WE CAN
DO SO
MUCH
TOGETHER

CIRCuIT

Mapping activities that support cities in their transition towards circular economy

tecnalia Inspiring Business

UN HABITAT

FOUR KEY MATERIALS CATEGORIES

STEEL

- *Used across economy in construction, transportation, industrial machinery, and consumer products*
- *40% of demand is served by secondary production in the EU, but the industry still releases some 230 CO_2 Mt per year*

PLASTICS

- *In advanced economies, packaging is a major use, followed by construction and automotive*
- *100 kg/capita is consumed annually in Europe, of which secondary plastics only represent 10% of demand*
- *130 Mt CO_2 are released annually from European production*

ALUMINIUM

- *Key uses include buildings, automotive, electrical machinery and packaging*
- *The EU imports 40% of its aluminium, sometimes from locations with very high CO_2 intensity of production*
- *In total, the CO_2 footprint of EU demand is around 80 Mt annually*

CEMENT

- *Used for construction of buildings and infrastructure*
- *Production is primarily local due to high availability of raw materials and high cost of transportation*
- *CO_2 emissions are more than 110 Mt per year, of which 55% are due to the process chemistry rather than energy*

66%

OF INDUSTRIAL CO_2 EMISSIONS

MATERIAL ECONOMICS

THE CIRCULAR ECONOMY – A POWERFUL FORCE FOR CLIMATE MITIGATION (2018)

INITIATIVES AND ACTIVITIES AT EU LEVEL

- EU Action Plan for the Circular Economy
- Revised legislative framework on waste
- EU Strategy for Plastics in the Circular Economy
- European Circular Economy Stakeholder Platform
- …

URBAN AGENDA FOR THE EU

WORKING TOGETHER FOR BETTER CITIES

CIRCULAR ECONOMY

12 PRIORITY THEMES

PARTNERSHIPS WHICH ALREADY STARTED

- INTEGRATION OF MIGRANTS & REFUGEES
- AIR QUALITY
- HOUSING
- URBAN POVERTY
- CIRCULAR ECONOMY
- CLIMATE ADAPTATION
- ENERGY TRANSITION
- URBAN MOBILITY
- DIGITAL TRANSITION
- PUBLIC PROCUREMENT
- JOBS & SKILLS IN LOCAL ECONOMY
- SUTAINABLE USE OF LAND AND NATURE-BASED SOLUTIONS

Europ
A joint initi

Association of Cities and Regions for sustainable Resource management

About | Activities | Members | News | Events

Home

ICLEI – Loca
Active in 10
Members ar

ICLEI Europ
with peers a
government

About Us

ACR+ is an international network of **cities and regions sharing the aim of promoting a sustainable resource management and accelerating the transition towards a circular economy** on their territories and beyond.

Circular economy calling for cooperation between all actors, ACR+ is open to other key players in the field of material resource management such as NGOs, academic institutions, consultancy or private organisations.

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A group o
led by t
Re

PlasticsEurope
Association of Plastics Manufacturers

FOCUS AREAS

The European Commission aims to transform Europe into a more circular and resource efficient economy. PlasticsEurope fully supports this objective.

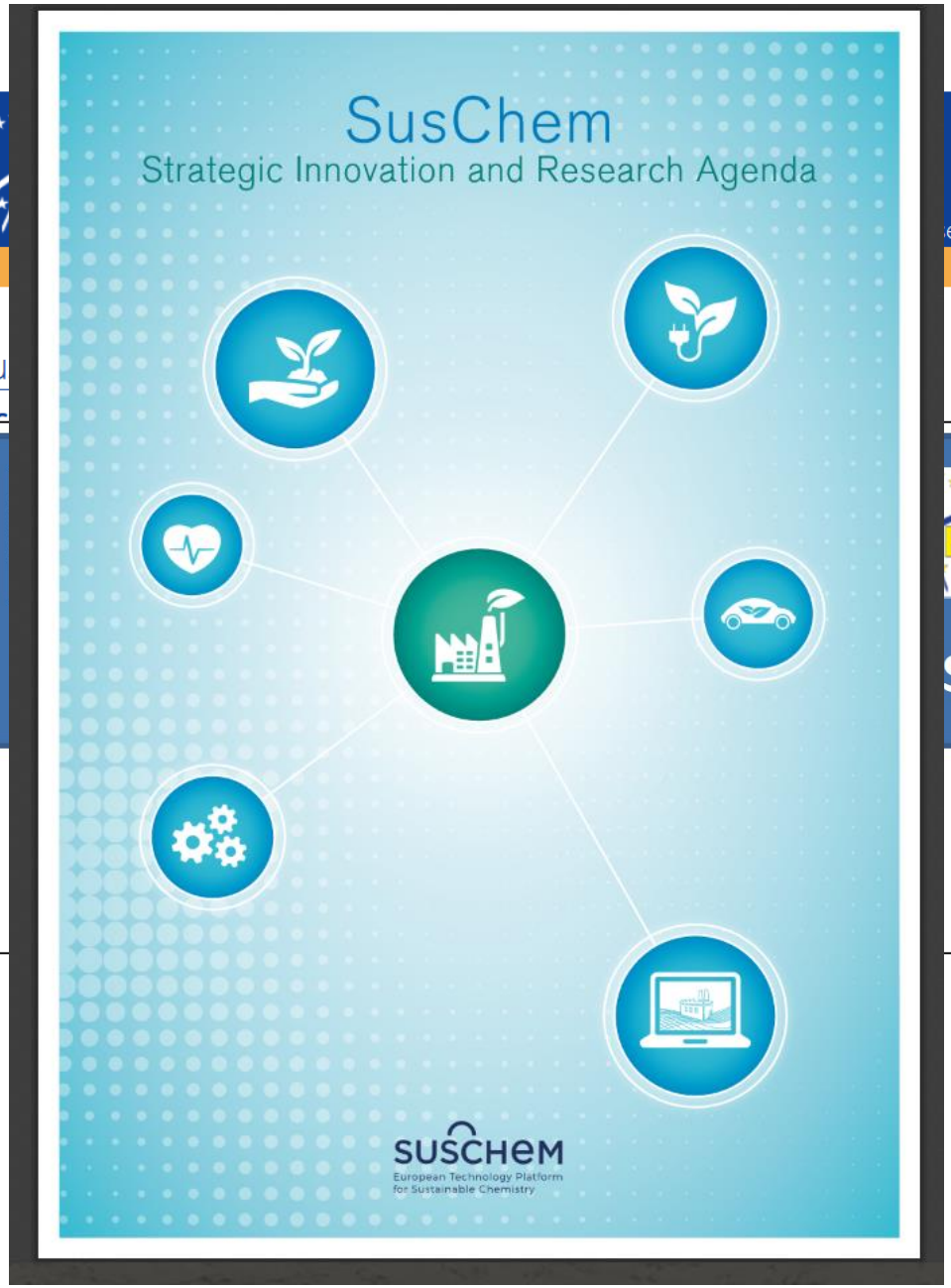
On 16 January 2018, the Vice-Presidents of the European Commission Katainen and Timmermans presented the "**European Strategy for Plastics in a Circular Economy**", part of the transition towards a more circular and resource efficient economy.

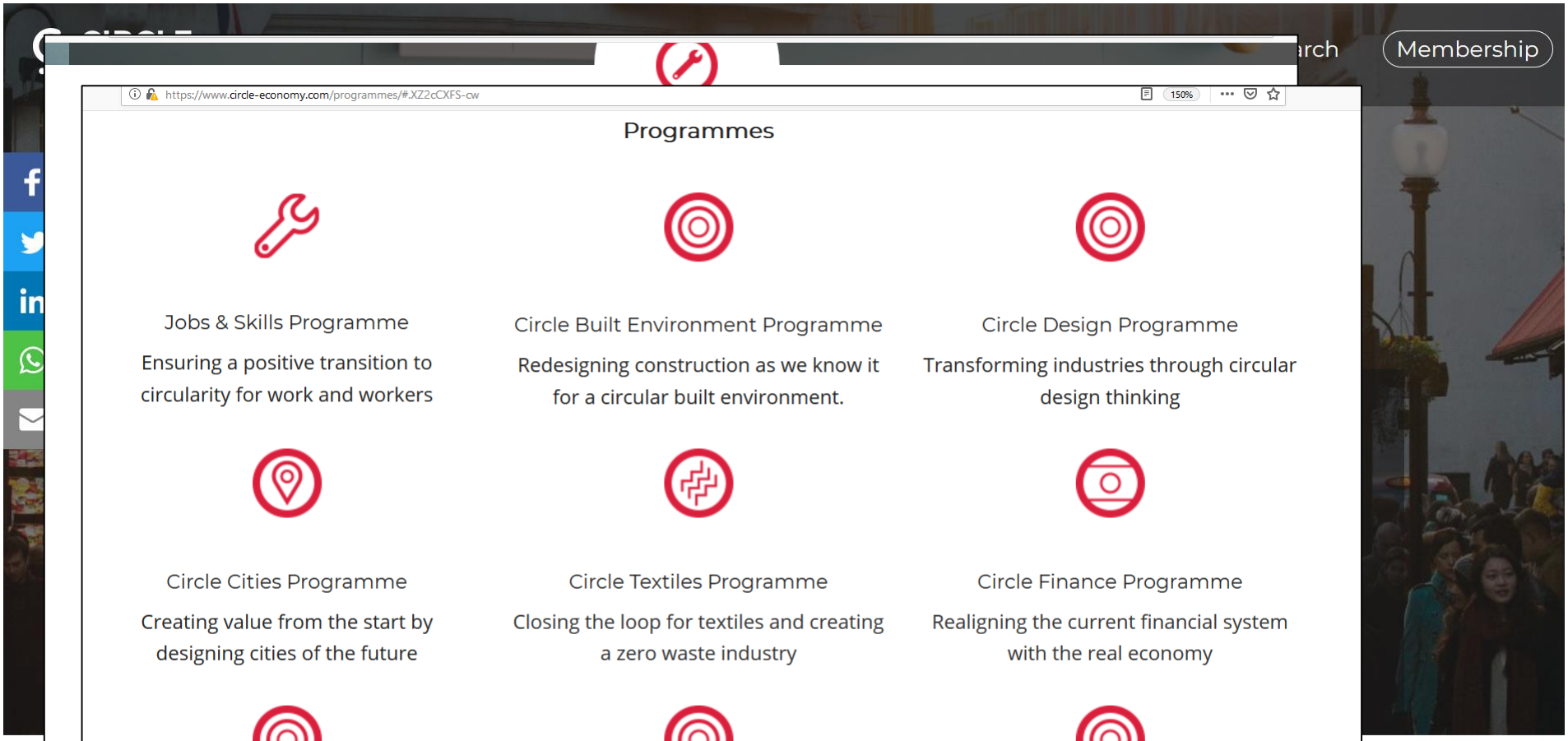
In this context, PlasticsEurope's voluntary commitment sets a series of ambitious targets and initiatives up to 2030, within a spirit of commitment to future generations.

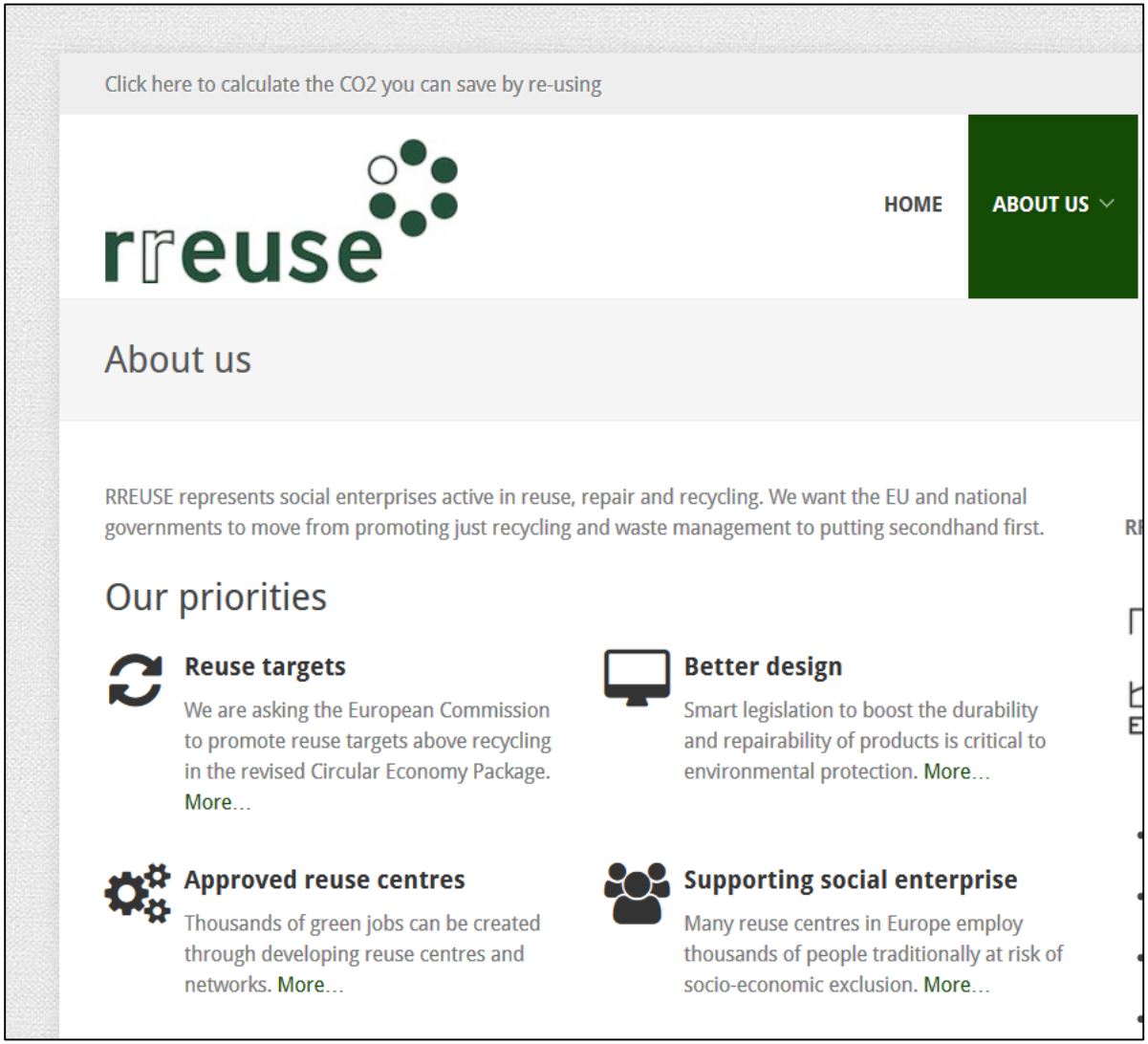
"Plastics 2030" contains a set of ambitious targets and initiatives representing the plastics industry contribution to achieve a fully circular and resource efficient Europe. PlasticsEurope is excited to engage in this transformation towards a new sustainable economic model.

IN THE SAME CATEGORY

- STRATEGY ON PLASTICS
- CIRCULAR ECONOMY
  - RESOURCE EFFICIENCY
  - SUSTAINABILITY
  - ZERO PLASTICS TO LANDFILL
    - WASTE COLLECTION, PRE-TREATMENT AND SORTING
    - RECYCLING AND ENERGY RECOVERY


SusChem
Strategic Innovation and Research Agenda
SUSCHEM
European Technology Platform
for Sustainable Chemistry


Membership
https://www.circle-economy.com/programmes/#.XZ2cCXFS-cw
150%
Programmes
Jobs & Skills Programme
Ensuring a positive transition to circularity for work and workers
Circle Built Environment Programme
Redesigning construction as we know it for a circular built environment.
Circle Design Programme
Transforming industries through circular design thinking
Circle Cities Programme
Creating value from the start by designing cities of the future
Circle Textiles Programme
Closing the loop for textiles and creating a zero waste industry
Circle Finance Programme
Realigning the current financial system with the real economy
Netherlands Circular Hotspot
Spearheading a movement towards
Nederland Circulair!
Transitioning the Netherlands towards
European Remanufacturing Network
Encouraging remanufacturing


Click here to calculate the CO2 you can save by re-using
rreuse
HOME
ABOUT US
About us
RREUSE represents social enterprises active in reuse, repair and recycling. We want the EU and national governments to move from promoting just recycling and waste management to putting secondhand first.
Our priorities
Reuse targets
We are asking the European Commission to promote reuse targets above recycling in the revised Circular Economy Package. More…
Better design
Smart legislation to boost the durability and repairability of products is critical to environmental protection. More…
Approved reuse centres
Thousands of green jobs can be created through developing reuse centres and networks. More…
Supporting social enterprise
Many reuse centres in Europe employ thousands of people traditionally at risk of socio-economic exclusion. More…

Status of waste is a problem
Need of End-Of-Waste criteria at EU/national level

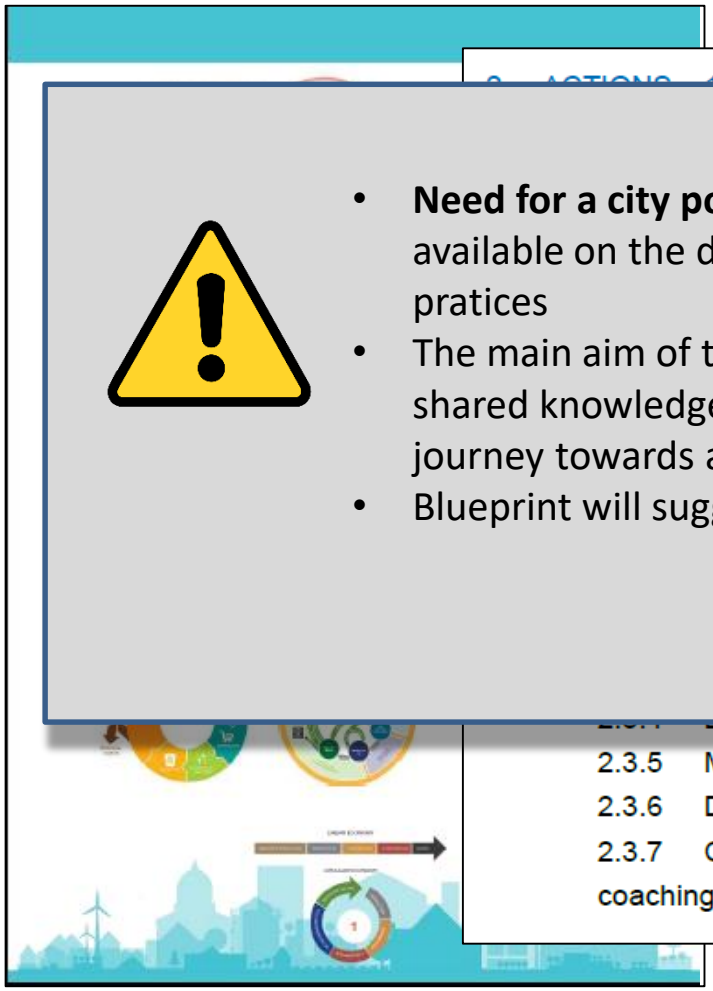
No oficial End-of-Waste criteria for many waste streams (i.e. C&D waste) at EU level → case by case (labor intensive)

→ Adapted legislation would be a lever for:

- Local administration
- Economic actors,
- Community involvement (facilitate initiatives for re-use, like setting up repair or second-hand shops)

- The term ‘urban wastewater’ is, according to European legislation, defined as domestic wastewater or the mixture of domestic wastewater with industrial wastewater and/or runoff rain water. Most cities have one system for collecting urban wastewater, including wastewater from industries and commercial activities which results in the limitation for these cities to re-use water;
- Wastewater from industrial production activities has more regulatory limitations than urban waste water;
- The lack of minimum quality requirements for water in its different uses and processes, like different quality standards for recycled water, results in the use of treated wastewater simply being forbidden

The European Commission is finalising a legal proposal on water re-use based on the JRC report on minimum requirements for water re-use for agricultural irrigation and aquifer recharge.



- **Need for a city portal with relevant information and** resources freely available on the development of the circular economy in cities. Good pratices
- The main aim of the action is to contribute to the creation of an openly shared knowledge basis that would inspire and guide cities in their journey towards a circular economy.
- Blueprint will suggest topics to be featured on the portal

Not enough focus is put on waste prevention, re-use, repair

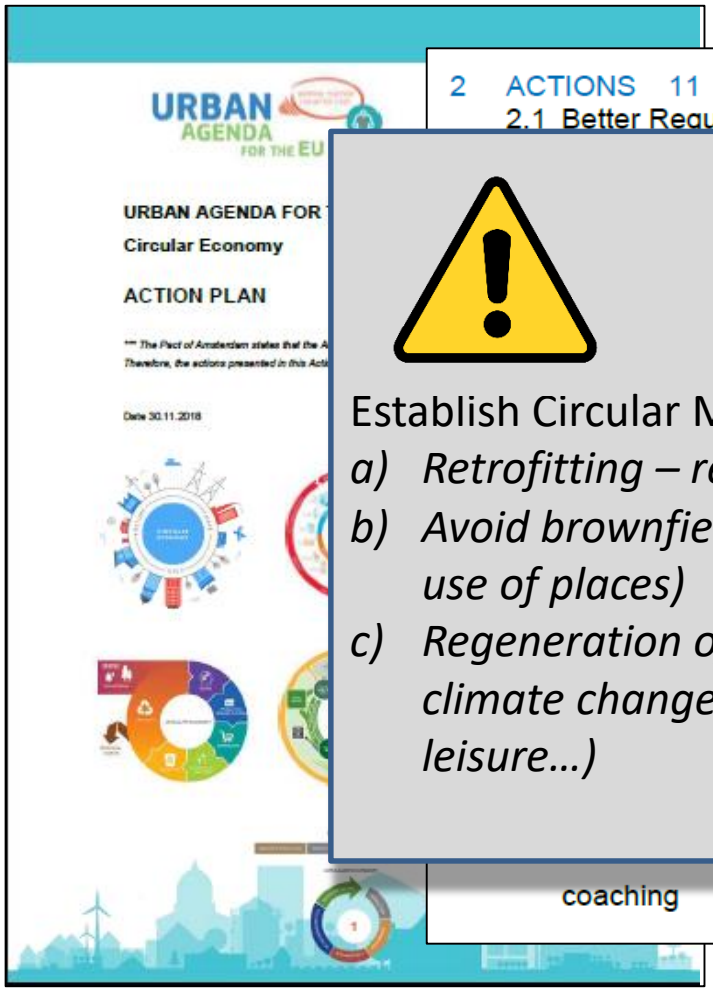
Cities need **a designated multifunctional place** where waste prevention, re-pair and re-use would be both promoted and exercised in practical terms

→ Analyse impact of already established centres and through a classification of the centres, review critical success factors and transferrable qualities
→ Enabling knowledge exchange platforms → creation of a city network
→ Ensure a sustainable organisation of European Resource Centres. The network would investigate funding opportunities

Establish a practical roadmap which enables cities to develop an urban resource management plan. In this Roadmap, the three main elements of resource management will be incorporated:

a) *mapping of resources and resource flows,*
b) *brokerage facilities to bridge the gap between supply and demand*
c) *the monitoring of results.*

Need for improved resource efficiency, meaning reduction of the use of virgin resources and increased use of secondary resources



2 ACTIONS 11
2.1 Better Regulation 11
11
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54
coaching

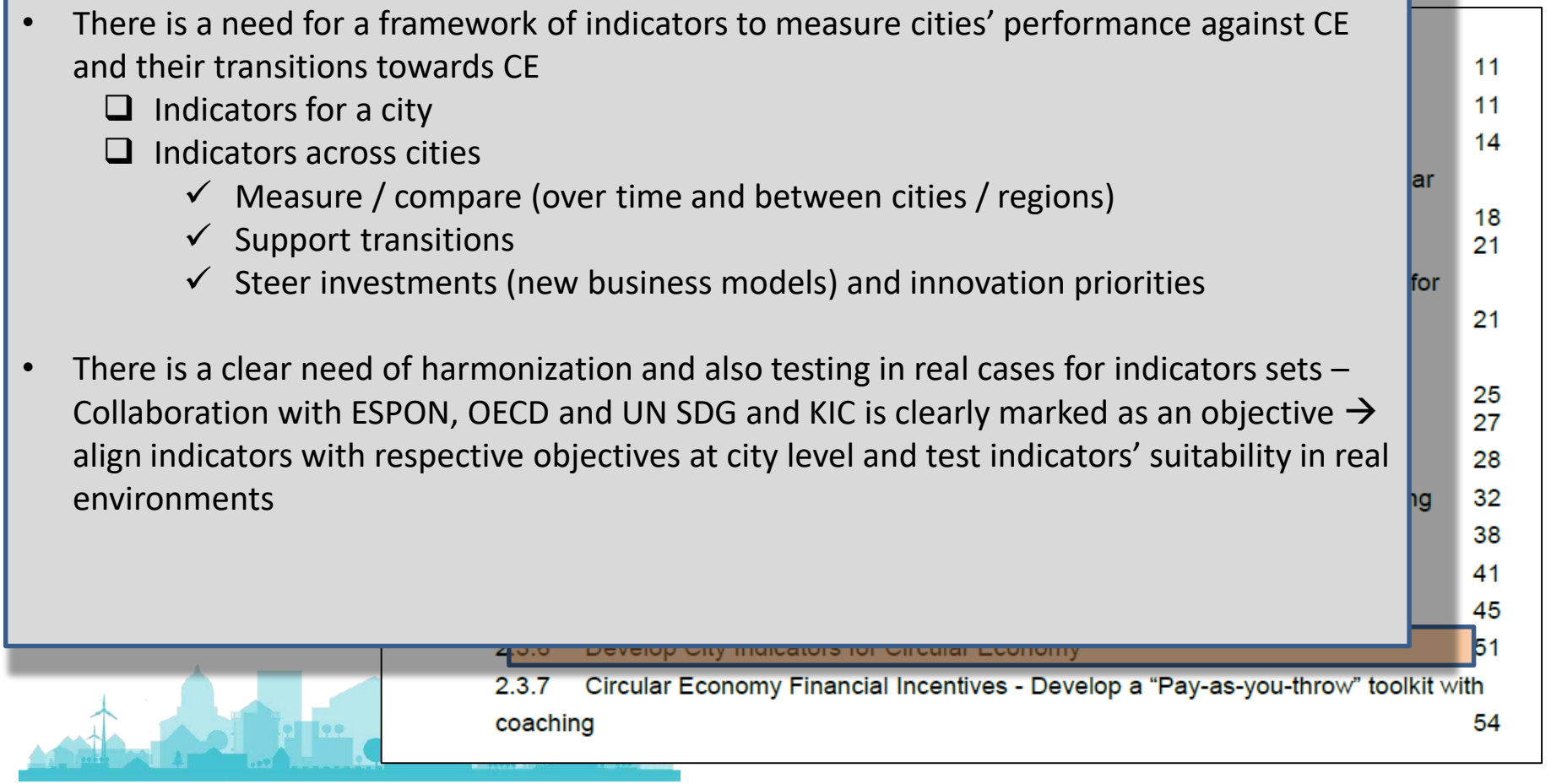
BROWNFIELDS or WASTESCAPES

Establish Circular Management of land and buildings

a) *Retrofitting – refurbishment of existing buildings*
b) *Avoid brownfields → Circular land management (i.e. temporary use of places)*
c) *Regeneration of brownfields towards service provision (NBS, climate change adaptation, carbon sink, aquifer recharge, leisure…)*

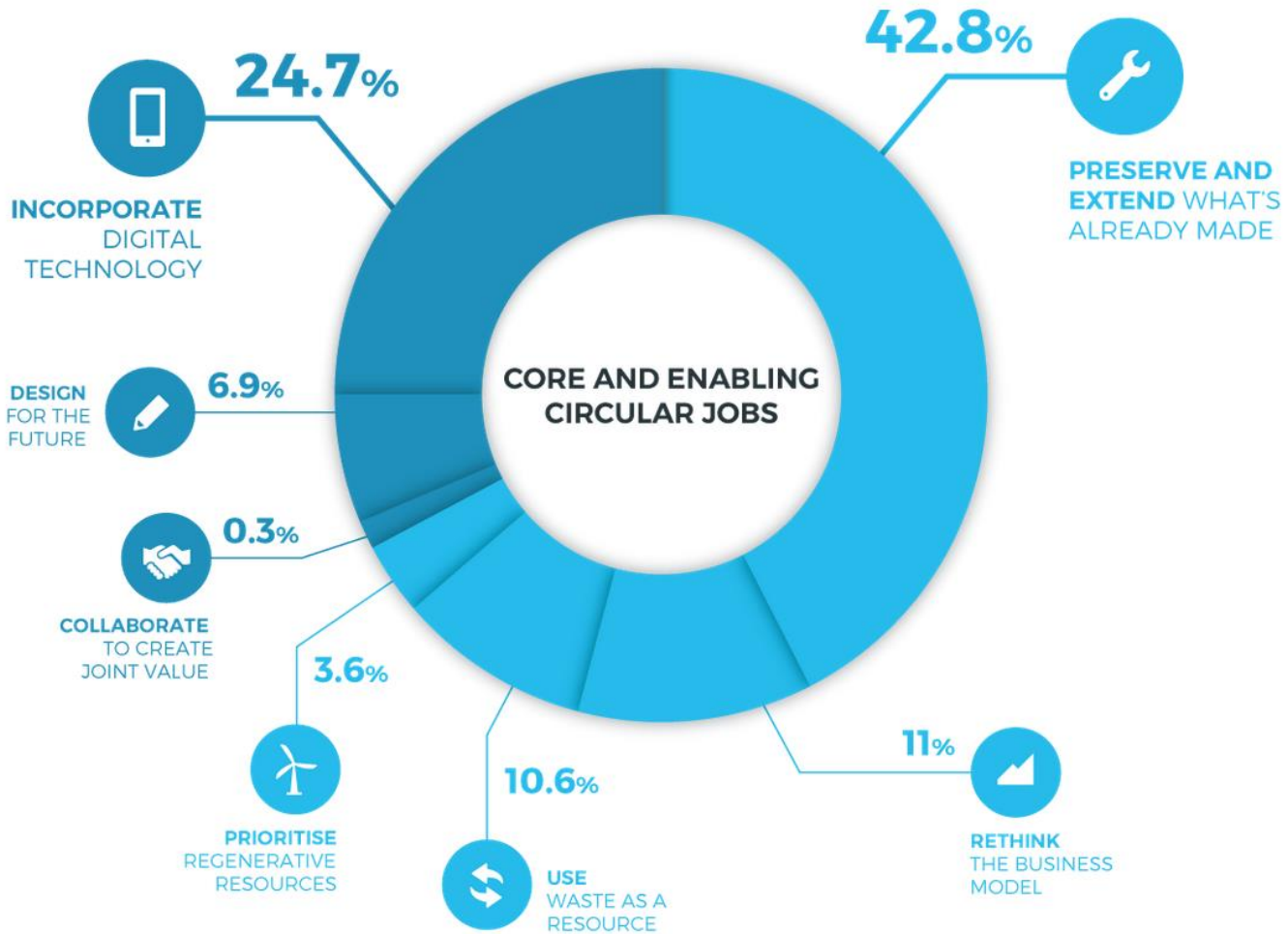
- There is a need for a framework of indicators to measure cities' performance against CE and their transitions towards CE
  - ❑ Indicators for a city
  - ❑ Indicators across cities
    - ✓ Measure / compare (over time and between cities / regions)
    - ✓ Support transitions
    - ✓ Steer investments (new business models) and innovation priorities

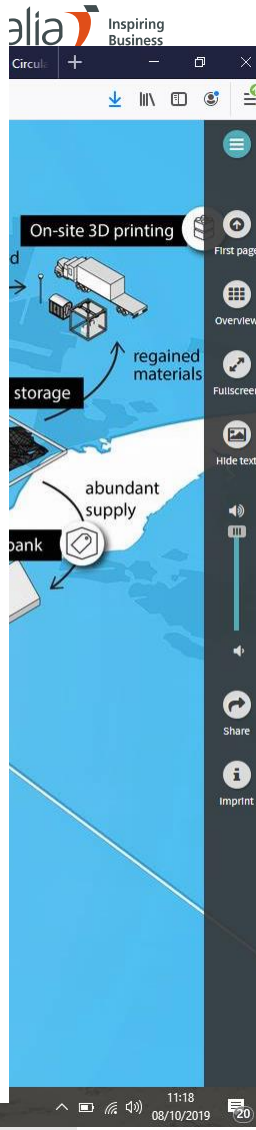
- There is a clear need of harmonization and also testing in real cases for indicators sets – Collaboration with ESPON, OECD and UN SDG and KIC is clearly marked as an objective → align indicators with respective objectives at city level and test indicators' suitability in real environments



The Partnership recommend the European Commission to:

- Mainstream Circular Economy dimension into ISO and BSI certification. Circular economy aspects are also to be considered in the ISO and BSI certification processes.
- Look into the possibilities of using Directive 2006/112/EU on Value Added Tax (VAT) as a measure to reduce waste by specifically boosting re-use and repair routes, to retain value of products as long as possible. This is the primary category of the waste hierarchy and therefore deserves serious attention.
- Use EPR as a means to set up and maintain cost-effective material processing routes that put costs at the polluter and can incentivise eco-design, while making sure that demand for the secondary material exists or is created.





together throughout the supply chain, internally within organisations and with the public sector to increase transparency and create shared value.

URBAN WINS
Waste
Resources
Innovation

Framework of intervention

The urban metabolism approach

URBAN WINS

What do cities 'eat'?

How do cities 'digest'?

What do cities 'throw out'?

UrbanWINS aims at understanding what our cities consume and discard to prevent, reduce and re-use waste, using the urban metabolism approach, both to describe processes and interactions from a qualitative point of view and to measure suitable indicators to sustain decision making processes.

Understanding the factors that influence the urban metabolism → Transform these factors in positive drivers

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UrbanWINS Toolkit

The UrbanWINS Toolkit addresses various audiences that can find in the current document sources of inspiration and action to act on the improvement of the sustainability of their cities from an innovative perspective and interpretation of waste issues and policies. In order to inspire the action, the toolkit story tells UrbanWINS experiences in an easy to understand manner, explaining both the theoretical considerations behind the activities and the practical ones - the deployment side. Moreover, the toolkit includes various testimonials, case studies, resources and sectorial/thematic focus that are relevant for the understanding and replication of the approaches, as well as to get to know the people and actors behind the UrbanWINS approach.

3 - Stakeholder engagement process

This part includes a theoretical description of the stakeholder identification and engagement processes with a focus on urban waste actors, as well as detailed explanations of the participatory processes that have been carried out in the face-to-face agoras of the UrbanWINS project.

- Part 3 - Consultation process

2 - Urban metabolism approaches

This part encompasses detailed descriptions of urban metabolism theoretical approaches and various tools for its implementation, such as UMAn, Material Flow Analysis, Life Cycle Assessment, urban accounts and indicators, as well as various sectorial / thematic case studies that can be used across the life cycle of waste policies.

- Part 2A - Urban Metabolism
- Part 2B - DPSIR model and LCA
- Part 2C - SPF and Action Plans focus

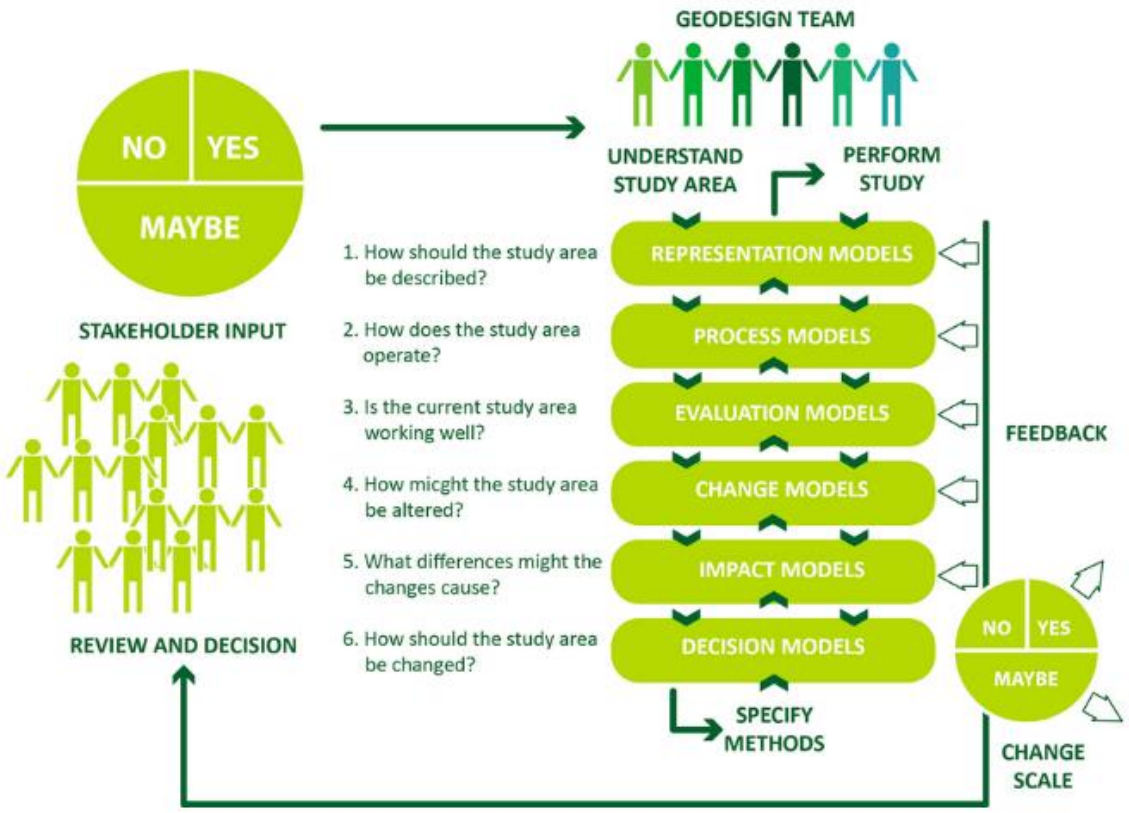
REPAiR

REsource Management in Peri-urban AReas: Going Beyond Urban Metabolism

REPAiR

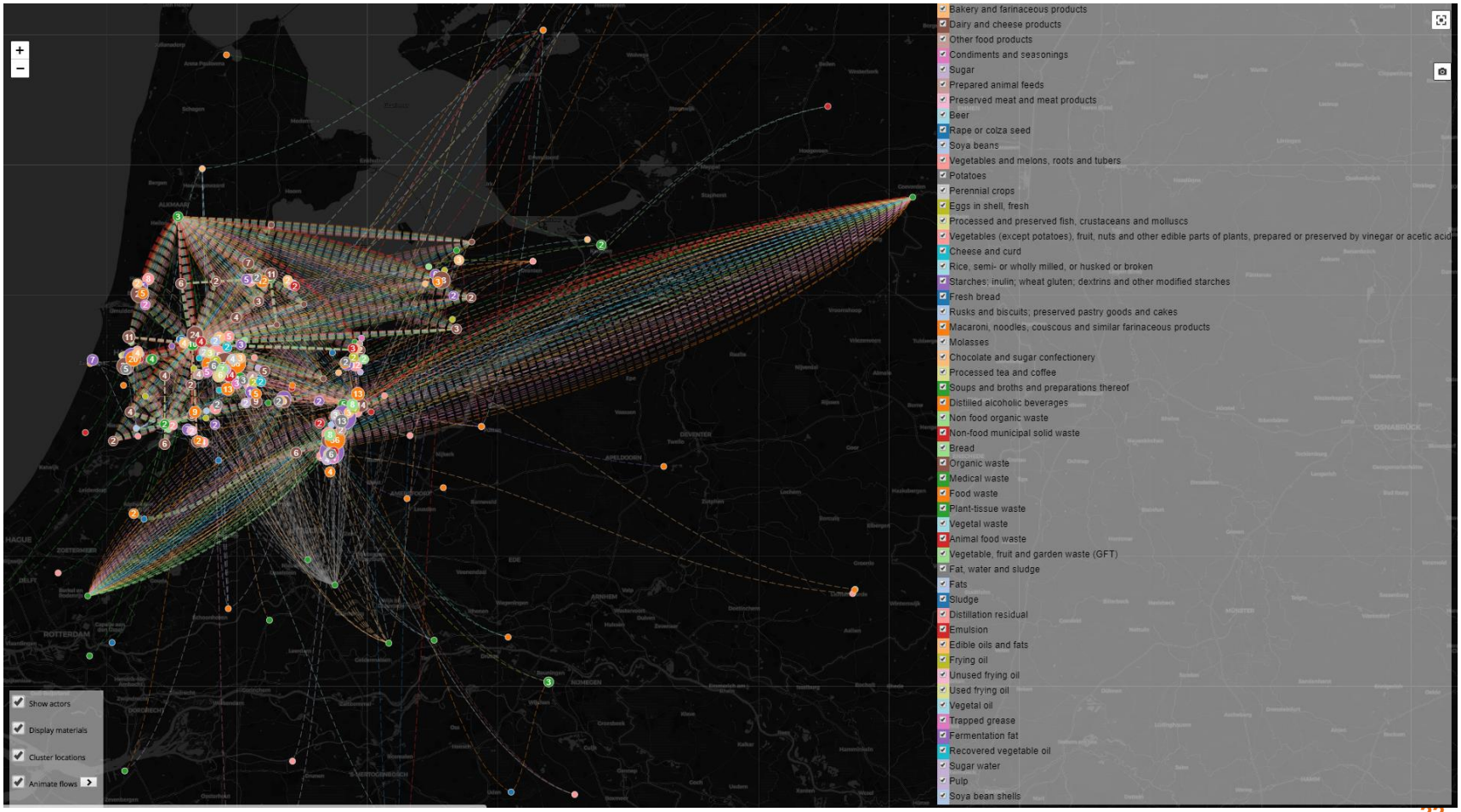
Manag ment

The core obje h an innovative
transdisciplin SE) developed
and impleme for 'an
integrated pr ch includes
project conce ternative design,
impact simul al, political and
social actors i



Activity-based Spatial Material Flow Analysis (AS-MFA)

Spatial, insightful, interactive and actor-specific understanding of resource flows



CINDERELA

New Circul… Economy Business Model for More Su…

A.García, J.Del Pozo, P.Menger, F.Cagigal, L.Barriuso (1), L.Gullon, S.Rosa…
(1) TECNALIA, (2) FGP, (3) ZAG, (4) IETU, (5) TUDelft, (6) KplusV

CINDERELA dvelops an… model (CinderCEBM) ai… environment (CinderOS… find how they can profi… turning secondary raw… waste streams into con… engineering applicatior…

CinderOSS:

Provides a digital environment enabling setting of circular business models depending on regional/local conditions together with information on SRM availability and the associated stakeholders

Delivers evidence-based knowledge on the enabling framework conditions for design, production and use of SRM-based construction materials

Helps build confidence in SRM-based construction materials by providing reliable test data on their performance based on testing protocols meeting the needs of construction sector requirements

CinderOSS and CinderCEBM are built upon and validated in real environments under six DEMO pilots:

- Phosphorous extraction as a step in a cascading recycling of sewage sludge as SRM
- Production of SRM construction products for building and civil engineering applications
- Geotechnical works with the use of SRM-based materials to revitalise a degraded area
- Construction of a building with SRM-based materials
- Construction of a road with SRM-based materials
- 3D printing of a building component involving combination of robotic 3D printing and recycled plastic waste

CINDERELA One-Stop-Shop

Services for developing demand-side measures and administrative / legal procedures for working with SRM-based construction products

Holistic Innovative Solutions for an Efficient Recycling and Recovery of Valuable Raw Materials from Complex Construction and Demolition Waste (HISER)

HISER project goal is to
gathering and data proc
during the execution of
tracking system, more
contribute to the impr
materials arising during
sorted waste materials v

Smart demolitions and refurbishments

Automated sorting and recycling technologies

Automated quality assessment system

New building products

Case studies

Integrated Environmental and Economic Assessment from Life Cycle Perspective

Policies and Standards Recommendations

ethodological solutions and tools

POLICY - STANDARDS

HIGH QUALITY SRM

ical solutions and tools facilitating the data
a highly efficient selective sorting at source
IM-SD tool and an innovative supply chain
ngs will be available. Those solutions will
g and management of subsequent waste
. Consequently, higher amounts of onsite

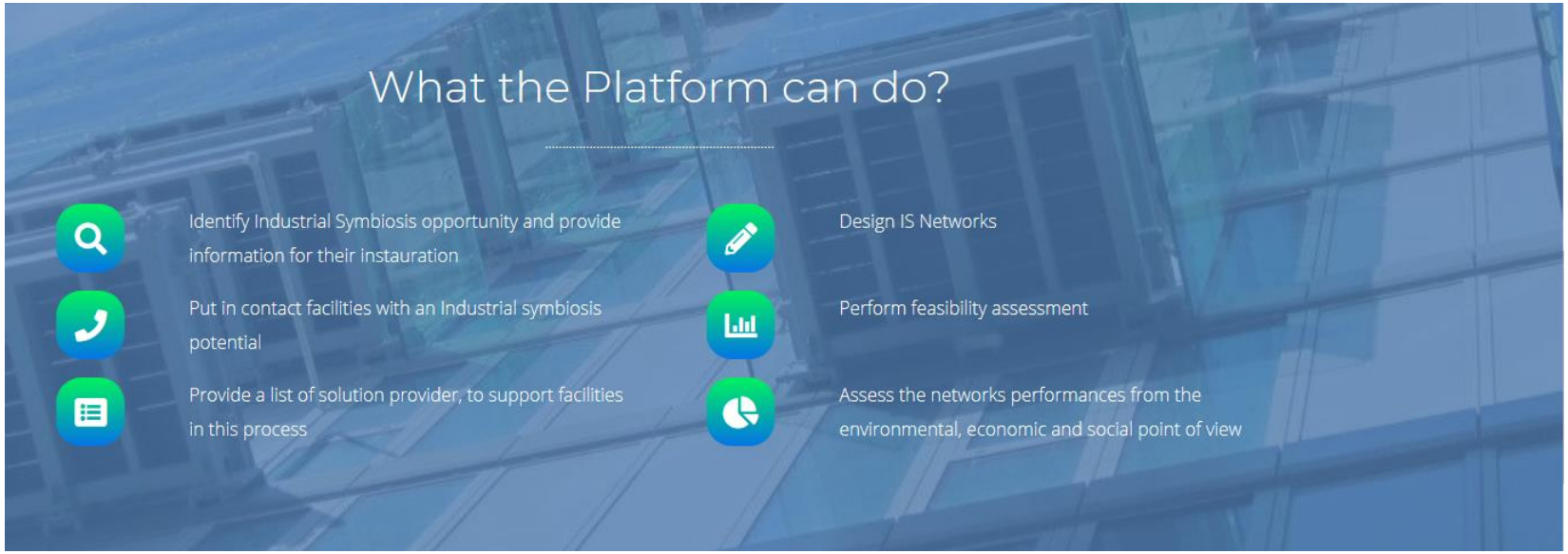
FISSAC

Fostering Industrial Symbiosis for a Sustainable Resource Intensive Industry across the extended Construction Value Chain

EVALUATION OF THE REPRODUCIBILITY OF THE IS MODEL TO OTHER SECTORS

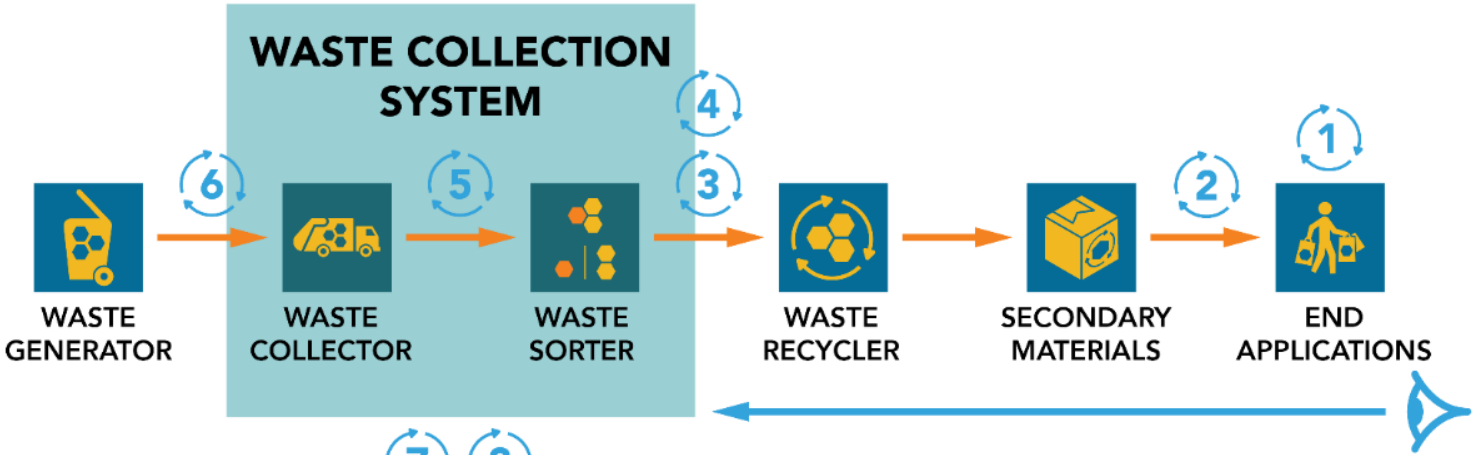
ABOUT FISSAC

The FISSAC project involves stakeholders at all levels of the construction and demolition value chain to develop a methodology, and software platform to facilitate information exchange, that can support industrial symbiosis networks and replicate pilot schemes at local and regional levels.



COLLECTORS
WASTE COLLECTION SYSTEMS ASSESSED AND GOOD PRACTICES IDENTIFIED

Waste push → linear economy
Waste push + market pull → circular economy



Assessment of performances on:

- *Material quality for recycling*
- *Societal acceptance (citizens)*
- *Economic performance (CBA)*
- *Environmental performance (LCA)*

Identification of complementarities, trade-offs, and opportunities.

Objectives

Key area 1: Improve and adapt CE tools and models to the manufacturing sector

- Develop novel business models
- Improve design tools and methodologies
- Develop novel repair and remanufacturing models with a focus on reverse logistics
- Implement an IT platform connecting all value/supply chain stakeholders

Key area 2: Implement CE tools and models in a large-scale white goods demonstrator

- Apply new business models
- Apply design tools and methodologies
- Apply novel repair and remanufacturing models
- Implement IT platform with usage tracking and health monitoring functions
- Evaluate environmental, economic and social impact of the demonstratorstor

Key area 3: Implement CE tools and models in a large-scale automotive parts demonstrator• Apply new business model

- Apply design tools and methodologies
- Apply novel reverse logistics models
- Implement IT platform interconnecting all trade levels
- Evaluate environmental, economic and social impact (customer acceptance) of the demonstrators

Key area 4: Conduct dissemination and exploitation activities

- Disseminate demonstrator results
- Communicate circular value models
- Develop a sustainable value/supply chain systems around each demonstrator
- Influence policy-makers

- Development of PSS design procedure → replicability for other goods and services (multiplier effect) → dematerialization – resource efficiency – waste prevention
- Demonstration with white goods sector, strong implication of end-users (citizen) in a pay-for-use model → identify improvement potentials of the model
- Training / awareness raising needs for either OEM and end-users

Circusol

Circular Business Models for the Solar Power Industry

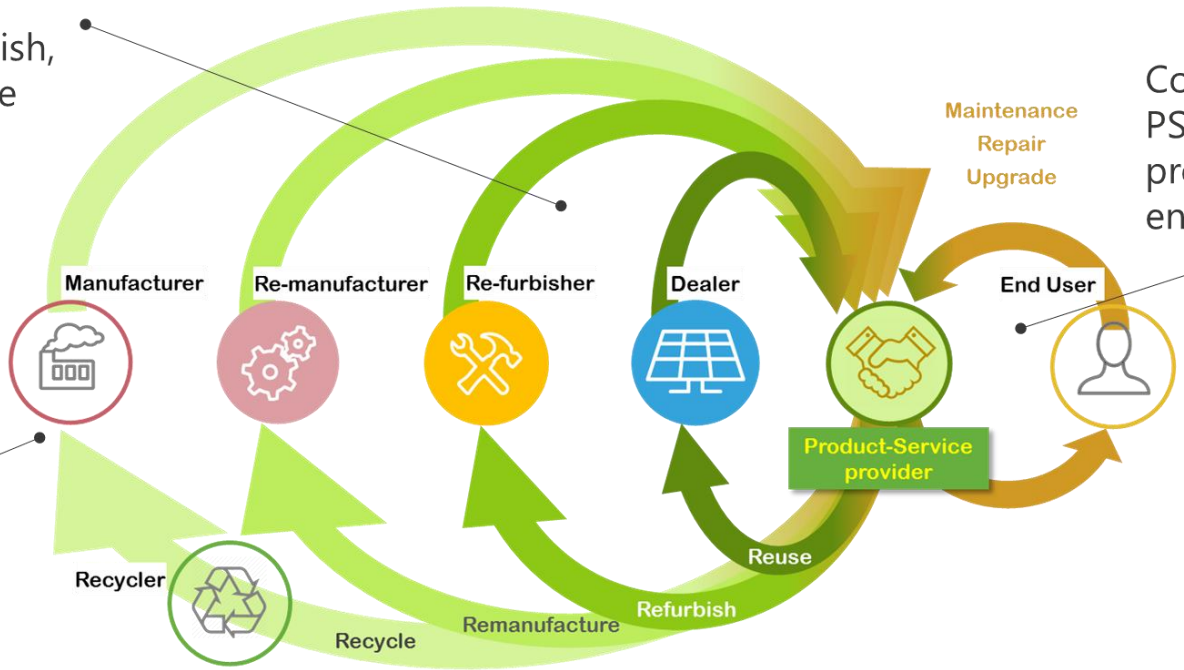
BY 2030...

8 million tons of PV	**2 million** old batteries	**13 GW** solar power for EU	**25 GWh** storage capacity for renewable energy
WILL BE DISCARDED AS "WASTE"	WILL BE REMOVED FROM EV	CAN BE PROVIDED BY SECOND-LIFE PV	CAN BE PROVIDED BY SECOND-LIFE BATTERIES

Circusol

Develop "second-life" paths — re-use, refurbish, remanufacture

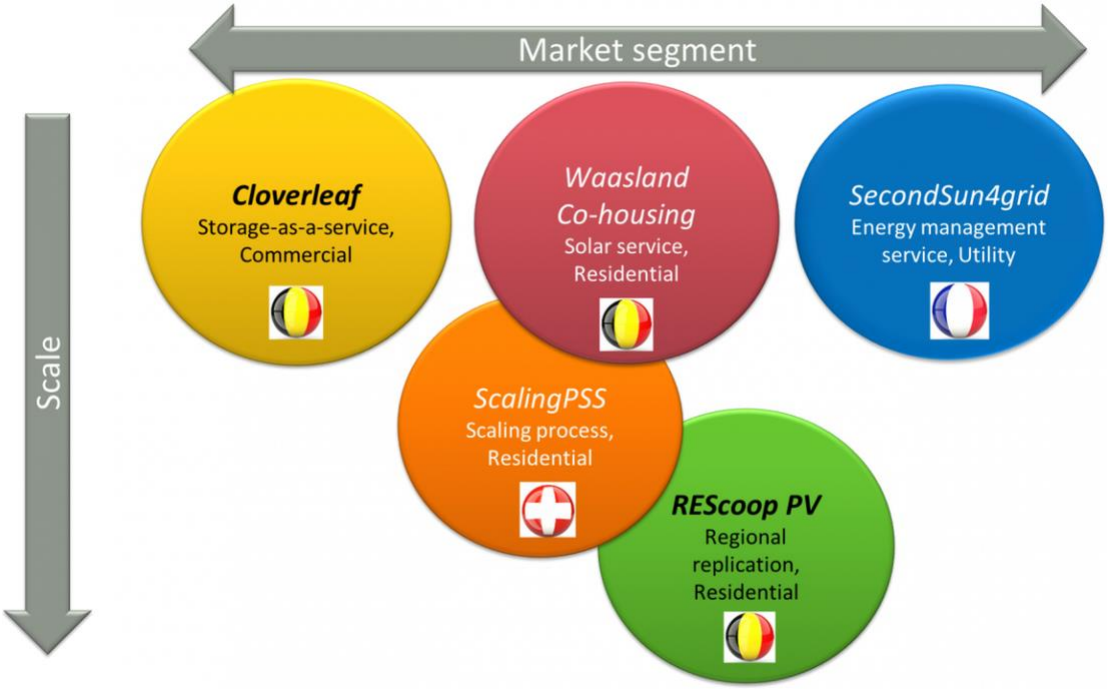
Co-create solar PSS value propositions with end-users



Incentivize "design for circularity"

Circular PSS Model = Circular Product Management + Value-added Product-Service

Circusol



- Identify weak points of the PSS model and strengths
- Fill the gap on asset information for better EoL management → connect actors along the value chain (manufacturer, service provider, dealer, refurbisher, remanufacturer, recycler)
- Replicability of model and lessons learned for other sectors → opportunity for testing in real environment

VERAM

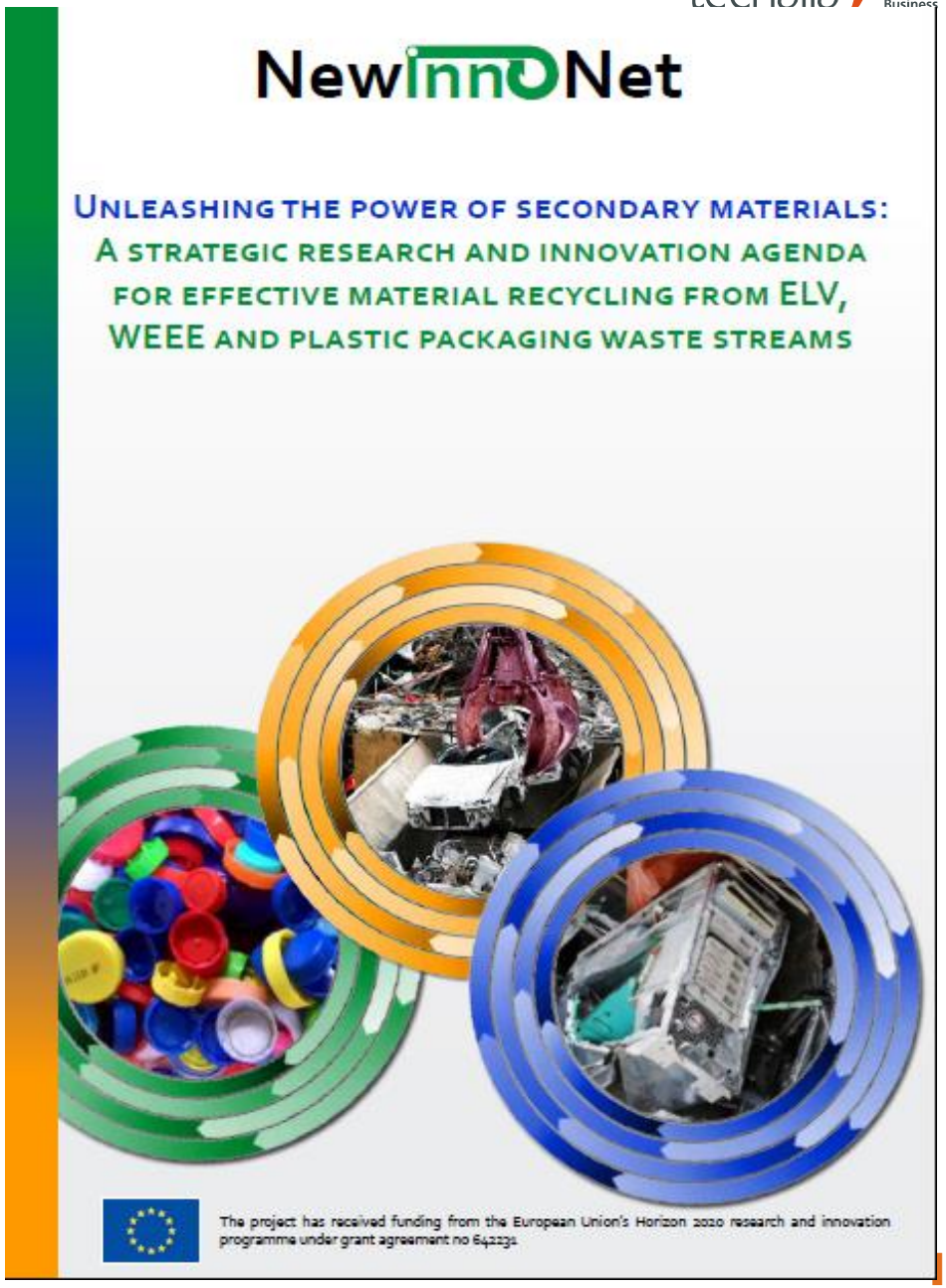
Vision and roadmap for European raw materials

- Multicriteria analysis (world, EU and national policies [i.e. long term vision], current R&I programmes, industrial needs assessed)
- 3 different scenario for 2050 horizon
- Definition of transition landscapes for future RM priority research issues

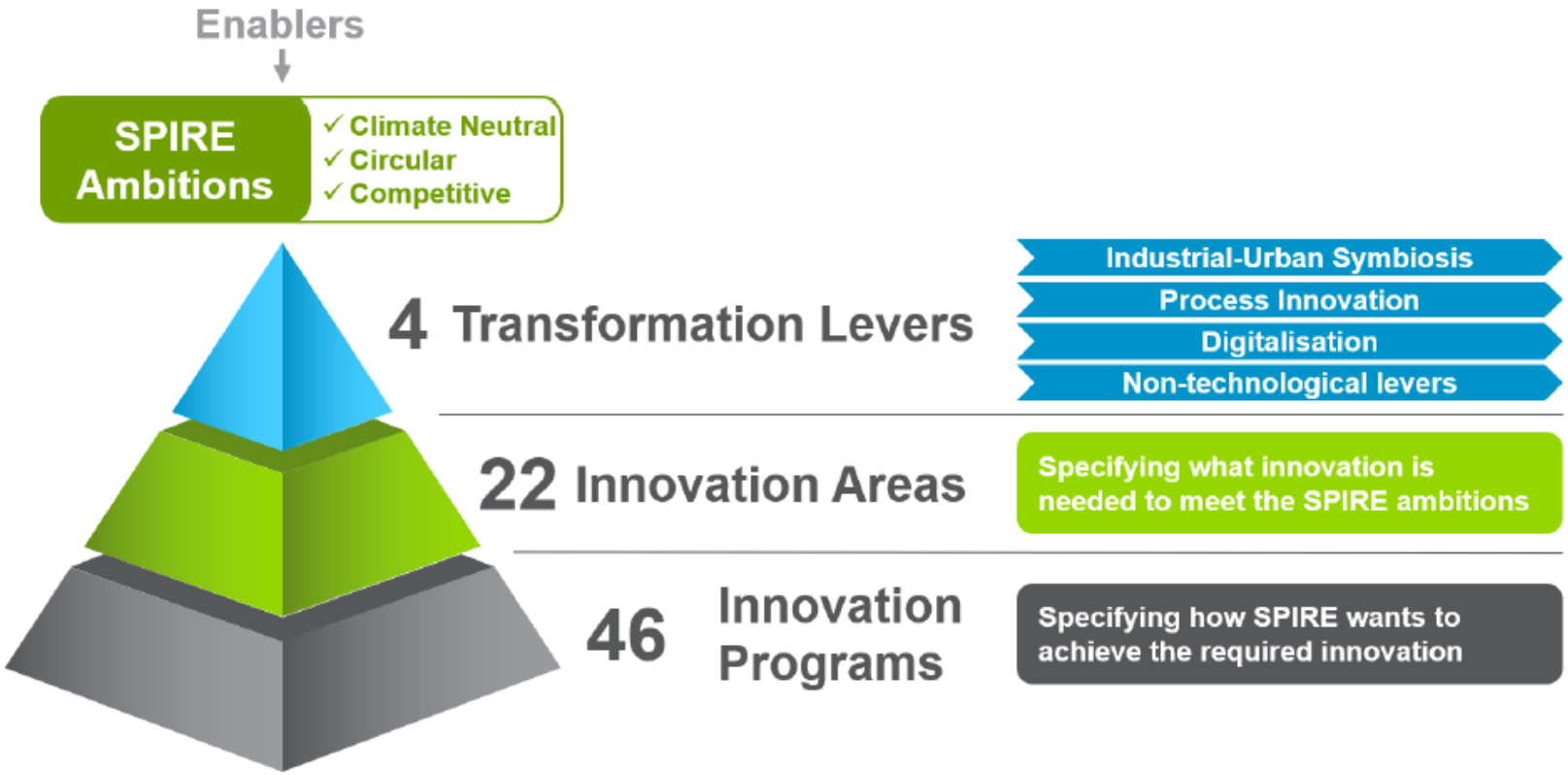
- Fostering a sustainable supply of raw materials to feed new and existing value chains (16 R&I issues identified)
- Resource-efficient processing for raw materials (13 R&I issues)
- Raw materials in new products and applications (20 R&I issues)
- Closing material loops by maximising the recycling of products, buildings and infrastructure (12 R&I issues + 3 specific to CRM, also includes design 4R topics)

NewInnoNet | The Near-Zero European Waste Innovation Network

- Bottom-up approach
- Evidence based (use cases)
- 5 R&I themes
  - Effective collection
  - Optimized sorting and recycling
  - Well functionning market for recycled raw materials (SRM)
  - Supporting policies and legislations
  - Design for circularity
- Total of 35 research topics across the 3 waste streams



SPIRE ROADMAP 2050



HUBS4Circularity – the territorial connection

A H4C should act as a competence and resource hub and set up a voluntary industrial and social culture of emissions and waste reduction, business and job development by connecting process industries to territories (I.e. regions, cities, harbours, geographical basins) and business partners (SMEs, other sectors, RTOs, civil society, funding and financial institutions, etc…). They jointly identify the society, customers and stakeholder **demands** (needs to cover) and co-develop adequate **solutions**.

- Connecting industry with regions/cities
- Broad: feedstock, energy, water
- Enabler for Industrial Symbiosis initiatives
- Ground for developping/testing/accelerating circular economy transitions as participating organizations have trust and common objectives

Key Component 5:

Real-life living labs

General Objective:

This Key Component is developing the migration paths towards the future water-smart society, by applying the innovations developed within the other Key Components of the present Water Europe SIRA.

Progress in the water sector towards solving our major challenges not only results from technology developments, but especially by combining **6 levels of innovation**:

1. **Technology developments on digital technologies**, such as big data and satellite based monitoring, forecasting and advanced decision support systems for smart water management;

2. **Emerging technological developments** towards better and upgraded infrastructures, cost-effective water treatment, extraction and pre-treatment of valuable substances in waste water and enabling closed loops;

3. Innovations in more advanced water storage and capillary distribution systems, integrating both **grey engineered and green-infrastructures** to leverage on the inherent capabilities of nature, while closing the larger and smaller water loops and enabling diversified allocation and distribution of different water qualities for different purposes;

4. Novel participatory and **inclusive governance models** to develop and implement regionally embedded water management policies that establish incentives for efficient water use (including reuse and cascade use) while securing fair distribution and access for all, also under adverse circumstances caused by climate change effects such as increased intensity and frequency of floods or droughts;

5. **Novel business models**, which increase the exploitation of the value of and the value in water within a circular multi-stakeholder economy linked with energy harvesting;

6. Other **horizontal measures** related to policies, standardisation, skills development and entrepreneurship that enable the transformation of Europe into the Smart-Water Society as foreseen in this vision.

"Living-Labs: Real-life environments to test, fine-tune and introduce novel water-smart solutions"

ISSUES ADDRESSED IN INITIATIVES AND PROJECTS

- Exchange of good practices - platforms – networks (providing tools and guidance)
- System approaches for identifying best strategies towards circular economy
- Development of IT supported decision making tools and innovative decision making procedures (i.e. Living Labs) – Data management / MFA
- Technology development for achieving higher quality of recyclates → better SRM
- Innovative business models (IT supported)
- LCA thinking broadly addressed
- Development and testing of industrial symbiosis as innovative collaboration
- Education, but more needs to be done

SOME BLINDSPOT

- Dematerialization – needs for research on innovative circular business models, i.e. PSS for cities (design products and services systems which favor reuse, repair, remanufacture and recycling)
- Develop, intensify innovative collaboration models (return of experience, Living-Labs-Hubs, IS) and methods to evaluate their net impact (economic, environmental, social)
- Innovative funding schemes for circular economy to be tested in real cases
- Improvement in waste collection systems driven by market demand
- Technology development for achieving higher quality of recyclates → better SRM
- Digitalization as accelerator for circular economy transition (IT as vector of transactions for Circular Economy / blockchain) – SPIRE ROADMAP 2050
- Metrics for circular economy – development – implementation - evaluation
- Education, training and capacity building. Maintain efforts on citizen participation in projects

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