Horizon 2020
SOCIETAL CHALLENGES
topic Waste-6b-2015 Eco-innovative Strategies

Beyond REPAiR

GLOBAL ONLINE SEMINAR

October 13 - 2020

Key RESULTS

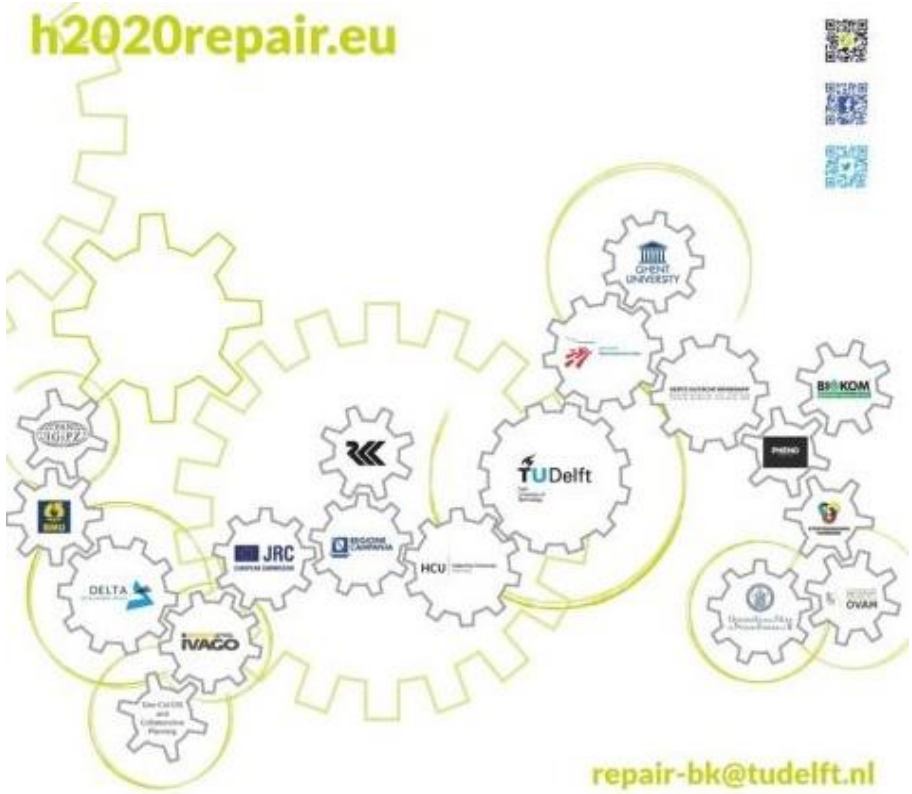
Alexander Wandl

MAKING THE TRANSITION OF THE CIRCULAR ECONOMY HAPPEN

TUDelft

REPAiR - REsource Management in Peri-urban Areas
Grant Agreement No.: 688920

Who is REPAiR



TUDelft

Project Aim and Ambitions

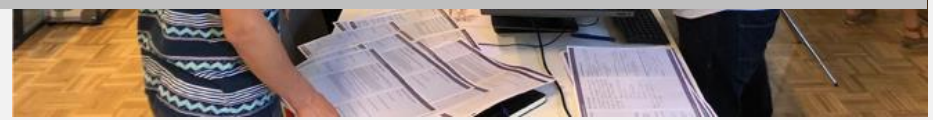
Objectives:

To develop, test and implement a **geo-design decision support environment (GDSE)** for the development of **integrative** spatial development strategies that understand waste and related treatment processes as a resource.

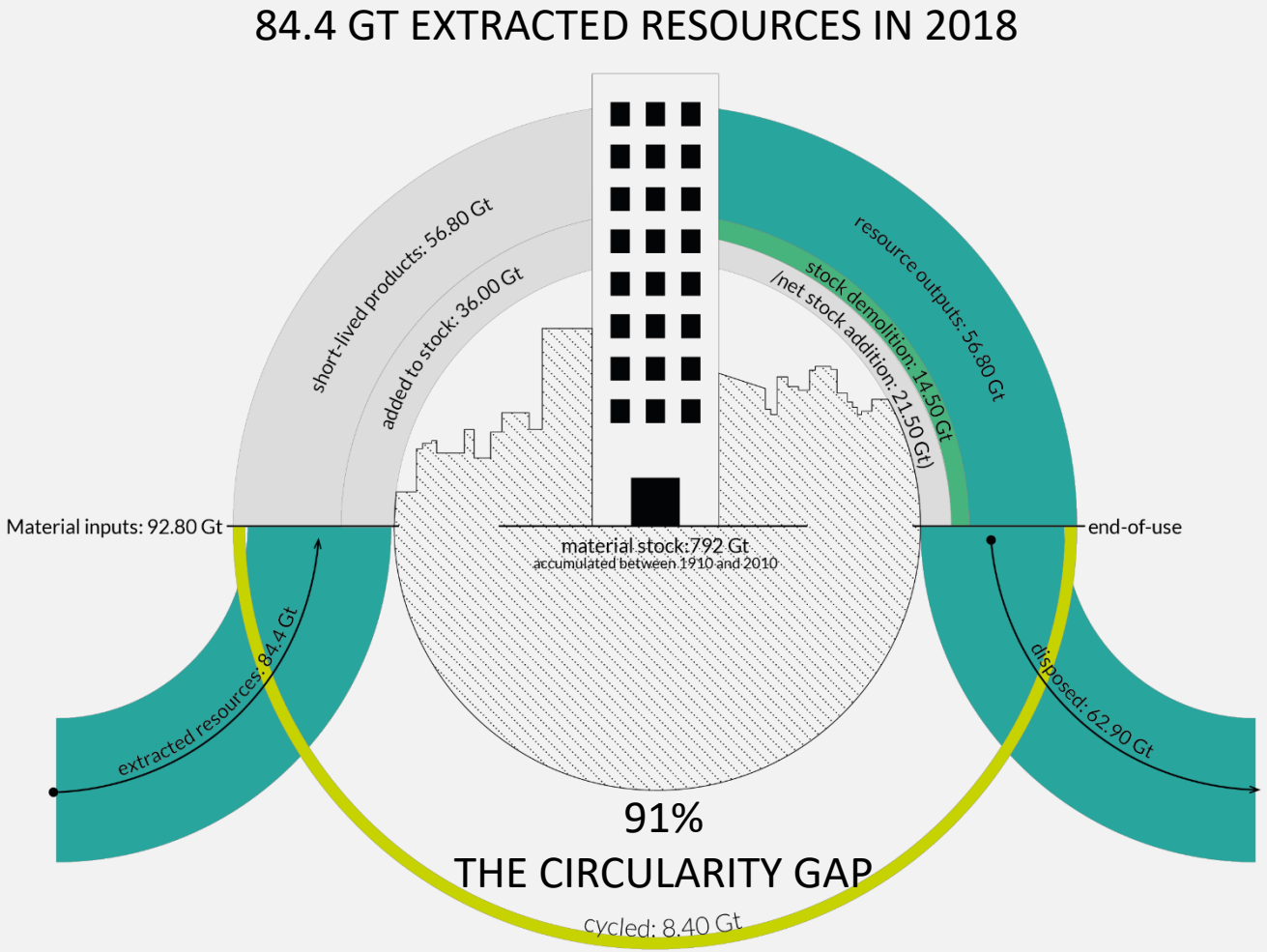
FROM WASTE AS A RESOURCE

TO

INTEGRATING RESOURCE MANAGEMENT INTO REGENERATIVE SPATIAL DEVELOPMENT



Only 9% of the Resources we Extract each Year is Cycled



http://shiftingparadigms.nl/wp-content/uploads/2017/11/the-circularity-gap-report-2018.pdf

Generation of Material Waste

Courtesy: Marcin Dąbrowski

Generation of Wastescapes

Fotos courtesy Libera Momenti (UNINA)

FOR WHAT DO WE USE OUR RESOURCES?

84.4 GT EXTRACTED RESOURCES IN 2018

9.1 GT CONSUMABLES

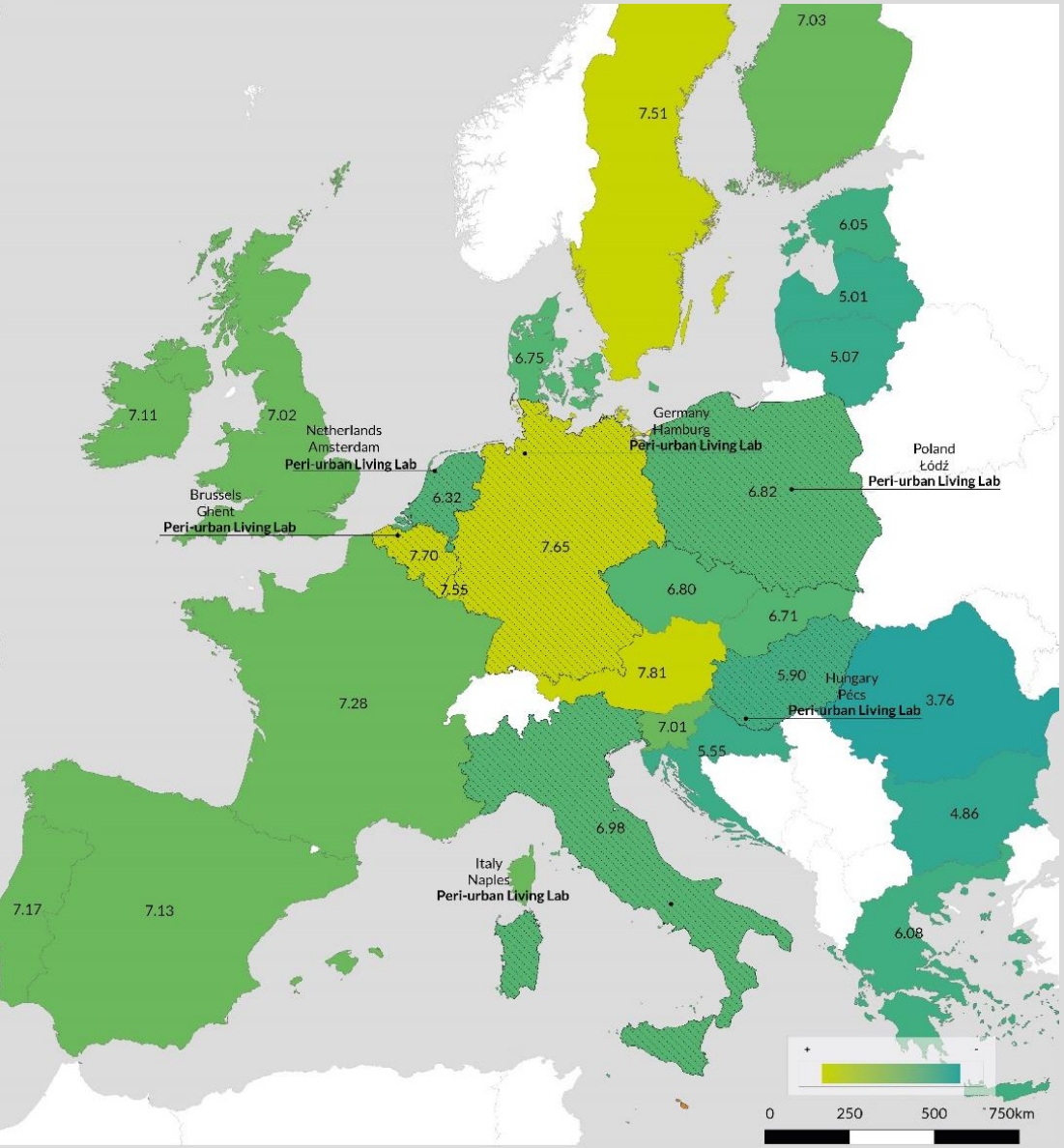
4.4 GT SERVICES

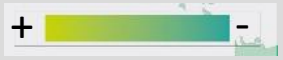
2.3 GT HEALTHCARE

1.7GT COMMUNICATION

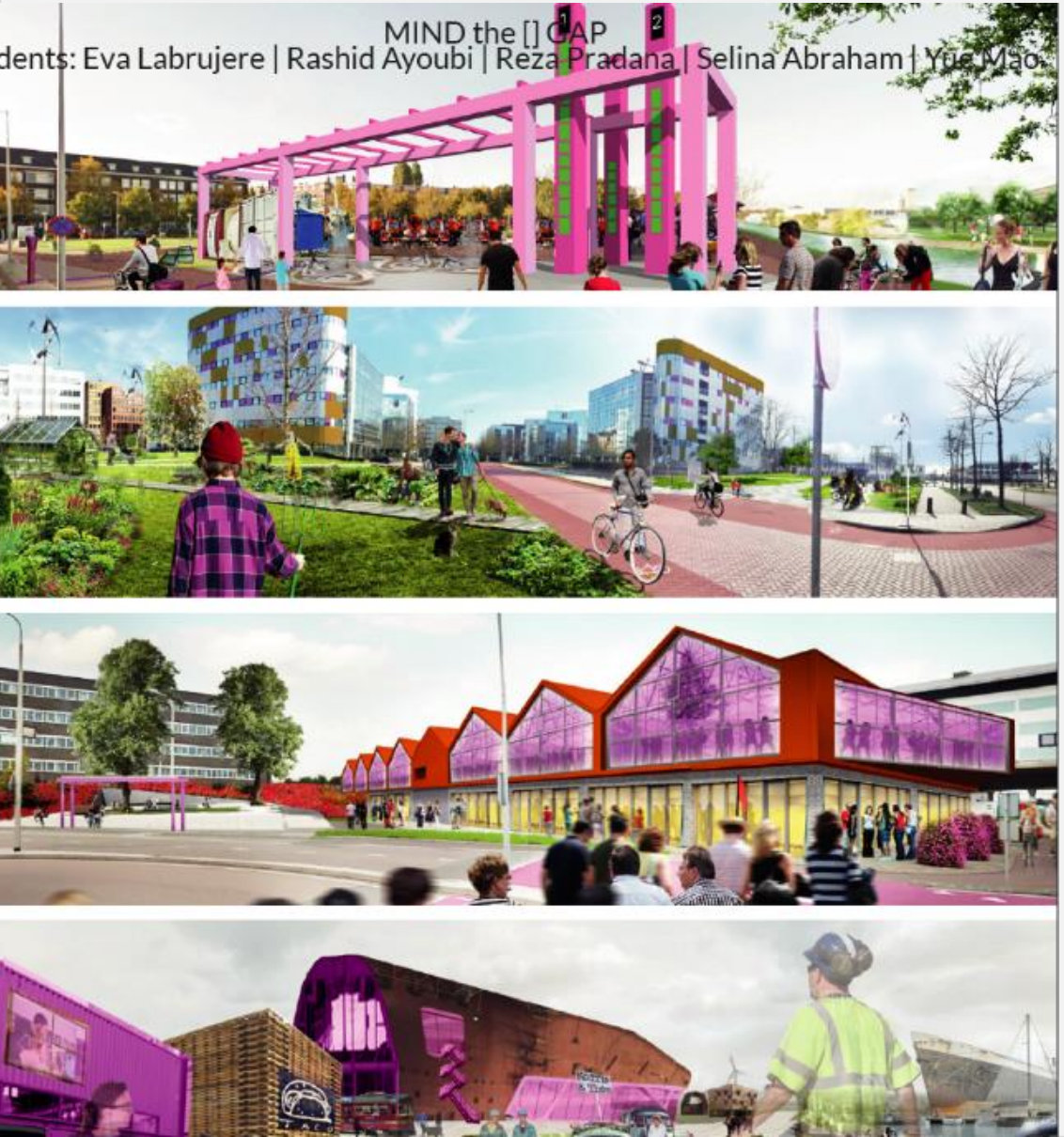
http://shiftingparadigms.nl/wp-content/uploads/2017/11/the-circularity-gap-report-2018.pdf

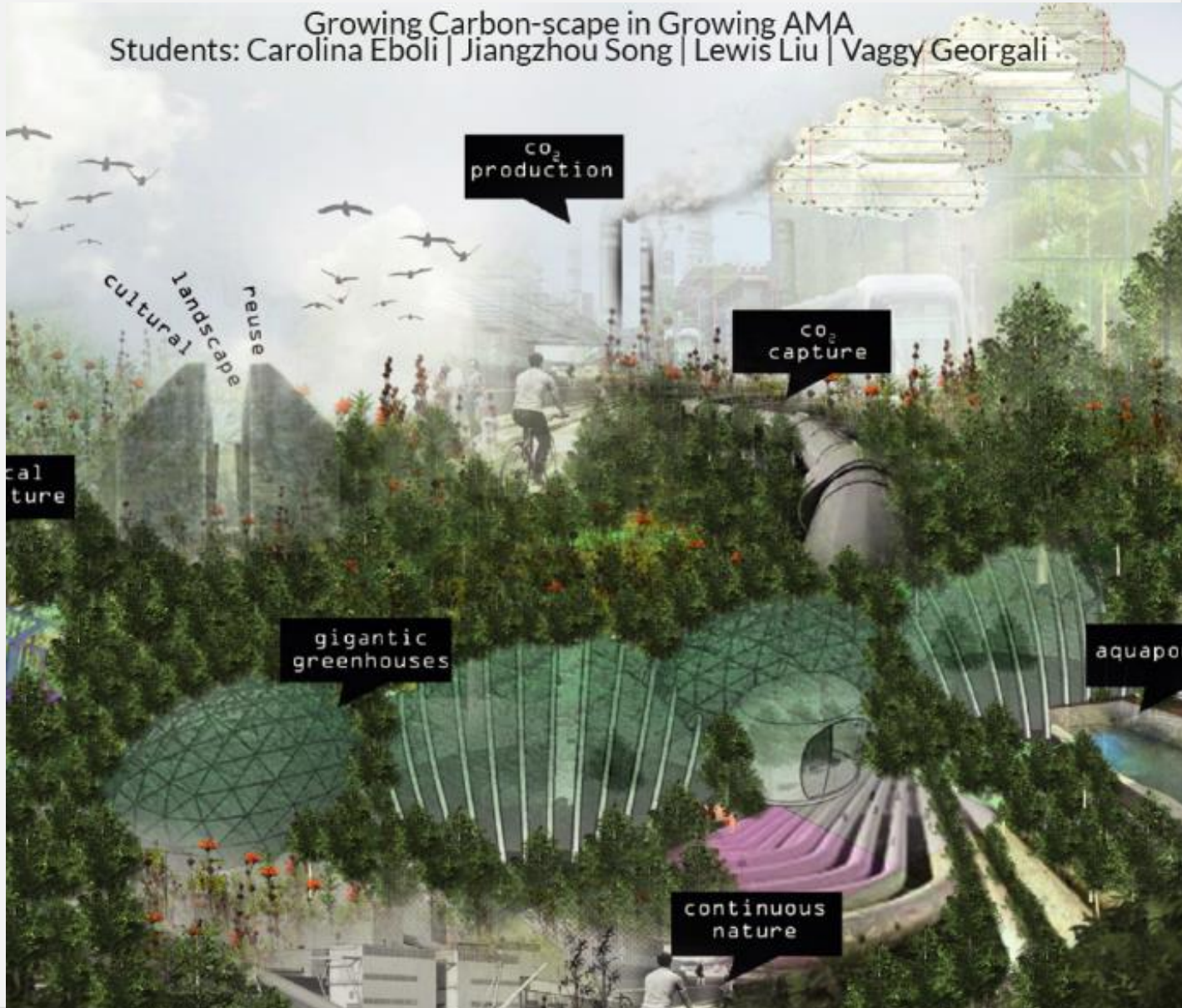
Waste behaviour –People are Ready





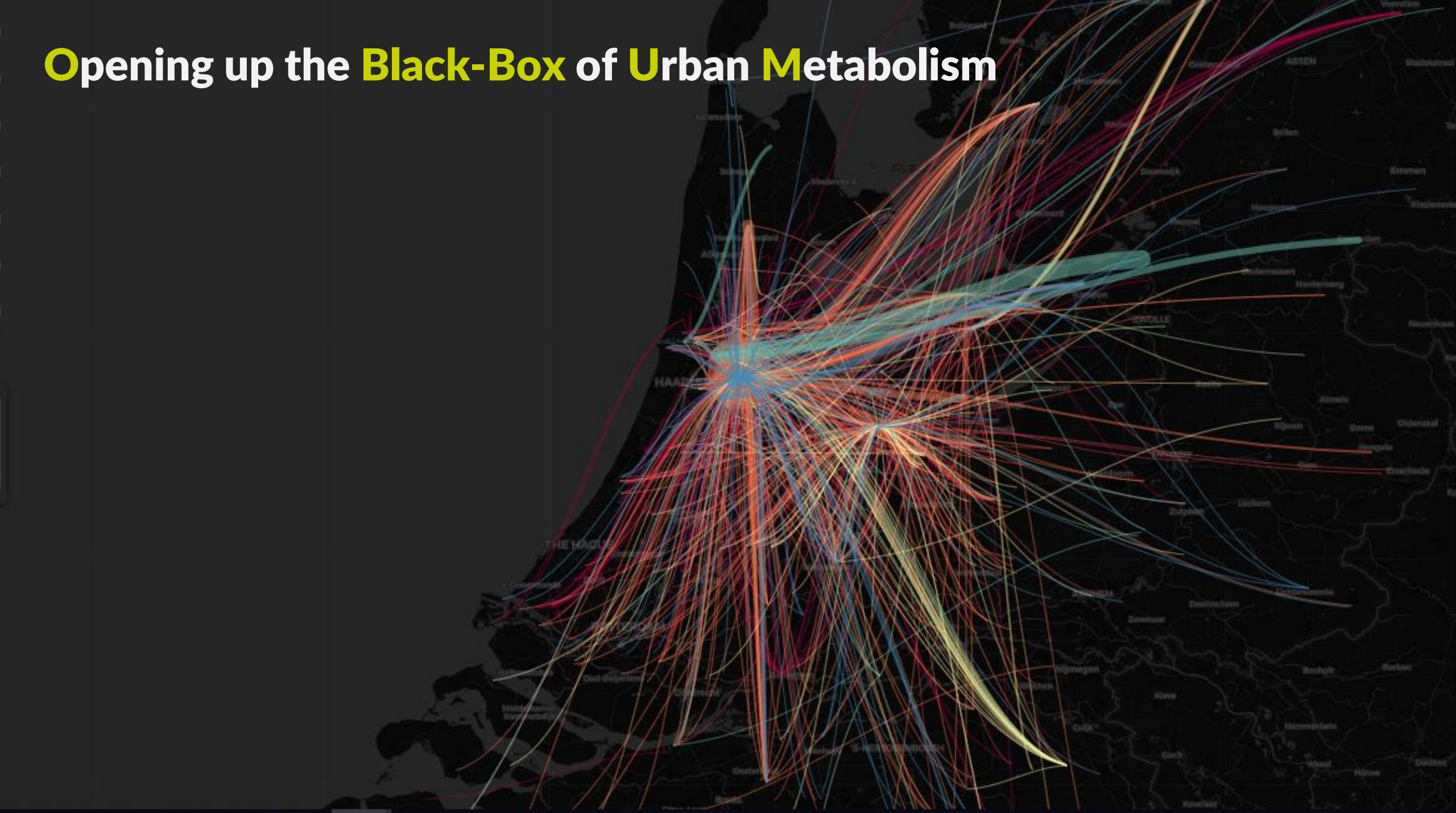
Future Circular Cities and Landscapes will be different





How do we get to a Regenerative Future?

Opening up the Black-Box of Urban Metabolism



Before REPAiR

But:

Where in the region are the flows?

What is the quality of the material?

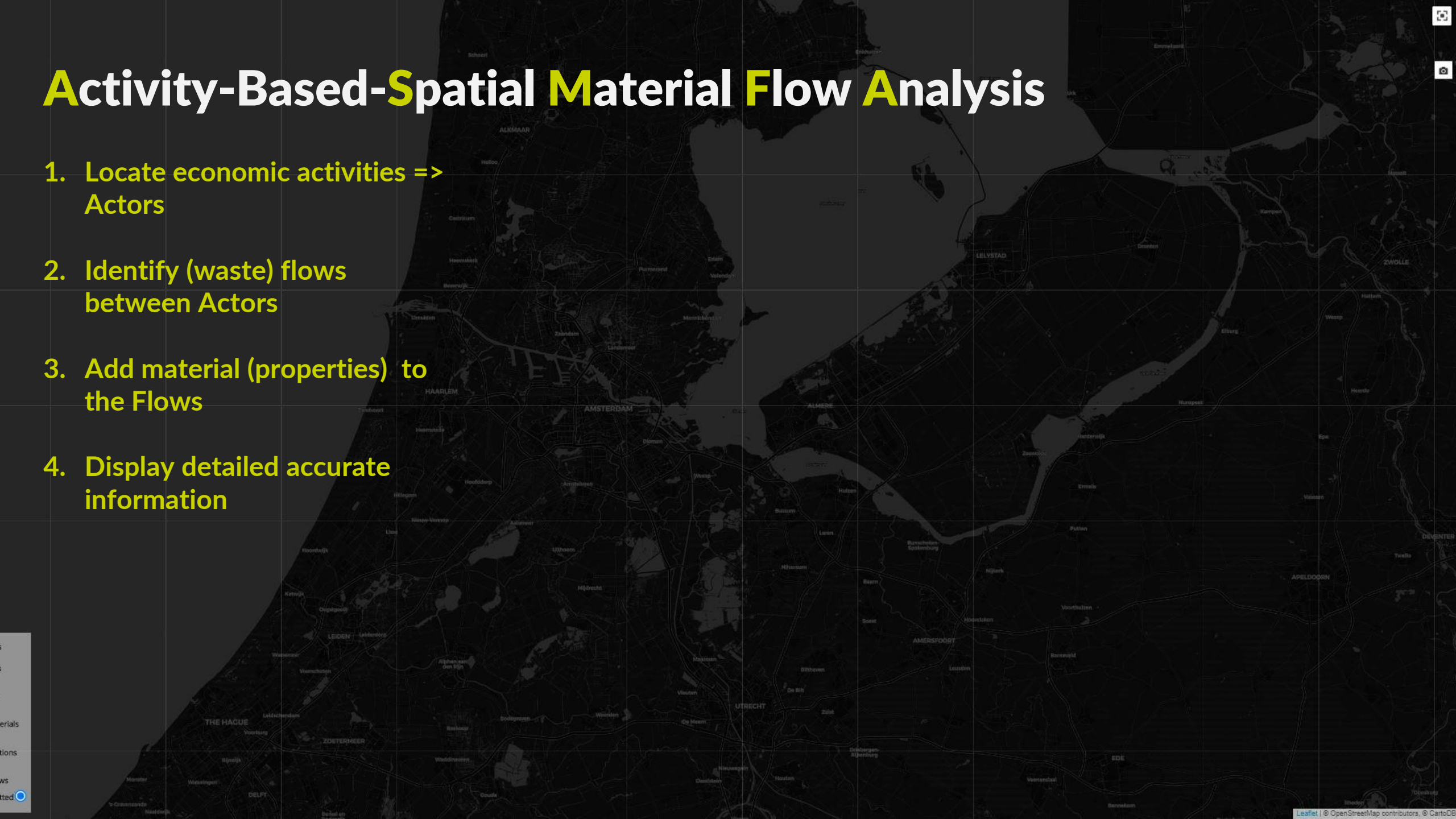
Who are the actors involved?

Where are potentials for synergies?

Grant Agreement No.: 688920

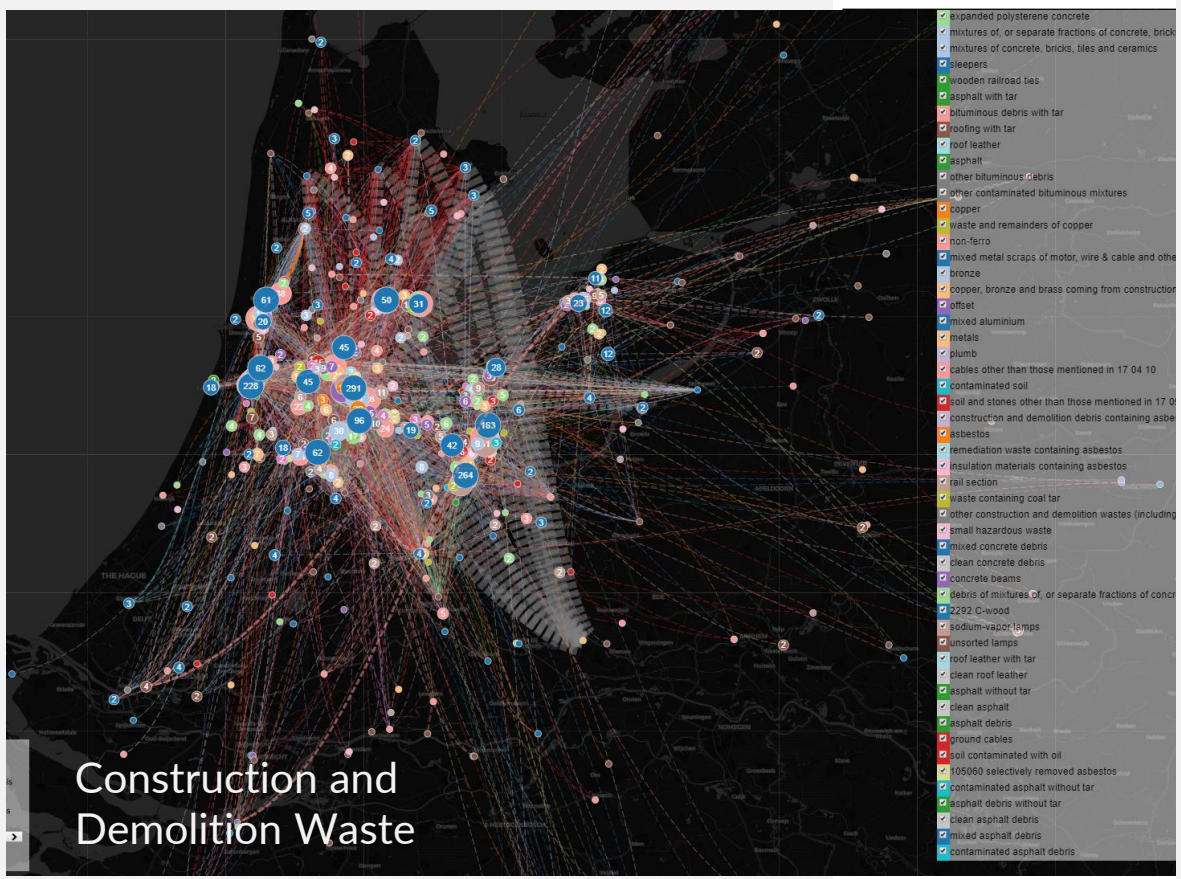
Activity-Based-Spatial Material Flow Analysis

1. Locate economic activities => Actors
2. Identify (waste) flows between Actors
3. Add material (properties) to the Flows
4. Display detailed accurate information



Activity-Based-Spatial Material Flow Analysis

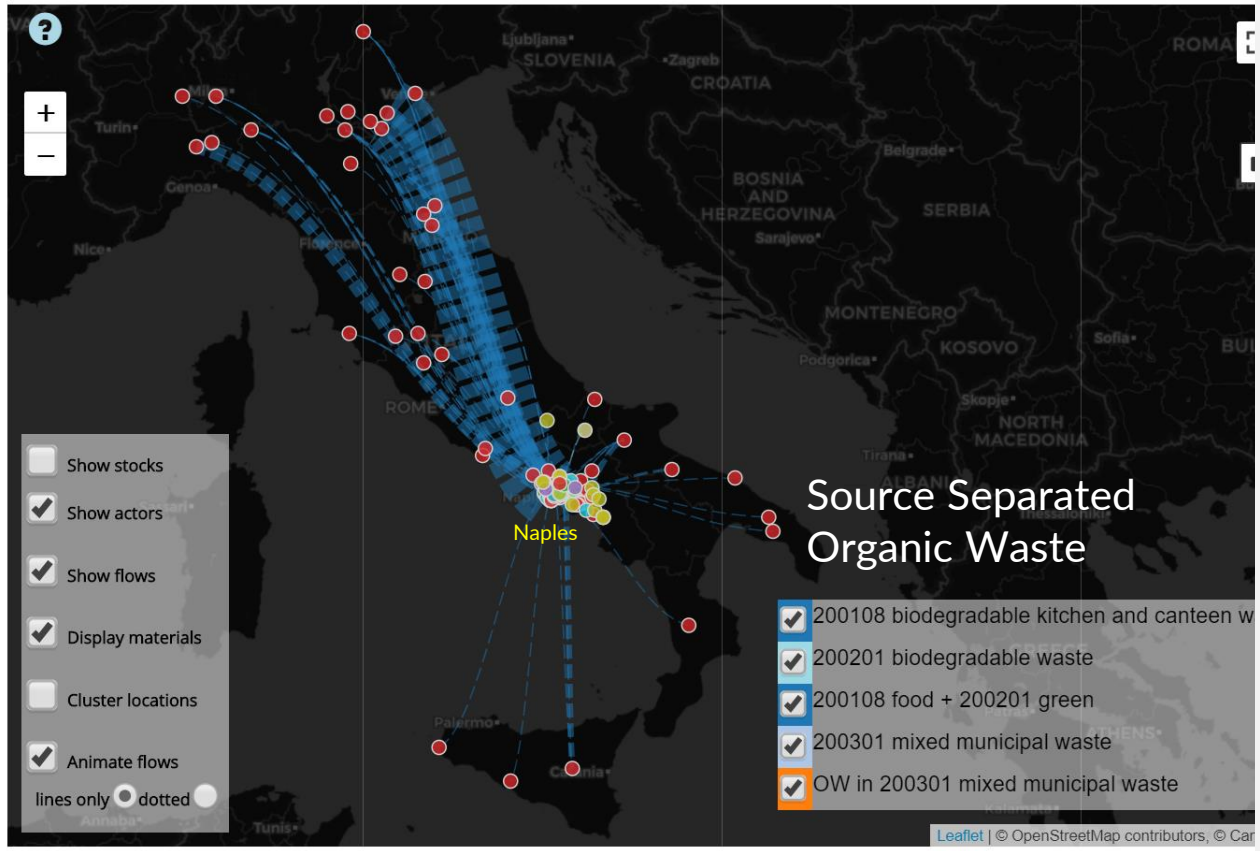
The Amsterdam Metropoltain Area (NL)



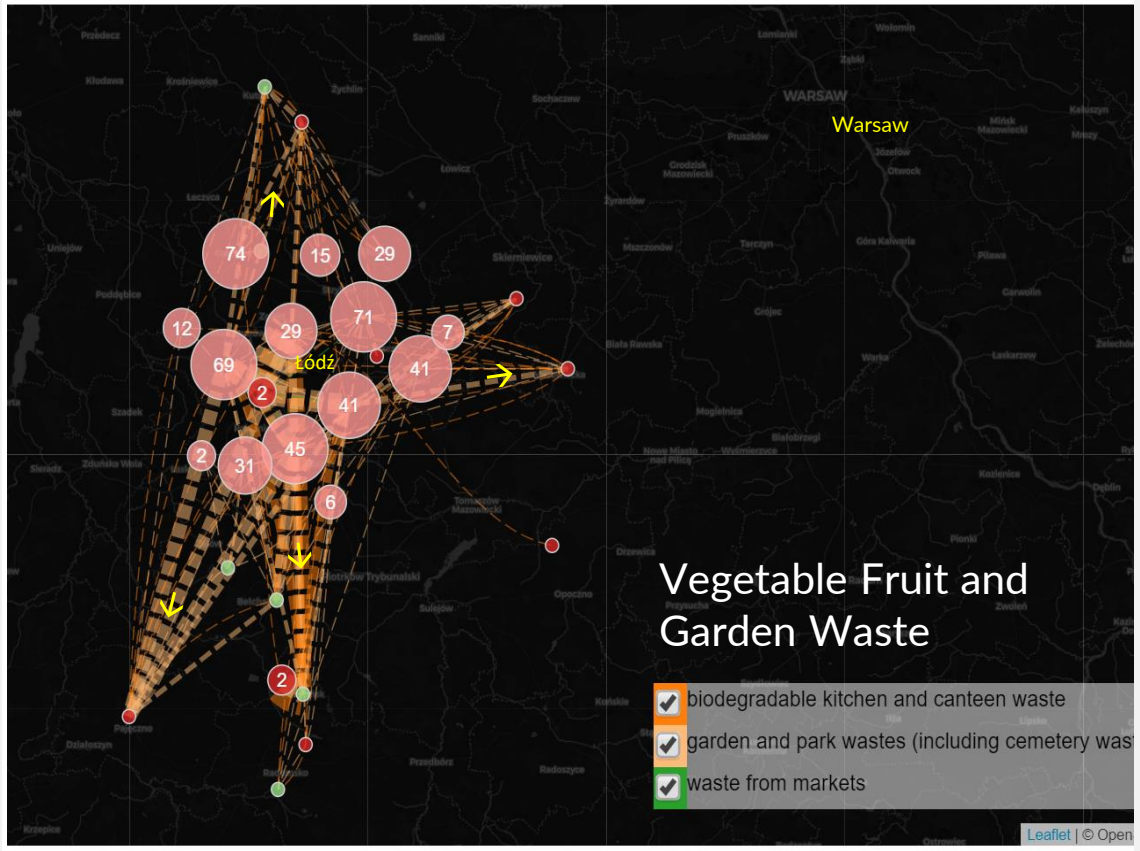
Hamburg: Altona District (Germany)

Activity-Based-Spatial Material Flow Analysis

The Metropolitan Area of Naples (Italy)

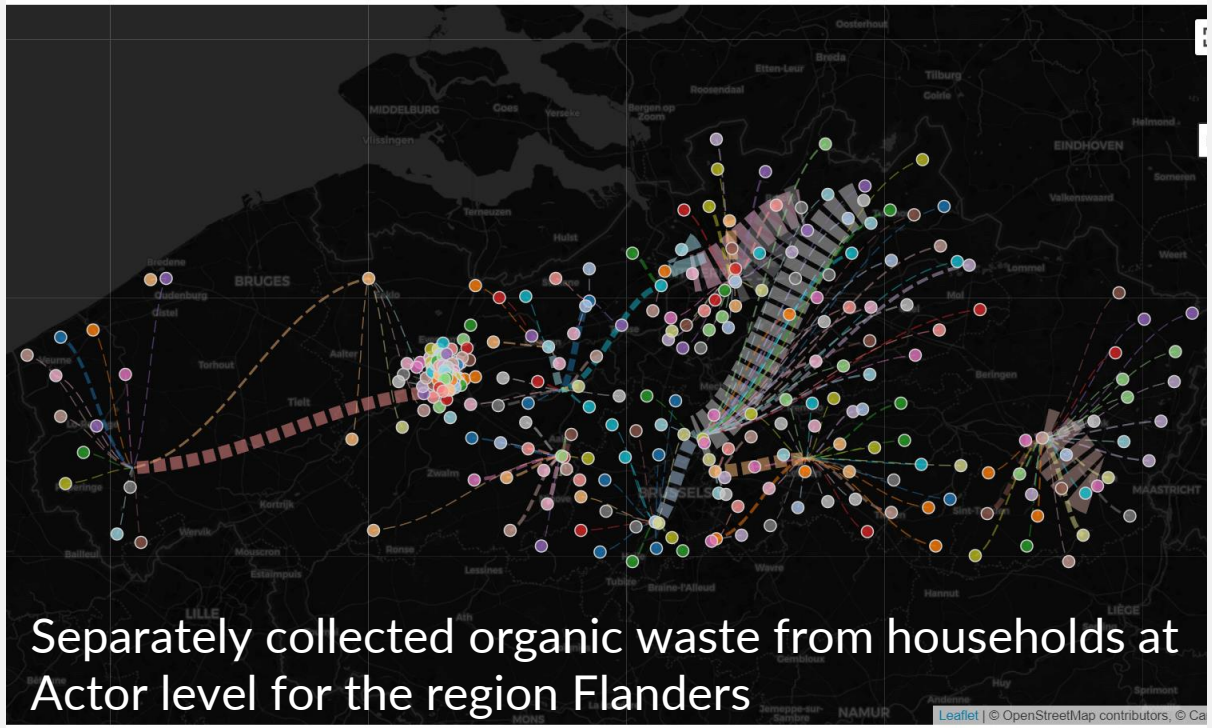


Łódź Metropolitan Area (Poland)



Activity-Based-Spatial Material Flow Analysis

Ghent and Destelbergen (Belgium)



The Pécs Agglomeration (Hungary)

Understanding the Material Composition of Waste flows

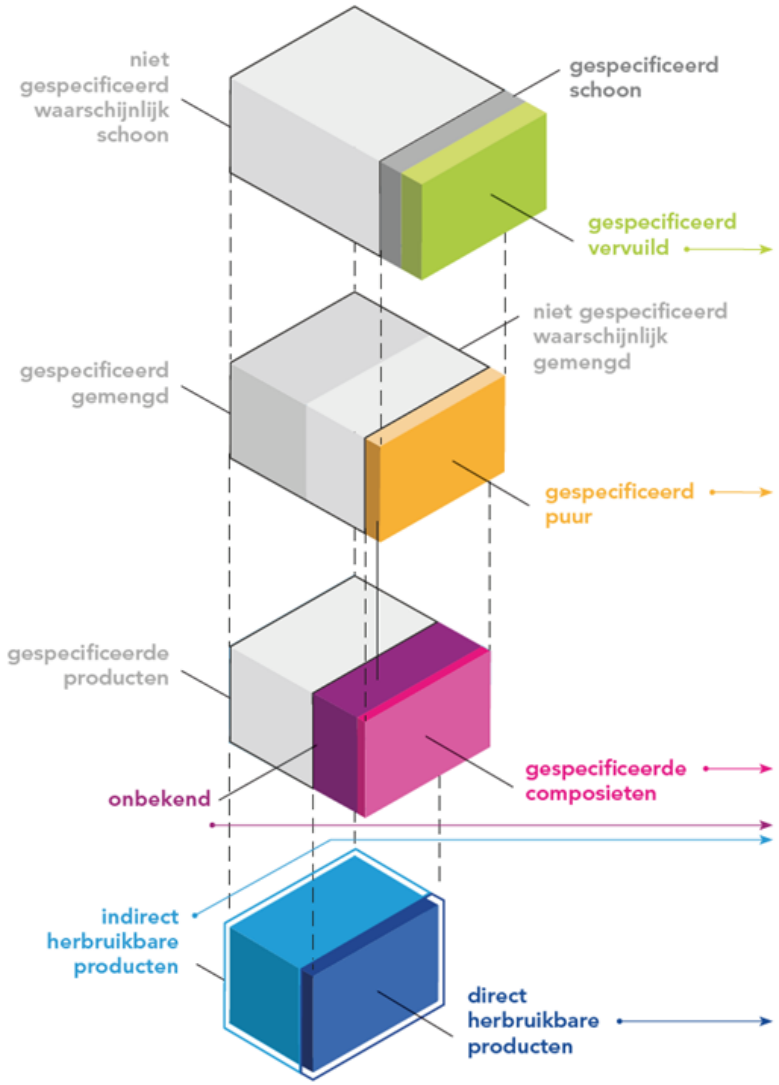
Stoffen

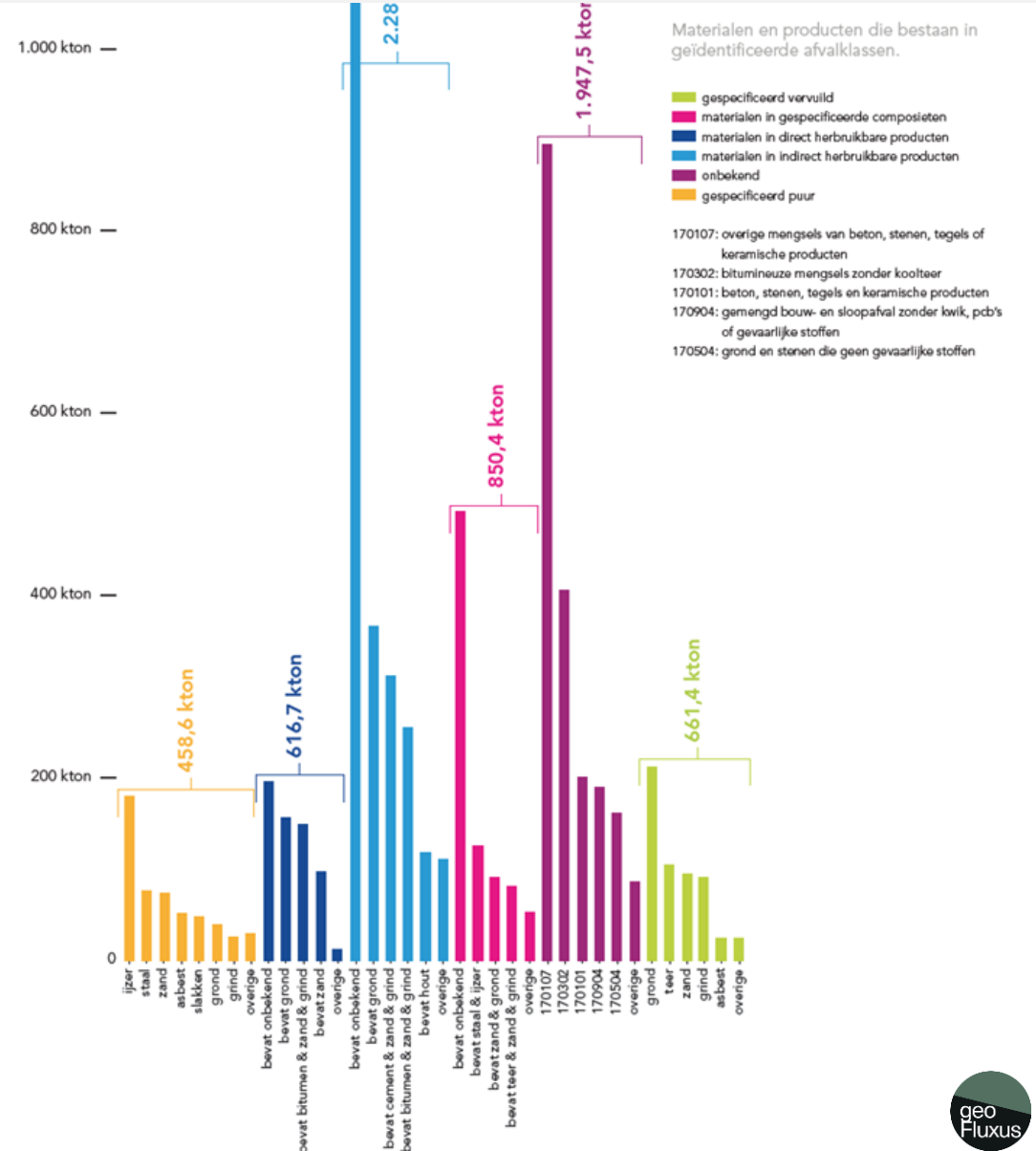
6.817 kton afval van de gebouwde omgeving is geproduceerd en/of verwerkt in de Metropoolregio Amsterdam in 2018.

401 kton voedsel & organische reststromen

3.228 kton consumptie-goederen

6.817 kton gebouwde omgeving





Materialen en producten die bestaan in geïdentificeerde afvalklassen.

- gespecificeerd vervuild
- materialen in gespecificeerde composieten
- materialen in direct herbruikbare producten
- materialen in indirect herbruikbare producten
- onbekend
- gespecificeerd puur

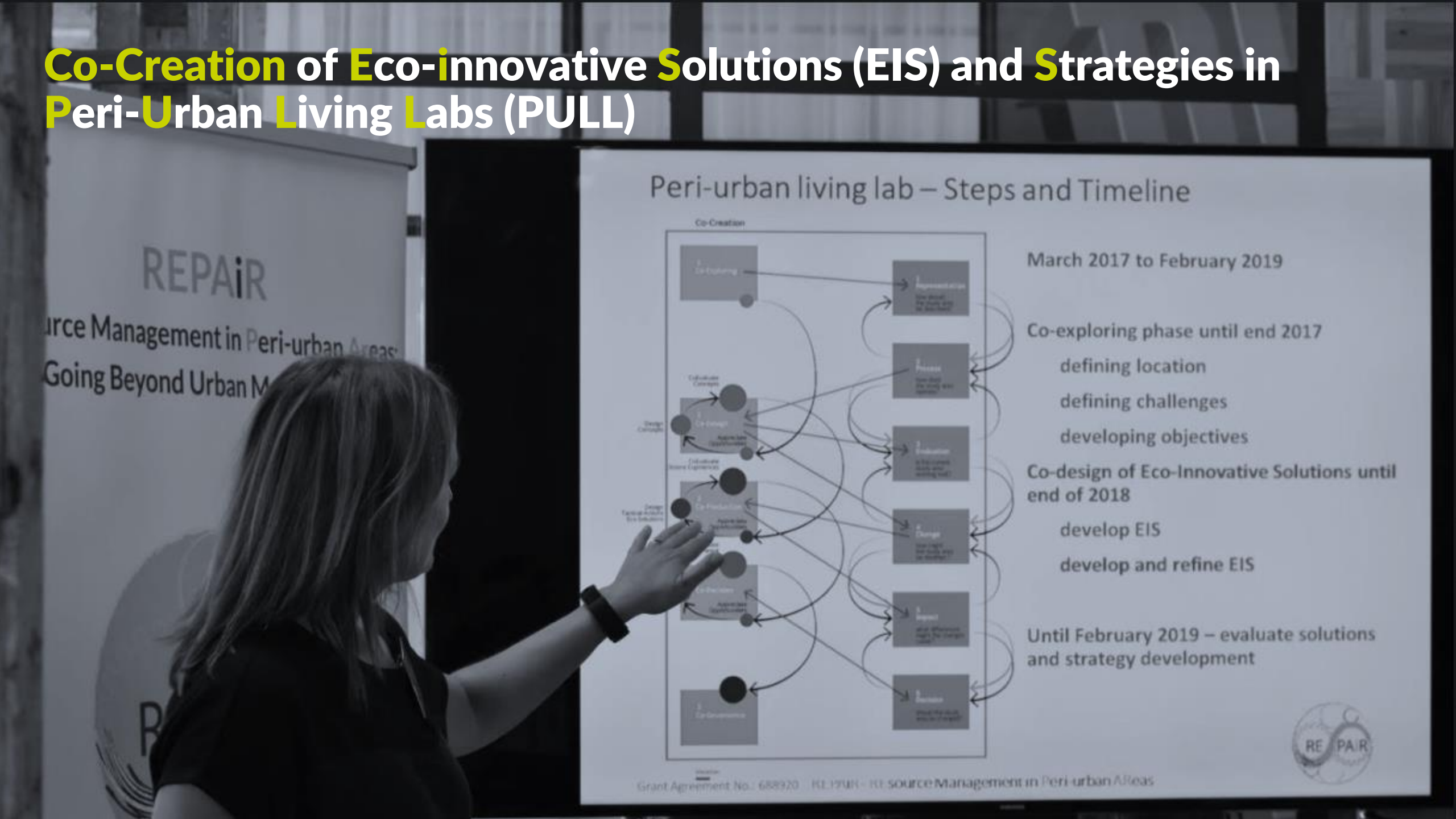
170107: overige mengsels van beton, stenen, tegels of keramische producten
170302: bitumineuze mengsels zonder koolteer
170101: beton, stenen, tegels en keramische producten
170904: gemengd bouw- en sloopafval zonder kwik, pcb's of gevaarlijke stoffen
170504: grond en stenen die geen gevaarlijke stoffen

Amsterdam Circulair

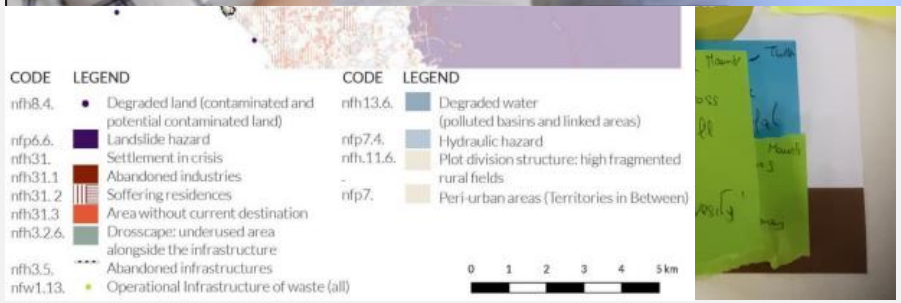
geo Fluxus

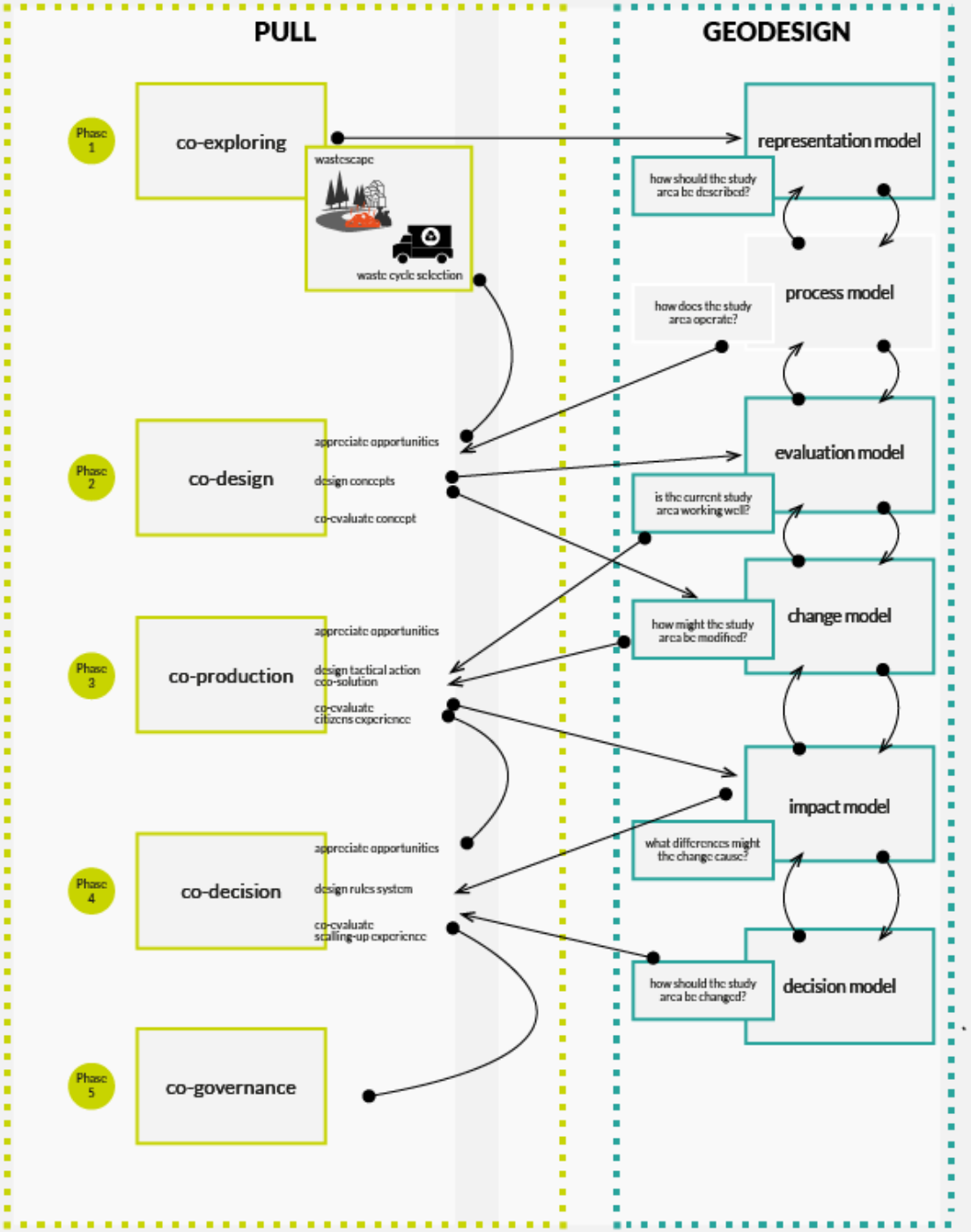
Source:https://www.amsterdam.nl/en/policy/sustainability/circular-economy/

Co-Creation of Eco-innovative Solutions (EIS) and Strategies in Peri-Urban Living Labs (PULL)



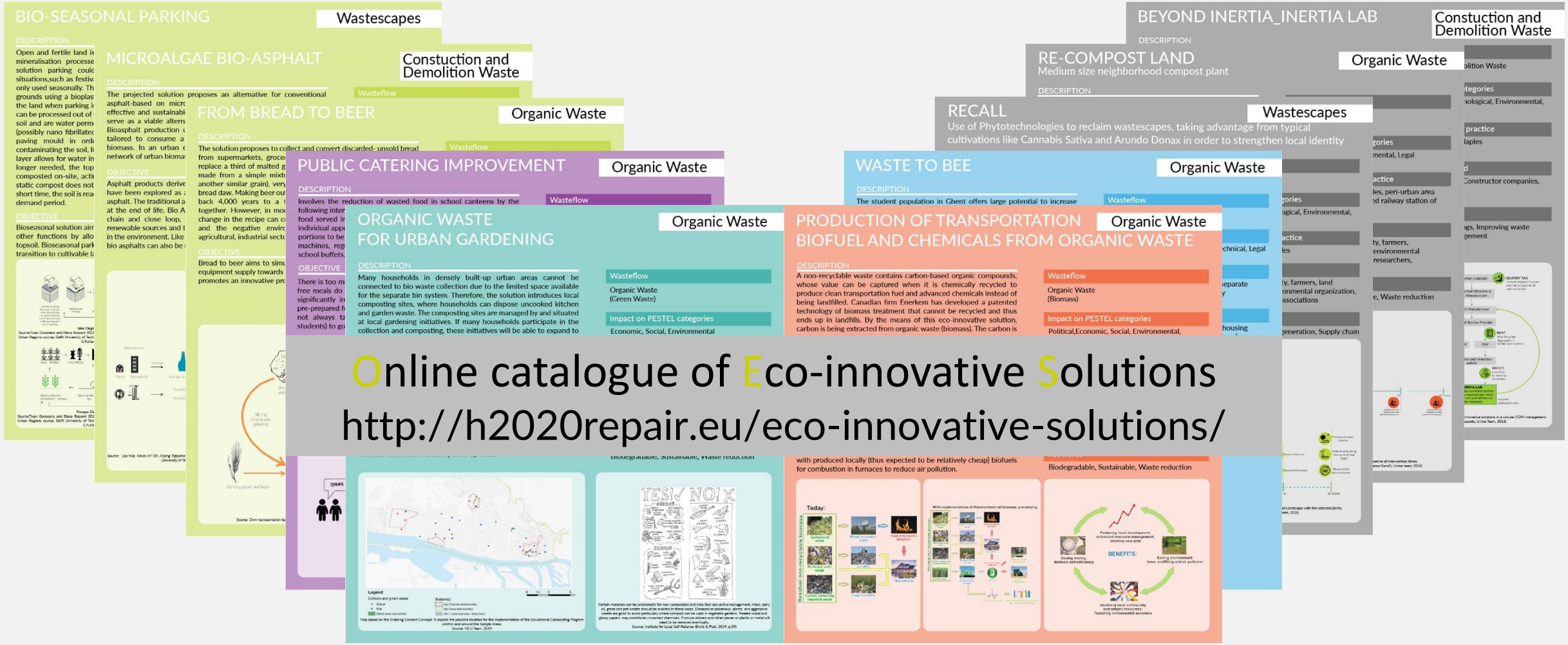
Living Lab meets Geodesign





Graphics Courtesy: to UNINA Team

Around 100 Eco-innovative Solutions



Online catalogue of Eco-innovative Solutions

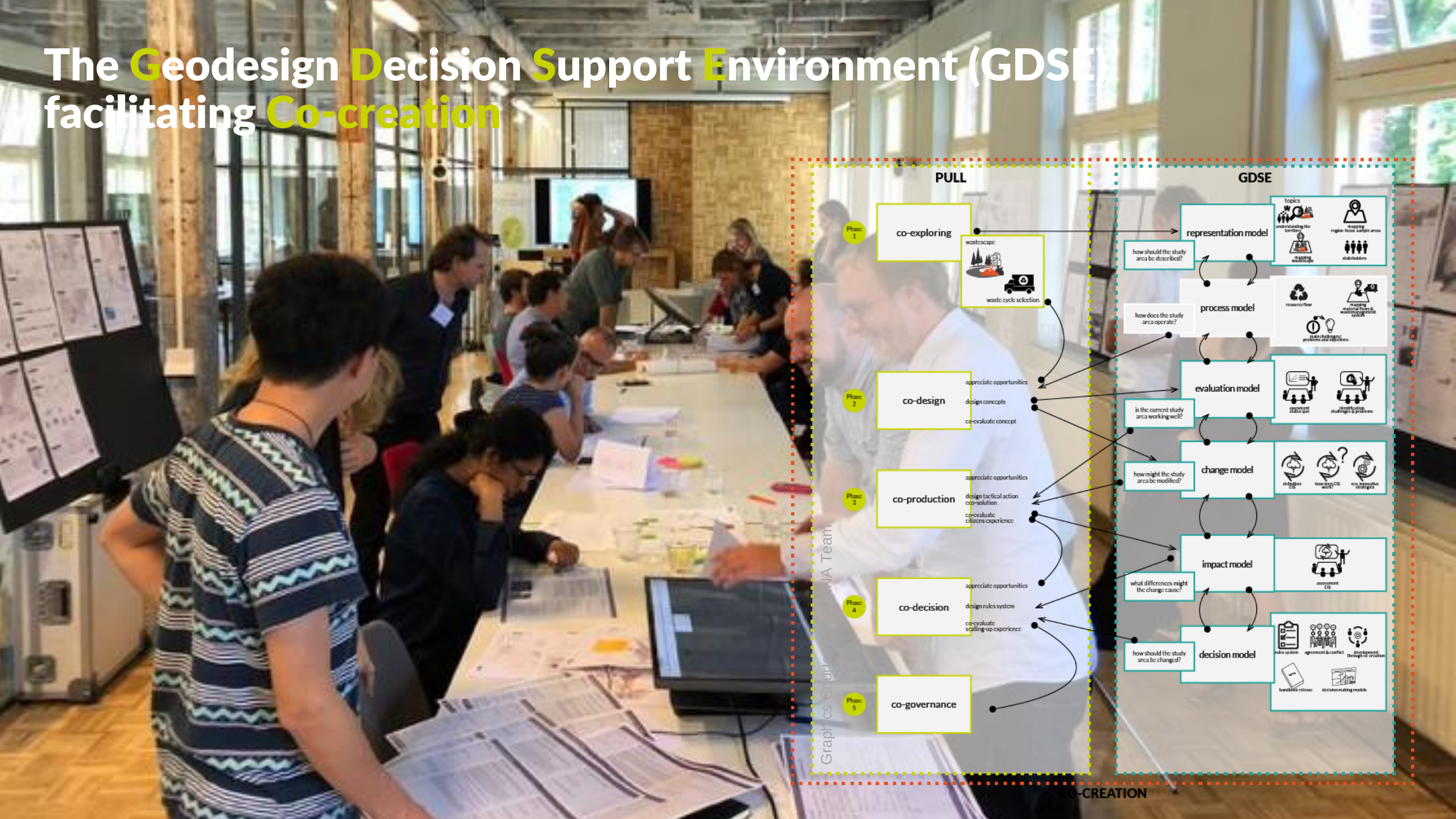
http://h2020repair.eu/eco-innovative-solutions/

TU Delft

REPAiR - REsource Management in Peri-urban Areas

Grant Agreement No.: 688920

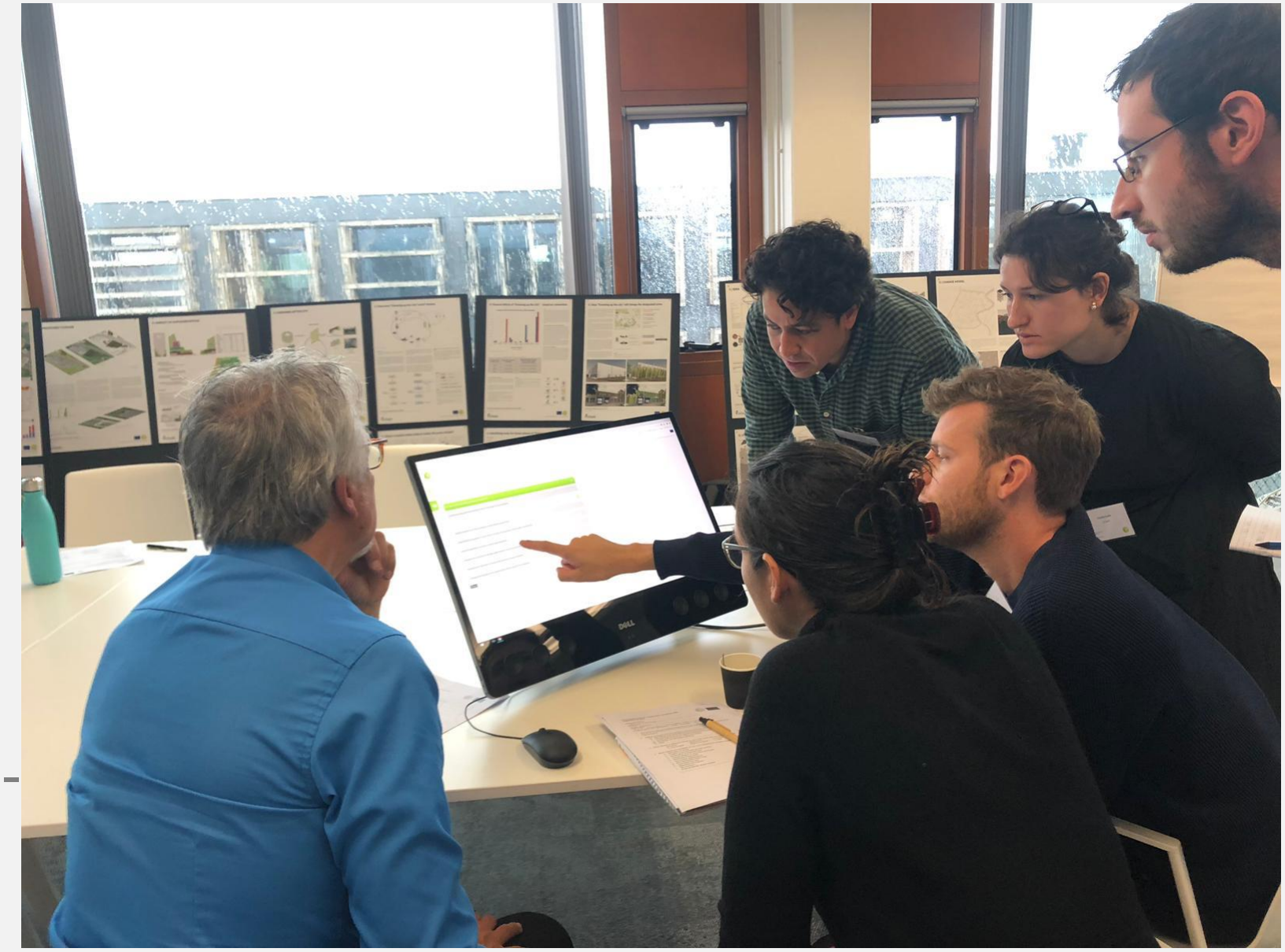
The Geodesign Decision Support Environment (GDSE) facilitating Co-creation



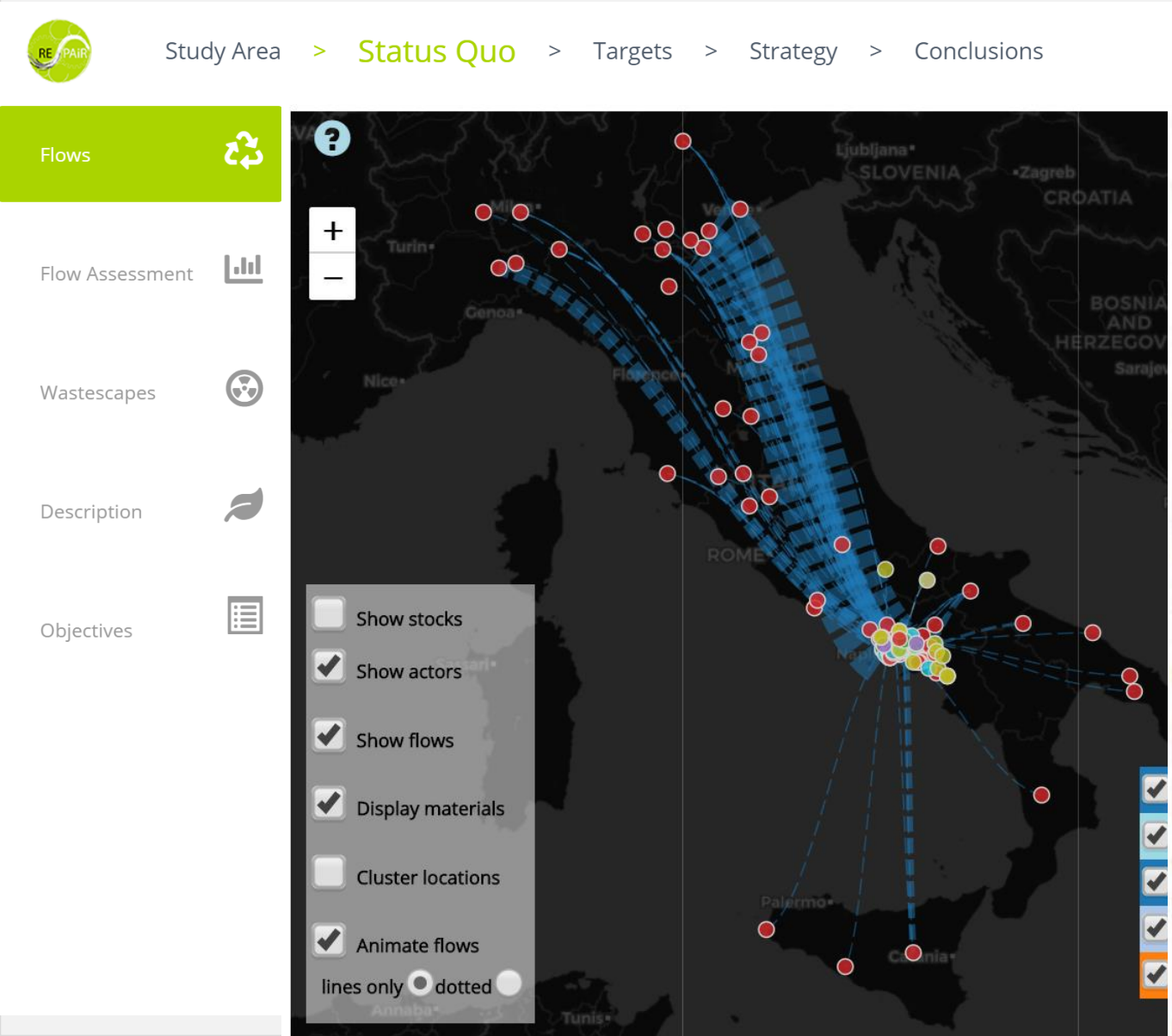
THE GDSE is

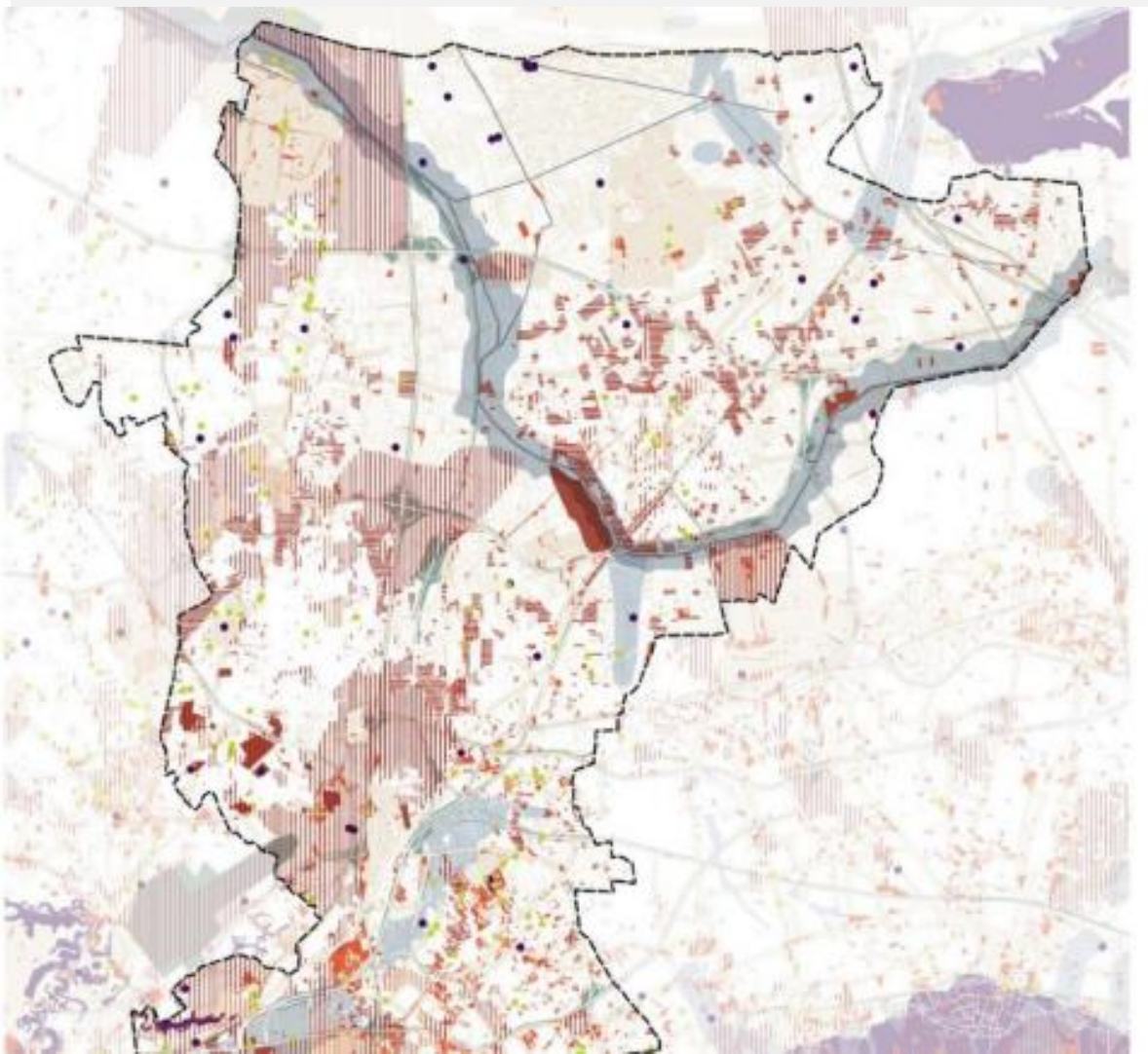
a hands-on, insightful and interactive, actor-specific spatial on line tool.

a touch table where, different actors and decision makes find an equal playing field to co-create and co-decide.



Co-Exploring Flows and Space





Co-Producing Eco-innovative Strategies

Amsterdam | Mode (Workshop) | User Area (gustavo) | About | English (en-us

Study Area > Status Quo > Targets > Strategy > Conclusions

Define your strategy for the key flow *Food Waste*

Food Waste

+ Solution

Solutions

Define Strategy

Modified Flows

Flow Target Control

PRODUCTION OF TRANSPORTATION BIOFUEL AND CHEMICALS FROM ORGANIC WASTE

Organic Waste

DESCRIPTION

A non-recyclable waste contains carbon-based organic compounds, whose value can be captured when it is chemically recycled to produce clean transportation fuel and advanced chemicals instead of being landfilled. Canadian firm Enerkem has developed a patented technology of biomass treatment that cannot be recycled and thus ends up in landfills. By the means of this eco-innovative solution, carbon is being extracted from organic waste (biomass). The carbon is then converted through a short chemical process into a gas. In turn, this product can be used to make biofuels like methanol and ethanol, as well as chemicals to be employed in production of numerous everyday products.

OBJECTIVE

Producing biofuels for the local need for municipal transportation (ethanol-run buses) will contribute to reducing costs in comparison to conventional fuel. Local farmers will be provided with biofuels for agricultural machinery and eventually the costs of production are expected to decrease. Apart from financial benefits, shifting from conventional (petroleum-based) fuels to biofuels contributes to reducing air pollution as no harmful combustion products are being and only carbon dioxide is being produced. Providing households with produced locally (thus expected to be relatively cheap) biofuels for combustion in furnaces to reduce air pollution.

Wasteflow

Organic Waste
(Biomass)

Impact on PESTEL categories

Political,Economic, Social, Environmental, Technical, Legal

Location of the good practice

Łódź Metropolitan Area

Stakeholders involved

Residents, Governmental institutions, Non-governmental environmental organizations, Authorities, Enterprises, Researchers,

Keywords

Biodegradable, Sustainable, Waste reduction

ORGANIC WASTE FOR URBAN GARDENING

Organic Waste

DESCRIPTION

Many households in densely built-up urban areas cannot be connected to bio waste collection due to the limited space available for the separate bin system. Therefore, the solution introduces local composting sites, where households can dispose uncooked kitchen and garden waste. The composting sites are managed by and situated at local gardening initiatives. If many households participate in the collection and composting, these initiatives will be able to expand to other areas, like underused parts of public green, or to convert sealed surfaces e.g. parking lots to establish further gardening projects.

OBJECTIVE

The solution aims at offering an alternative composting possibility to households who otherwise would have to dispose their bio waste with the residual waste. Consequently, the amount of bio waste that is separately collected and composted rises.
This increases the amount of locally produced compost which will be used for urban gardening projects and for greening the neighborhood therefore contributing to the quarter's climate adaptation action plan. The long-term aim is to create a localized cycle from food grown in the area to bio waste used as compost for urban gardening to increase resilience in densely built-up areas.

Wasteflow

Organic Waste
(Green Waste)

Impact on PESTEL categories

Economic, Social, Environmental

Location of the good practice

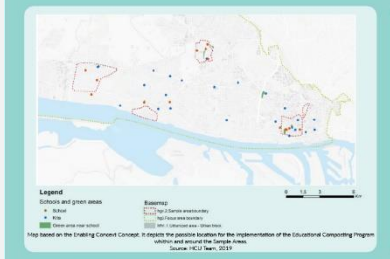
District of Altona, Hamburg

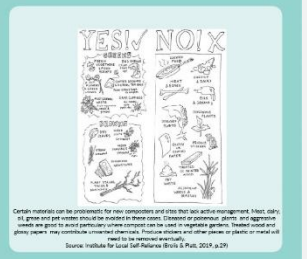
Stakeholders involved

District of Hamburg-Altona, Stadtreinigung Hamburg, initiatives for urban gardening in the area, environmental initiatives and associations

Keywords

Biodegradable, Sustainable, Waste reduction





RE-COMPOST LAND

Medium size neighborhood compost plant

Organic Waste

DESCRIPTION

The proposed solution works on the potentialities of organic waste for the regeneration of wastescapes through reuse of the organic flow. The idea is to create a short supply chain for the organic waste. The idea is to localize medium compost plants in each municipality in order to create eco-district as catalyst of territorial reconfiguration and implementation of the supply chain. In these municipalities the first goal is to increase the citizens awareness of the separate waste collection, providing tax incentives in order to improve the waste management and obtain a real scenario of the tonnes produced too.

OBJECTIVE

The aim is to reduce the treatment of OW outside the Region and regenerate wastescapes.The size of each plant could be between 5,000 and 10,000 t/y, in order to minimize the impact on the environment. By the aerobic treatment, about 30% of the compost by the organic fraction treated in the plant could be obtained. This treatment allows greater control and would help small farms that could benefit from their management. With combined anaerobic/aerobic plants, smaller than the existing plants in Campania (Caivano and Salerno) around 10,000 t/y, in addition to avoid the NIMBY effect, there could be a greater return in economic terms.

Wasteflow

Organic Waste
(Food Waste)

Impact on PESTEL categories

Economic, Social, Environmental, Legal

Location of the good practice

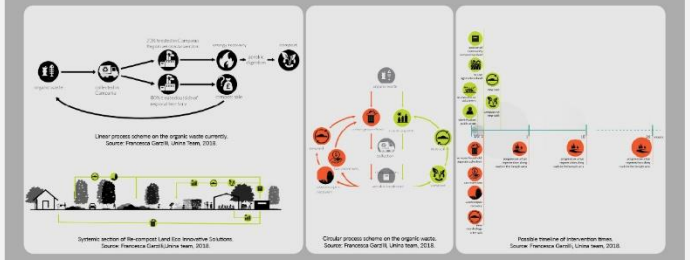
Metropolitan Area of Naples, peri-urban area surrounding the high-speed railway station of Napoli-Afragola (TAV)

Stakeholders involved

Campania Region Authority, farmers, land owners, institutions, environmental organization, enterprises, researchers, associations

Keywords

Biodegradable, Sustainable, Waste reduction



Co-Evaluating Flow Changes

Amsterdam ▾ Mode (Workshop) ▾ User Area (gustavo) ▾ About ▾ English (en-us

Study Area > Status Quo > Targets > Strategy > Conclusions

Food Waste

Solutions

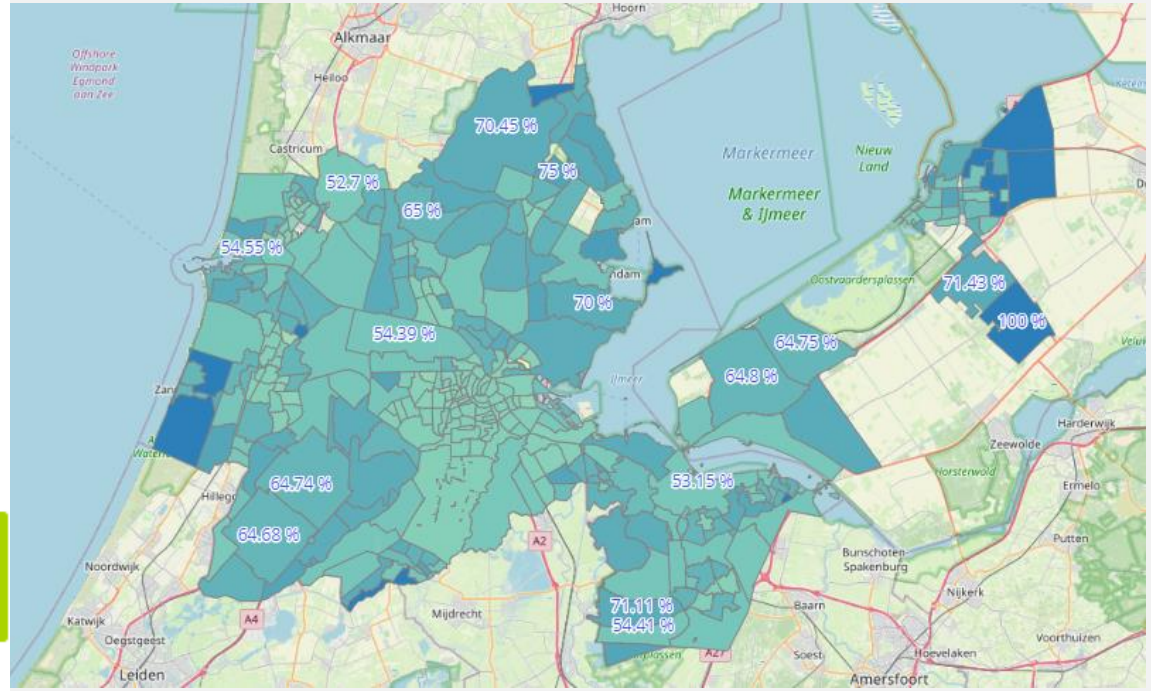
Define Strategy

Modified Flows

Flow Target Control

Target Control | Indicator Map

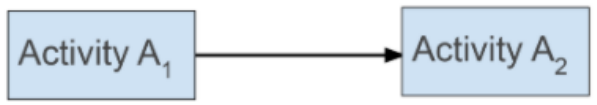
Indicator: Avoidable / unavoidable ratio



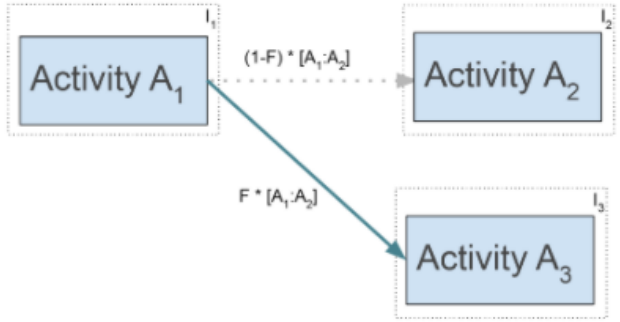
Shift Destination

The mass of each flow from Actors of the Activity A1 in the Implementation Area I1 to Actors of Activity A2 in the Implementation Area I2 will be multiplied by (1 - F). For each of these reduced flows a new flow with the respective mass multiplied by the Factor F will be created from each Actor of Activity A1 in the implementation area I1 to the closest Actor of the Activity A3 in the Implementation Area I3.

STATUS QUO



PROPOSED PROCESS



Compare between interests Groups

Food Waste

Objectives

Flow Targets

Strategies

Modified Flows

How were the objectives ranked by the small groups?

Objectives for keyflow *Food Waste*		Industry 2	Governance 2	Industry 1	Governance 1	Research 1
Provide a platform for data exchange on waste flows	#1	#4	#3	#2	#1	#3
Raise the awareness of citizens for food waste avoidance	#2	#2	#6	#5	#2	#1

Which target values were set?

Indicators used as target setting in the key flow *Food Waste*	Industry 2	Governance 2	Industry 1	Governance 1	Research 1
Avoidable / unavoidable ratio (region)					
Food waste produced per inhabitants (region)	decrease by 20%			decrease by 50%	decrease by 50%
Percentage of food waste that is incinerated (region)	decrease by 90%	decrease by 30%		decrease by 50%	decrease by 50%

Keep Transparency

Objectives

Flow Targets

Strategies

Modified Flows

Sustainability

Conclusions

Common Ground

household waste is the most important to tackle.

company waste requires less attention as there are already a lot of regulations

To be discussed

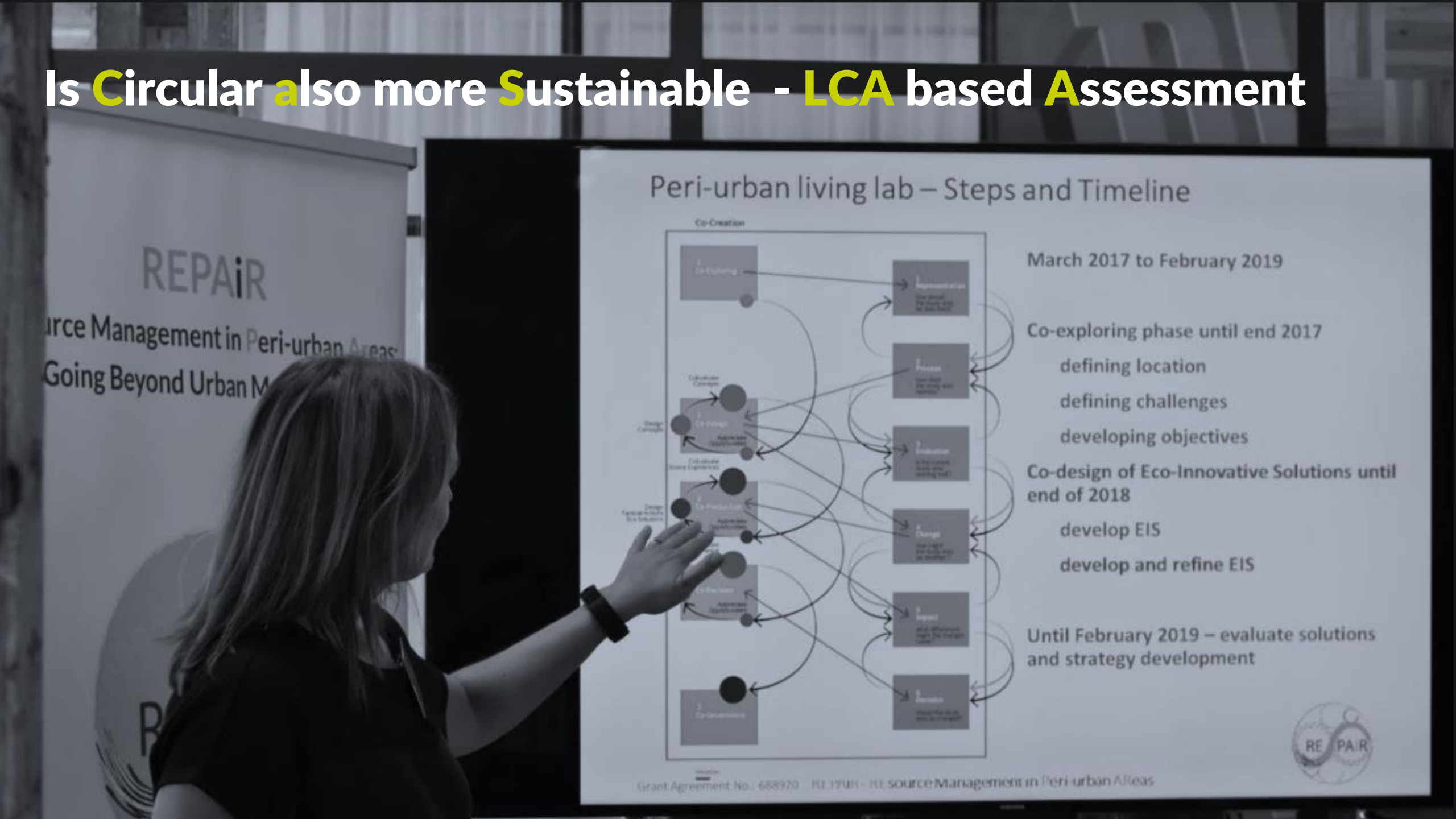
should first awareness be raised or the infrastructure be in place

Disagreement

a lot of infrastructural investments are considered therefore on groups states 30 %. 90% don't burn any avoidable food waste ...stupid idea to burn food.

fdsdffdsfd hzfghgf gfhgfh

Is Circular also more Sustainable - LCA based Assessment



Integrated Sustainability Assessment

MULTIDISCIPLINARY IMPACTS

Economic
e.g., capital expenditure

Social
e.g., private space consumption

Environmental
e.g., global warming

MULTISIZE IMPACTS

Micro
e.g., odour disamenities

Meso
e.g., ecotoxicity

Macro
e.g., ozone depletion

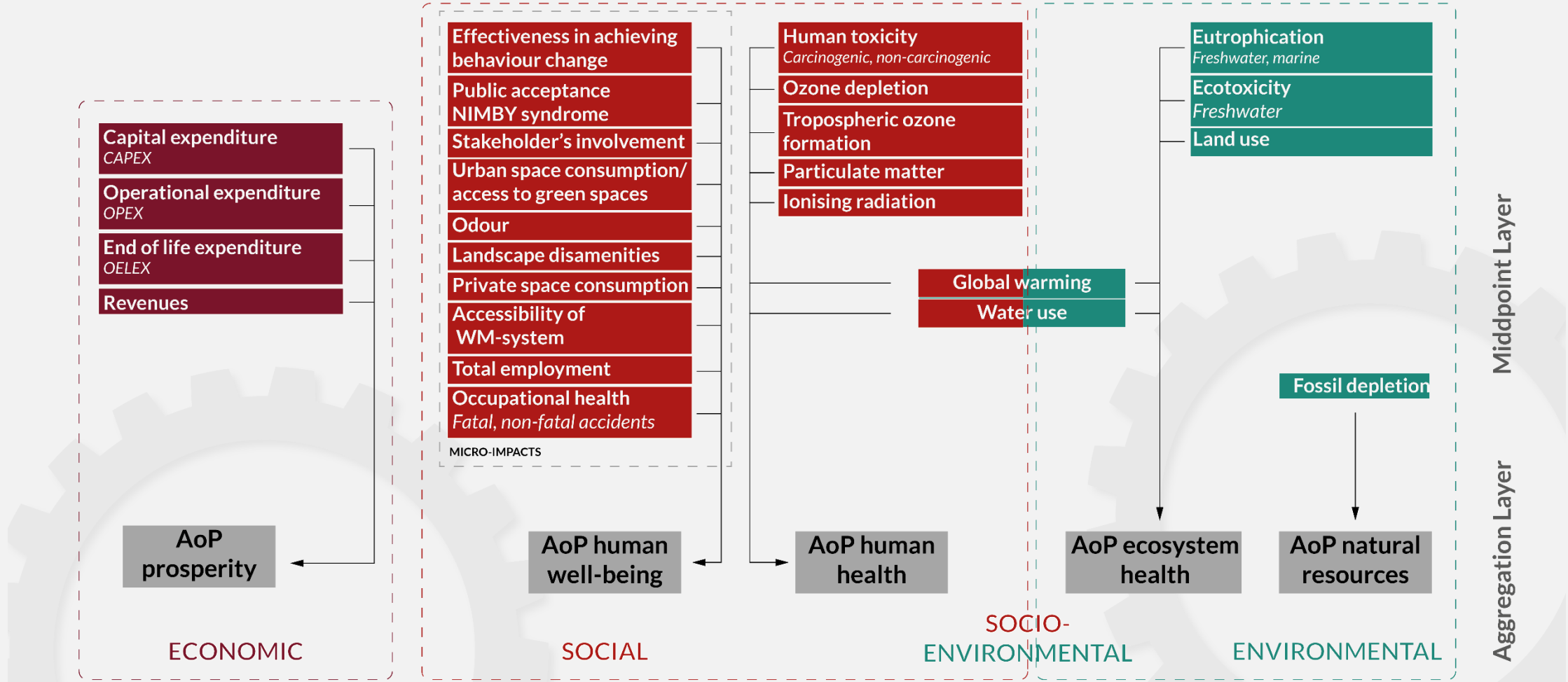
MULTI-SCALE IMPACTS

Local
e.g., Ghent

Regional
e.g., Flanders (Belgium)

Global

Framework: 28 Indicators agregated to 5 Areas of Protection



Sustainability Assessment of Strategies

STRATEGIES

	SORTING	COLLECTION	VALORISATION
1	Mandatory VFG bins for the entire focus area.	CNG fuelled trucks.	
2A	Mandatory VFG bins for the entire focus area.	CNG fuelled trucks, increased frequency of VFG collection to a weekly basis. Assumed VFG capture rate increase: 10%.	
2B	Mandatory VFG bins for the entire focus area.	CNG fuelled trucks, increased frequency of VFG collection to a weekly basis. Assumed VFG capture rate increase: 20%.	
2C	Mandatory VFG bins for the entire focus area.	CNG fuelled trucks, increased frequency of VFG collection to a weekly basis. Assumed VFG capture rate increase: 30%.	
3		CNG fuelled trucks.	BSF treatment plant
4	Mandatory VFG bins for the entire focus area.	CNG fuelled trucks, increased frequency of VFG collection to a weekly basis.	BSF treatment plant

Sustainability Assessment of Strategies

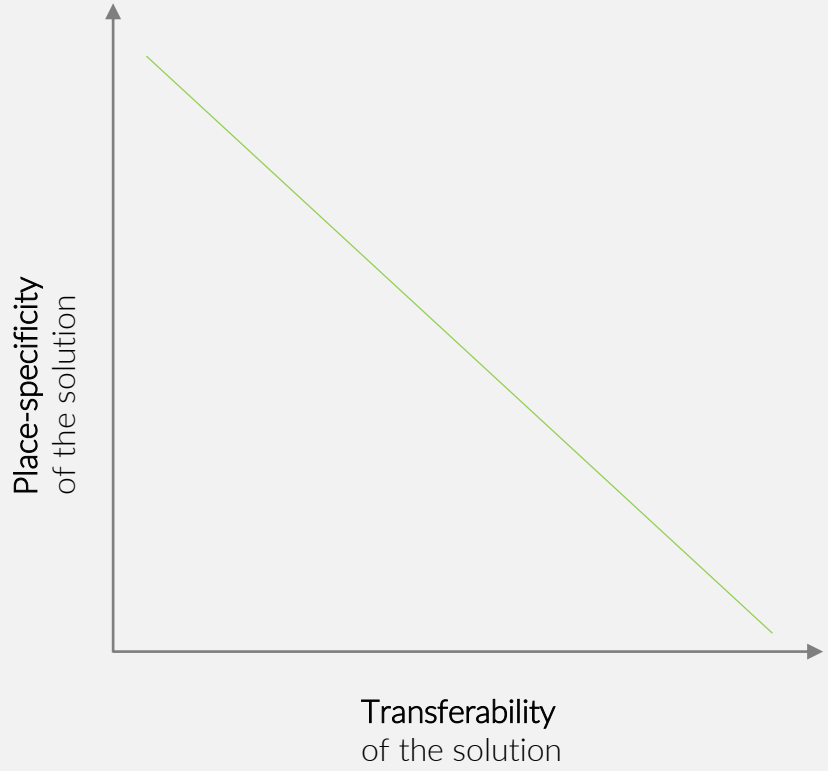
AGGREGATION

	Ecosystem health	Human health	Human well-being	Natural resources	Prosperity
SQ	3	7	3	1	3
S1	3	3	4	2	5
S2A	5	3	4	3	4
S2B	5	3	4	4	5
S2C	7	3	4	5	7
S3	2	2	1	6	1
S4	1	1	1	7	1

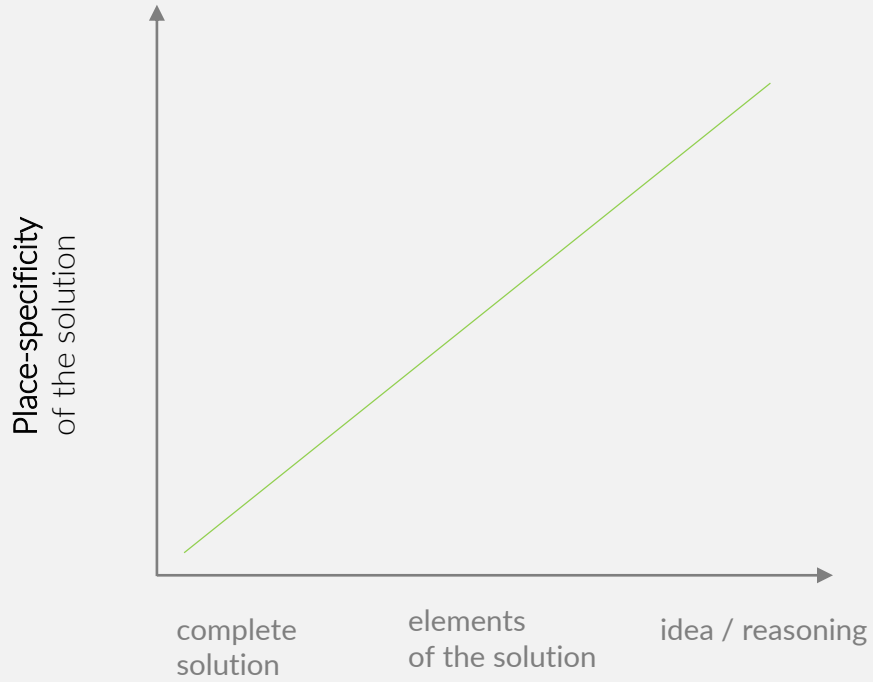
From Knowledge Transfer to Knowledge Co-creation

Knowledge Transfer

place specificity vs. transferability



place specificity vs. “degree of abstraction” of an EIS

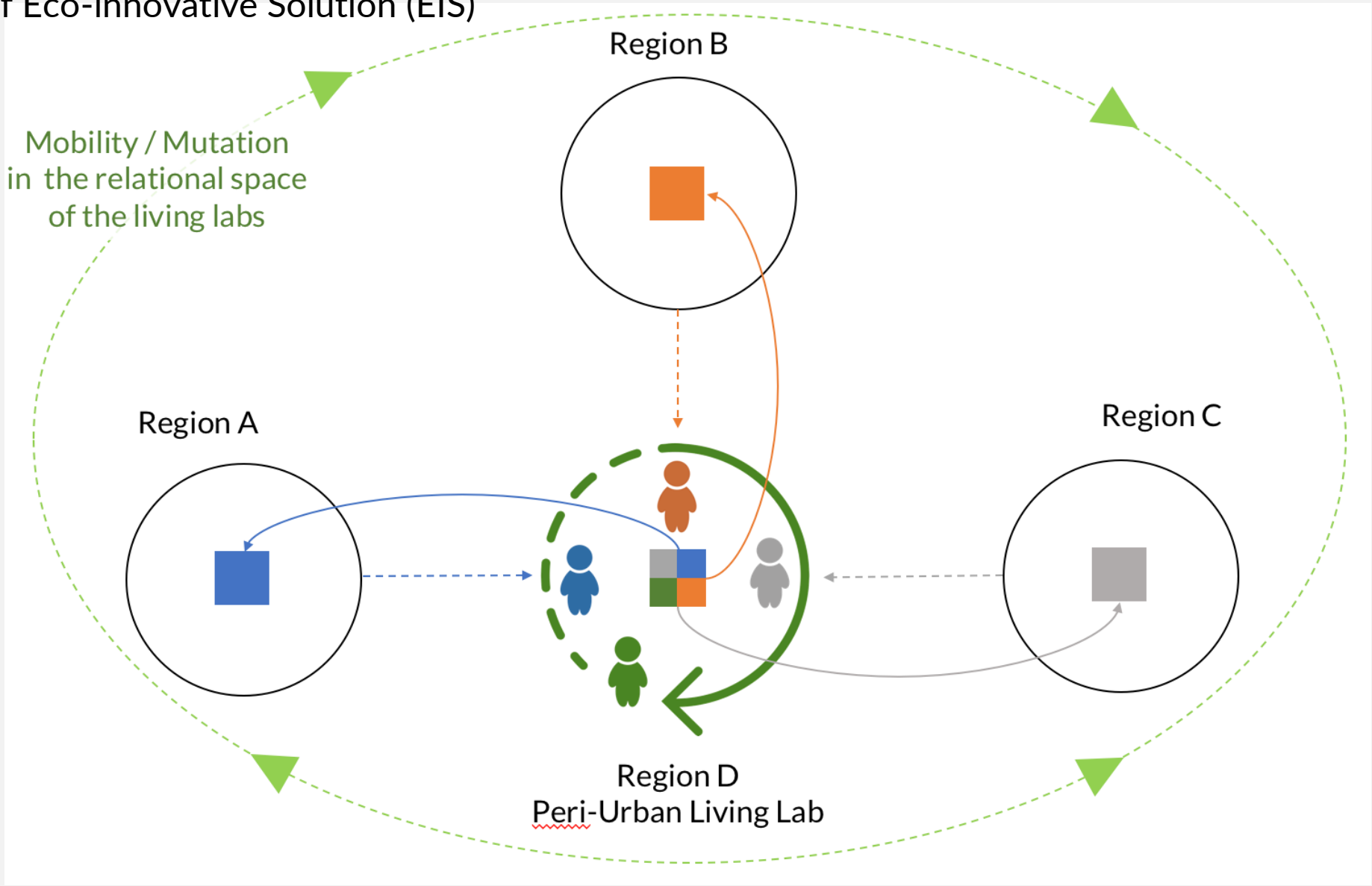


Need for transformation to adapt

(degree of abstraction)

Knowledge Co-creation

Exchange of Eco-innovative Solution (EIS)



Co-design across PULLS

Co-design of EIS with MSc students and PhD candidates from other PULLS

Overcoming Governance Challenges

Three Dimensions to Examine Governance Challenges

Multi-level governance while ambitious initiatives for CE do exist in urban regions, the connection between these local and regional initiatives to policies on higher political and administrative levels is often lacking.

Three Dimensions to Examine Governance Challenges

Cross-sectoral governance within the public sector:

A lack of connection of CE strategies with other policy fields especially spatial planning.

Often-missing horizontal cooperation between municipalities. Strategies and activities often remain local, not using the opportunity of promoting CE in larger regional scale.

Grant Agreement No.: 688920

Three Dimensions to Examine Governance Challenges

Multi-actor or quadruple helix governance:

In some regions many entrepreneurial and civic society initiatives exist, but they lack coordination and support by the public sector;

In other regions still only few activities from the economic sector and citizens can be observed and the public sector is weak in promoting CE.

REPAiR's Policy Impact

REPAiR's Policy Impact

Naples

Possibility to concretely implement the co-created ideas thanks to:

the PICS (Programmi integrati città sostenibili - in English 'Integrated Programs for Sustainable Cities') for the Municipality of Casoria (in the focus area);

the Campania Regional Landscape and Territorial Plan;

Urban Plan for Ischia Island (regeneration of wastescapes – illegal settlements)

UNINA as stakeholder for the Technical Table on the Special Waste Regional Plan.

REPAiR's Policy Impact

Łódź

Bzura: intercommunal union

REPAiR inspired aim to transform

From Waste Management

to a Circular Economy Center

Ghent

Pécs

REPAiR as good practice of co-creation of eco-innovation and green employment.

European Green Capital Application 2020

Thank You

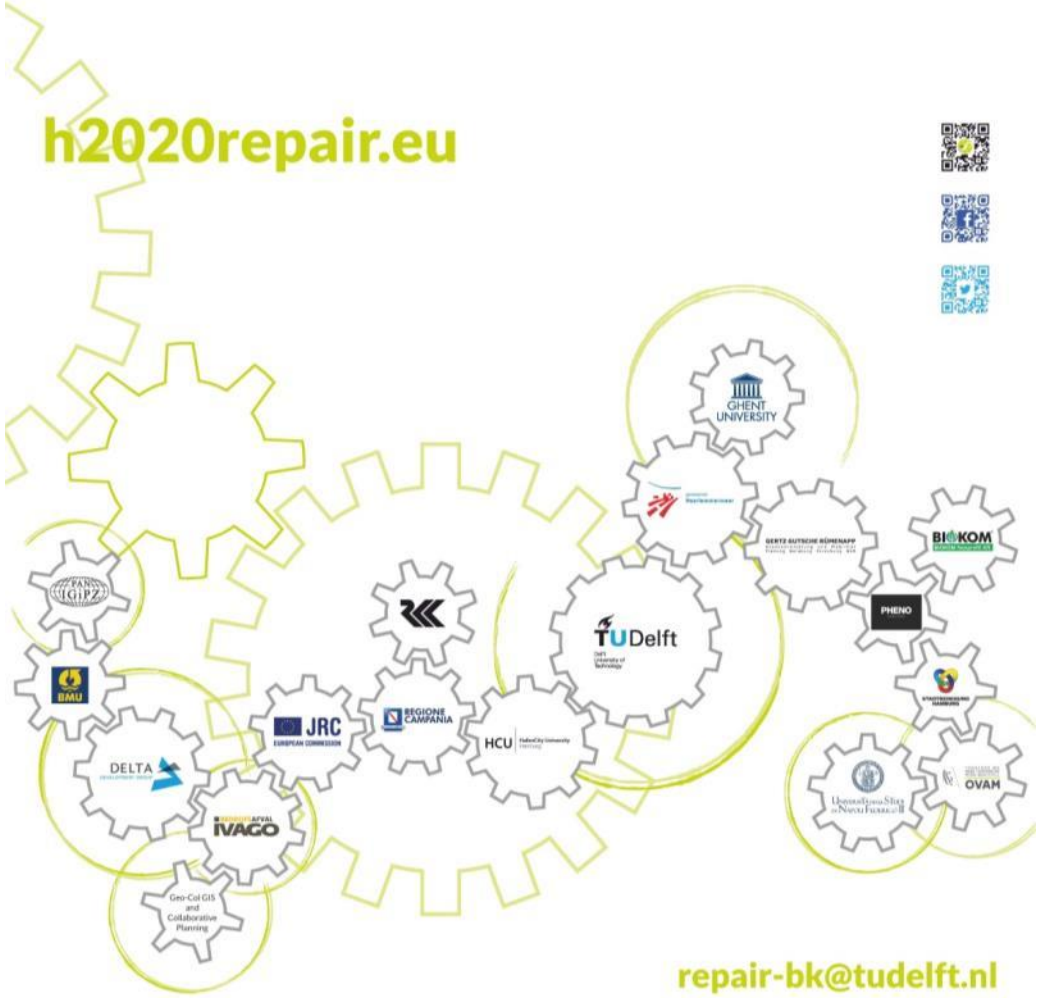

h2020repair.eu
GHENT UNIVERSITY
BIOKOM
TUDelft
PHENO
BMU
JRC
REGIONE CAMPANIA
HCU
DELTA
IVAGO
OVAM
Geo-Cel GIS and Collaborative Planning
repair-bk@tudelft.nl


photo by: Ni Yan

Beyond REPAiR:

making the transition of the circular economy happen

h2020repair.eu

key results of REPAiR

panel discussion with the REPAiR work package leaders

Jens-Martin Gutsche
Gertz Gutsche Rümenapp - Stadtentwicklung und Mobilität,
WP 2 leader

Bob Geldermanns
TU Delft,
WP 3 leader

Jo Dewulf
Ghent University,
WP 4 leader

Libera Amenta
UNINA – University of Naples Federico II,
WP 5 co-leader

Andreas Obersteg
Hafencity University Hamburg,
WP 6 leader

Viktor Varjú
Institute for Regional Studies HAS,
WP 7 leader

This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 688920.
This conference reflects only the authors' view. The Commission is not responsible for any use that may be made of the information it contains.