

The background of the slide is a photograph of a cityscape under a dramatic, stormy sky. Dark, heavy clouds dominate the upper two-thirds of the image. A bright light source, likely the sun, is breaking through the clouds on the left side, creating a strong lens flare and illuminating the scene. A faint rainbow is visible in the sky, arching from the left towards the center. The city below is seen from an elevated perspective, showing a mix of residential and commercial buildings, green spaces, and a multi-lane highway with traffic on the right side. The overall mood is one of resilience and hope amidst adversity.

ECONOMIC SYNERGIES, BUSINESS CASE AND FINANCING

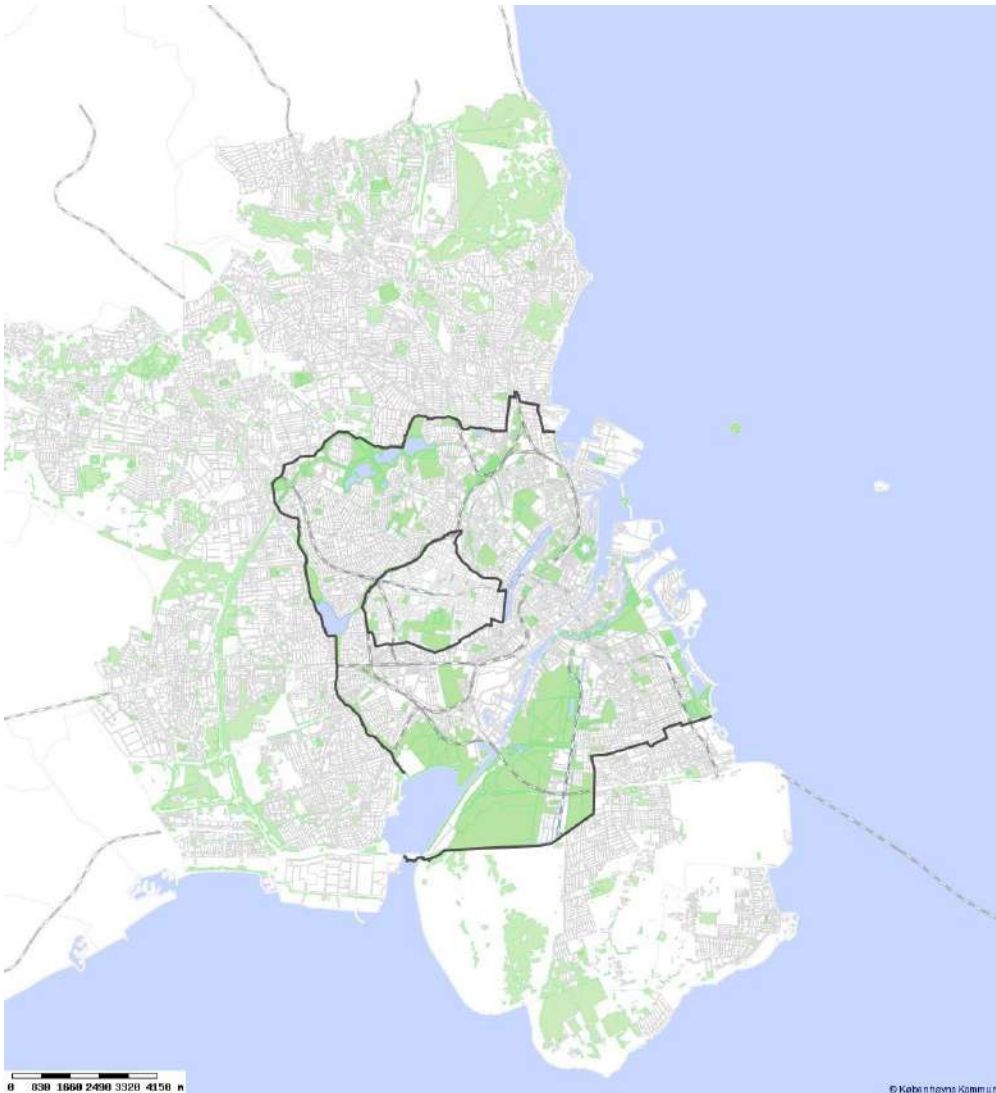
JAN RASMUSSEN, COPENHAGEN MUNICIPALITY

Copenhagen

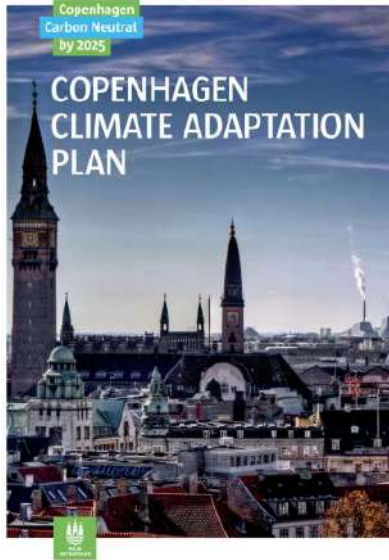
**The capital of
Denmark**

**The City of
Copenhagen (app.
600.000
inhabitants)**

**(Metropolitan area
app. 1,500.000
Inhabitants)**

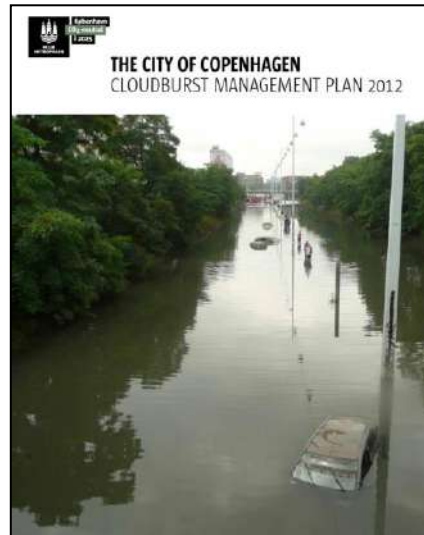


Time line of adaptation proces in Copenhagen



August 2011

**Plan approved by
City Council**



December 2012

**Plan approved by
City Council**



2013-2014

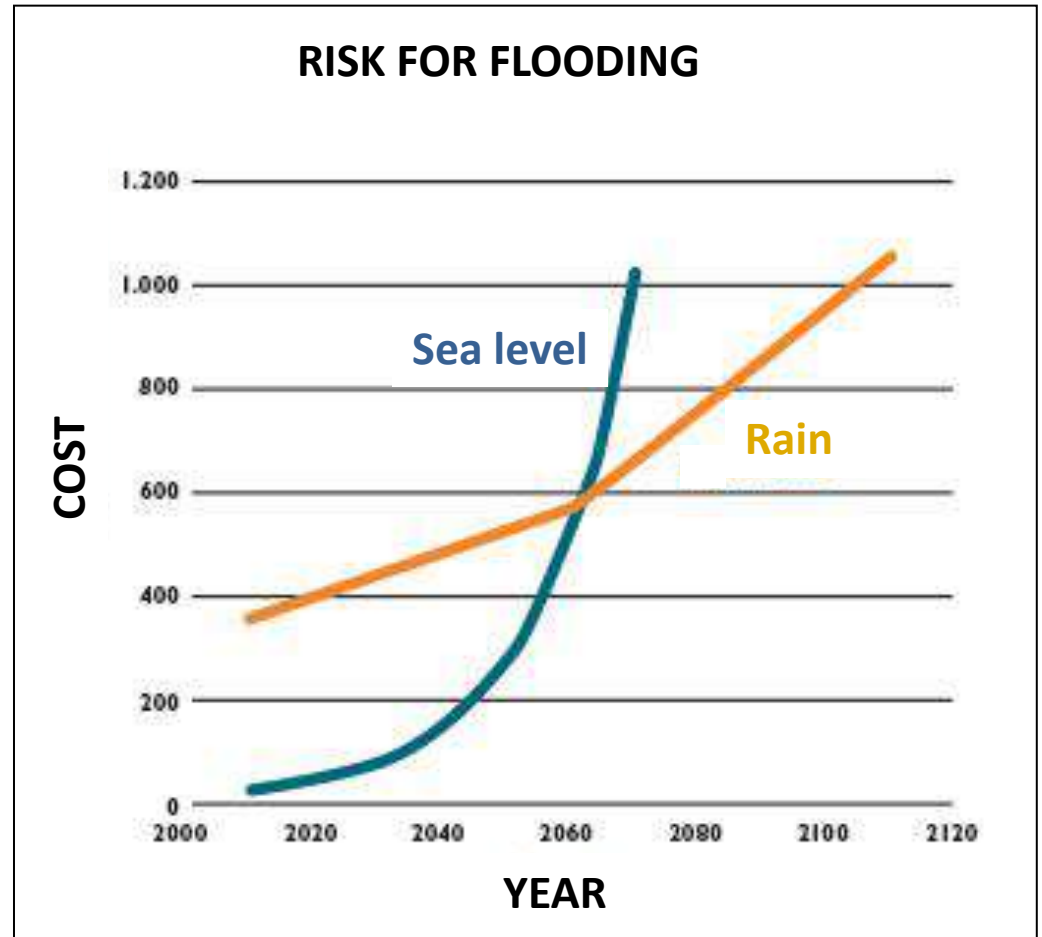
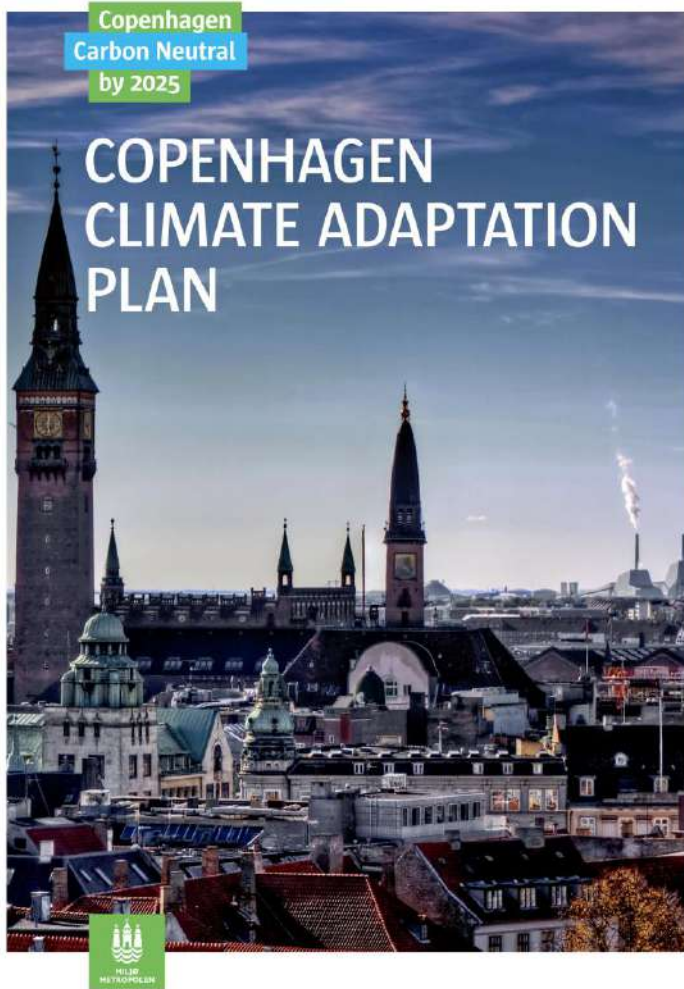
**Preparation af
plan for each
water catchment
area**



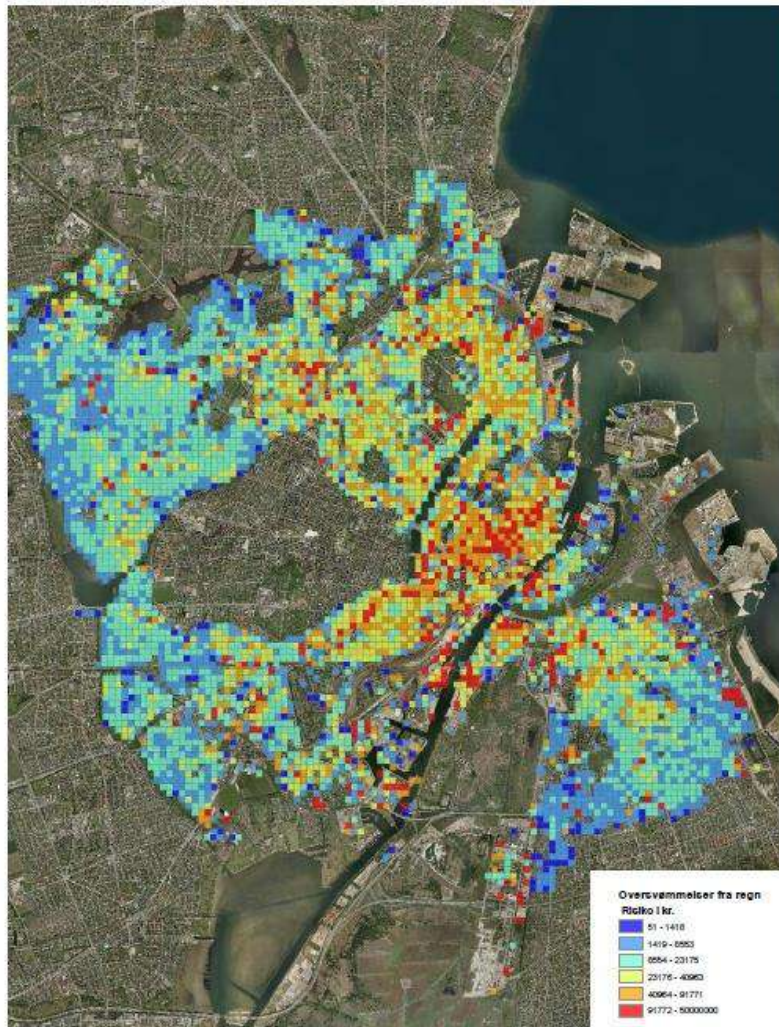
November, 2015

**Political decision
for
implementation**

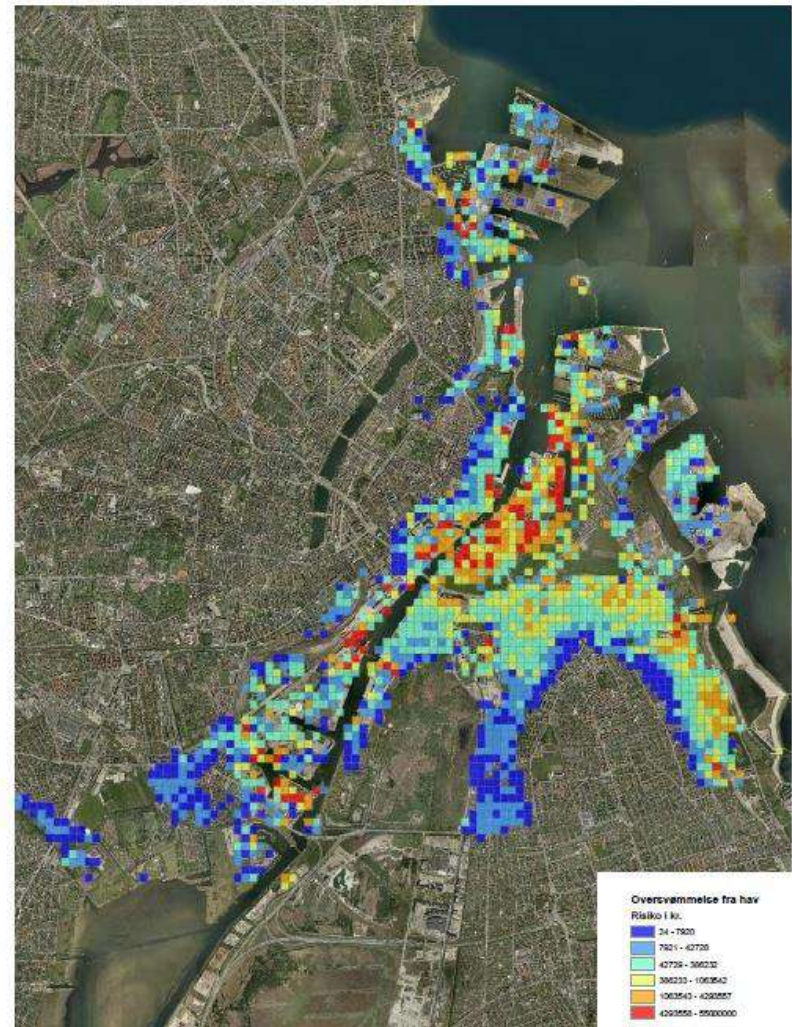
The adaptation plan



Risk assessment

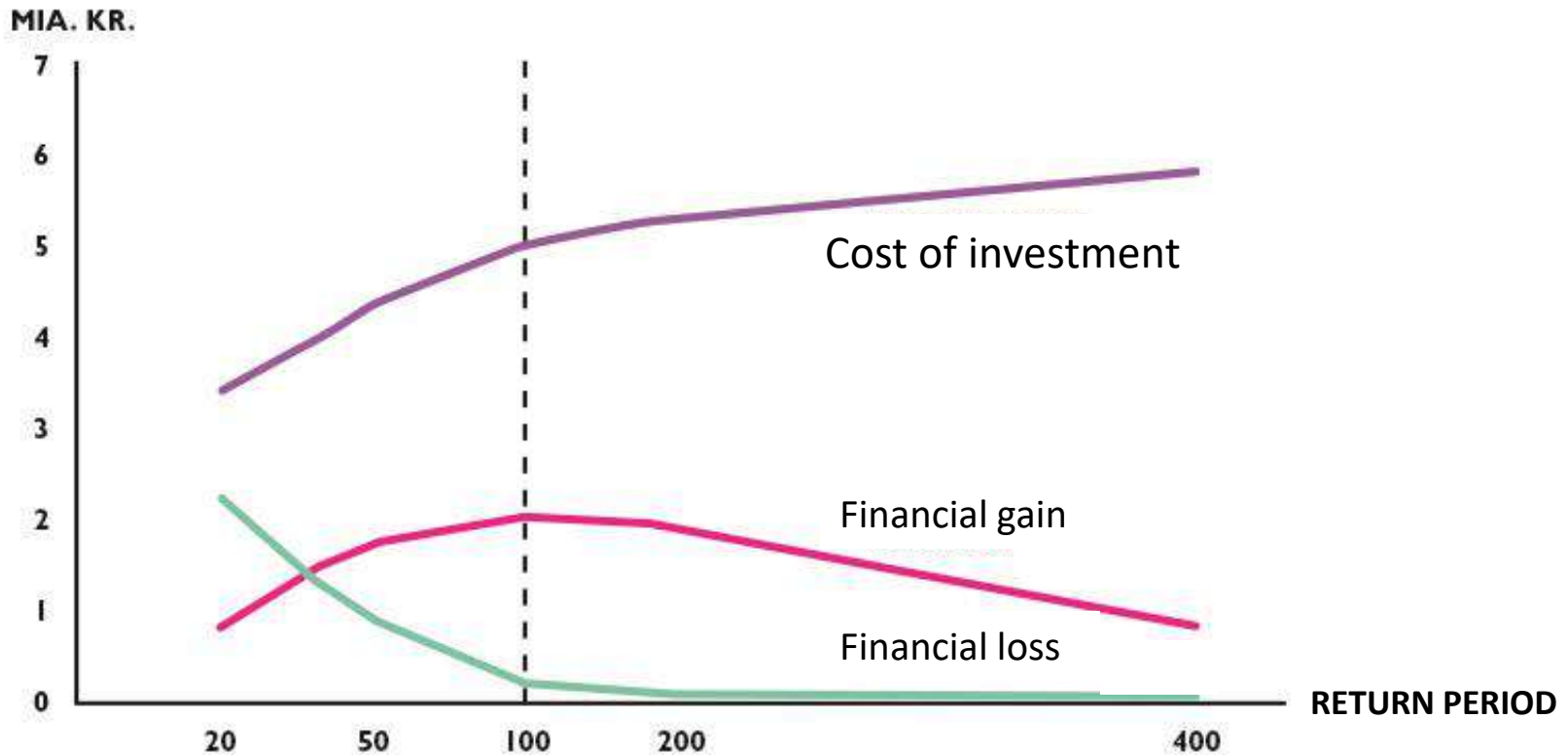


Risk map for flooding caused by rain in 2110



Risk map for storm surges from the sea in 2110

Decision of safety level



STRATEGY – FOUR POSSIBLE STRATEGIES

1. Do nothing and let the citizens pay through the insurance policies.



2. Expand the existing sewage system.



3. Only green solutions

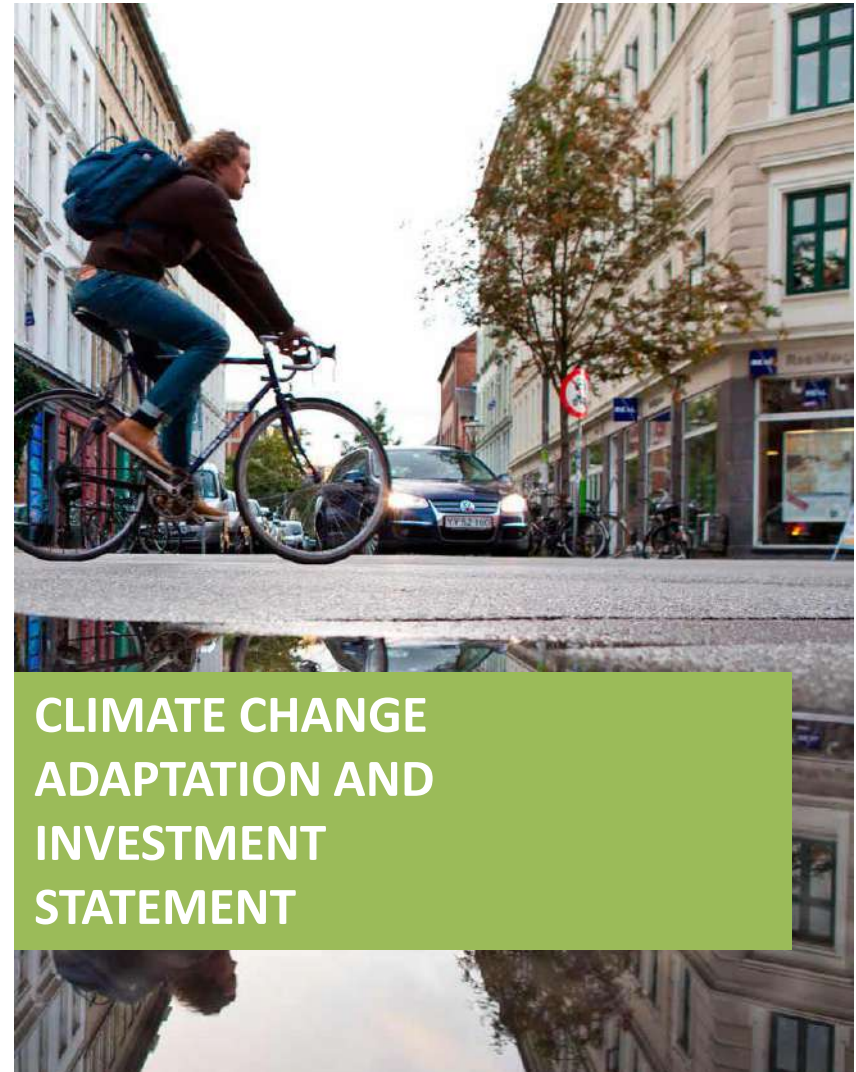
4. Combined solution

The opportunities of adaptation

- Focus on urban spaces
- Green and blue urban spaces
- We are developing a concept for the integration of water in the urban space
- Green adaptation – using the synergies to create green corridors and increase biodiversity
- Synergies – saves times and money

INVESTMENT STATEMENT - SOCIO-ECONOMIC DATA

- Cost of investments
- Value of estimated damages
- Value of "green solutions"
- Saved investments in expanding the present sewer system
- Other aspects

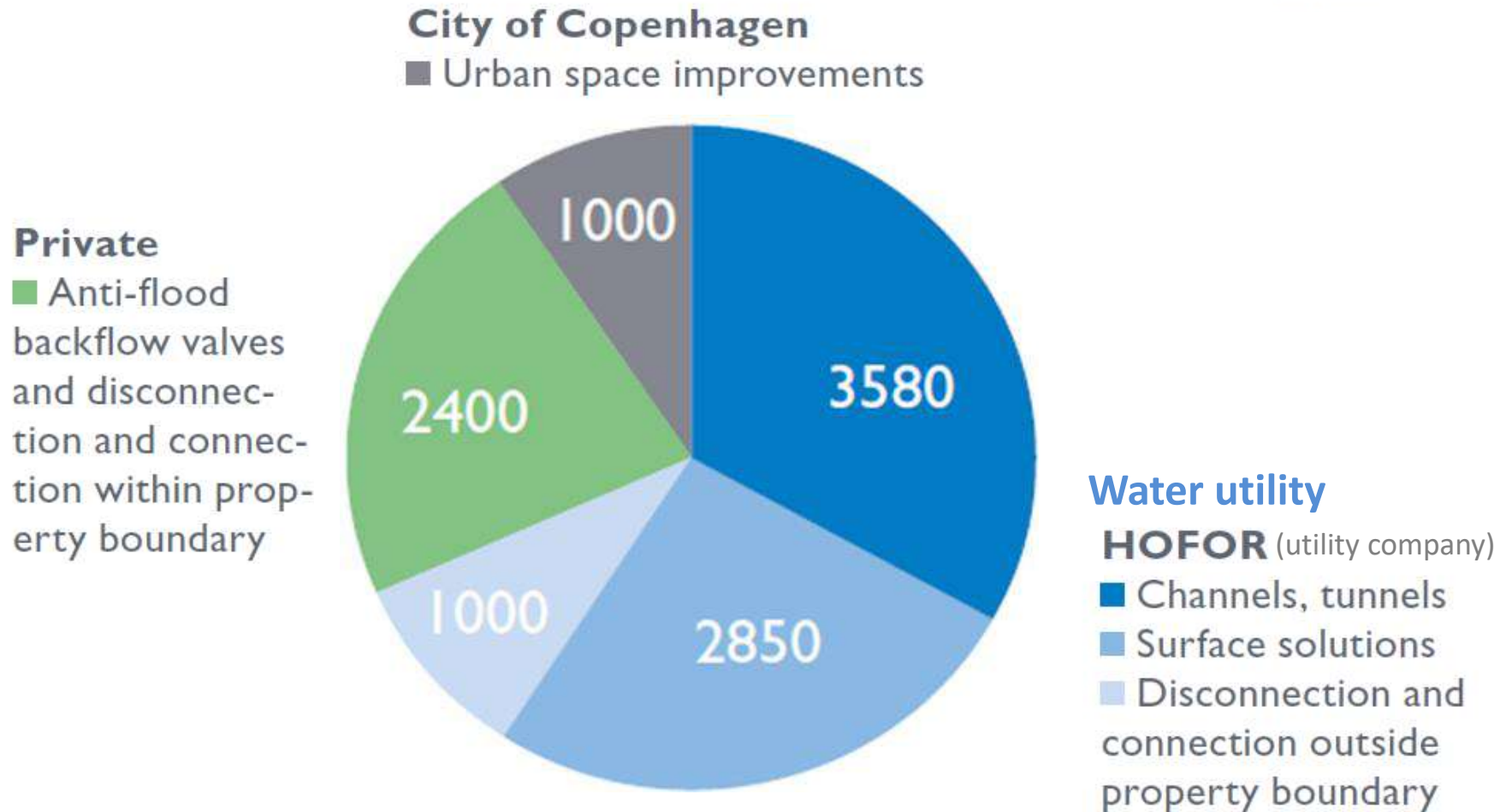


INVESTMENT STATEMENT

- Total costs of new storm water infrastructure – 1.3 billion Euro
- Expanding the existing system would be double the price
- Extra costs for urban improvement (greening etc) 100 mill Euros – or more depending on level of ambition
- Cost benefit analysis still shows that it is a good business case

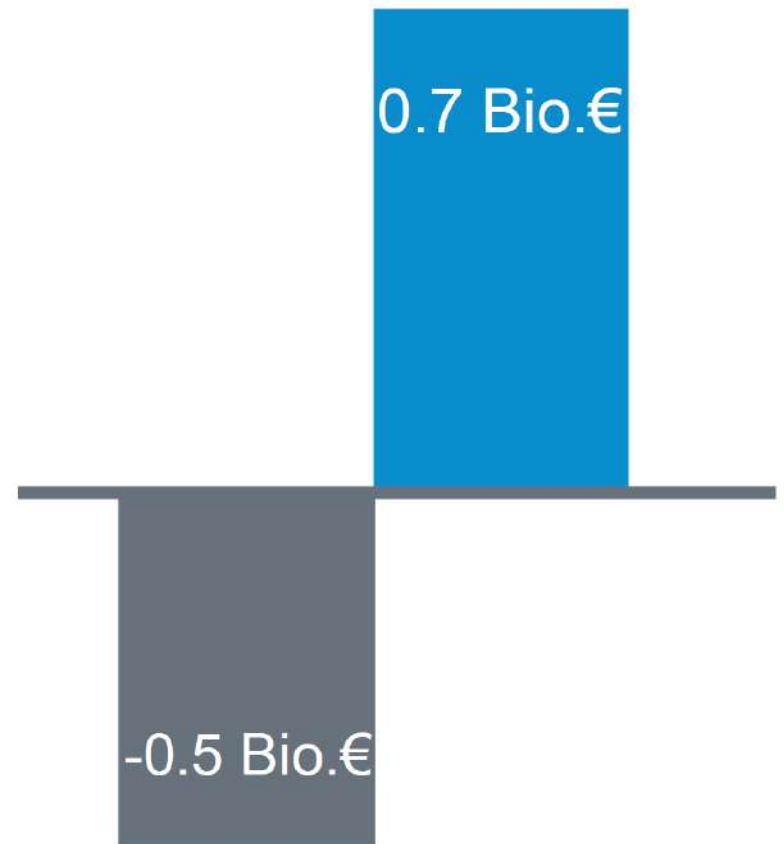


CONSTRUCTION COST ESTIMATE – 1.3 BIO. EUR



A GOOD BUSINESS CASE

- Robust socio economic figures
- Cheaper than traditional solutions
- Less flooding – less damage
- Lower insurance costs
- Higher house prices
- Total costs 1.3 billion



Financing: A new scheme for climate adaptation

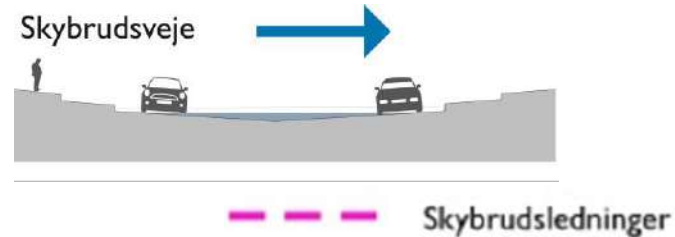
'Co-financing' makes it possible to finance **CLIMATE ADAPTATION SOLUTIONS** through the water rates.



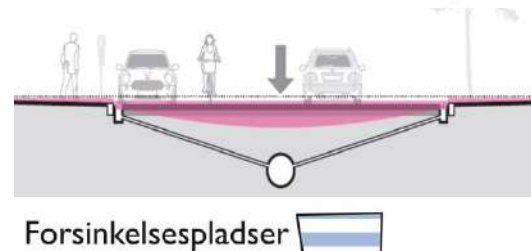
URBAN SPACE IMPROVEMENTS on the other hand is tax-financed and is therefore part of the city budget.

5 TYPES OF SOLUTIONS

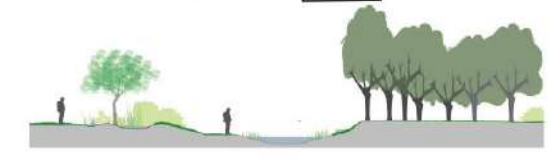
1. **Cloudburst boulevards – transporting water**



2. **Pipes transportation under ground**



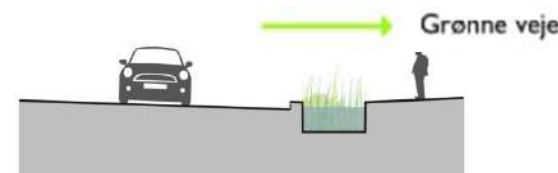
3. **Retention boulevards – delaying water**



4. **Central delays – for storing water**



5. **Green roads – transport and delay of water on small roads**

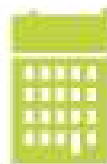


THE IMPLEMENTATION PLAN

- 
- 300 projects
 - Investing 1.3 billion €
 - 20 years framework

IMPACT ON WATER FEES

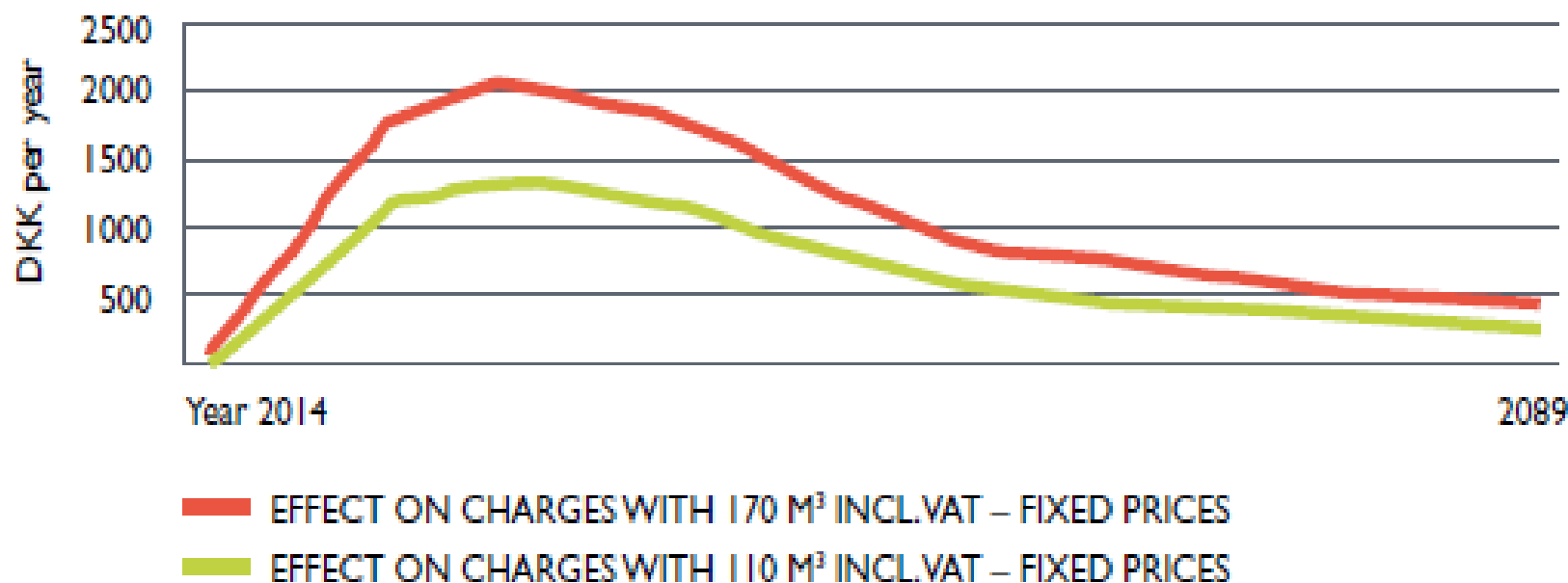
- 15% increase in water fee



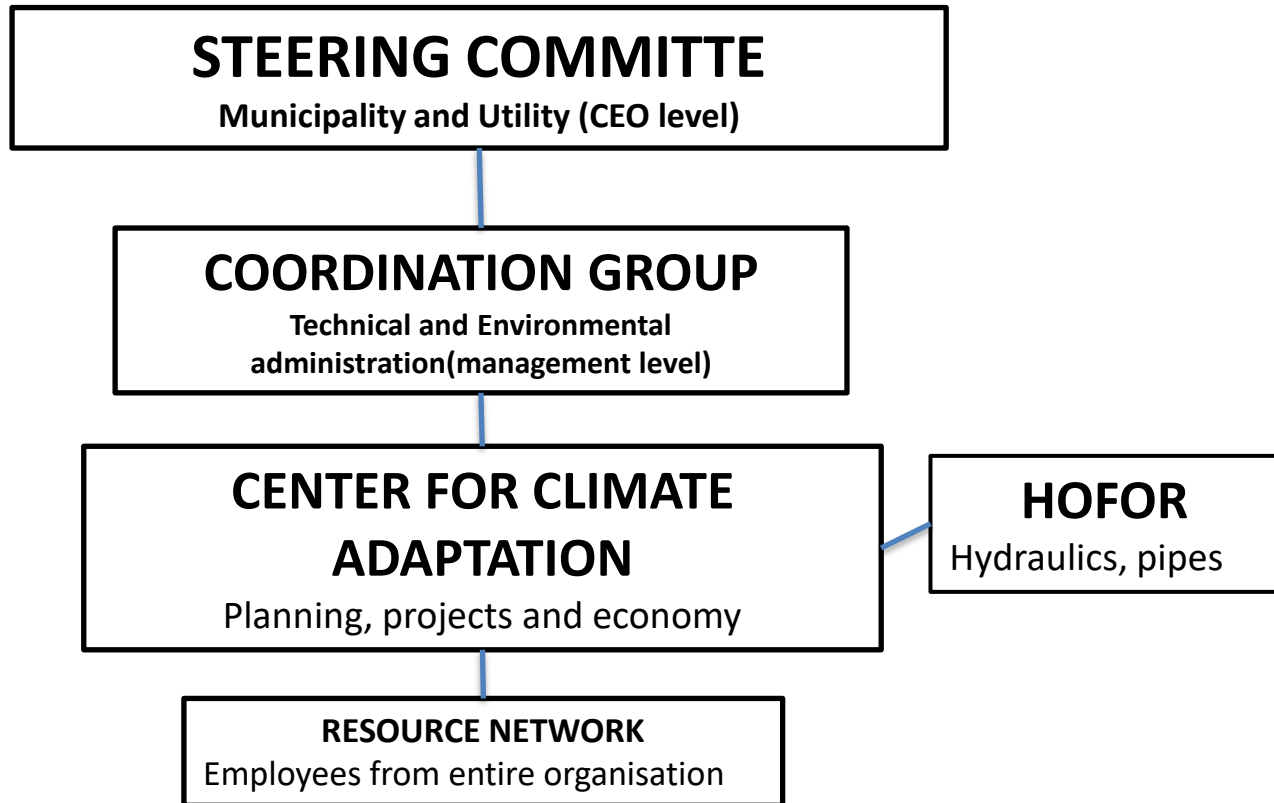
House 170 m³ = DKK 1100 /year

Apartment 110 m³ = DKK 715 /year

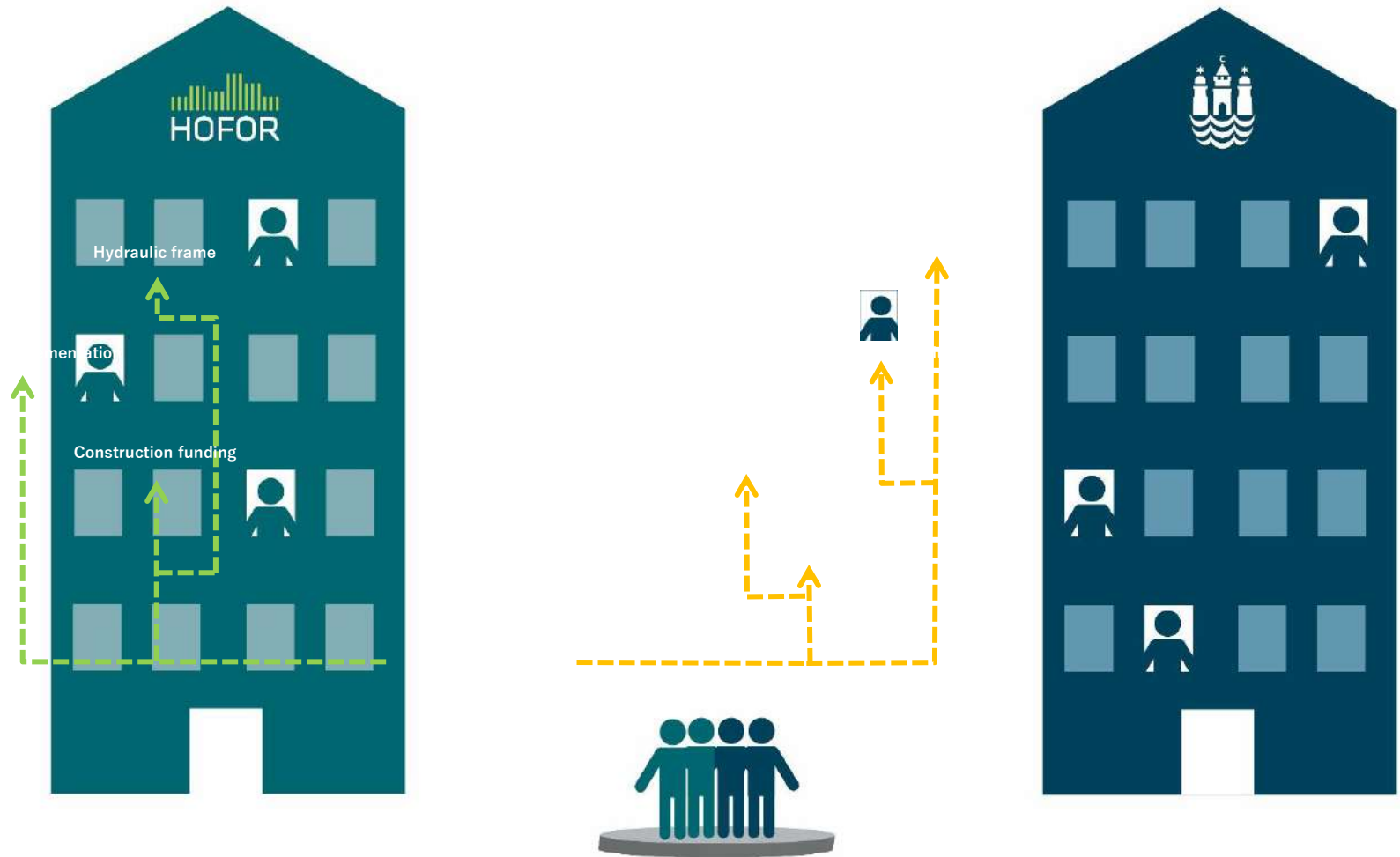
ADDITIONAL ANNUAL COST DUE TO CLIMATE CHANGE ADAPTATION AND CLOUDBURST MANAGEMENT



Organisation

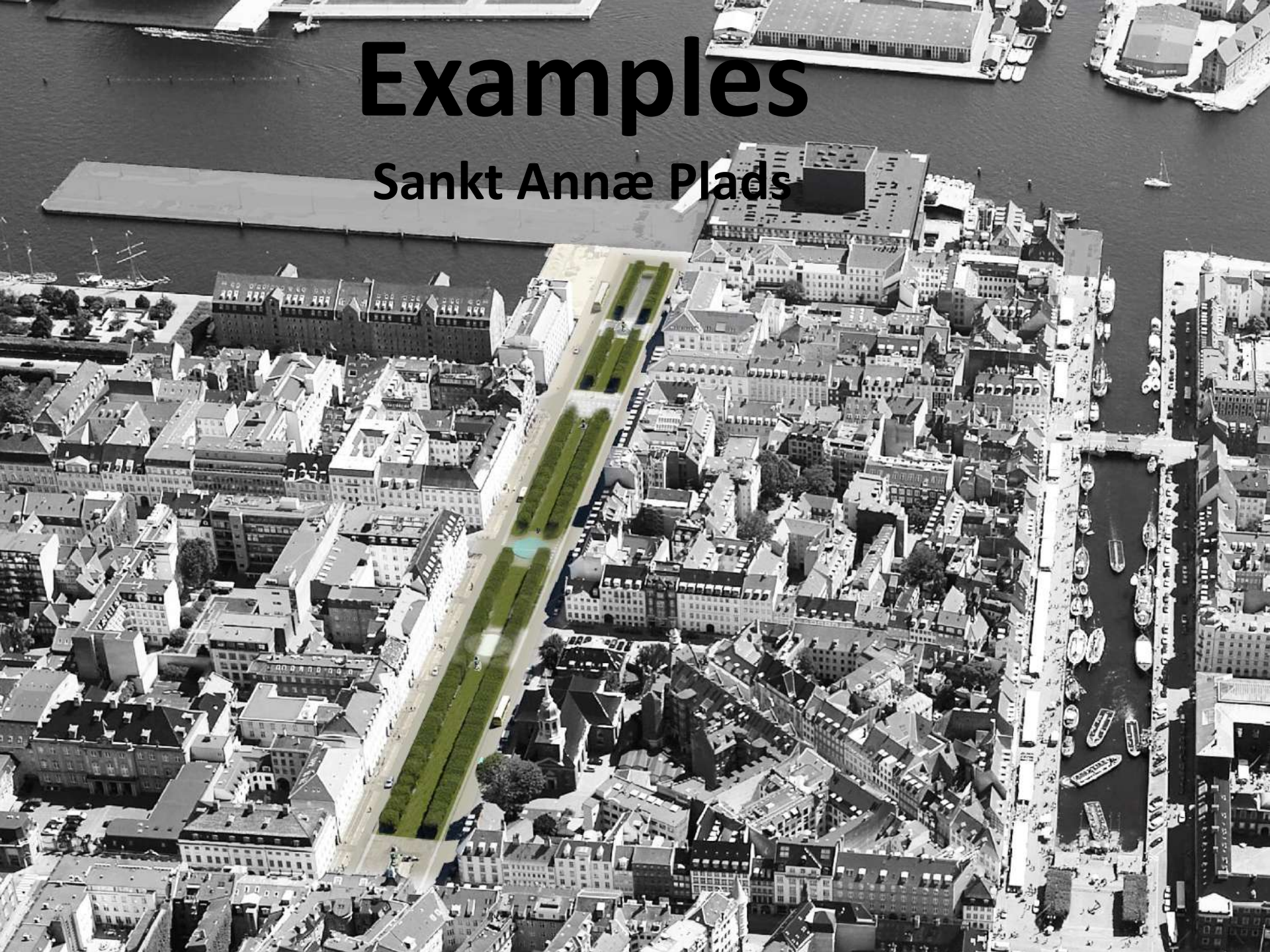


Masterplanning: Organisation

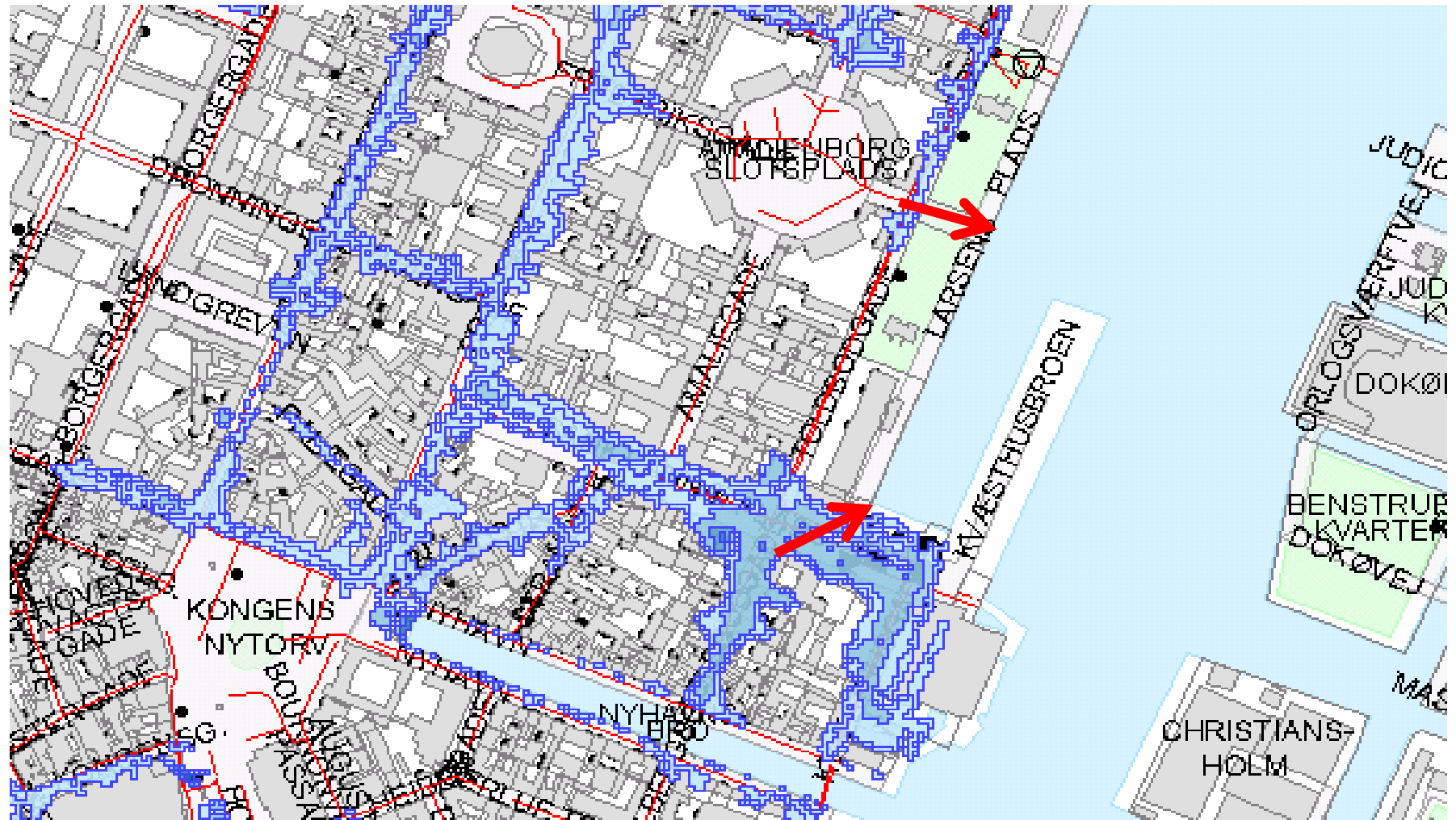


Examples

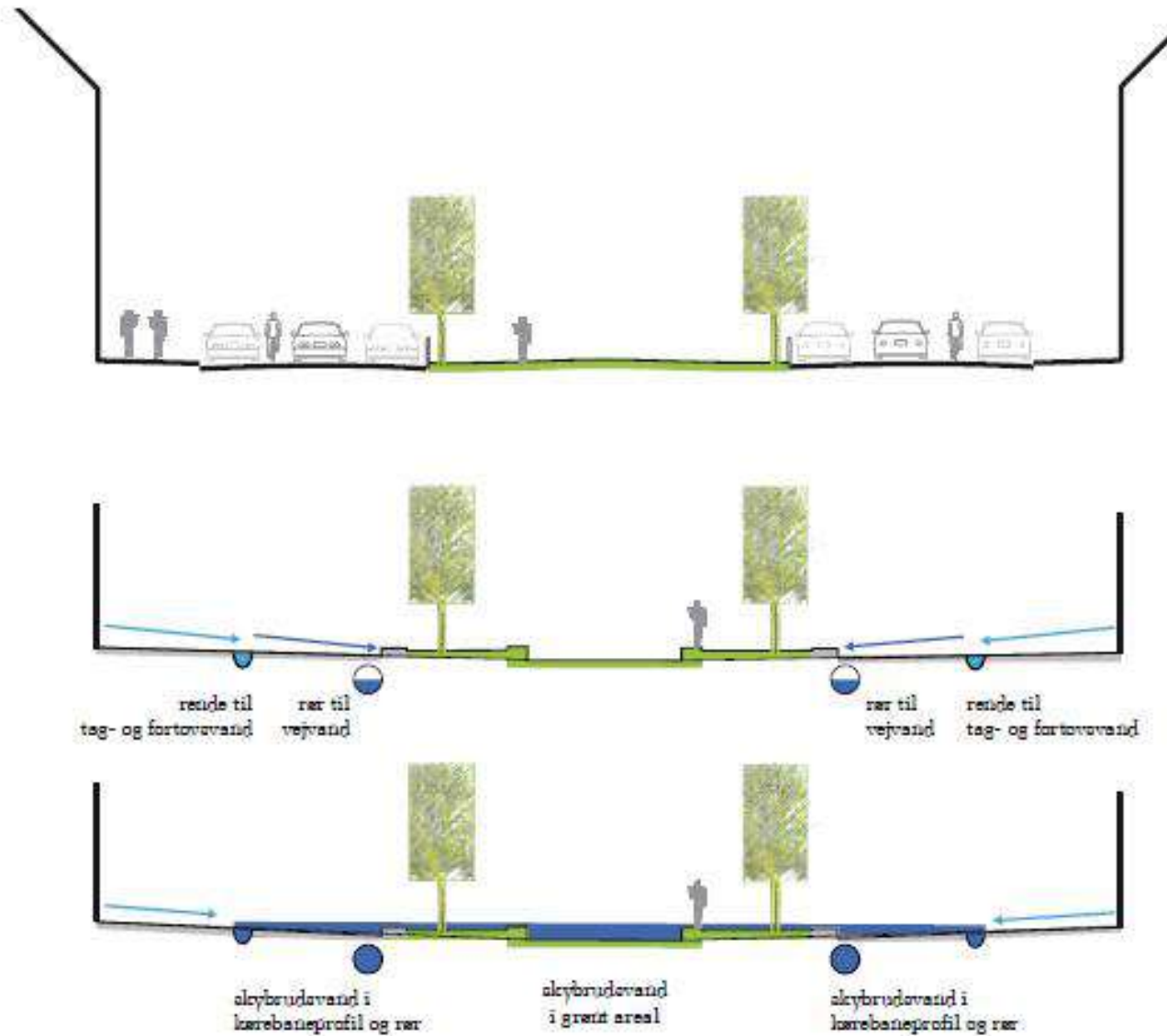
Sankt Annæ Plads



EXAMPLE: SANKT ANNÆ PLADS



EXAMPLE: SANKT ANNÆ PLADS



Cloudburst project at Skt. Annæ Plads



Photo: Søren Svendsen



Retention and
transport of
rainwater at
the square
and the road



Cloudburst project at Taasinge Plads



Photo: Troels Heien



Retention and
infiltration of
rainwater at
the square



Cloudburst project at Scandiagade



Photo: Troels Heien



Retention of
rainwater in
green area



Cloudburst project at Enghave Park



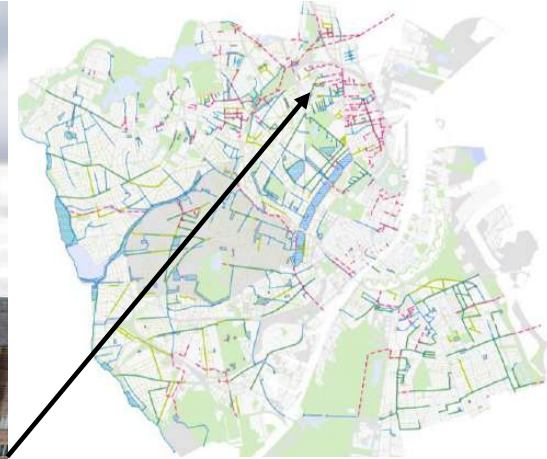
Photo: Anders Pedersen



Retention of
rainwater in
the park



Cloudburst project at Skt. Kjelds Plads



Retention,
infiltration
and transport
of rainwater



Thank you for your attention

