



# Financing sustainable Nature-Based Solutions

Strand 6: Nature and the city - insight into nature-based climate adaptation investment

Covenant of Mayors Investment Forum,  
February 19<sup>th</sup> 2020





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Funded by the Horizon 2020 Framework  
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Trinity College Dublin



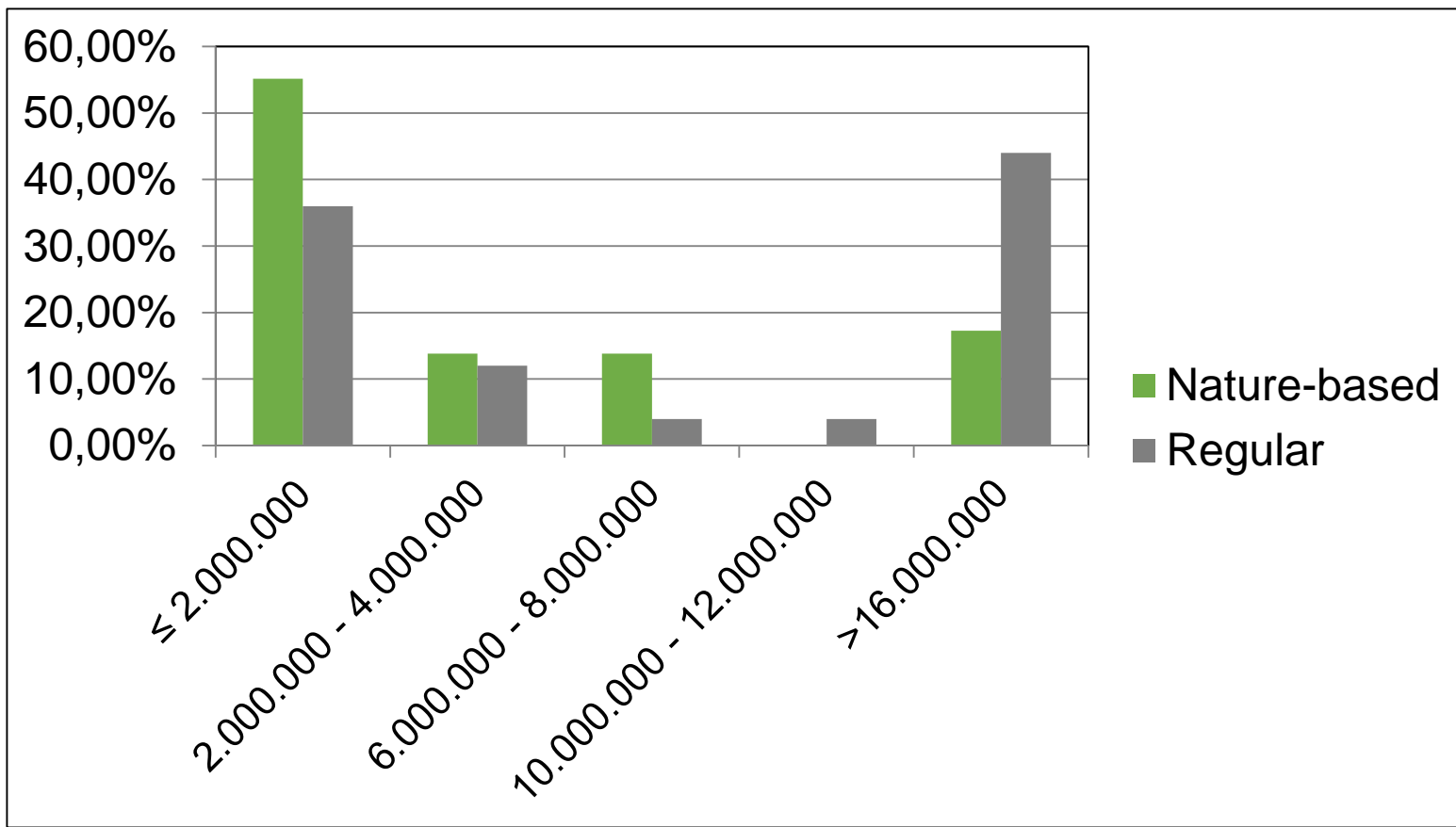
Funded by the Horizon 2020 Framework  
Programme of the European Union  
Grant Agreement No 730222



## NBS financing : context



## Scale of NBS financing (Europe)

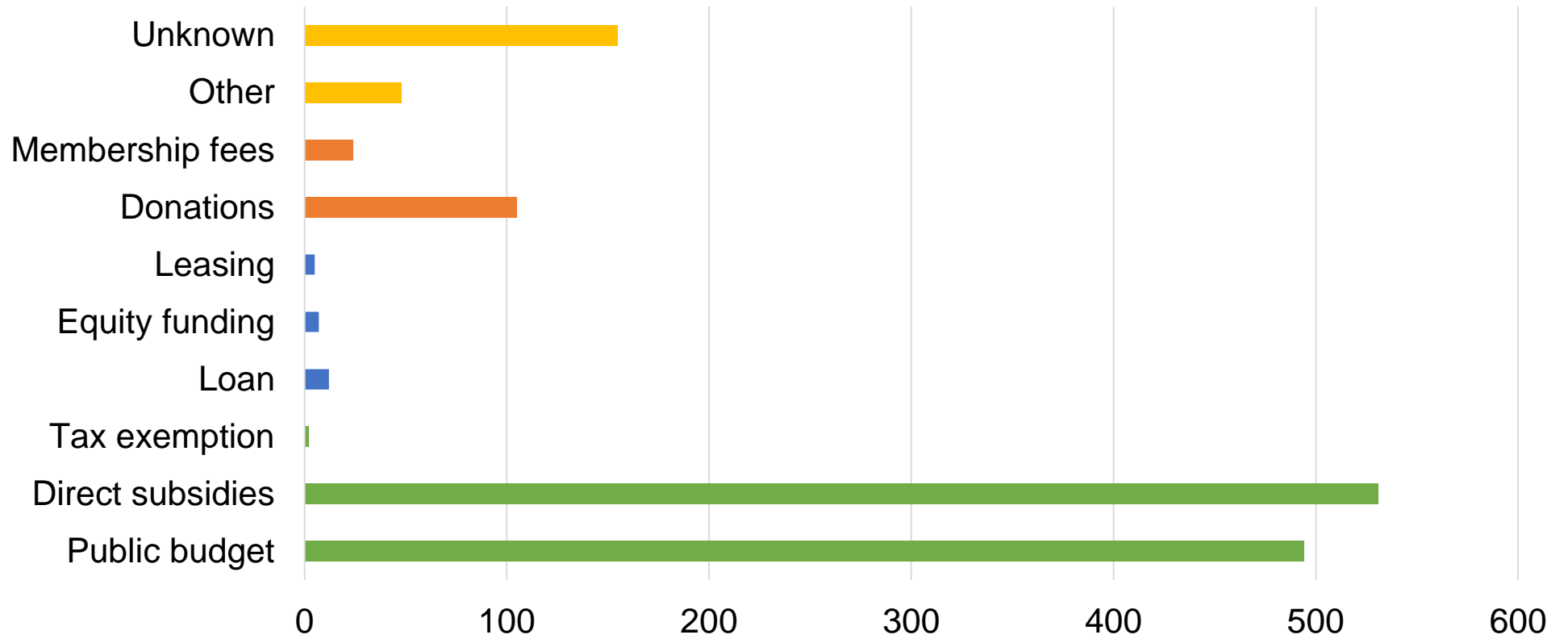


- Two scales of NBS financing: small-scale and large-scale
- Hybrid governance and finance is common practice for urban NBS
  - Large scale financing: higher number of government-led projects
  - Small scale financing: higher number of co-governance projects



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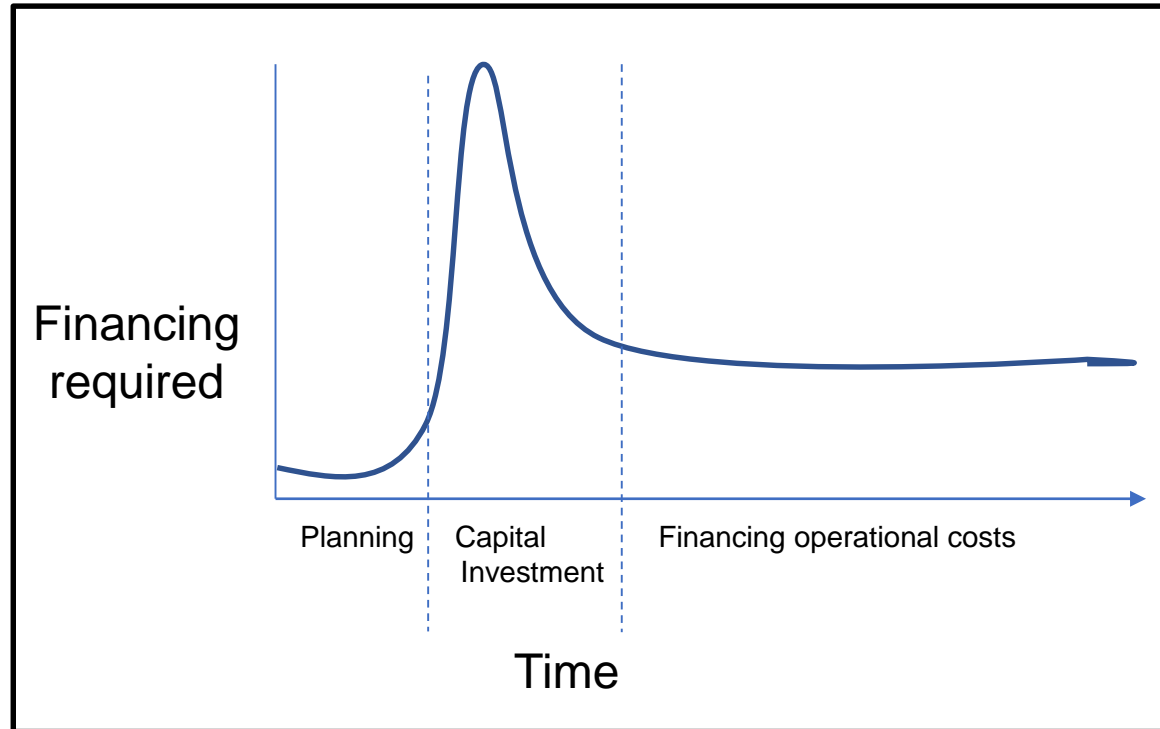
## Sources of financing NBS



Source: Naturvation Atlas: 1000 NBS exemplars 2018



# NBS Financing & Business models



**Business Model for Sustainability**

Bringing cities to life,  
Bringing life into cities.



This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 730222



# Challenges identified





## **Urban NBS competing for increasingly expensive urban space with building development**

- Financial markets / low interest rates; high demand for living in cities

## **Sustained pressure on public sector funding of urban NBS**

- Lack of investment in climate mitigation / preventive measures (vs post-disaster spending)
- Urban NBS competing for public funding with other projects. Lack of indicators to secure support.

## **Knowledge gap on implementation, finance and effectiveness of NBS**

- Effectiveness of NBS depends greatly on local climatic conditions

## **Mismatch between NBS investment needs and institutional investor demands**

- Lack of scale and convincing cash flows (public good); standardized impact indicators missing

## **NBS typically become cost-effective on multiple benefits, but co-funding is challenging**

- Investment is often focused on one benefit; coordination requires complex co-governance (and shared indicators for decision-making)

## **Maintenance and monitoring of NBS more complex than grey infrastructure**

- Stakeholders hesitate to take long-term costs into budget, although NBS appreciate rather than depreciate over time.



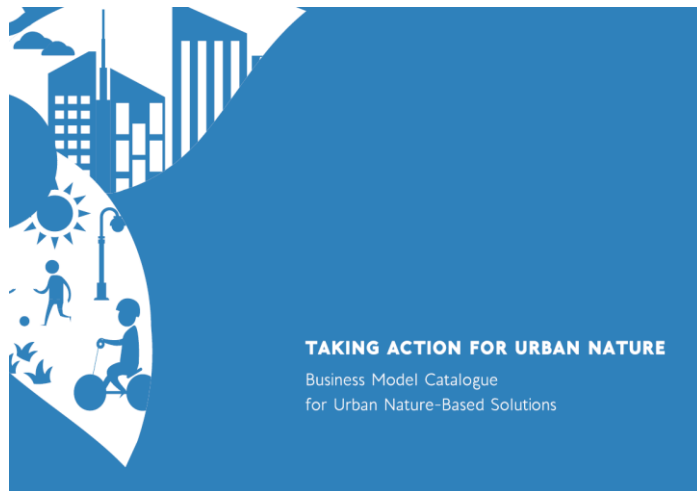
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# Some solutions





## GrowGreen Catalogue of NBS Financing Approaches

[http://growgreenproject.eu/wp-content/uploads/2019/03/Working-Document\\_Financing-NBS-in-cities.pdf](http://growgreenproject.eu/wp-content/uploads/2019/03/Working-Document_Financing-NBS-in-cities.pdf)

## Naturvation Atlas & Business Model Catalogue

[https://naturvation.eu/sites/default/files/results/content/files/business\\_model\\_catalogue.pdf](https://naturvation.eu/sites/default/files/results/content/files/business_model_catalogue.pdf)

## Connecting Nature NBS Business Model Canvas Guidebook & Workshops. NBE Database.

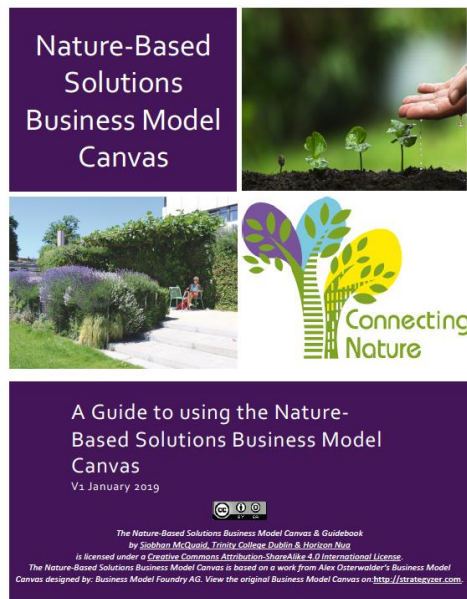
<https://connectingnature.eu/financing-and-business-models>

## NAIAD EcoActuary investment planner

<http://www.policysupport.org/ecoactuary>

## NAIAD General Framework for economic assessment of Natural Assurance Schemes.

<http://naiad2020.eu/wp-content/uploads/2018/11/4.1-2.pdf>





# Case Studies

## River Valleys:

The City of Genk will present their 'Stiemer Deals' framework, an innovative collaboration mechanism to build partnerships between the city and nature-based enterprises (social and commercial) which contribute to a sustainable business model for the Stiemer river valley nature-based solution.

## Football pitches:

The Sparta Stadium in Rotterdam has implemented BlueBloqs by FieldFactors, as a natural assurance scheme for both intense pluvial rains and of water scarcity through rainwater harvesting to collect the rain, storing it underground using aquifers as large underground green infrastructure reservoirs for later re-use. The same solution is now being replicated at the Zorrilla football stadium in Valladolid.

## Building-integrated NBS (i.e. schools)

Naturvation have been working with the green roof sector in the Netherlands as well as with Spanish schools to build the business case for green roofs and building-related greening, bringing together different stakeholders and value streams to fund green roofs. In this case study Helen shares ongoing work to facilitate urban NBS investment based on multiple benefits from these 2 cases.





# Questions for open discussion

1. What is the major roadblock to securing more investment for NBS?
2. What kind of tools would help you to secure more investment e.g. an investment template clearly summarising:

Costs of NBS

V

Expected returns on investment

- financial return on investment (direct revenue or indirect economic returns e.g. lower flood damage costs)
- non-financial returns e.g. expected environmental impacts or social impacts

3. Which actors make the investment decision on urban NBS? Or should different benefits of NBS be paid for by different actors?



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## Question for private/institutional investors

1. Apart from financial return on investment, **how important are other NBS values (social/environmental)** in making investment decisions?
2. Apart from financial return on investment, what other values of NBS do you take into account in making investment decisions?
3. What is preventing investors from investing in NBS?





## Question for cities

1. Which actors have you engaged with regarding investment in NBS?
2. From your experience at what scale do you think urban NBS make most impact?
3. What financial instruments are needed to increase community/private sector 'investment' in urban NBS?



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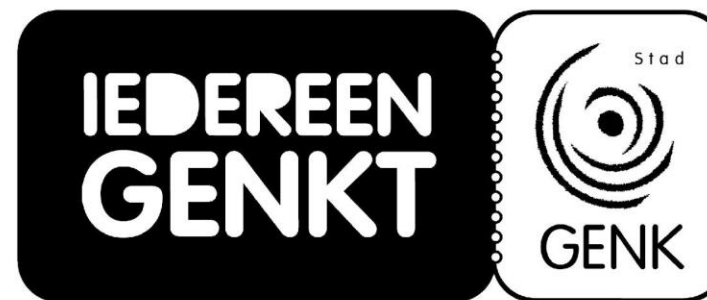
# STIEMME

# RDEALS

Peter Vos - City of Genk - Belgium



#stiemervallei  
#connectingnature #connectingNBS  
#stadgenk



#stiemervallei  
#connectingnature #connectingNBS  
#stadgenk



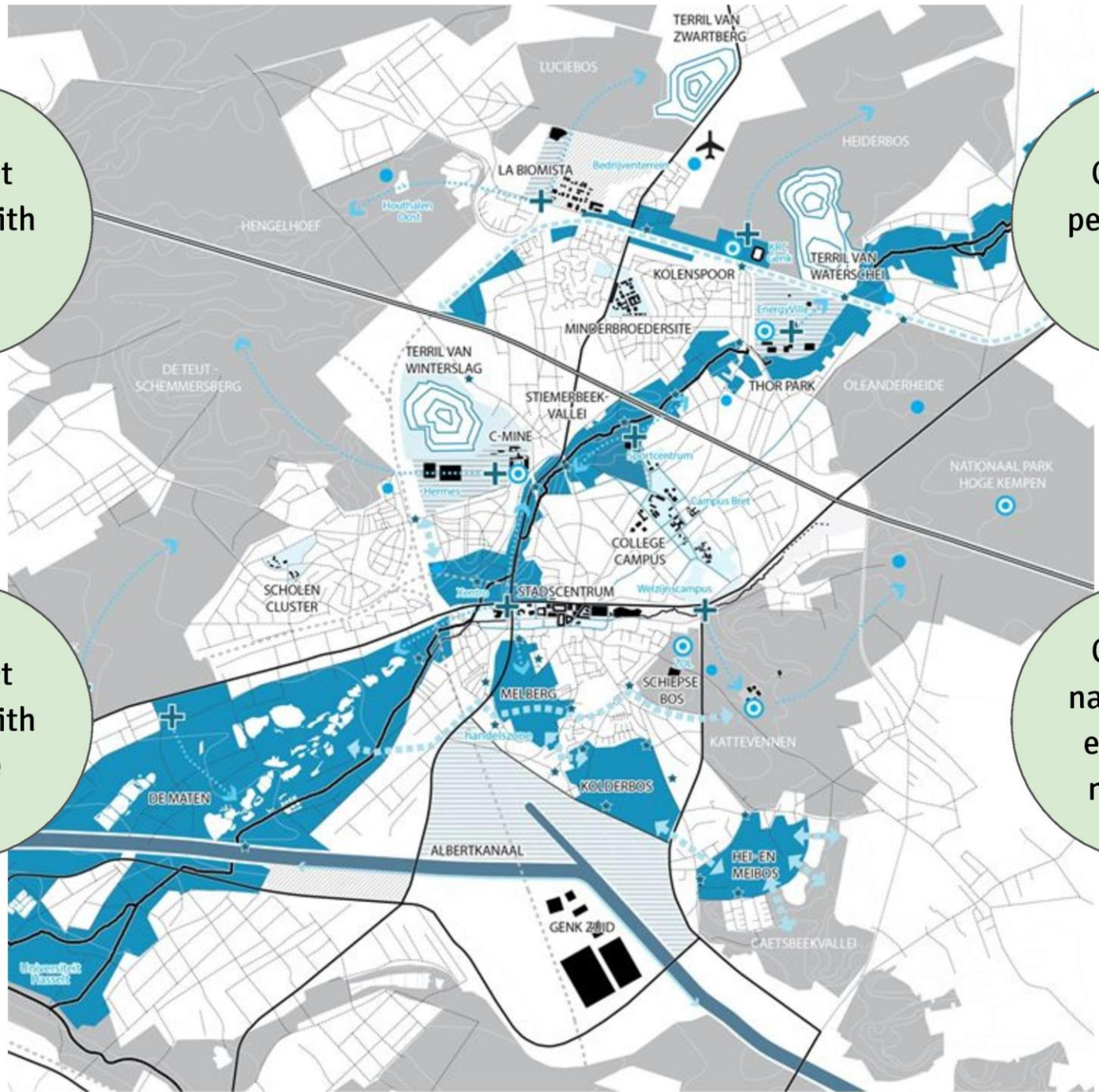


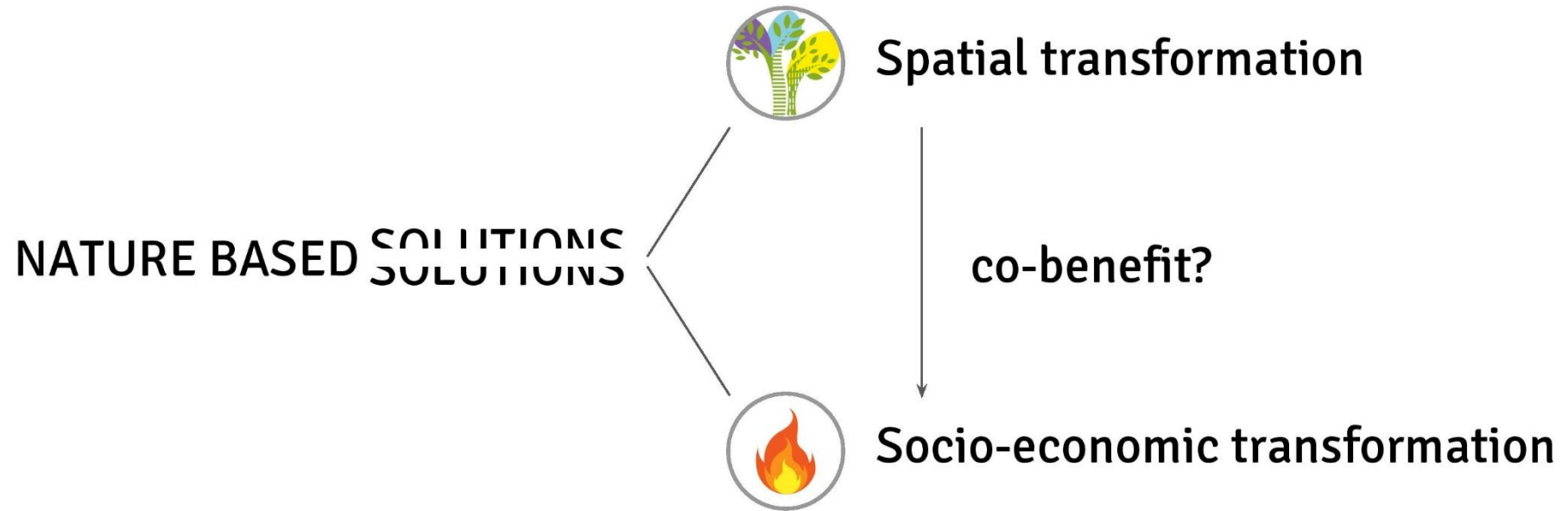
Connect nature with nature

Connect people with people

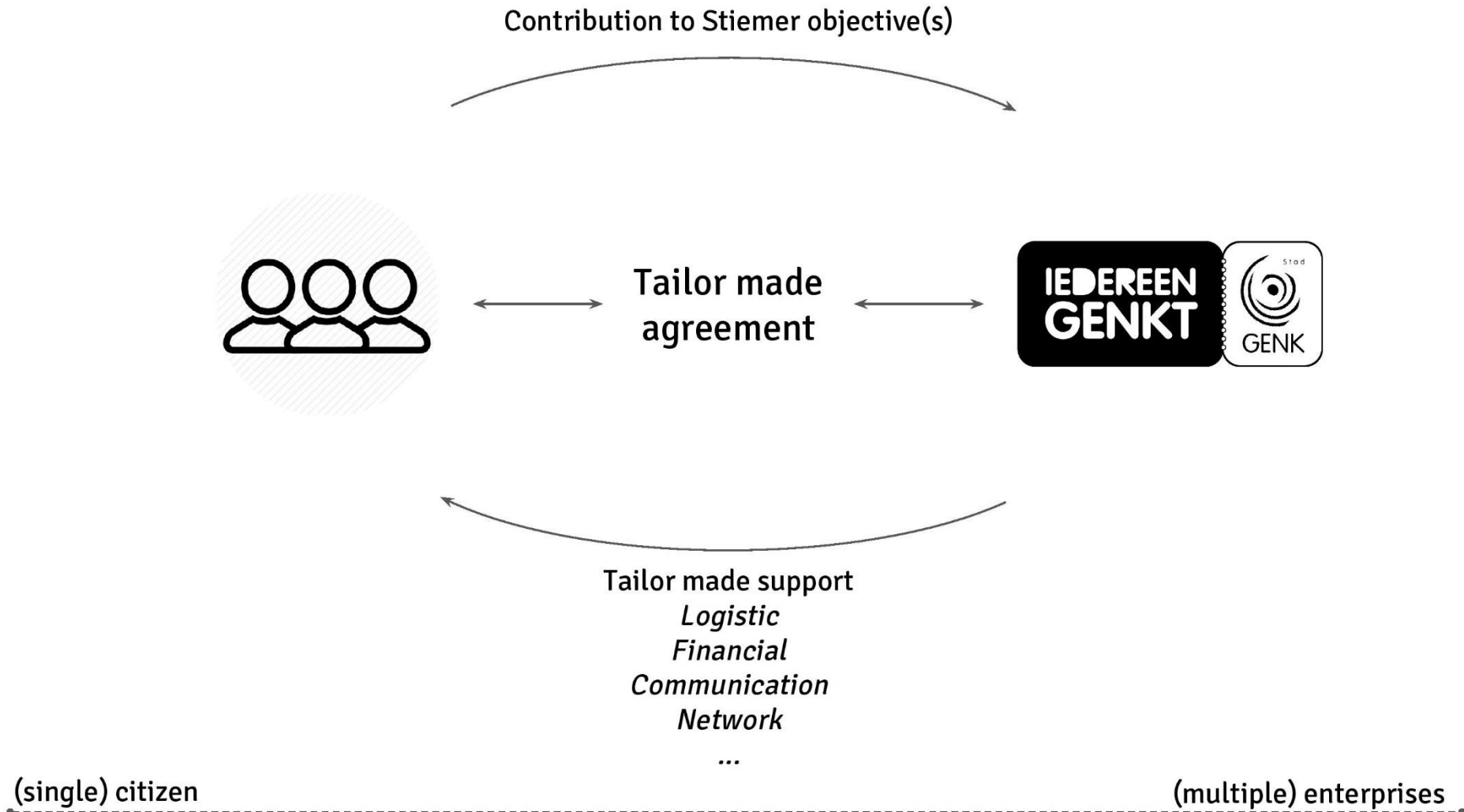
Connect nature with people

Connect nature with entrepreneurship





# STIEMER DEAL



## STIEMERDEAL 1

Citizen providing pictures for Stiemer programme social media



Stiemervallei

## STIEMERDEAL 2

Local ice-cream parlour developing Stiemer ice cream



## STIEMERDEAL 3

StiemerLab: citizen-science project on monitoring water quality by local university



## STIEMERDEAL 4

Slagmolen: co-creating NBS business model for the redevelopment of old water mill



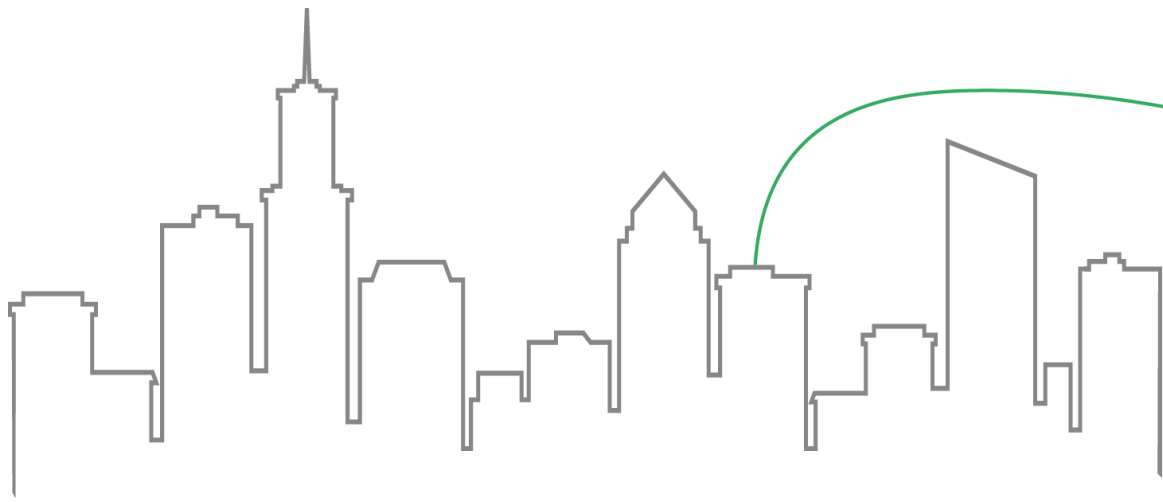


# THE END

Peter Vos - peter.vos@genk.be



#stiemervallei  
#connectingnature #connectingNBS  
#stadgenk



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# Building the investment case for building-integrated urban NBS

Helen Toxopeus



Funded by the Horizon 2020 Framework Programme of the European Union  
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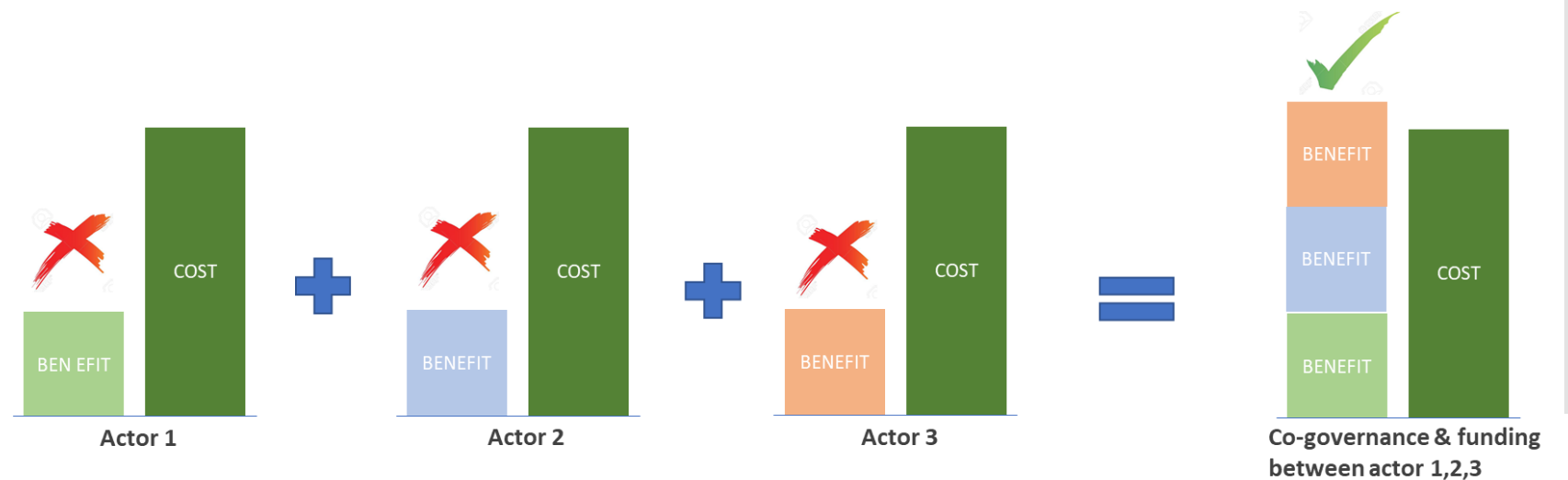
Utrecht University





# Key message

- Urban NBS deliver multiple benefits; the ownership of these benefits is scattered between different actors
- Leads to 2 coordination problems:
  1. Valuation of **multiple benefits** (budget often earmarked for one benefit)
  2. Collaboration between **multiple actors** to co-fund and each reap benefits
- Calls for an **integrative business case** – of benefits and actors
- Need for **investment template** that recognizes value of relevant benefits





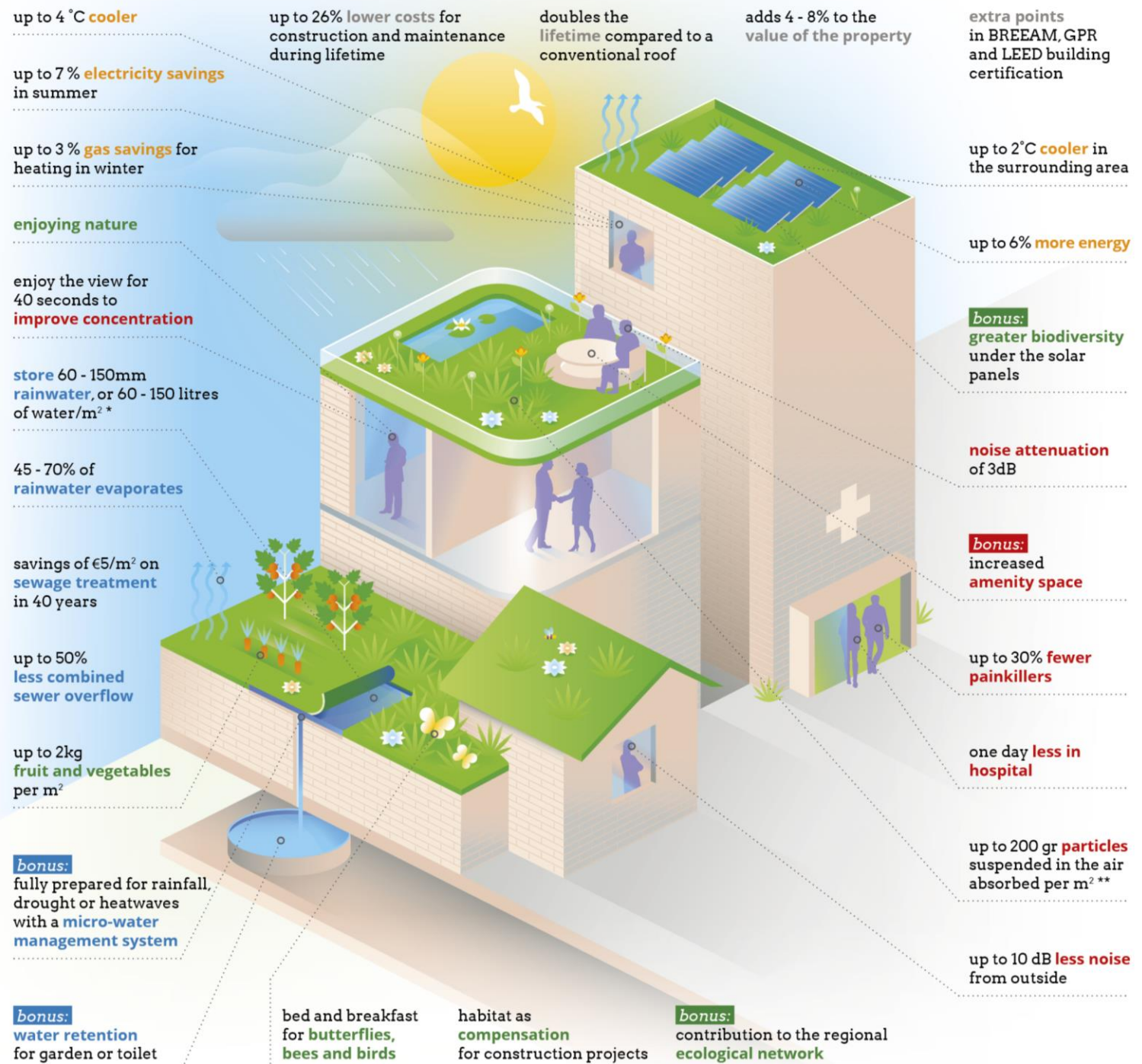
# Who values what? Solving the puzzle of benefits & actors

NBS type/case: \_\_\_\_\_

Who values what?	Economic benefits flood risk reduction; material & energy efficiency; higher revenues; economic growth; employment; employee wellbeing	Biophysical benefits biodiversity; water quality; cooling; pollination; air filtering	Social benefits Health, social cohesion, relaxation, safety, noise reduction, concentration, justice	Cultural benefits Identity, aesthetic value, sense of place, cultural heritage, symbolism, creativity
Public actors (municipalities, water boards, provinces, national government)				
Private actors (insurers, real estate developers, roofing firms, gardening firms, landscape architects)				
Not-for-profit organisations (NGO's, stakeholder networks)				
Citizens & local communities				

# Case 1: Joint investment based on multiple benefits of green roofs (Netherlands)

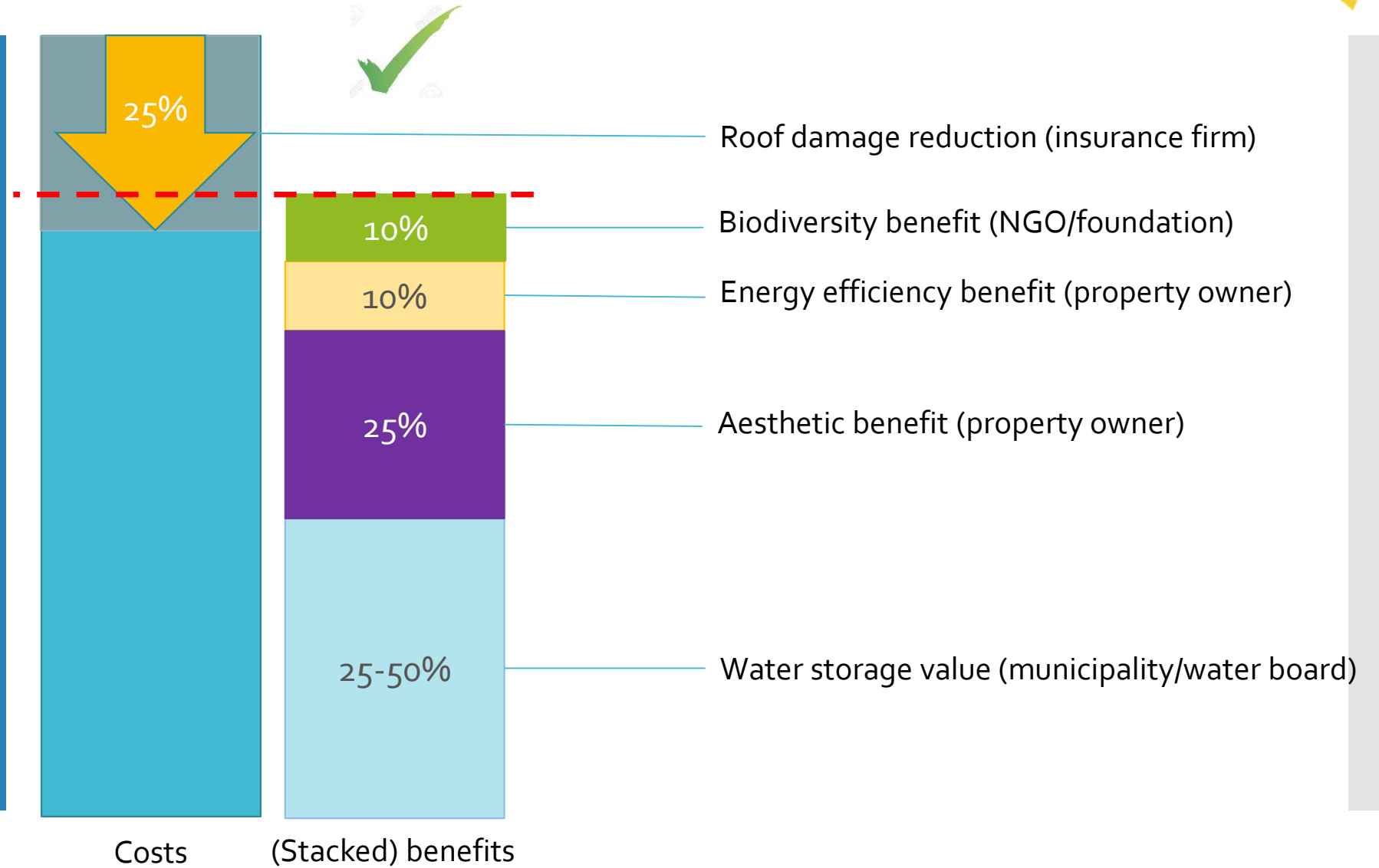
Infographic: Green Deal Green Roofs  
<https://www.greendealgroenedaken.nl/en-facts-values/>





# Value stacking

to realize the  
(joint) green roof  
business case  
in the  
Netherlands





# The pioneering role of Interpolis (Dutch insurance firm)

- 2018: a 2 month pilot with Tilburg municipality
- April – Dec 2019: national roll-out of green roof offer for (small) homeowner roofs (realizing collective buying power)
  - **30.000 M2 realized** (1/6 of the total Dutch green roof stock)
- Future:
  - Integrating it into their regular product offering in 2020
  - Targeting larger / multiple roofs (housing corporations, businesses)

Interpolis. Glashelder

Verzekeringen Preventie Schade melden Zorg regelen Contact 🔍

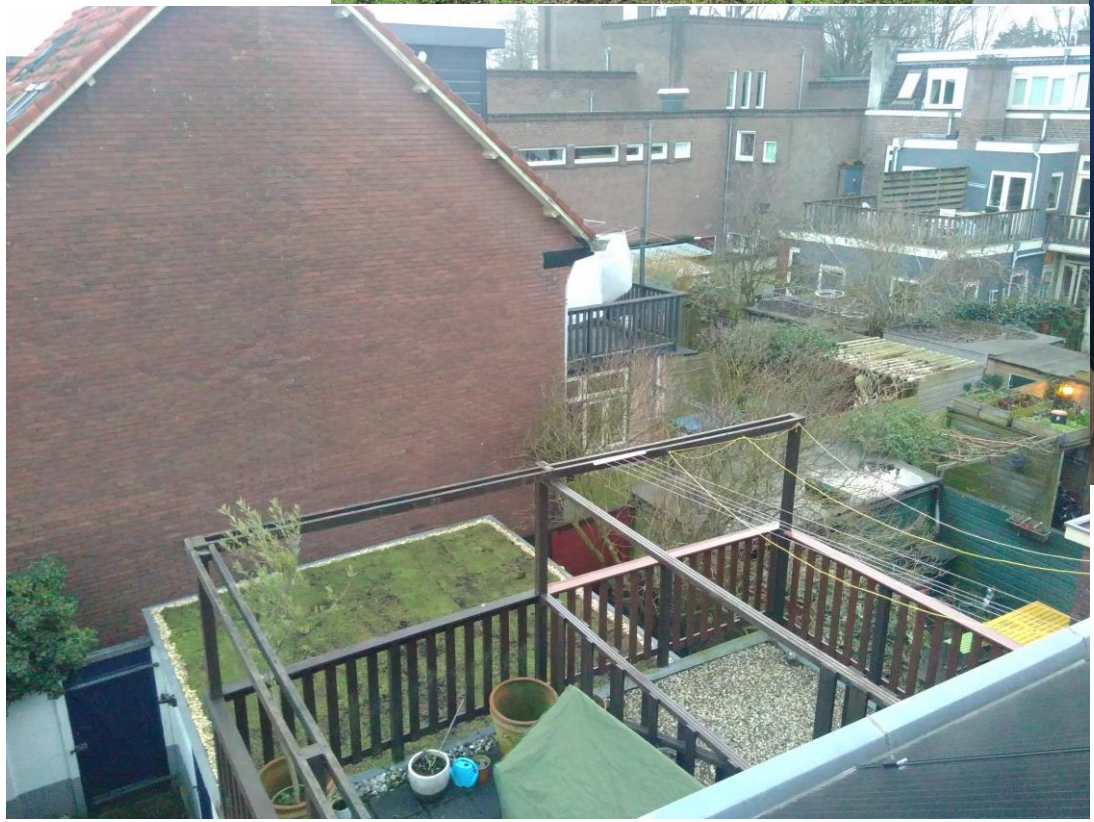
**Minder grijs, meer groen**  
Voorkom schade met een groen dak

- ✓ vermindert de kans op waterschade
- ✓ vergroot de levensduur van jouw dak
- ✓ verbetert in de winter de isolatie in huis

[Ik heb interesse](#)



My green roofs  
with  
neighbours  
(26m<sup>2</sup>) 😊







EDUCATION &gt;

## Spanish students demand action to stop sweltering conditions in classrooms

Children are suffering nosebleeds and collapsing due to the lack of air conditioning in schools in the south of Spain

### Case 2: greening (cooling) schools in Spain

- Schools in Spain are not prepared for increased heat in summer
- Current measures include shorter school days and longer holidays
- Decreased effectiveness of education, building use, and ultimately human capital creation
- Health risks for students and teachers





# Aim: Developing a cost-effective prototype for green schools in Spain & Portugal

- 3 pilot schools are being greened in Spain / Portugal (**LIFE – my building is green**) – includes baseline monitoring of key indicators
- Aim is to realize a replicable business case for school greening across Spain/Pt
- Preferably in financial value



my building is green  
A LIFE PROJECT



[CENTRO TECNOLÓGICO] **CARTIF**



CONSEJO SUPERIOR DE INVESTIGACIONES CIENTÍFICAS



*In progress:*  
Building the  
investment case  
for green schools



Energy efficiency from  
green roofs and walls;  
longevity of roof

Indicators:

- Energy bill
- Roof maintenance

Direct cash flows

For school



Risk reduction of  
extreme heat events

Indicators:

- Lower indoor temperatures
- Longer school days
- Better learning outcomes

More cost effective  
public spending

For public bodies



More healthy learning  
environment (air quality,  
green playground, temp)

Indicators:

- Improved health of students
- Air quality
- Less overweight?

Market demand

From families





# NAIAD

NAture Insurance value: Assessment and Demonstration

**Covenant of Mayors**  
**19<sup>th</sup> February 2020**



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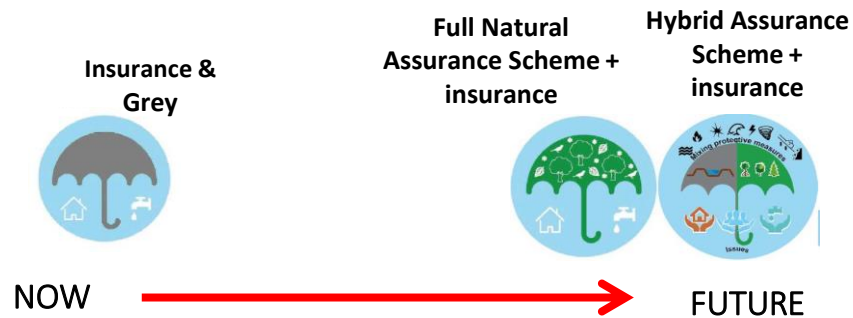
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**NAIAD Scientific Coordinator**

**Kieran Darte and Thomas Biffin**  
**(Field Factors)**  
**Philippe Le Coent (BRGM)**  
**Nora van Cauwenbergh (IHE Delft)**  
**Monica Altamirano (DELTARES)**

**[www.naiad2020.eu](http://www.naiad2020.eu)**

**contact: [elopezgunn@icatalist.eu](mailto:elopezgunn@icatalist.eu)**

# NATURAL ASSURANCE SCHEMES



**Step 1: Natural Assurance Assessment**

- Physical assessment
- Social assessment
- Economic Assessment

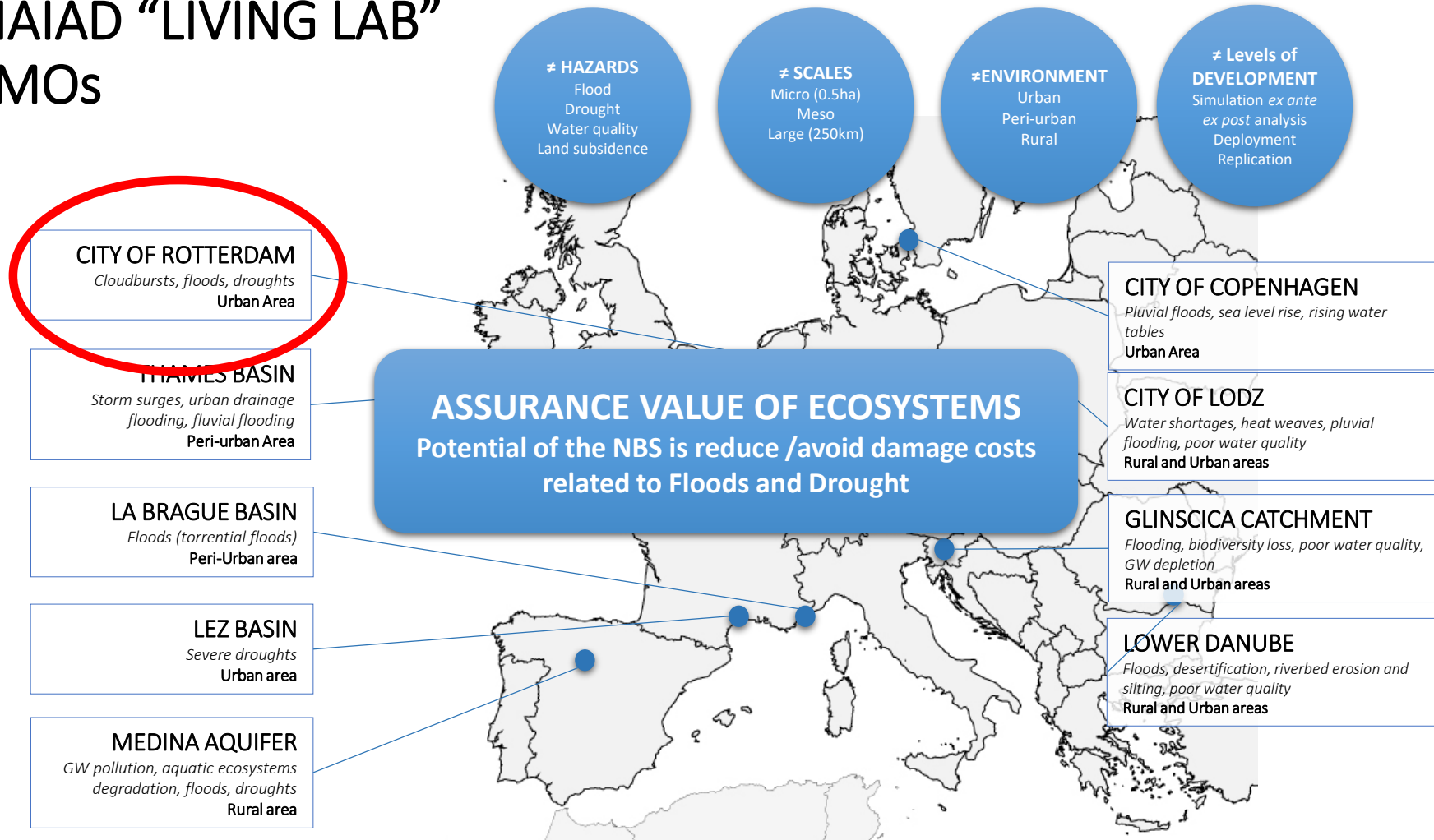
**Step 2: NAS Integration processes**

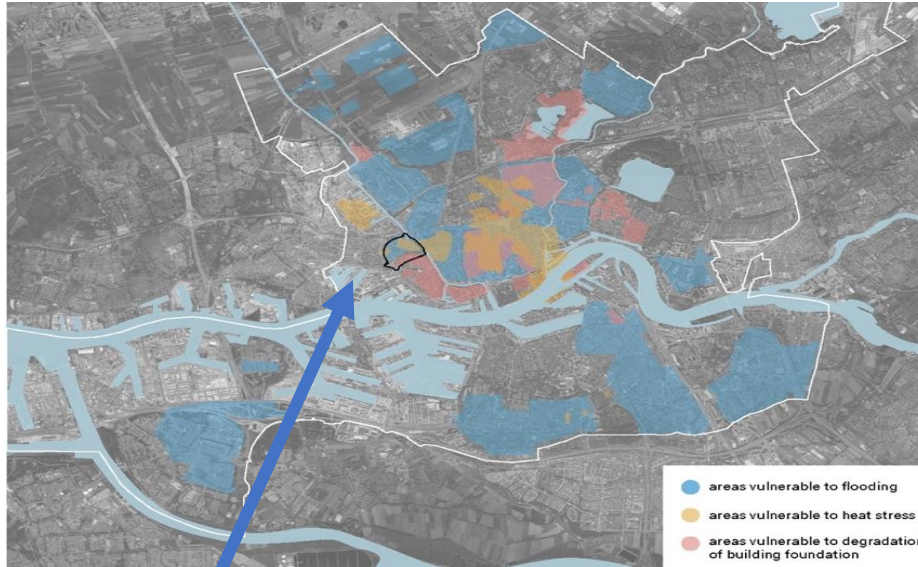
- Adaptive planning
- Natural Assurance Canvas
- Financing framework

**Step 3: Investment- NAS Bankable and Replicable projects**

- Rotterdam (implementation- monitoring)
- Valladolid (design)

# 9 NAIAD “LIVING LAB” DEMOS





Rotterdam, showing areas vulnerable to flooding, heat stress and subsidence.

### Spangen Neighbourhood Assessment

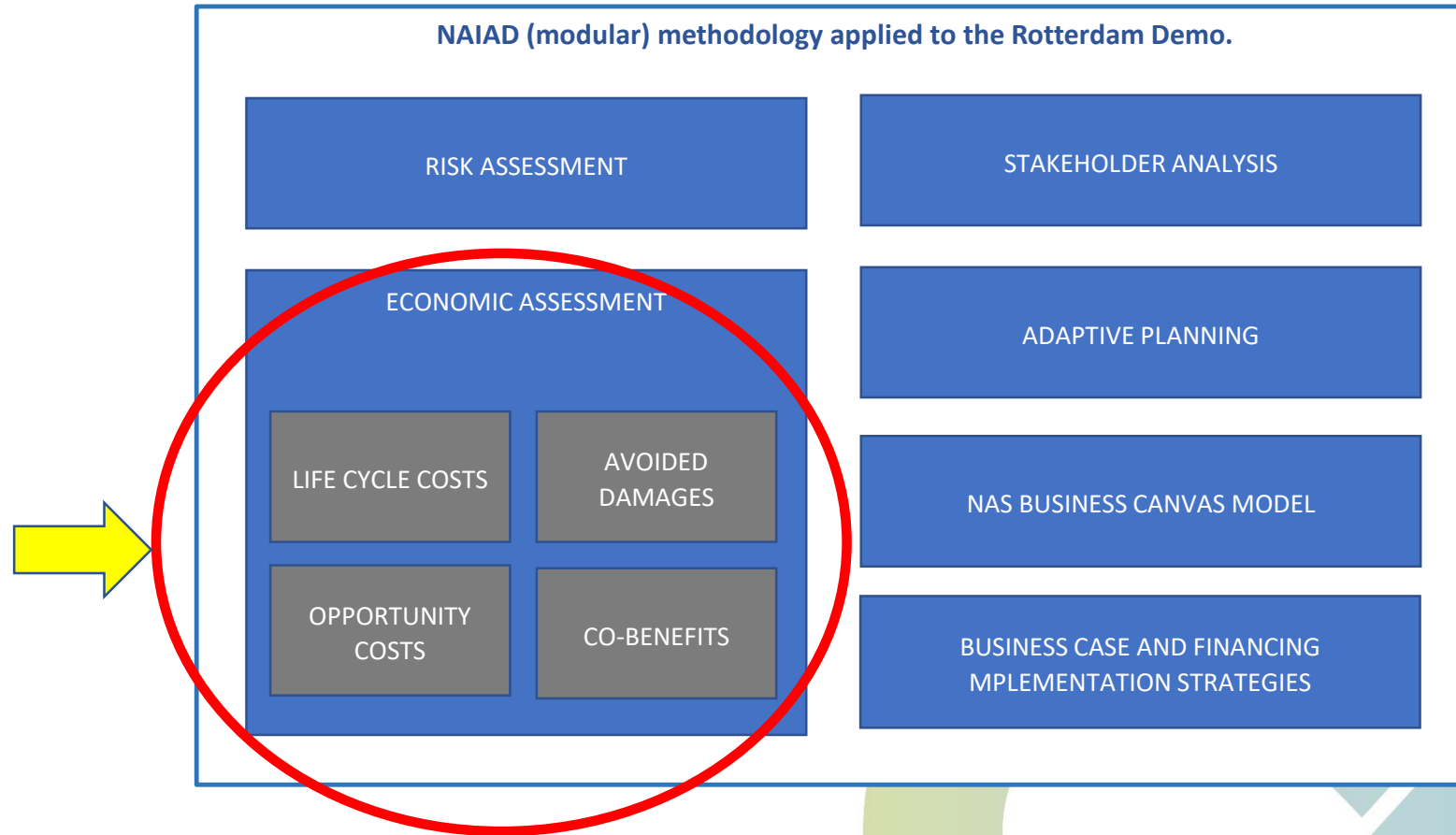
Strategy 1 (Grey)	Strategy 2 (Hybrid)	Strategy 3 (Green)
<i>Traditional and centralised</i>	<i>Infiltration via public squares</i>	<i>Local infiltration through green infrastructure</i>
<ul style="list-style-type: none"> <li>• Separated sewer</li> <li>• Permeable pavement in road edges</li> </ul>	<ul style="list-style-type: none"> <li>• 2 x Urban Waterbuffers</li> <li>• Retention ponds</li> <li>• Expansion of central green space</li> <li>• Separated sewer for water collection and distribution</li> </ul>	<ul style="list-style-type: none"> <li>• Green roofs</li> <li>• Façade gardens</li> <li>• Green strips and swales</li> <li>• Retention ponds</li> <li>• Expansion of central green space</li> </ul>



**Field Factors**



# NATURAL ASSURANCE SCHEMES

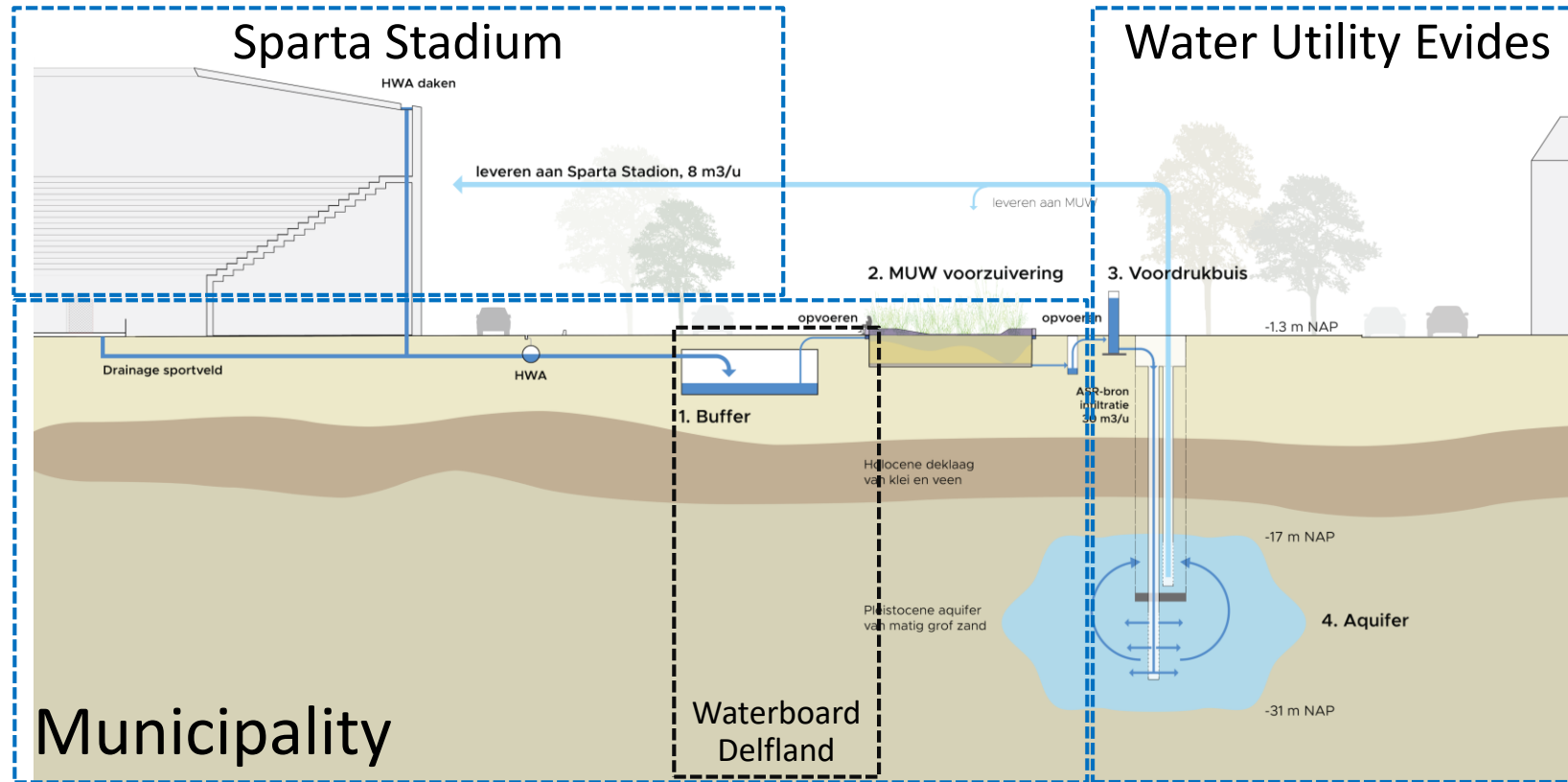




# Urban Water Buffer- Sparta Football Stadium, Rotterdam demo.

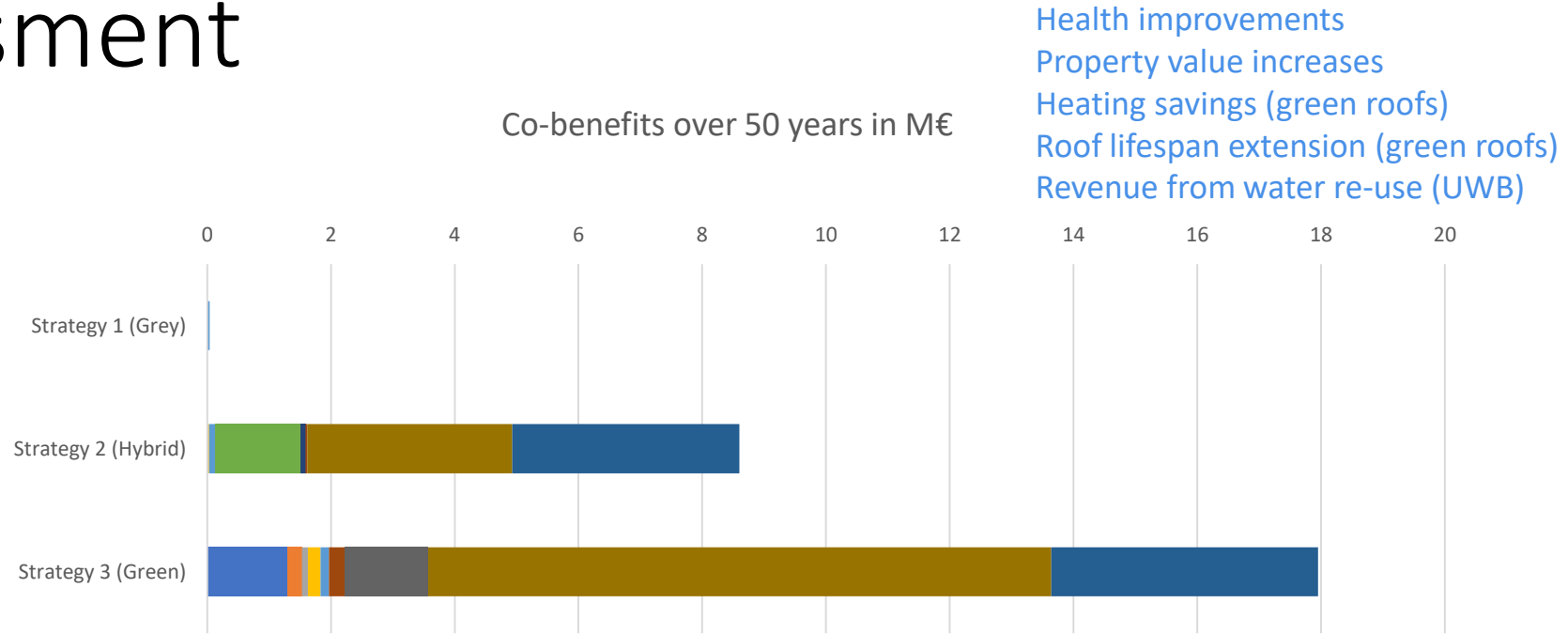


# Funding and financial arrangements L Rotterdam.



# Co-benefits were a major focus of our assessment

Co-benefits over 50 years in M€



- Heating savings
- Cooling savings
- Carbon sequestration
- Avoided CO2 emissions
- Reduced pumping costs
- Revenue from the sale of re-supplied water
- Electricity savings from reduced water production
- Air quality improvements\*
- Extension of roof lifespan (green roofs)
- Reduced health care costs and labour loss
- Increase in property values

JOBS

NAIAD

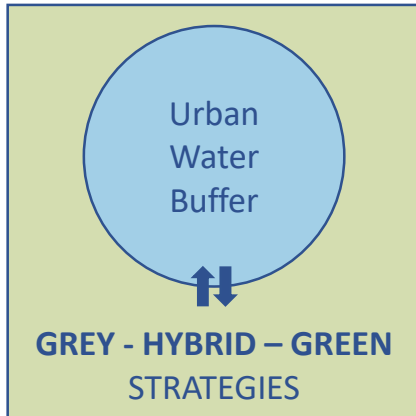


# Wrap up Rotterdam demo.

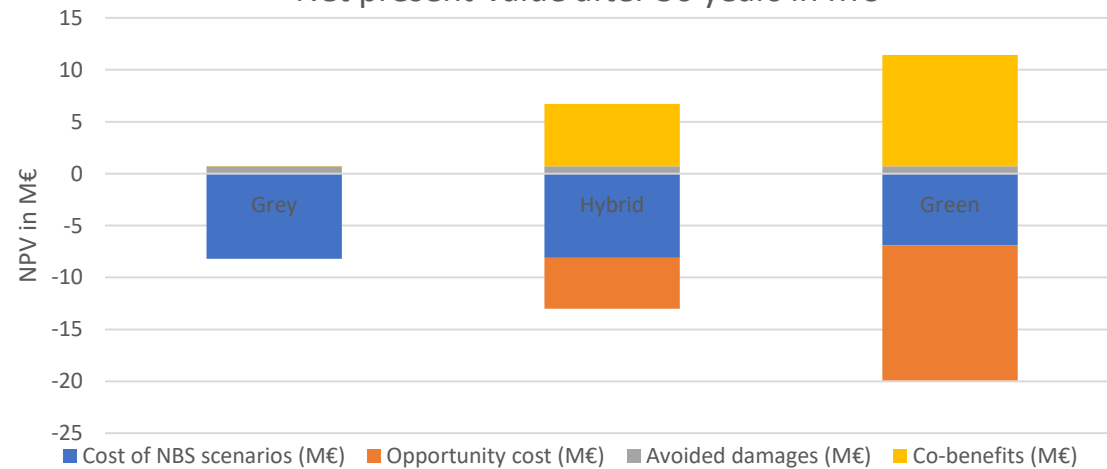
Economic assessment

Central question: *When comparing a grey, a hybrid and a green strategy for mitigating a T10 rain event in Spangen, which is the most favourable choice in terms of associated costs and (co-) benefits provided?*

Spangen neighbourhood



Net present Value after 50 years in M€



NAIAD



# Replicate: Zorrilla Football Stadium (Spain)



*Thank You!*

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