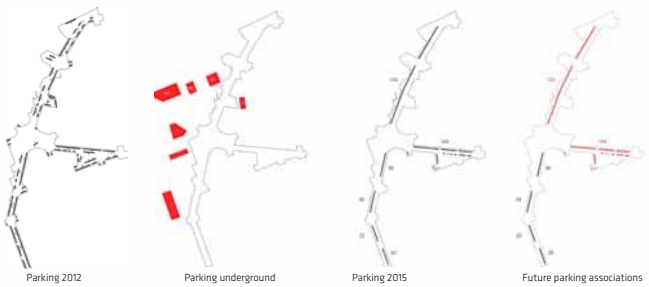


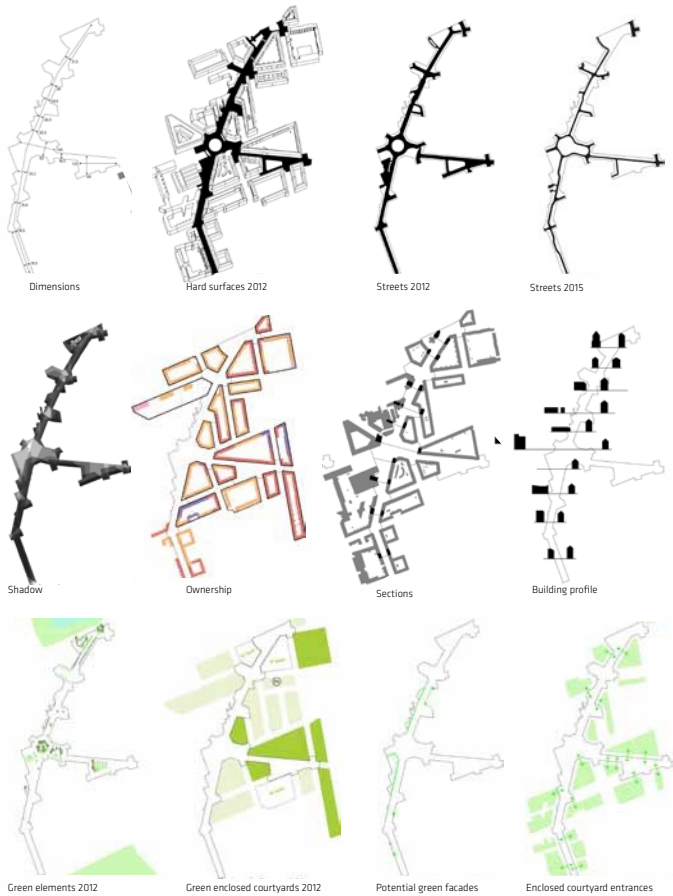
COPENHAGEN CLIMATE PROJECTS

2016

Piani e progetti di adattamento climatico

Copenhagen: climate projects a livello di quartiere (St. Kjeld's)

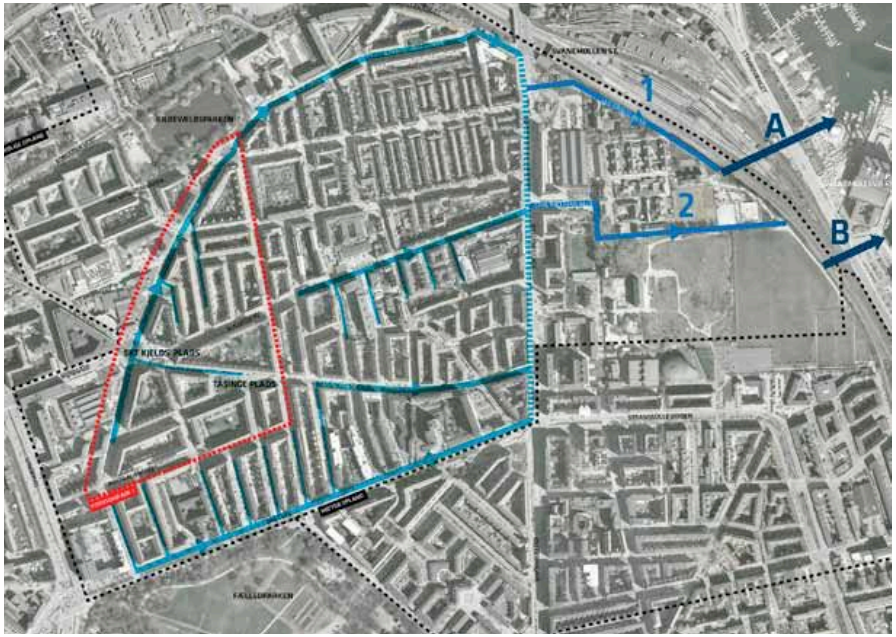




Piani e progetti di adattamento climatico

Copenhagen: climate projects a livello di quartiere (St. Kjeld's)

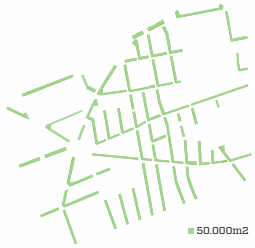
MAIN WATER CHANNEL
MINOR WATER CHANNEL
POSSIBILITY 1
POSSIBILITY 2
EXIT TO THE HARBOUR A
EXIT TO THE HARBOUR B
WATER CATCHMENT AREA
FOCUS AREA



The water's way to the harbour. St. Kjeld's Neighbourhood is located in Østerbro, north of Fælledparken. We will secure an entire neighbourhood against the effects of torrential rain by creating channels in the streets that will lead large quantities of water to the harbour where it will do no damage.

270.000 sqm

is the road surface area in St. Kjeld's Neighbourhood today. The streets are much wider than necessary to be able to handle the local traffic.



50.000 sqm

of green spaces can be created if we design the streets according to current standards - with traffic in both directions and the same number of parking lots as today.

Better urban life

In this way we create space for green corridors, roadside trees, front gardens and thriving urban space without losing a single parking lot.

Piani e progetti di adattamento climatico

Copenhagen: climate projects a livello di quartiere (St. Kjeld's)

Bryggervangen today

Bryggervangen at Landskronagade. Improved urban space on Bryggervangen can create local meeting places along the green stream.

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Piani e progetti di adattamento climatico

Copenhagen: climate projects a livello di quartiere (St. Kjeld's)

St. Kjeld's Square. The proposal is inspired by the dead ice landscape - a Danish cultural landscape with characteristic depressions in the surface. Here nature can break through the asphalt.

Piani e progetti di adattamento climatico

Copenhagen: climate projects a livello di quartiere (St. Kjeld's)

Tåsinge Square. From a pointless expanse of asphalt to a refreshing green area.

Piani e progetti di adattamento climatico

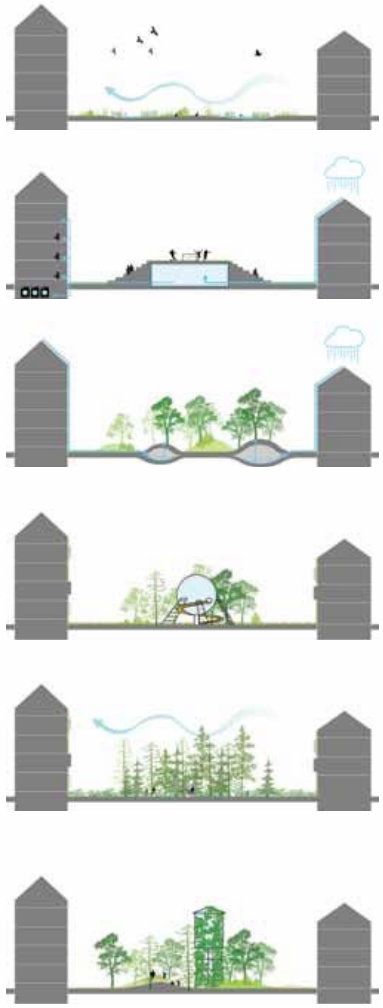
Copenhagen: climate projects a livello di quartiere (St. Kjeld's)

Large enclosed courtyard

In a large enclosed courtyard, there is room for big trees without compromising on direct sunlight to the apartments. The roofs can be greened and hard covered surfaces can be transformed into water play and detention ponds.

Narrow enclosed courtyard

In a narrow enclosed courtyard, it is natural to adapt the facades to both climate solutions and energy renewal. Green and blue facades can be part of a rethinking of dwelling opportunities and energy reduction. The water can be used to cool the building and courtyards and to water the green facades.



Contatti e materiali

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