



CIRSEAU

Building a water-smart
economy and society

The CIRSEAU Cluster

March 2023





The CIRSEAU Cluster

About the Cluster



Our Ambition

The CIRSEAU cluster comprises a cluster of the five sister projects that were granted within the H2020 call topic CE-SC5-04-2019 entitled “Building a water-smart economy and society”.

This call was targeting at actions able to demonstrate the feasibility of a 'water smart' economy and society in which all available water resources, including surface, groundwater, waste water, and process water, are managed in such a way as to avoid water scarcity and pollution, increase resilience to climate change, appropriately manage water-related risks, and ensure that all valuable substances that could be obtained from waste water treatment processes, or are embedded in used water streams, are recovered.



Our Impact



Significantly reduced use of water from freshwater sources



Improved recovery and use of resources (materials and water itself), including energy



Mobilisation of water-related investments and synergies with other funding instruments



Creation of new business opportunities and increased competitiveness of EU industries



Successful implementation of EU water policies



Sustainable transition to a more circular economy at different scales and economic and social conditions



Increased water security, water use efficiency, enhanced resilience to climate change and achievement of the relevant Sustainable Development Goals

Our Projects

Next generation water-smart management systems: large scale demonstrations for a circular economy and society
(Grant Agreement No: 869474)

WIDER UPTAKE: Achieving wider uptake of water-smart solutions
(Grant Agreement No: 869283)

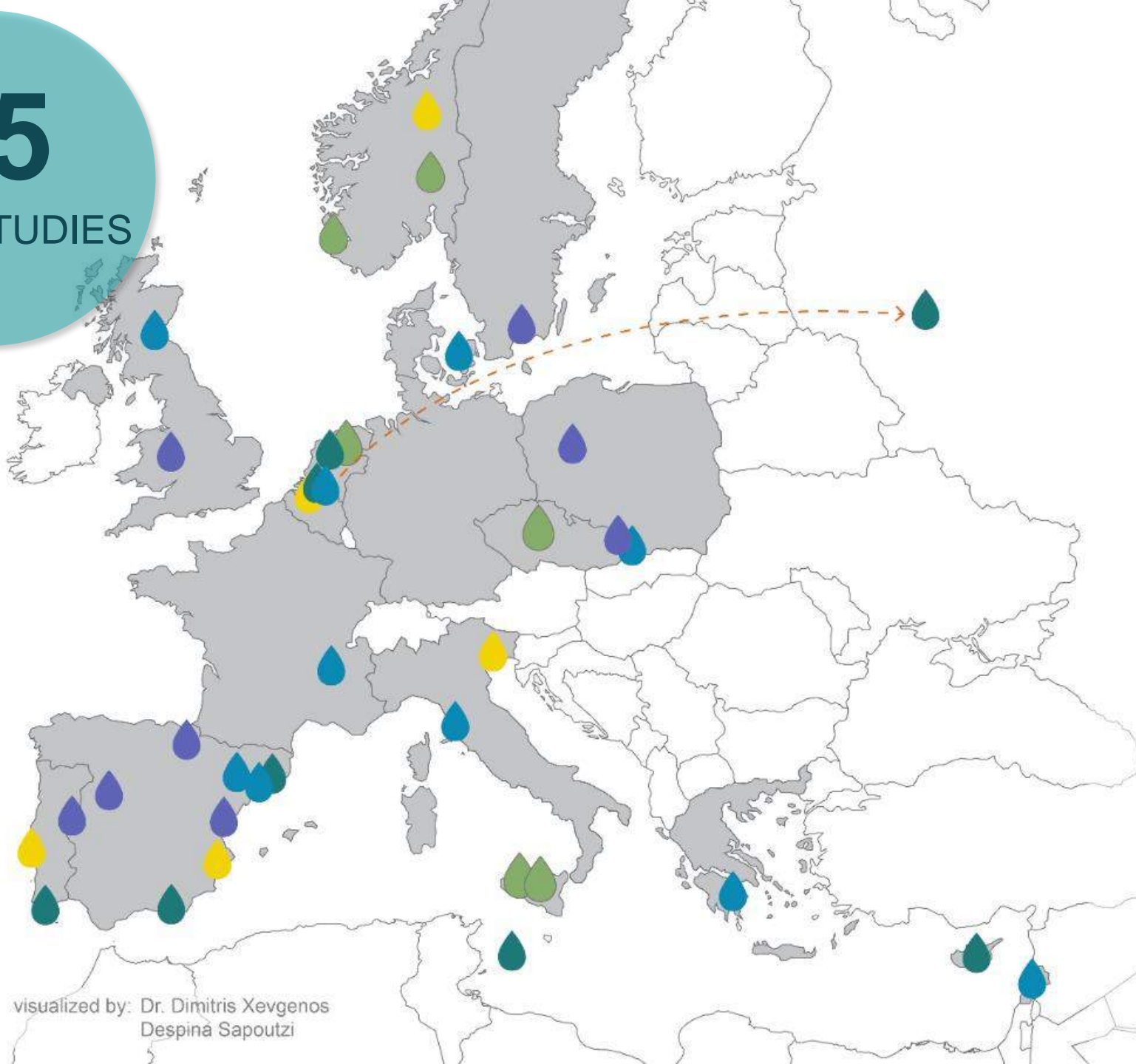


Accelerating Water Smartness
in Coastal Europe
(Grant Agreement No: 869171)

REsiliEnt WAtEr Innovation for Smart
Economy: a new smart-water ecosystem
(Grant Agreement No: 869496)

indUstry water-utiLiTy symbiosis
for a sMarter wAtEr society
(Grant Agreement No: 869318)

35 CASE STUDIES



9



9



6



6



5

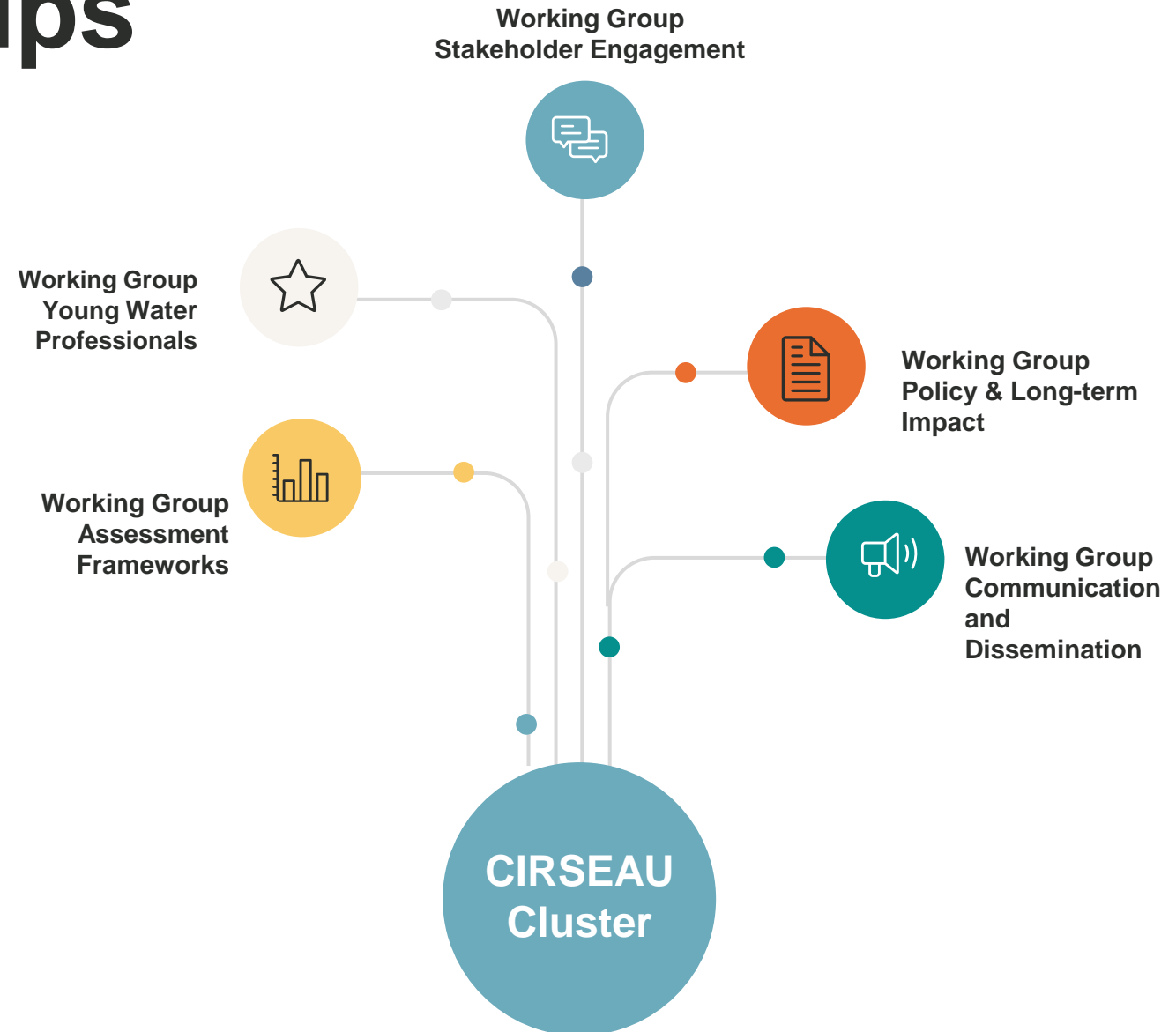


visualized by: Dr. Dimitris Xevgenos
Despina Sapoutzi



Our Working Groups

Within the CIRSEAU cluster, and with the aim to maximize the impact of all projects activities, five Working Groups (WGs) have been established:





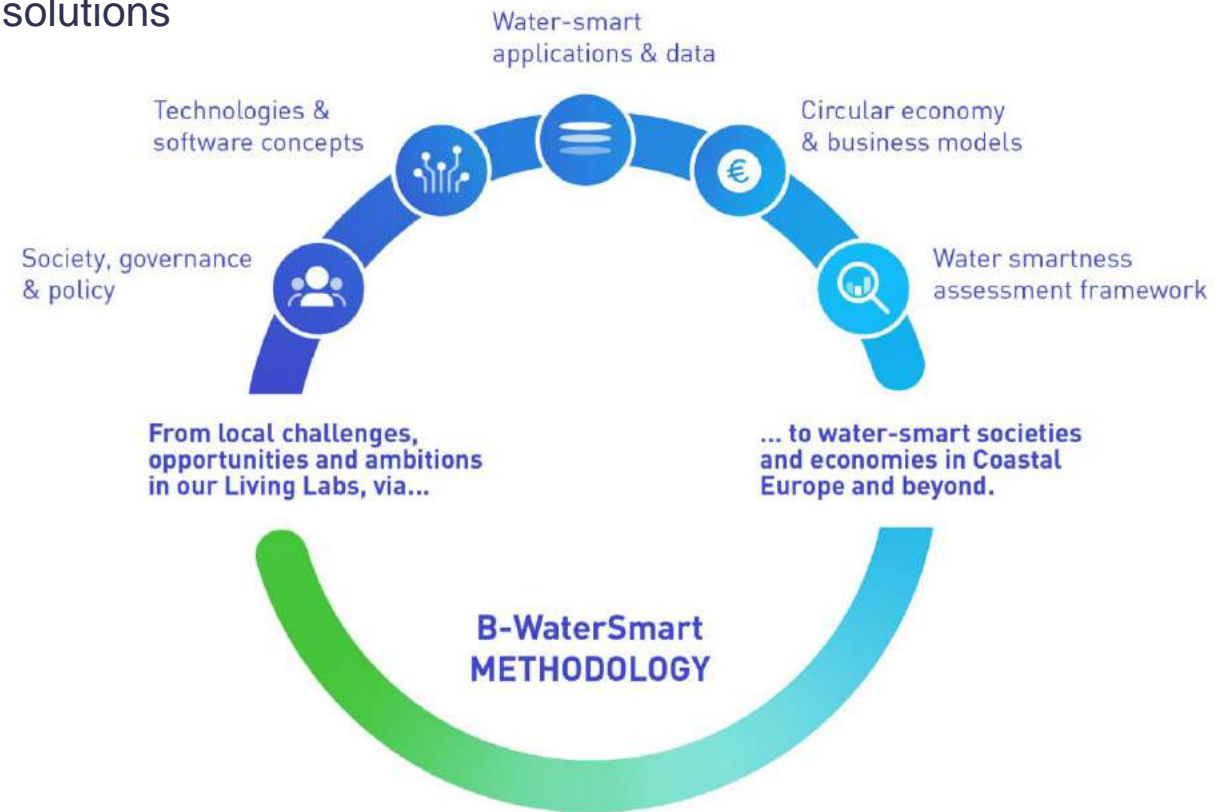
The CIRSEAU Cluster

Projects Overview



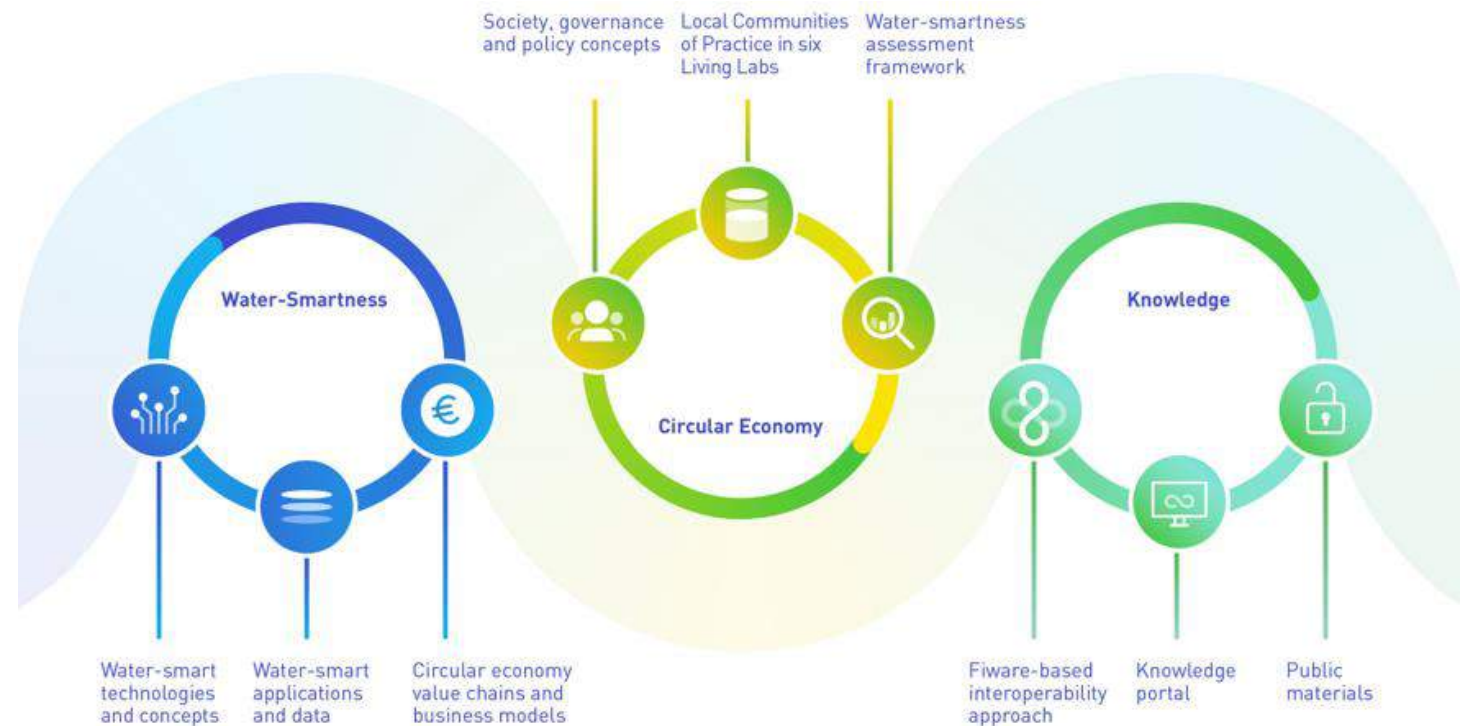
B-WaterSmart: Sustainable and water-smart economies and societies in coastal Europe and beyond

- **Systemic innovation** by including Living Labs and Communities of Practice
- **Water-smart coastal regions** with technologies, concepts & solutions
- **Smart resource allocation** by implementing water reuse, alternative water resources, water efficiency
- Resource recovery, **circular economy** & ecosystem regeneration
- Water-smart **culture** by raising awareness for water & climate change issues
- Water-smartness as novel and holistic concept through **strategic planning**
- Stimulating **new business opportunities**



B-WaterSmart: Results & Impacts

- **Water-smartness assessment framework and tool** (web-based)
- A **water-smartness agenda** implemented by our six Living Labs and Communities of Practice
- Sustainable **Marketplace** on water-smartness and **Circular Economy solutions**
- **Business models** for Circular Economy value chains
- **New policy & governance recommendations & solutions**
- **Interoperability approach**
- **Water-smart applications, data, concepts & technologies** (24 tools)



REWAISE

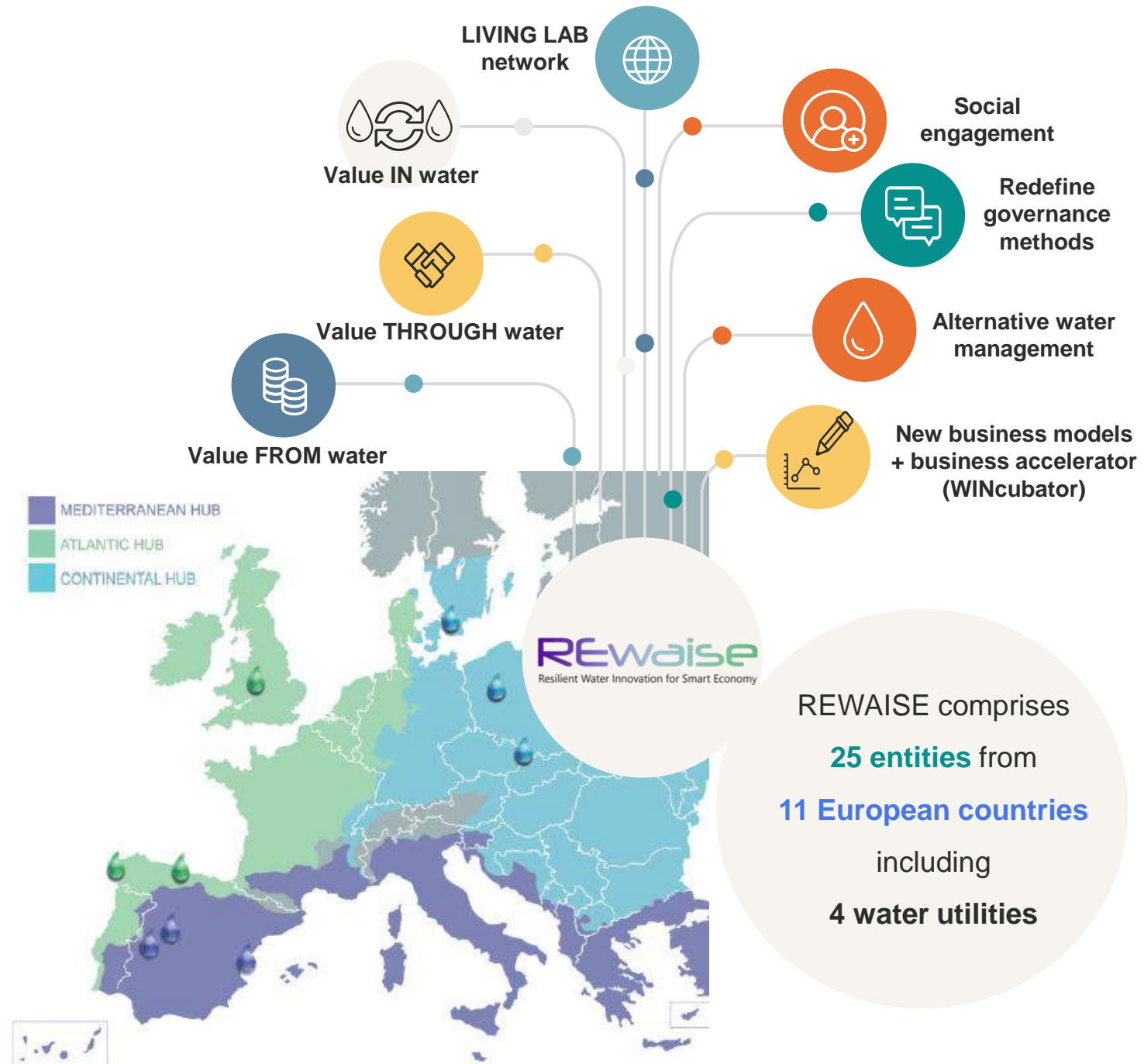
WATER FULL VALUE

REWAISE reveals the full value of water for Europe, considering three key technical, economic and societal factors:

VALUE IN WATER, by extracting minerals from seawater brine, recovering nutrients from wastewater, and converting all organic matter and biomass into energy.

VALUE THROUGH WATER, generating wellbeing in society through stakeholder participation and new governance methods to maximize the positive and new governance methods to maximize the positive effects of innovation for the users and the environment.

VALUE FROM WATER, developing the business of sustainable services and innovative products all along the water cycle, working with start-ups and SMEs to give them privileged access to the large utility users.



REWAISE



3 Hubs, 9 Living Labs



WATER RECOVERY / REUSE



- Municipal uses
- Industrial Uses

NUTRIENT & MATERIAL RECOVERY



- Fertilizers
- Minerals
- Specialties

ENERGY & HEAT RECOVERY / REUSE

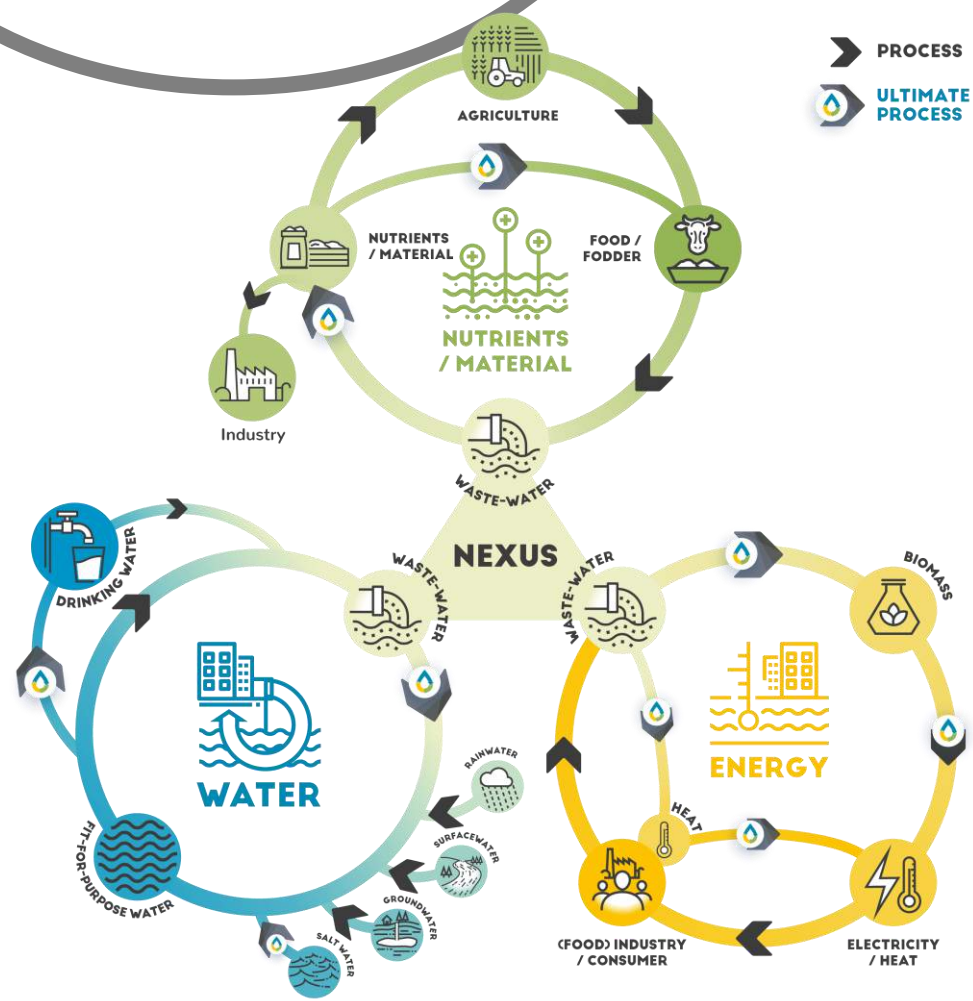


- Biogas production
- Fuel replacement
- Heat & RES

SMART WATER MANAGEMENT



- Digital models



Mission:

- Transition from linear to circular economy in the nexus of the water sector & intensive water consuming industries
- Creation of a **Water-Smart Industrial Symbiosis** by interlinking industries for reusing water, energy & materials from wastewater
- Mobilisation of strong partnerships of water utilities, industry, technology providers, business developers & applied research institutes
- Adoption of evidence-based approach anchored at 9 large-scale demonstrations with advanced technologies

Impact

**DEMONSTRATING WIN-WIN
SYMBIOTIC OPPORTUNITIES ...**

**... FOR WATER-SMART
INDUSTRIAL SYMBIOSIS (WSIS)**

 **ENABLING
TECHNOLOGIES**

**SYMBIOTIC
PARADIGMS** 

 **SMART
TOOLS**

**WATER-ENERGY
MATERIALS** 

 **INNOVATOR
ECOSYSTEM**

**WSIS
MARKET BUILDING** 

 **GLOBAL
OUTREACH**

**STRONG
PARTNERSHIP** 

Gerard van den Berg
KWR Research



Budget 13.5K Mio. €
Duration 06/2020-05/2024
48 months

 [ultimate-water-eu](https://www.linkedin.com/company/ultimate-water-eu)

 @ULTIMATEWaterEU

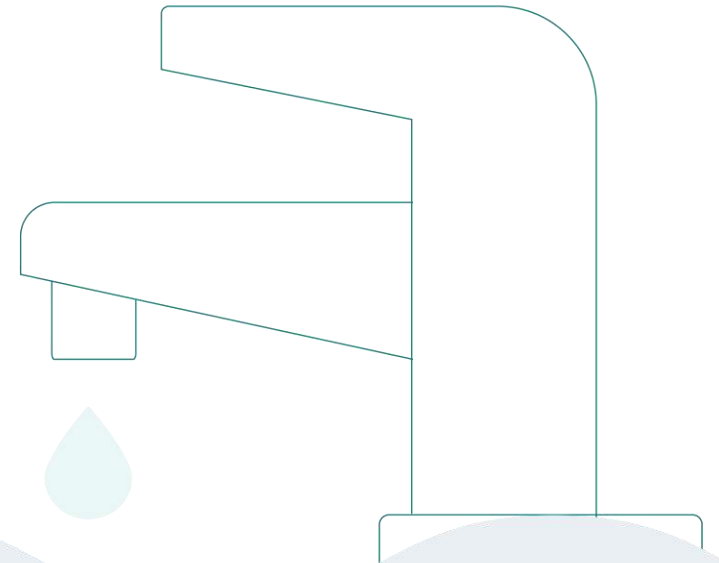


Concept



WATER-MINING is an EU-funded multidisciplinary research project that creates water management solutions using a circular economy approach. The project's consortium consists of 38 public and private partners and four linked third parties from 12 countries, and is led by the Delft University of Technology (TU Delft, the Netherlands). WATER-MINING works with pilot sites in Cyprus, Spain, Portugal, Italy and the Netherlands to demonstrate new and efficient ways to reclaim nutrients, minerals, biopolymers,

energy and freshwater from desalination, and industrial and urban wastewater. To successfully integrate these value-added products into resource supply chains, the project produces science-based, market-oriented policy recommendations, designs circular business models, and engages stakeholders, leading to sustainable management of water resources.



Water Value Chain

Water as a Resource

Water demands must be met by policymakers, and in the face of increasing water scarcity, alternative water resources must be integrated into the supply. Desalination is expected to play a key role, especially in water-stressed regions.



Desalination
Sea-mining

Water as a Consumable

Over the last century the global population tripled, and together with increasing levels of consumption and living standards, water demand increased substantially. Urban water consumption is an important fraction of the total human water use, but it presents a possible alternative source of water via wastewater recovery technology.



Urban wastewater
Urban-mining

Water as a Durable

Durable goods are defined as goods used for final consumption regularly over a period of over one year. Development of innovative technologies to reuse industrial water is promising for reducing water demand from within this sector via advanced wastewater treatment and recovery technology.



Industrial used streams
Industrial-mining

Data-mining

New water services

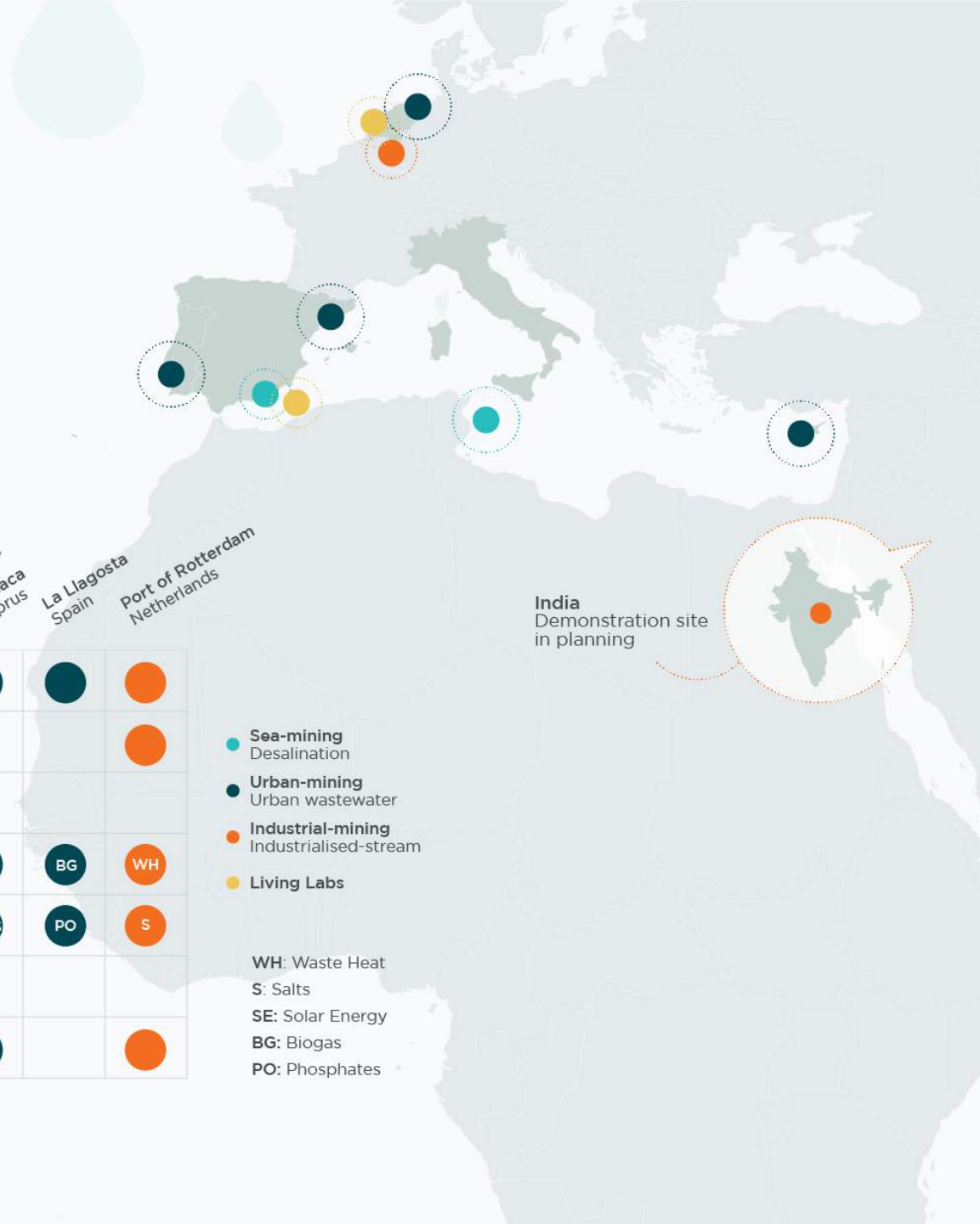
- Fit-for-purpose water
- Carbon neutral water services
- Safe water reuse
- Smart water management
- Recovery and supply of critical raw materials
- Supply of nutrients
- Supply of alginate-like polymers
- Rate setting mechanisms
- Demand management

Expected impact

The WATER-MINING project includes six demonstration sites covering the three water sources: sea, urban and industrial and includes two physical living labs in Almeria, Spain and the port of Rotterdam, The Netherlands.

| Services | Lampedusa Italy | Almeria Spain | Faro Portugal Delft Netherlands | Larnaca Cyprus | La Lagosta Spain | Port of Rotterdam Netherlands |
|--|--------------------|------------------|------------------------------------|-------------------|---------------------|----------------------------------|
| Maximize water usage efficiency | ● | ● | | ● | ● | ● |
| Reduce water consumption | | | | | | ● |
| Safe water reuse | | | ● | | | |
| Energy production and saving | WH | SE | BG | SE | BG | WH |
| Recovery and supply of critical raw material | S | S | PO | PO/S | PO | S |
| Supply of alginate-like polymers | | | ● | | | |
| Chlorine recycling | | | | ● | | ● |

- Sea-mining
Desalination
 - Urban-mining
Urban wastewater
 - Industrial-mining
Industrialised-stream
 - Living Labs
- WH: Waste Heat
S: Salts
SE: Solar Energy
BG: Biogas
PO: Phosphates



Wider Uptake of Water-smart Solutions

MISSION: WIDER UPTAKE aims to facilitate industrial symbiosis in order to increase resource efficiency, limit emissions and develop sustainable business based on water-smart solutions. Our hypothesis is that the barriers are not only technological but also of organizational, regulatory, social and economic character.

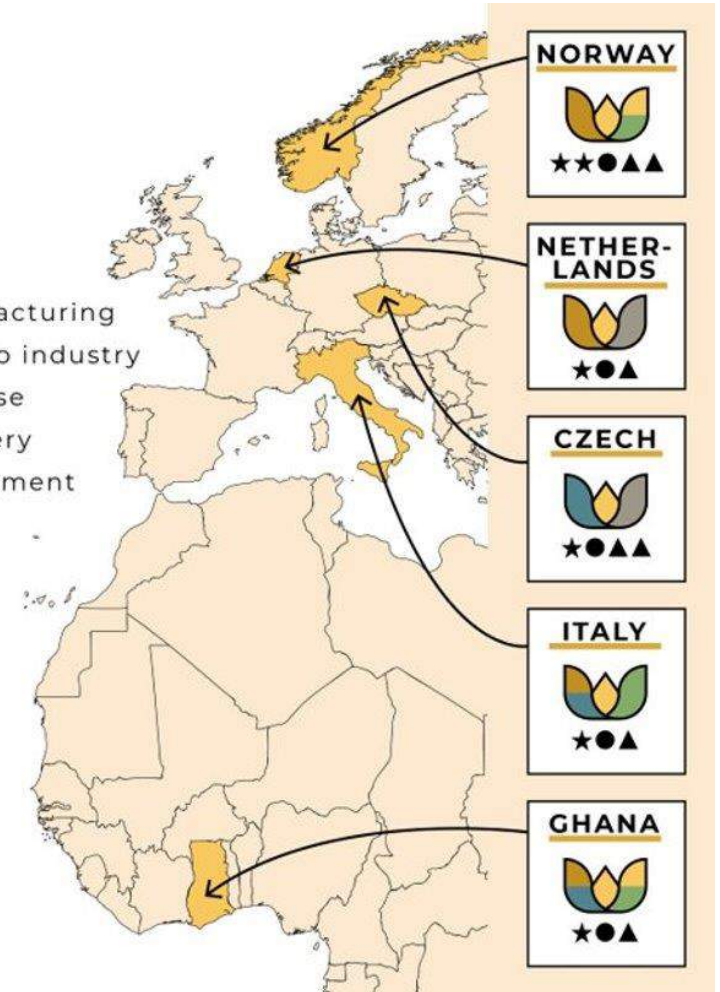
IMPACT: After demonstrating water-smart, circular economy solutions, we will develop an open access roadmap on how to upscale and implement such solutions on a wider scale, in Europe and beyond.

Partners

- **11 Water Utilities and Industries:** SSGL, AMAP S.p.A., PVS, Storm Aqua, WATNL, NPSP BV, Hias IKS, HIAS How2O AS, Sirkula, IVAR IKS and Terramarine
- **7 Research Institutions:** SINTEF, NTNU, TU Delft, CVUT, VSCHT, UNIPA, CSIR-GH
- **5 Countries:** Norway, Netherlands, Czech Republic, Italy, Ghana



- Agriculture
- Building/manufacturing
- Energy supply to industry
- Wastewater reuse
- Resource recovery
- Industry involvement
- ★ Water utilities
- ▲ R&D Partners



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www.wider-uptake.eu

Products and Solutions



WIDER UPTAKE demonstrates water-smart circular economy solutions in five countries:

- ✓ Reuse of treated wastewater for irrigation in public parks and agriculture (Italy, Czech Republic, Ghana)
- ✓ Fertilisers from sewage sludge and recovered phosphorous (Norway, Italy)
- ✓ Soil improvement from sewage sludge and other waste streams (Norway)
- ✓ Biogas from sewage sludge and other waste streams (Norway)
- ✓ Biochar from sewage sludge (Ghana)
- ✓ Material for bioplastics from sewage (Italy)
- ✓ Biocomposite production utilising calcite and cellulose from water and wastewater treatment (Netherlands)



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www.wider-uptake.eu



The CIRSEAU Cluster

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