

# JRC TECHNICAL REPORT

## Fostering the green transition through Smart Specialisation Strategies

Some inspiring cases across Europe



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# Contents

- Executive summary ..... 1
- Acknowledgements ..... 3
- Abstract ..... 4
- 1 Introduction..... 5
- 2 Methodological approach ..... 7
  - 2.1 Defining the criteria and evaluation grid to select the cases..... 7
  - 2.2 Analyses and selection of cases through interaction with case owners..... 9
  - 2.3 Limitations in the methodological approach ..... 9
- 3 Interpretation of evidence ..... 14
  - 3.1 The role of S3 in fostering green transition ..... 14
    - 3.1.1 Enhanced EDP for ‘green S3’ ..... 14
    - 3.1.2 Governance evolution for ‘green S3’ ..... 15
    - 3.1.3 Monitoring ‘green S3’ implementation ..... 15
  - 3.2 Circular economy a recurring transversal driver and a source of economic gains ..... 15
  - 3.3 Skills aspects crucial for green transition..... 16
  - 3.4 Importance of raising awareness and changing mentalities ..... 16
  - 3.5 Need to consider local-regional-national-transnational dimensions concurrently ..... 16
  - 3.6 Multiplicity of funding sources used ..... 17
  - 3.7 Specific green policy tools identified..... 17
- 4 Concluding remarks ..... 19
- References ..... 20
- List of abbreviations ..... 21
- List of tables ..... 22
- Annex 1. Presentation of the ten inspiring cases ..... 23
- Annex 2 Interviews for final selection and in-depth analysis of cases ..... 68



## Executive summary

Throughout 2014-2020, Cohesion Policy has guided the investment of over EUR 450 billion (including national co-financing) to help achieve the EU-wide goals of increasing Jobs and Growth, while reducing territorial, economic and social disparities. Smart Specialisation has been an integral part and an ex-ante conditionality of Cohesion Policy, which has led EU Member States and regions to develop over 120 Smart Specialisation Strategies (S3), driving research and innovation investments of over EUR 40 billion provided by the EU (EUR 68 billion including national co-financing). These strategies have been implemented by national and/or regional managing authorities through collaborative processes involving stakeholders, such as universities and other research and higher education institutions, businesses, industry as well as social partners.

In the new programming period for 2021-2027, Smart Specialisation is expected to continue to play a major role to promote regional development and cohesion, with the deployment of five broad policy objectives. A new thematic enabling condition - "Good governance of national or regional smart specialisation strategy" - is introduced dependent on seven fulfilment criteria covering the main success factors of Smart Specialisation Strategies, from their design to their implementation, as well as monitoring and evaluation mechanisms. In line with the new European Green Deal, stronger attention is being paid by policy makers and citizens alike to the societal challenges associated with green transformation across European territories.

The present report seeks to highlight the role played by Smart Specialisation Strategies in fostering environmentally oriented activities through the provision of inspiring examples from across Europe. It showcases how stakeholders from various territorial levels in different Member States are using the Smart Specialisation concept to deliver their own innovation-driven green transition agendas, detailing specific policy tools and incentives developed in this context. The cases selected in the report provide insights into the role played by governance and stakeholder involvement in the Entrepreneurial Discovery Process (EDP), and/or Smart Specialisation Monitoring and Evaluation mechanisms in enhancing the implementation of 'green' interventions.

Among the criteria used for selecting the cases, a 'territorial balance' criterion helped identify territories with distinct economic development levels and geographical dimensions, in order to enhance learning potential for a wide range of stakeholders. The ten case studies include in total two interregional cases driven by Lombardy (Italy) and the Baltic Region (with Finland as coordinator, Latvia, Lithuania, Estonia, Denmark, Sweden, Poland and the regions of Germany bordering the Baltic Sea, together with two non-EU territories - Norway and regions of Russia), one example at national level (Slovenia), four regional cases (Basque Country Region, Spain; Northern Denmark; Northern Netherlands; Centro Region, Portugal) and three cases at municipal level (Culatra island, Algarve, Portugal; three municipalities in the Region of Hauts-de-France; Ii municipality in the Oulu region, Finland).

The main findings can be summarised as follows:

- The role of S3 in fostering green transition

Overall, the exploration of the ten examples demonstrates efforts to adopt an S3 ecosystem approach within the EDP itself, with more actors involved than hitherto. In addition to the active involvement of businesses and the research community, local authorities/cities/municipalities and in some cases public utilities gain increased importance in the EDP, as additional actors for green S3. End users of green products and services also become more important because the transition requires substantial changes in mentality and demand patterns. Certain cases lend themselves well to 'quadruple helix' approaches – from local energy communities to broader community involvement.

- Circular economy a recurring transversal driver and a source of economic gains

The majority of cases deal with the promotion of the circular economy. The transversal nature of the theme means that it has particularly wide application across different fields. The economic and environmental benefits of circular business approaches are highlighted concurrently in many of the examples, demonstrating that investing in green innovation pays off.

- Skills aspects crucial for green transition

Most of the examples highlight the importance of the skills dimension and suggest that new skills for green transition are needed at all ends of the spectrum (higher education, schools, public authorities, etc.).

- Importance of raising awareness and changing mentalities

Green transition demands significant mentality and behavioural changes in addition to new technological solutions, to encourage demand as well as supply. A number of examples demonstrate a combination of technological and social innovation. The success of local energy transition initiatives depends largely on engagement of local people through innovative methods, securing also their financial commitment.

- Need to consider local-regional-national-transnational dimensions concurrently

In order to reach real transition, relevant changes at higher system levels together with regional or local green initiatives are required. Regional authorities have an important role in upscaling and replicating local experiments, moving from demo cases to large scale transition strategy implementation. Localities in their own right, as well as networks of municipalities, appear as important players with a strong influence in the EDP. In line with the S3 concept, the international dimension also emerges prominently from the examples. Two inter-regional cases seek to expand upon trans-national green business opportunities, whilst addressing political reluctance to commit to cross-border investments.

- Multiplicity of funding sources used

Many of the examples reported difficulties in accessing EU Funds, particularly mainstream European Structural and Investment Funds (ESIF), for activities classed here as part of green S3 implementation. As a result, several of the initiatives examined have had to struggle to find other sources of funding, often resulting in a portfolio mixing local, regional and national funds, with a diversity of EU funds from different programmes. Small scale projects of a demo nature involving social innovation in particular, were said to 'fall between' traditional EU funding channels. Several interviewees felt that the European Regional Development Fund (ERDF), in their mainstream programmes, was better suited to larger-scale, technology-driven initiatives.

- Specific green policy tools identified

A variety of specific policy implementation tools for 'green' transformation in the regions were identified in the cases, including among others, a) Calls for projects in green subject areas linked to innovation grants (various/general); b) Green value chain mapping; c) Circular Procurement; d) Life Cycle Analysis as basis for investment decisions; e) Local participatory diagnosis extending into implementation; f) Local management of profits from renewable energy generation; g) Engagement of children in green transition, etc.

The ten cases collected demonstrate that, even though the original S3s were not always initially designed with a strong green focus in mind, many regions have successfully used the S3 approach to promote innovation for green transformation. The cases exemplify the place-based dimension of smart specialisation - notwithstanding differences in scale, from small municipalities to larger regions and/or small country level. They demonstrate the value of enhanced EDP in incorporating the demand side into 'green' experiments. Many of them facilitate the inclusion of the skills dimension, consistent with the broader S3 approach foreseen for 2021-2027. Most have a strong multi-level governance perspective, based on the need to scale up local experiments through replication at regional or national level. Frequently, there is a trans-national dimension fed by international value chain approaches, which could be further facilitated by the proposed new Interregional Innovation Investment 'I3' instrument.

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### **Persons interviewed in connection with the ten cases**

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## **Abstract**

The aim of this study is to illustrate the role played by Smart Specialisation Strategies (S3) to foster environmentally oriented activities through the examination of inspiring examples from different European Member States. The report presents ten inspiring examples and highlights how stakeholders from various territorial levels across Europe are using the Smart Specialisation concept to deliver their own innovation-driven green transition agendas, detailing specific policy tools and incentives developed in this context. The selected cases provide insights into the role played by multi-level governance and enhanced stakeholder involvement in the Entrepreneurial Discovery Process (EDP), and/or Smart Specialisation Monitoring and Evaluation mechanisms in fostering the implementation of experimental 'green' interventions. They demonstrate that even though the S3 concept was not initially designed with a strong environmental focus, different types of territories have successfully used the S3 approach to promote environment-related priorities. In particular, the circular economy appears as a recurring transversal driver and a source of economic gains in many territories.



# 1 Introduction

Throughout 2014-2020, Cohesion Policy has guided the investment of over EUR 450 billion (including national co-financing) to help achieve the EU-wide goals of increasing jobs and growth, while reducing territorial, economic and social disparities. Smart Specialisation has been an integral part and an ex-ante conditionality of Cohesion Policy, which has led EU Member States and regions to develop over 120 Smart Specialisation strategies, driving research and innovation investments of over EUR 40 billion provided by the EU (EUR 68 billion including national co-financing). These strategies have been implemented by involving national and/or regional managing authorities and stakeholders, such as universities and other research and higher education institutions, businesses, industry and social partners in a collaborative process.

Smart Specialisation Strategies (S3), also referred to as Research and Innovation Strategies for Smart Specialisation (RIS3), follow a place-based approach that builds on the assets and resources available to regions and Member States, as well as on their specific socio-economic challenges in order to identify unique opportunities for development and growth. In this context, "specialisation" entails identifying a limited number of well-identified priorities in a vertical logic, for knowledge-based investments to achieve competitive advantage at international, national, regional and local level.

In addition, Smart Specialisation is based on stakeholders' involvement in the shaping of the innovation system, known as the Entrepreneurial Discovery Process (EDP). It relies on an interactive and co-creative process between businesses, academia, the civil society and the public sector, in which stakeholders are identifying and producing information about potential opportunities and developing jointly new activities. Successful Smart Specialisation is supported by effective monitoring and evaluation mechanisms, to guide research and innovation trajectories at the regional/national level, and the decision-making process. Furthermore, Smart Specialisation is outward-looking and embraces a broad view of innovation including but not limited to technology-driven approaches. In general terms, the purpose of this innovative policy concept is to promote the whole economy of the territory (Foray and Goenaga, 2013).

In the new programming period for 2021-2027, Smart Specialisation is expected to continue to play a major role towards regional development<sup>1</sup> and cohesion, with the deployment of five broad policy objectives<sup>2</sup>. It will be the subject of a new thematic enabling condition, i.e. "Good governance of national or regional smart specialisation strategy", made up of seven fulfilment criteria covering the main success factors of Smart Specialisation strategies, from the design, to the implementation and the monitoring and evaluation mechanisms.

In this context, this report seeks to examine the role of Smart Specialisation Strategies in fostering environmentally oriented activities and provides useful implementation cases that can instil new practices and modus operandi in other European territories. The ten selected cases highlight how stakeholders across Europe are using the Smart Specialisation concept to develop their own innovation-driven economic transformation agendas at various territorial levels, with a specific emphasis on the green transition. They provide useful information on the role played either by the governance, and/or stakeholders' involvement in the Entrepreneurial Discovery Process, and/or Monitoring and Evaluation mechanisms to foster the implementation of eco-friendly activities, with a description of the policy instruments and measures that are developed in that respect.

The European Green Deal<sup>3</sup> seeks to make the European Union's economy sustainable by turning climate and environmental challenges into opportunities and making the transition just and inclusive for all. In this regard, environmentally oriented activities in the present study are defined very broadly to cover a large array of topics such as: Energy transition; Climate change – adaptation; Circular Economy; Industrial symbiosis; Zero pollution; Sustainable smart mobility; Digitalization for green transition; Sustainable manufacturing; Bio-economy; Sustainable agriculture; Ecosystems and biodiversity, etc.

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<sup>1</sup> Common Provisions regulation (11 December 2020 version) with a reference to the smart specialisation enabling condition on page 390 of the document ST 13693 2020 INIT  
[https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=consil%3AST\\_13693\\_2020\\_INIT](https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=consil%3AST_13693_2020_INIT)

<sup>2</sup> European Regional Development Fund and Cohesion Fund regulation (11 December 2020 version)  
[https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=consil%3AST\\_13716\\_2020\\_INIT](https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=consil%3AST_13716_2020_INIT)

<sup>3</sup> European Green Deal: [https://ec.europa.eu/info/strategy/priorities-2019-2024/european-green-deal\\_en](https://ec.europa.eu/info/strategy/priorities-2019-2024/european-green-deal_en)

The report first presents the methodological approach and selection criteria that were developed to identify the most relevant cases. It then provides the key findings regarding the evidence gathered and some concluding remarks.

The ten cases are detailed in the annex of the report and accessible from the Smart Specialisation Platform<sup>4</sup>. They include in total:

- two interregional cases driven by Lombardy (Italy) and the Baltic Region (with Finland as coordinator, Latvia, Lithuania, Estonia, Denmark, Sweden, Poland and the regions of Germany bordering the Baltic Sea, together with two non-EU territories - Norway and regions of Russia);
- one example at national level (Slovenia);
- four regional cases (Basque Country Region, Spain; Northern Denmark; Northern Netherlands; Centro Region, Portugal); and
- three cases at municipal level (Culatra island, Algarve, Portugal; 3 municipalities in the Region of Hauts-de-France; li municipality in the Oulu region, Finland).

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<sup>4</sup> Smart Specialisation Platform website: <https://s3platform.jrc.ec.europa.eu/-/fostering-environmental-oriented-activities-through-s3-results-from-the-call-for-contributions>

## 2 Methodological approach

The present study responds to a request from DG REGIO to highlight good practices related to environmental-oriented initiatives that were implemented within the smart specialisation policy context, and that could be a source of inspiration for other territories. Considerable experience in implementing S3 to address environmental challenges is indeed being gained across regions and ad-hoc solutions are being found in many different contexts.

The Smart Specialisation Platform has developed many initiatives to facilitate knowledge exchange among regions across the EU, such as the publication of a handbook on the implementation of Smart Specialisation Strategies<sup>5</sup> (Gianelle *et al.*, 2016), the organisation of peer-review exercises<sup>6</sup> and the publication of success stories, among others: the *Smart Stories*<sup>7</sup>, *Good practices for smart specialisation in energy* (Nauwelaers *et al.* 2018), etc. Identification and sharing of good practices contribute to disseminating knowledge among practitioners and capitalising experience, so that other organisations and actors can learn from those successful practices in order to inform their own policies adequately.

In this framework, the approach chosen was therefore to focus only on cases that were identified as good and promising practices, to understand and document what worked well and why, examining also their potential for replication and upscaling by other regions.

This chapter presents the methodological approach that was developed, including the criteria definition and evaluation grid (section 2.1), the scope and selection process (section 2.2) and the limitations of the study (2.3). The information collected emerged from direct and structured dialogue with policy makers as well as stakeholders in certain cases. Despite the difficult circumstances related to the Covid-19 pandemic, the edition of the cases has always involved interactions with the stakeholders through e-mail exchanges and teleconferences to ensure that the account provided followed the methodology in place and that precise data were collected.

### 2.1 Defining the criteria and evaluation grid to select the cases

In order to emphasise the learning potential of the case studies to various types of territories, particular attention was given to several factors related to the Smart Specialisation approach.

Seven main criteria were retained for selecting the inspiring cases:

1. Embeddedness in the Smart Specialisation approach;
2. Addressing 'green transition';
3. Learning potential on either the Governance of Smart Specialisation Strategies, and/or the Entrepreneurial Discovery Process (EDP) and/or Monitoring & Evaluation mechanisms;
4. Implemented or in implementation phase with lessons learnt;
5. Multi-actor setting;
6. Degree of innovation/originality in territorial context;
7. Potential for scale-up / replication;

A detailed evaluation grid, expanding on the above criteria, was defined to guide the selection process of the cases (Table 1).

An additional 'Territorial balance' criterion was subsequently integrated to identify and select the most relevant cases to distinct economic development levels and geographical dimensions. To achieve this, it was decided to focus on a sample of ten cases that should include at least two of each of the four EU Cohesion Policy categories of region, namely:

- 2 more developed regions;
- 2 transition regions;
- 2 less developed regions;
- 2 interregional cases.

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<sup>5</sup> <https://s3platform.jrc.ec.europa.eu/s3-implementation-handbook>

<sup>6</sup> <https://s3platform.jrc.ec.europa.eu/peer-review>

<sup>7</sup> <https://s3platform.jrc.ec.europa.eu/smart-stories>

**Table 1** Evaluation grid for the selection of cases

<b>Compulsory criteria</b>	
1. Visibly in line with S3	The selected cases refer to either the governance, and/or the Entrepreneurial Discovery Process, and/or Monitoring and Evaluation processes. A case does not necessarily need to be funded by ERDF but needs to be 'in line' with key S3 principles and related to S3 priorities (e.g. it fits with the wording of an S3 priority and/or its relationship to S3 is confirmed by interlocutors from the region).
2. Implemented or in implementation phase and lessons learnt	The practice should be already implemented or in implementation phase, so that (even preliminary) lessons exist about its effectiveness to reach the intended goal. If the outcomes are not yet fully visible, steps should have been taken towards learning, with a view to providing guidance for further green initiatives and processes. Specific attention will be given to the measures/ policy instruments and tools that have been developed to guide the green initiatives and processes (having a range of reinforcing measures will be a plus) – for instance: skills, green calls, green procurement, building-up a multi-level / multi-sectoral governance framework, inter-ministerial work etc.
3. Innovative	Innovation is understood as being pivotal around a new technology, technique, process or approach, including social innovation – preferably with visible connection to recent research. Innovation can also be considered in the context of the region/country concerned (although mundane examples should be avoided).
4. Multi-actors	The case should not be limited to a single-actor ad hoc project. There should be evidence of a partnership approach between different bodies and preferably different actor types.
5. Implemented within and/or across Europe	All cases should have implementation components within the EU. Multi-territory initiatives may have partners outside of the EU, but still within the European and/or European neighbourhood space.
<b>Quality criteria</b>	
6. Stems from or enables enhanced EDP	Degree to which the development of the case demonstrates an approach based on greater inclusiveness – e.g. triple or quadruple helix approaches, citizen participation – beyond more 'normal' business-research sector collaboration.
7. Embodies improved governance	How far the case represents a new role for regional authorities, stronger synergies between policy domains, more demand-led approaches, new types of leadership, multi-level governance, etc.
8. Involves better monitoring / evaluation	Degree to which the case promotes more robust, more effective monitoring practices – e.g. through new indicators measuring transition dynamics – and/or new evaluation methods, or results from such approaches.
9. Seeks to drive forward the green transition	Degree to which the case promotes real transition in the environmentally oriented subject area covered – e.g. how far relevant transition dynamics have been taken into account.
10. Contains plans for scale-up / replication	How convincing are any planning elements present, that future scale-up of successful results has been considered from the outset in the context of the territory and/or other regions/countries?

## 2.2 Analyses and selection of cases through interaction with case owners

The collection work started with an extended search process for relevant examples, which would be likely to meet the selection criteria. Three types of sources were investigated:

- The outcomes from a Call for Contributions specific to the assignment<sup>8</sup> launched by the S3 Platform on 27 July 2020 and open until end of September. The Call delivered 29 proposals, each of which included a short description of the potential case and contact points;
- An extended search performed through browsing a wide range of sources: the S3 Platform website, DG REGIO website, Interreg Europe and Interreg projects, Vanguard Initiative, past and upcoming EU events and reports etc. This search delivered a long list of 41 territories (some of which included several potential examples);
- Proposals from DG REGIO Unit G1 'Smart and Sustainable Growth', consisting of 14 project examples.

Following this initial search, documentary screening was performed, with emails sent to certain case owners to gain a better understanding of the fit of these examples with respect to the selection criteria. Document analyses and responses received from case owners formed the basis for a first analysis, which generated a long list of 28 potential examples. According to their expected fit with the selection criteria, these were arranged in a priority list of 18 examples<sup>9</sup> and a reserve list of ten examples.

Starting from the priority list, a second round of more in-depth analyses was carried out. Case owners were contacted systematically, with a view to assessing the relevance of the potential examples, as well as asking for their collaboration and willingness to be included in the exercise. Questionnaires were sent to the case owners along with requests for online interviews.

At least one online interview was organised for each case, during the course of September-November 2020. In some instances, follow-up interviews were held later on, when further detail was needed. The list of interviews undertaken is presented in Annex 2.

Seven examples had to be dropped after the interviews revealed that they did not satisfy all of the selection criteria. Many potentially good examples could not be retained due to the added strict criterion on territorial balance. Several examples from the reserve list were added to reach the final number of ten cases meeting all criteria.

Apart from the territorial balance constraint, other reasons for examples dropping out were: projects not yet sufficiently far into implementation stage; weak results and/or lessons learnt; poor innovative character; insufficient linkage with S3; and non-availability of an English speaking contact person.

Overall, the methodological approach succeeded in delivering ten case descriptions fulfilling the criteria set for the assignment as detailed in Table 1 above. The ten cases are listed in Table 2 below.

## 2.3 Limitations in the methodological approach

The methodology suffered from two main limitations, which should be corrected for future similar efforts to collect inspiring examples on S3 implementation.

The main limitation lay in the lack of sufficient opportunities to triangulate information to ascertain the solidity of the examples. This is due mainly to time and space constraints, linked to the on-going COVID-19 crisis. Supplementing documentary analysis by virtual interviews with case owners was necessary and useful, but not really sufficient. The ability to interview several stakeholders involved in a particular case and to see results and shortcomings on site, would have enabled a more efficient acquisition of understanding of their strengths, weaknesses and transitional potentials.

The second limitation is linked to the territorial balance established on the selection of cases. As the exercise progressed, it became clear that the most innovative and genuinely inspiring examples are to be found chiefly in the more advanced regions. Since the final sample of cases allowed for the incorporation of a maximum of three such examples, a number of potentially highly inspiring cases for relevant actors throughout Europe had

<sup>8</sup> <https://s3platform.jrc.ec.europa.eu/-/call-for-contributions-fostering-the-implementation-of-environmental-oriented-activities-through-smart-specialisation>

<sup>9</sup> [The 10 cases were all extracted from the priority list.](#)

to be discarded. Nevertheless, the balance was maintained as it was seen fit to enhance the learning potential for a variety of territories.

A final note on the methodology points to a serious difficulty in reconciling the criterion of innovativeness with that of 'being implemented with lessons learnt'. Truly innovative experiments are often recent, hence the process of lesson drawing on impacts tends to be incomplete, because of the time needed for the latter to materialise. As a compromise, cases that were in implementation phase, with preliminary lessons learnt were also considered in the work.

Upcoming research could pay further attention to the key constraints faced by territories to develop and implement efficient smart specialisation activities geared toward the green transition, and to potential solutions to overcome bottlenecks. They may be linked to several factors such as weak institutional arrangements and a well-defined attribution of responsibilities (Guzzo and Perianez, 2019), weak prioritisation (Gianelle et al., 2017), limited capacity building, and poor monitoring and evaluation systems.

**Table 2** Ten inspiring examples of S3 implementation for green transition

Inspiring example cases	Territory/ies of focus			Main 'green' topic area(s) covered
	Name(s) of territory/ies	Territorial type	Development classification (EU Cohesion Policy 2014-2020)	
<p><b>Algarve – Culatra 2030</b></p> <p>A living lab for the sustainable energy transition ambition of the region's Smart Specialisation Strategy</p>	Culatra island Algarve, Portugal	Local/City	Transition region	Energy transition Circular Economy Zero pollution Sustainable smart mobility Sustainable aquaculture Ecosystems and biodiversity
				Specifically: Community-led holistic green transition initiative
<p><b>Eco-innovation towards a circular economy in the Basque Country</b></p> <p>Sharpening the competitive edge of Basque industry through ecodesign and life cycle thinking, following a Smart Specialisation approach</p>	Basque Country, Spain	Region	More developed	Circular Economy
				Specifically: Eco-innovation
<p><b>Centro Region, Portugal - Green Deal on Circular Procurement</b></p> <p>Regional Smart Specialisation partnership makes 'circularity' a priority for Public Procurement</p>	Centro, Portugal	Region	Less developed	Circular Economy
				Specifically: Circular Public Procurement

Inspiring example cases	Territory/ies of focus			Main 'green' topic area(s) covered
	Name(s) of territory/ies	Territorial type	Development classification (EU Cohesion Policy 2014-2020)	
<p><b>Hauts-de-France - direct citizen participation in green energy transition</b></p> <p>Smart Specialisation approaches foster increased local ownership and longer-term political commitment to energy transition in difficult areas</p>	Hauts-de-France, France	Local/City	Transition region	Energy transition
				Specifically: Community-led green transition initiative
<p><b>Aalborg, Denmark – industrial symbiosis in 'normal' business areas</b></p> <p>Smart Specialisation partnership facilitates circular economy transition for local companies</p>	Aalborg, North Jutland, Denmark	Local/city	More developed	Circular Economy Energy efficiency
				Specifically: Industrial symbiosis
<p><b>Green transition becomes reality in Ii Municipality, Oulu Region, Finland</b></p> <p>Delivery of a long-term strategy for a carbon-neutral Municipality driven by Smart Specialisation and social innovation</p>	Ii Municipality, Oulu, Finland	Local/City	More developed	Energy transition Climate change Adaptation
				Specifically: Community-led green transition initiative
<p><b>Slovenia - Strategic Research and Innovation Partnership (SRIP) on Circular Economy</b></p> <p>Dedicated Smart Specialisation network for innovation in the circular economy transition</p>	Slovenia	Country	Less developed / More developed	Circular Economy



Inspiring example cases	Territory/ies of focus			Main 'green' topic area(s) covered
	Name(s) of territory/ies	Territorial type	Development classification (EU Cohesion Policy 2014-2020)	
<p><b>WaterCampus Leeuwarden, Northern Netherland</b></p> <p>Creating Water Technology solutions through an Open Innovation Ecosystem with pivotal links to Smart Specialisation in the Northern Netherlands</p>	Leeuwarden, North Netherlands	Local / city with EU/international focus	More developed	Climate Change Adaptation Circular Economy Resource Efficiency Zero Pollution
				Specifically: Water Technology
<p><b>Sustainable Mobility using renewable Liquefied Biomethane - Lombardy, Italy</b></p> <p>Smart Specialisation Platform supports interregional partnership for new sustainable European fuel supply chains</p>	Lombardy (IT – Leader) Emilia Romagna (IT) Piedmont (IT) North Rhine Westphalia (DE) Upper Austria (AT)	Interregional	More developed	Energy Transition / Circular Economy
				Specifically: Sustainable Mobility
<p><b>Baltic Sea Region – interregional cooperation on circular bio-economy</b></p> <p>Demonstrating the potential of shared Smart Specialisation approaches to promote green transition</p>	Baltic Sea Region	Interregional	Mixed	Circular Economy Bio-economy
				Specifically: Industrial symbiosis (trans-regional)

### **3 Interpretation of evidence**

A number of recurring topics emerge from the desk reviews and interviews for the cases taken together:

- The role of S3 and its key components – EDP, governance, monitoring and evaluation – in fostering green transition in EU regions;
- Circular economy as a recurring transversal driver and a source of economic gains;
- Skills aspects as a crucial ingredient for green transition;
- The importance of raising awareness and changing mentalities;
- The need to consider local-regional-national-transnational dimensions concurrently;
- A multiplicity of funding sources to support pioneering examples for green transition;
- The use of specific green policy tools.

Despite the limited number of examples, each of the above themes can be considered as a strategic issue in the relationship between S3 and green transition of European territories.

#### **3.1 The role of S3 in fostering green transition**

Overall, the exploration of the ten examples shows that in reality, there is rarely a clear linear trajectory of, first design, then implementation of S3. It is usually rather more of a subtle process of S3 being ‘implemented’ through relevant projects developed sometimes independently, which feed the S3 approach.

Because S3 priority areas are frequently broad, more focused measures often only take shape through actual experimentation – for example, the locally-based industrial symbiosis in Aalborg (Denmark). This is not to say that the cases explored simply represent collections of unconnected projects. They are invariably situated in the context of long term-strategies with green transition-related goals, even if the persons interviewed did not always make the connection between their locally named strategy and S3.

In more advanced regions, certain green projects and initiatives can, in fact, influence the whole S3 approach. WaterCampus Leeuwarden, which existed prior to the Northern Netherlands’ first S3, provided a model used in developing the S3’s Entrepreneurial Discovery Process (EDP). The Basque Country’s (Spain) experiments with eco-innovation have brought about a revised emphasis in the region’s new S3 for 2021-2027. These two examples are arguably the only fully-fledged transformative cases in the sample for this exercise.

In this study, particular attention was paid to the role of EDP, governance and monitoring in the implementation of green S3. Not all of the examples have a story to be told about all of these S3 implementation aspects, but all have noteworthy features concerning at least one of them. The findings in this regard are summarised for each aspect below.

##### **3.1.1 Enhanced EDP for ‘green S3’**

All of the examples demonstrate efforts to adopt an ecosystem approach in their EDP, with more actors involved than hitherto. In addition to the active involvement of businesses and the research community, local authorities/cities/municipalities and in some cases public utilities – e.g. the Port Authority in the case of Aalborg industrial symbiosis (Denmark) and utilities in ‘WCYCLE’ under Slovenia’s Strategic Research and Innovation Partnership (SRIP) for Circular Economy – gain increased importance in the EDP, as additional actors for green S3.

End users of green products and services also gain in importance, since the transition requires substantial changes in mentality and demand patterns. Certain cases lend themselves well to ‘quadruple helix’ approaches, from local energy communities involving all citizens – e.g. Culatra (Portugal), Ii (Finland) and Hauts-de-France, to larger operations – e.g. demo sites in and around WaterCampus Leeuwarden (Netherlands). The role of the demand side is fostered in the case of Centro (Portugal) by involving users such as schools and pupils.

In more advanced regions research-business collaboration is already well under way, so the novelty here is perhaps more in involving agents outside of the research and innovation community, from the environmental sphere (e.g. energy and water utilities). Around the Baltic Sea Region, the Biobord tool and trans-national

accelerator camp link stakeholders in a cross-border 'triple helix' EDP configuration to help identify joint opportunities.

### **3.1.2 Governance evolution for 'green S3'**

Green transition, particularly circular economy, lends itself well to cross-sectoral governance. Slovenia is a good example in the establishment of its cross-sectoral 'Strategic Research and Innovation Partnership (SRIP) – Circular Economy' as a main implementation organ of the S3, able to enhance coordination between various line ministries and collaborate systematically across the other eight SRIPs in Slovenia's S3 structure. In the Basque country (Spain), operational bodies responsible for economy, innovation and environment have been brought together under a single department, for implementation of the next S3. Similarly, the previously separate programmes of the Basque Ministry of Economic Development and Infrastructures and the Ministry of the Environment, Territorial Planning and Housing, which contribute collectively to circular economy objectives, are now better coordinated.

The majority of the cases demonstrate evolutions in multi-level governance, for instance the involvement of Ii Municipality in Finland in regular consultations on regional and national policy initiatives for green transition, or the local industrial symbiosis experiment in Aalborg's connection with Danish national authorities. New linkages are also established, in Culatra (Portugal) and Hauts-de-France, between local initiatives and regional governance tiers to ensure effective policy alignment.

Interregional cooperation within Italy is the central governance feature of the SMBio-LNG example, which demonstrates a new supply chain for sustainable bio-methane promoting energy transition in the heavy transport sector. Transnational policy learning on specific green approaches and instruments is also evident in many of the cases as part of the governance process. Centro (Portugal) taking part in the EC DG REGIO Pilot Action 'Strategic Public Procurement', provides an interesting example in this regard, as does the Baltic Sea Region's Directors Network, which seeks to align the partner regions' strategies and identify joint untapped opportunities.

### **3.1.3 Monitoring 'green S3' implementation**

Smart monitoring of green transition effects seems still in its infancy, but there are some good examples in the cases illustrating different aspects of green S3 monitoring. The GAIA tool in the Aalborg case, for instance, is able to measure potential environmental and economic benefits of circular business practices, while they are being designed, as well as the actual effects during and after implementation. The WaterCampus Leeuwarden Monitor document, published annually, provides insights into its education/scientific, entrepreneurship and internationalisation outcomes in the water technology field, in relation to 17 key performance indicators.

The common indicator system provided by the EU Monitoring Framework for Circular Economy is used by a number of the cases studied. Both Centro and the Basque Country are also monitoring against additional complementary indicators which they have developed for the circular economy field. The Basque Country further measures the relative returns on investment of public money in its different circular economy interventions. Support for eco-design emerges as by far the most cost-effective, producing an average induced business investment of €178 per Euro of public support.

## **3.2 Circular economy a recurring transversal driver and a source of economic gains**

The majority of inspiring examples deal in some way with promotion of the circular economy. The transversal nature of the theme means that it has particularly wide application across different fields. The SRIP – Circular Economy in Slovenia pays special attention to fostering this inter-sectoral dimension, with circular economy now featuring the Action Plans of all nine SRIPS (i.e. clusters) under the country's S3, due to growing market demand for circular approaches. The Baltic Sea Region example illustrates also the potential for trans-regional circularity, specifically in bio-economy fields.

The economic and environmental benefits of circular business approaches are highlighted concurrently in many of the examples, demonstrating that investing in green innovation pays off. This is done to good effect in the Aalborg case and also in the Basque Country, which reports a doubling in turnover expectations, since 2015, for eco-designed products and services to €7bn/year. Both examples also record substantial reductions in raw material use and GHG emissions. However, in some cases there is a tension between 'going green' and economic

outcomes. Centro experiences barriers with circular procurement, where prices may be higher when circular criteria are imposed.

Nevertheless, an important phenomenon reported by Centro and most of the other circular economy examples, is the positive image which companies generally gain from increasing their circularity. This can boost their standing in the region and potentially open up new markets. 'Greening' the fishing industry in Culatra is another example where the transition to cleaner practices is bringing new market perspectives.

### **3.3 Skills aspects crucial for green transition**

Most of the cases highlight the importance of the skills dimension. The most transformative examples have a deep structural emphasis on skills, such as the founding of the new Competence Centre for Circular Economy in Slovenia and the much more established relationships, which WaterCampus Leeuwarden enjoys with universities, schools and vocational training establishments, dating back some 17 years. The eco-innovation agency, Ihobe, in the Basque Country explains that the region's current critical mass of graduates with Life Cycle Assessment (LCA) skills going into local companies, exists specifically because they decided to start investing in this discipline strategically over ten years ago.

The examples also suggest that new skills for green transition are needed at all ends of the spectrum. At the higher end, Aalborg University is breeding skills necessary for circular economy thanks to new internships and Industrial PhDs attracted by the favourable environment and experiments in industrial symbioses. Skills are cultivated at a very young age in some of the examples: children in Hauts-de-France are exposed to the 'green' investments realised in their school environment thanks to the citizen-driven funding schemes for green transition.

New skills for public authorities are also part of the story. For example, all the participants in the Centro Green Deal are obliged to attend at least four modules of the comprehensive EC Green Public Procurement (GPP) training courses.

### **3.4 Importance of raising awareness and changing mentalities**

Green transition demands significant mentality and behavioural changes, in addition to new technological solutions, to encourage demand as well as supply. A number of the cases demonstrate a combination of technological and social innovation. The success of local energy transition initiatives in Hauts-de-France, for example, depends largely on engagement of local people through innovative methods securing also their financial commitment. The transformation of the Culatra island into a clean energy and energy self-sufficiency territory rests on the change of mentality and practices by all inhabitants. Culatra's strategy relies as much on the use of new technologies as on a change of mindset: addressing the societal challenge of energy poverty is an important component of the overall 'Culatra 2030' framework.

The Municipality of Ii in Northern Finland deploys the so-called '50/50 model' in all school and nursery buildings, under which pupils are involved in energy/resource efficiency improvements and then receive back, for their classes' own use, 50% of the money thus saved. High-quality facilitation was cited as a crucial mentality-changing factor in several of the examples, such as the Baltic Sea Region and Aalborg, where the Port Authority has permanently recruited the facilitators engaged during the now-finished industrial symbiosis project. As the Aalborg interviewee remarked, *'Once a business starts going circular, there's no going back'*.

### **3.5 Need to consider local-regional-national-transnational dimensions concurrently**

Real transition needs regional or local green initiatives, in addition to relevant changes at higher system-level, in order to succeed. The roles of these three levels are clearly defined, for example, in Portugal's National Circular Economy Action Plan. Regional authorities have an important role in upscaling and replicating local experiments, moving from demo cases to large scale transition strategy implementation. In the case of the Centro Green Deal on circular procurement, a national Monitoring Group integrates operational bodies with entities having responsibilities for Public Procurement regulation.

Even small places can play an important role in pushing for alignment between the different dimensions, for instance in the strongly 'local' Culatra 2030 initiative, where the local stakeholder partnership seeks tighter

interaction with a key national Ministry and a major energy provider. The same can be said for larger projects, or regional-level initiatives, such as in the Basque country, where the network of municipalities is an important player with strong influence in the EDP.

In line with the S3 concept, the international dimension emerges prominently from the examples. The SMBio-LNG project, led by Lombardy, is using the networking strength of the Vanguard Initiative to expand a predominantly Italian-based business model into a genuinely European value chain perspective. The Baltic Sea Region similarly seeks to expand upon trans-national green business opportunities, whilst addressing political reluctance to commit to cross-border investments.

### **3.6 Multiplicity of funding sources used**

In an ideal world, money should follow strategies, rather than the reverse. In practice, however, many of the examples reported difficulties in accessing EU Funds, particularly mainstream European Structural and Investment Funds (ESIF), for activities classed here as part of green S3 implementation. As a result, several of the initiatives examined have had to struggle to find other sources of funding, often resulting in a portfolio mixing local (generally small), regional and national funds, with a diversity of EU funds from different programmes.

Small scale projects of a demo nature involving social innovation in particular, were said to ‘fall between’ traditional EU funding channels. Several interviewees felt that mainstream European Regional Development Fund (ERDF) was better suited to larger-scale, technology-driven initiatives. In the case of Culatra, the Algarve Regional Operational Programme (ROP) 2014-2020 was reported as being mainly devoted to ‘*standard*’ SME grant schemes which were ‘*rigid in terms of target groups and indicators*’ and not well suited to the Culatra 2030 local green transition initiative. That said, Community-Led Local Development support does feature in the Algarve ROP and appears as if it might have been good fit.

The interviewee from WaterCampus Leeuwarden drew particular attention to the lack of ERDF funding options for its on-going activities, from the Northern Netherlands OP 2014-2020. He noted that whilst ERDF could be forthcoming under the current OP to develop a new campus infrastructure, it was not available for core funding the operations of the present one. WaterCampus partners are instead active in many other EU programmes, including Interreg cross-border, transnational and interregional, LIFE, COSME, Horizon 2020 and ERASMUS, as well as various national, regional and local programmes, putting together a patchwork of public support for its many innovation projects.

### **3.7 Specific green policy tools identified**

A variety of specific policy implementation tools for ‘green’ transformation in the regions were identified in the cases:

- Calls for projects in green subject areas linked to innovation grants (various/general);
- Green value chain mapping (Basque Country, Slovenia, transnational - Baltic Sea Region);
- Circular Procurement (Basque Country, Centro, Ii Municipality, Slovenia);
- Life Cycle Analysis as basis for investment decisions (Basque Country, Centro, Slovenia);
- Local participatory diagnosis extending into implementation (Culatra, Hauts-de-France, Ii Municipality);
- Local management of profits from renewable energy generation (Culatra, Hauts-de-France, Ii Municipality);
- Engagement of children in green transition (Ii Municipality, Hauts-de-France);
- Widespread deployment of the EC Green Public Procurement training programme (Centro);
- Circular business model development tool (North Jutland);
- Tax deductions for green purchasing by businesses (Basque Country);
- Financial tools for engagement of residents, as individuals, in energy transition (Hauts-de-France);
- Transnational S3 accelerator camp (Baltic Sea Region);

- Transnational pilot voucher for SMEs to access bio-economy test facilities in other countries (Baltic Sea Region).

In general, the cases feature the use of only one or a few of these tools, but in some instances where place-based zero-carbon strategies are deployed, such as in Ii municipality or Culatra, a broader integration of different tools is used to reach the ambitious goals.

The above tools all appear to have strong application potential in a wide variety of regional circumstances. More in-depth study on success conditions for their broader applicability, in different regional contexts, would be needed to ascertain any typology in this regard. Some of the technical-type tools, such as Life Cycle Analysis or green/circular business model development, may be more amenable to diffusion and replication. Others that are more dependent on cultural and societal conditions, such as those for engaging citizens in green transition, need more careful consideration when transposed into other cultural environments.

## 4 Concluding remarks

The first generation of Smart Specialisation Strategies were designed with the aim of boosting knowledge-based growth, through better use of research and innovation, concentrating investments and capacities around areas of regional strength. To achieve this goal, S3 priority domains were identified in regions, as areas where both technological expertise and economic assets are strong, interlinked and distinctive. EDP - the main novelty brought by the S3 concept - mobilised a wide range of stakeholders to identify those areas of strength, foster new connections between actors and develop ambitious open innovation initiatives in S3 priority areas.

While still pursuing the same ambitions, the preparation of the second generation of S3 is taking place in a changed context. In line with the new European Green Deal, stronger attention is being paid by policy makers and citizens alike to the societal challenges associated with green transformation across European territories. This 'green innovation' approach needs to be firmly incorporated into the renewed S3s for the 2021-2027 EU Multiannual Financial Framework.

The ten cases collected during this study demonstrate that, even though the original S3s were not always initially designed with a strong green focus in mind, many regions have used the S3 approach to promote innovation for green transformation, notably related to the circular economy. Although clear figures are not available, a wide range of territories participate in S3 activities with an environmental dimension, notably within the framework of the Smart Specialisation Thematic Platforms<sup>10</sup>. More than 80 territories at the regional and national level are taking part in partnerships that address environmental challenges in a wide range of domains including energy efficiency, solar energy, sustainable buildings, high tech and sustainable farming, sustainable mobility, advanced material for batteries, etc.

The ten cases exemplify the place-based dimension of smart specialisation - notwithstanding differences in scale, from small municipalities to larger regions and/or small country level. They demonstrate the value of enhanced EDP in incorporating the demand side into 'green' experiments. Many of them facilitate the inclusion of the skills dimension, consistent with the broader S3 approach foreseen for 2021-2027. Most have a strong multi-level governance perspective, based on the need to scale up local experiments through replication at regional or national level. Frequently, there is a trans-national dimension fed by international value chain approaches, which could be further facilitated by the proposed new Interregional Innovation Investment 'I3' instrument.

Moreover, upcoming studies related to Smart specialisation could provide methodological guidelines to promote the Green transition and assess its implementation across European territories; they could also explore further the crucial role of monitoring and evaluation systems as well as capacity building to foster environmental-oriented practices, and highlight potential barriers and ways to address them.

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<sup>10</sup> <https://s3platform.jrc.ec.europa.eu/s3-thematic-platforms>

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## **List of abbreviations**

BSR: Baltic Sea Region

CCDR: Regional Coordination and Development Commission

EDP: Entrepreneurial Discovery Process

ERDF: European Regional Development Fund

GPP: Green Public Procurement

KPIs: Key Performance Indicators

S3: Smart Specialisation Strategies

SMEs: Small and Medium Enterprises

SRIP: Strategic Research and Innovation Partnership

TSSP: Thematic Smart Specialisation Platforms

VET: Vocational Education and Training

## List of tables

<b>Table 1</b> Evaluation grid for the selection of cases.....	8
<b>Table 2</b> Ten inspiring examples of S3 implementation for green transition .....	11

## **Annex 1. Presentation of the ten inspiring cases**

### **1. A living lab for the sustainable energy transition ambition of the Algarve Region's S3 Culatra 2030, Portugal**

#### **Summary of the case**

The 'Culatra 2030 - Sustainable Energy Community' initiative is a demonstration project on the island of Culatra in Algarve, Portugal, covering multiple aspects of green transition. It implements the ambitions of the Smart Specialisation Strategy (S3) in Algarve, using a novel Entrepreneurial Discovery Process (EDP) to create a real-life laboratory for green transition, focusing on the specific needs of the island and capitalising on its assets.

The value of the Culatra 2030 initiative lies in its all-encompassing strategy covering multiple aspects of green transition, including social issues such as energy poverty. Rather than the development of new technology per se, the key perspective is the holistic model and demonstration character of the initiative. The central ambition of the initiative is to transform all structures on the island to become energy self-sufficient. A mix of new technologies is implemented to prepare the transition to clean energy and energy self-sufficiency. The community will produce energy exclusively from renewable sources, use electric mobility, decarbonise its fishing industry and acquire sustainable habits and living practices. It will also manage its own energy system, recycle water for self-consumption and retrieve value from its waste.

The key to its success is the active participation of the island's whole community through a continuous EDP process. The initial Community Participatory Diagnosis was based on a fully inclusive participatory process, which brought together public entities, academia, companies and communities. Following the initial stage, a new governance system for participatory exploration of transition pathways was put in place. This participatory model is proving effective in improving decision-making, compared to the previous situation, which was characterised by several scattered and uncoordinated initiatives.

Culatra 2030 succeeds in tailoring new technological solutions for green transition to the specific needs of the island, as expressed by the islanders themselves. It is a truly bottom-up initiative, inspired by the S3 approach, which can be replicated in other communities.

#### **1. Territorial context and challenge faced**

Culatra is a small island, located in a protected area, home to 1,000 permanent inhabitants living primarily from fishing activity. There are over 7,500 daily tourists in summer, providing a second source of revenue for the island's population. As a small and relatively isolated community, Culatra faces specific challenges in terms of energy efficiency and self-sufficiency, water scarcity, waste management and localised pollution. Given that energy accounts for some 50% of household expenditure on the island, energy poverty is another important challenge.

#### **2. Aims and ambition of the initiative**

Consolidating the strategic sector of renewable energy is identified as a key priority within the Algarve Smart Specialisation Strategy (S3). In response, the Culatra 2030 Sustainable Energy Community initiative – 'Culatra 2030' – aims to address the island's challenges through comprehensive green transition, creating at the same time a living pilot demonstration of its new green socio-economic model. The broad scope of Culatra 2030 impacts upon several of the region's S3 domains. Beyond the benefits for Culatra, the initiative also aims to position the Algarve as a whole as a centre of excellence in renewable energy research and training, exploiting its distinctive resources in the decarbonisation of its economy.

Culatra 2030 seeks to demonstrate that, through systematic use of a broad EDP involving all local stakeholders, local energy communities can play a central role in the transition to a greener, more inclusive, democratic, transparent and participatory energy system.

#### **3. Content and implementation of the initiative**

A wide Entrepreneurial Discovery Process around the Community Participatory Diagnosis

Culatra 2030 was established in 2018, in the context of the EU initiative 'Clean Energy for EU Islands'. Implementation began with a Community Participatory Diagnosis, a specific form of EDP adapted for the island from the region's S3 partnership processes. Using this model, different pillars of energy transition were defined collectively by key stakeholder groups, comprising members from academia, companies, residents' groups and administration. The Community Participatory Diagnosis was carried out in three distinct phases:

Phase 1 - Views: understanding the actors and the territory as a social product;

Phase 2 - Horizons: dialogue and proposals for action;

Phase 3 - Negotiation and Action: seeking consensus for the development of the territory.

During this dynamic process, possible transition pathways were discussed and agreed upon to create a shared vision for the future development of the Island – the 'Culatra 2030 Clean Energy Transition Agenda' (CETA). Based on this vision, proposals for actions were generated collectively. Opportunities for cooperation and financing were identified under the three main priority areas of Energy, Water and Waste. The EDP proved essential for defining priorities and generating ideas for actions with a high degree of commitment by all local actors. It also helped bring about important changes in mentality among islanders, boosting their confidence and sense of self-belief.

### **New governance model for participatory transition pathways**

The Culatra 2030 initiative is firmly based on a 'quadruple helix' partnership model, bringing together the Regional Authority of Algarve, Local Authorities, the University of Algarve and various companies providing technology solutions, as well as citizens gathered under the Culatra Island Residents' Association. The University of Algarve is coordinating the initiative. Together they form the 'Island Sustainability Committee', overseeing the whole Culatra 2030 initiative. The committee has proved to be of considerable help in streamlining decision-making processes and ensuring feasibility of all projects from the outset. The new participative approach compares favourably to the past situation, where a multiplicity of bodies in the small territory were acting in an unconnected and uncoordinated way. The local partnership is now also seeking to involve the National Ministry of the Sea in the Island Sustainability Committee, in order to increase its power and influence at higher decisional levels.

### **Bundles of pilot experiments implemented in the Culatra living laboratory**

The Island Sustainability Committee selected key instruments and tools for implementation under the three priority areas of the CETA, as follows:

Energy transition - the main focus of the initiative, with four lines of action:

- 1) Increasing power generation from renewable energy sources and storage capacity:
  - establishing flexible instruments and grid support for management of the island's integrated energy system;
  - developing flexible demand response models for prosumers, associated with local decentralized renewable production;
  - installing a set of renewable generation systems (predominantly photovoltaic), with the aim of reaching 100% of the consumption of electricity from Renewable Energy sources by 2030;
- 2) Increasing housing and building efficiency:
  - interventions aimed at increasing energy efficiency and energy production capacity, water efficiency and at evaluating rainwater harvesting and grey water reuse potential;
- 3) Development of electric mobility and decarbonisation of maritime transport:
  - electrification of transport on, to and from the island
  - setting up of Smart Charging Systems for electric vehicles, combined with innovative vehicle-to-grid mechanisms and energy storage;
- 4) Creation of an energy community in charge of renewable energy production,
  - establishment of an intelligent micro-grid, as well as reward/market/price/sharing mechanisms that motivate consumers to develop more sustainable practices.

#### Water supply and treatment:

- Desalination pilot plant;
- Application of new concepts for rational use of water.

#### Waste reduction, management and valorisation:

- Pilot station to recycle waste produced on the island;
- Development of new consumers habits and waste sorting solutions.

Taken together, these activities were considered by the partnership as the most appropriate for establishing Culatra as a real-life laboratory for green transition. They are now under different stages of implementation.

#### **Constant efforts needed to combine appropriate funding sources**

A major challenge faced by Culatra 2030 remains the acquisition and successful articulation of a variety of financing sources into an integrated initiative. Culatra 2030 has been funded so far from a scattered policy mix of local, regional, national and EU sources:

- Local level: 'Fundo Culatra2030 - Environmental and social responsibility fund'. This is a grass-roots fund made up from a collection of micro funding sources from local associations and bodies. Local municipalities also provide small amounts for green projects;
- Regional level: ERDF and domestic regional funds, managed by the Algarve Regional Coordination and Development Commission (CCDR), supported a wide range of infrastructure investment in Culatra under previous generations of EU Cohesion Policy. However, the current Algarve regional OP – with its main emphasis on SMEs – is not well adapted to the needs of the initiative in terms of eligible target groups. Changes are expected in the 2021-2027 funding period, which should enable better alignment between regional funds and this kind of initiative;
- From national level: a Portuguese NGO supporting 'Win-win strategies and small actions for big impacts on climate change' funded the participatory diagnosis.
- The 'Decarbonisation of Aquaculture Activity' project, aimed at providing solar power generation sources and solar boats, is funded by the European Maritime and Fisheries Fund (EMFF), through Portugal's 'MAR2020' EMFF OP.

Other programmes contributed with technical rather than financial support:

- The EU programme, 'Clean Energy for EU Islands';
- The SMILO, Small Island Organization - a cooperation programme to support sustainable management on small islands.

#### **Monitoring plans**

Plans are underway to create an online monitoring platform, managed by the University of Algarve, to collect and display data from the photovoltaic generation plants of the island. The platform will also present real-time information about the energy imports and exports to and from the national power grid, with a view to calculating trends in emission reductions.

Combination of technology and human contributions as success factor

While embarking on its initiative, the Culatra community has taken up lessons from successful cases of energy transition in other islands – for example, in Norway and Denmark. The lessons, which inspired Culatra most, were those showing that success depends on specific virtuous configurations of technologies, humans, organisations and space in their specific contexts, beyond the energy issues they are actually seeking to address.

#### **Important lessons learnt from Culatra's experience:**

- It is essential to include the community's perspective in order to truly understand actual needs;
- Broad citizen participation and strong cooperation between citizens, authorities, researchers and companies provide the most realistic basis for green transformation. The broad and thorough EDP carried out has been a key ingredient of success;
- A wide combination of all potential technology pathways, whether they concern batteries, electric vehicles, retrofitting of homes, or heat pumps etc. need to be carefully aligned to achieve a reliable, community-owned, decarbonised energy system.

## **Appropriate regulations and funding are needed to complete this demonstration case**

The success of Culatra 2030 still depends on new regulatory developments and incentives for the creation of energy communities, yet to be put in place. Further adaptation of urban administrative procedures on the island and better availability of funding sources are also needed for test beds, to ensure optimum adaptation of new technologies to Culatra's specific needs.

### **4. Achievements**

While the implementation of the full range of solutions for Culatra 2030 Clean Energy Transition Agenda is still underway, several remarkable achievements are already visible.

An important step is being taken to decarbonise fishing - the main economic activity of the islanders - in the transition from combustion engine powered to electric-solar boats, thereby reducing pollution and the emission of greenhouse gases. This will allow the award of the 'zero carbon fishing products' label, raising the value of seafood from Culatra, contributing in turn to the environmental sustainability of the Ria Formosa Natural Park and enhancing sustainable tourism. Decarbonisation of the island's main economic activity in this way responds directly to the twin ambitions of the Algarve S3 to both support economic development and improve the environmental sustainability of the territory.

Beyond the anticipated environmental and economic benefits of the initiative as a whole, Culatra is also implementing a new participative economic model, in which the distributions of costs of and incomes resulting from renewable energy generation are co-decided with the citizens. The new model is expected to demonstrate that energy communities can play a relevant role in the generation of electricity in a decentralized way. Energy poverty on the island should become a thing of the past.

The initiative has already attracted the interest of Portugal's main energy operator for the National grid. Discussions are underway regarding a possible major investment by this operator to help accelerate the system conversion.

### **5. Replicability**

The Culatra 2030 initiative is conceived as a living lab for energy transition in Algarve, through which the island will become the first Portuguese community that is fully sustainable in terms of energy production, distribution and consumption. Culatra 2030 will not only produce new tools to generate and manage green energy. It will also make recommendations on the legal and regulatory framework to create better market opportunities for increasing the share of renewables in the energy mix, as well as for larger-scale replication of different solutions. The Algarve Regional Energy and Environment Agency will facilitate dissemination to other isolated territories in the region.

Replicability to other islands of the EU is strongly embedded in the initiative through Culatra's membership of the EU pilot project 'Clean Energy for EU Islands'. Under this EU pilot, islands - as micro versions of larger territories - are seen as appropriate sites for validating and spreading new concepts, processes and technologies, serving as showcases at international level.

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## **2. Eco-innovation towards a circular economy in the Basque Country (Spain). Sharpening the competitive edge of Basque industry through eco-design and life cycle thinking, following a Smart Specialisation approach**

### **Summary of the case**

The Basque Country places especially strong strategic emphasis on eco-innovation in its industrial base for successful transition to a circular economy. The autonomous region has been promoting eco-innovation intensively for over 10 years and has achieved inspiring results: there are now 150 Basque industrial companies applying circular practices such as life cycle assessment and ecodesign, as well as new circular business models, bringing remarkable economic and environmental benefits. Three particular initiatives stand out:

- Basque Ecodesign Centre (since 2011) – accelerating the integration of ‘life cycle thinking’ in the strategies of the region’s largest companies;
- Circular Economy Innovation Programme (since 2017) – generating circular business opportunities for SMEs through demonstration projects focused on regional priorities;
- Basque Ecodesign Hub (since 2015) - building up long-term green capacity by developing key circular business skills in young people and supporting their employment in local SMEs.

Entrepreneurial Discovery Processes (EDP) established in the framework of the Region’s Smart Specialisation Strategy (S3) have fostered productive dialogue between the actors from large companies, clusters, SMEs, universities and regional and local government bodies involved in these initiatives. This proactively managed EDP has strengthened the operational linkages between the three initiatives and helped improve their efficiency. Support to eco-innovation is proving to be by far the region’s most cost-effective public intervention in the circular economy sphere.

Valuable lessons learnt from the region’s eco-innovation initiatives fed into the development of the new ‘Circular Economy Strategy of the Basque Country 2030’, adopted at the beginning of 2020, under which they will be continued and further refined. The region’s new S3 for post-2021 will see circular economy expanded into more of a transversal driver as a result and in turn, a strengthened focus in its EDP structures on eco-innovation.

### **1. Territorial context and challenge faced**

The Basque Country managed its transition from heavy industry over 30 years ago with a high degree of success, to become one of the wealthiest regions in Europe today. The autonomous Regional Government has been investing consistently in environmental protection throughout this transition and more recently also in green innovation. In the 2014-2020 period, green innovation investments have taken place in the strategic context of the Basque Environment Framework Programme 2020 and the Science, Technology and Innovation Plan ‘PCTI 2020’ – the region’s current Smart Specialisation Strategy (S3).

Whilst the Basque economy has grown by 26% since 2000, material consumption has fallen by 25% and the volume of municipal waste going to landfill has reduced by 56%. There are therefore encouraging signs that the region’s economy is decoupling from material consumption and waste generation. The circular economy in the Basque Country currently accounts for 1.12% of the GDP, with gross annual income of €764m. In terms of employment, there are 18,463 jobs related to the circular economy – some 2.08% of total jobs in the region.<sup>11</sup>

Nevertheless, the Basque industrial sector still consumes 21 million tons of raw materials per year, 77% of which are imported. It generates 72% of total waste, of which 42% ends up in landfill. The costs of raw materials in Basque industry account for 61% of company expenditure, compared to 2% for energy costs, both similar percentages to those for Germany.<sup>12</sup>

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<sup>11</sup> Circular Economy Strategy of the Basque Country 2030, Basque Country Government (January 2020)

<sup>12</sup> The Circular Economy in Basque Industry, Ihobe (March 2018)

## **2. Aims and ambition of the initiative**

The Region has recently developed its new Smart Specialisation Strategy (S3) covering the 2021-2027 EU funding period, in the form of the 'Regional Research, Development and Innovation Plan 2030' (RDIP). The new S3 fully supports the 'Circular Economy Strategy of the Basque Country 2030', launched by the Regional Government in January 2020. Circular economy is now integrated more transversally into the S3 priority area of 'Advanced Manufacturing and Energy', with the objectives, by 2030, to:

- increase material productivity by 30%;
- increase the circular material use rate by 30%;
- cut waste generation per unit of GDP by 30%.

The role of eco-innovation is strongly emphasised in both strategies. Eco-innovation now replaces 'ecosystems' as one of the four so-called opportunity niches of the current S3, around which the Entrepreneurial Discovery Process (EDP) is organised. It is estimated that innovative circular solutions in Basque industry could potentially lead to annual savings of 6% in the consumption of raw materials, resulting in savings of €2bn/year for companies.

## **3. Content and implementation of the initiative**

The new S3 and the Action Plan to 2025 of the Circular Economy Strategy, both stress the importance of consolidating existing eco-innovation initiatives in achieving the above goals, as well as placing greater emphasis on the development of circular business models.

### **Strengthened cross-sectoral and multi-level governance for circular economy**

Under the new strategic framework, the previously separate programmes of the Ministry of Economic Development and Infrastructures and the Ministry of the Environment, Territorial Planning and Housing, which contribute collectively to circular economy objectives, are now better coordinated. Following a Government decision taken in September 2020, programmes relating to Environment, Industry and Innovation have been brought together for implementation under a single department. Ihobe, the Government's Agency for Eco-Innovation, delivers those measures specifically targeting eco-innovation. At local level, 'Udalsarea 2030', the Basque Network of Municipalities for Sustainability, and the Development Agencies will play a key role in coordinating the actions of the different local entities in the field of circular economy and disseminating good local practices.

### **Entrepreneurial Discovery Process focused on eco-innovation**

Ihobe coordinates the new S3 Eco-Innovation Working Group, organising structured debate around key eco-innovation themes. Membership of the Working Group largely comprises the actors involved in the three main eco-innovation initiatives in the region, namely:

#### **Basque Ecodesign Centre**

A public private partnership with prestigious physical location, created in 2011, bringing together 9 leading multinationals - CIE Automotive, EDP Energia, Eroski, Euskaltel, Iberdrola, Orona, Siemens-Gamesa, Velatia, Vicinay (collective annual turnover €36bn), together with SME sectoral clusters and Basque public agencies. The Ecodesign Centre serves to enhance the competitiveness of participating firms through their acquisition and application of cutting-edge ecodesign-related knowledge and to ensure that environmental considerations are fully integrated into supply chains.

#### **Circular Economy Innovation Programme**

Established in 2017, based on lessons learnt from the three earlier circular economy calls (2014-2016), the programme supports circular business creation for SMEs through demonstration projects focused on regional priorities. Each demonstration project forms a specific public-private dialogue involving SMEs and an inter-sectoral networking platform, linking projects results to demand-driven instruments and formulating policy recommendations for the future.

#### **Basque Ecodesign Hub**

A collaboration between the Basque Government and all the Basque universities, the Hub has been training young people, since 2015, in specialist green growth topics, such as eco-design, Life Cycle Analysis,



environmental footprint, plastic recycling, competitive-environmental analysis and ISO 14006 implementation. The Ecodesign Hub aims to successfully integrate Life Cycle thinking, Ecodesign and circularity into the operations of regional SMEs.

Participation of these regional initiatives in the S3 Eco-innovation Working Group helps to cement the operational linkages between them. The Ecodesign Hub provides skilled people for the supply chains of the multinationals supported through the Ecodesign Centre, whilst the Circular Economy Innovation Programme helps focus business innovations in SMEs onto circular economy challenges of the region requiring people with the appropriate skills and so on. Further circular economy specialists of the Basque Science and Technology Network and other catalyst stakeholders also participate in the Working Group.

Large companies, clusters, universities and government actors are therefore fully involved in the Basque Country's EDP on eco-innovation. SMEs are also associated with the EDP, but Ihobe aims to stimulate stronger involvement by them through a Think Tank dynamic currently being designed. Different S3 activities, such as the recent Basque Ecodesign Meeting 2020 and technical events like 'Value Chain Green Competitive Surveillance Studies and Challenges' have facilitated the exchange between companies. Citizens have been less directly involved, although they have taken part in co-creation sessions for the Circular Economy Strategy and have indirect involvement in the EDP through the municipality network 'Udalsarea 2030'.

### **Specific tools used to encourage circular economy**

To help create circular economy demand, the Region offers 30% tax deductions for business investment in equipment on its Clean Technologies List. The Region also requires commitments to green purchasing practices from companies and provides comprehensive guidance for this purpose. These measures overlay a progressive greening of the Region's techno-environmental standards and procedures for environmental authorisations and inspections, which are expected to be further strengthened in the future.

Ihobe provides innovation grants to companies for ecodesign, material efficiency and recycling. It also financially supports the three linked ecodesign initiatives – Ecodesign Centre, Ecodesign Hub and Circular Economy Innovation Programme. Ihobe reports the comparative cost-effectiveness of these measures as shown in the box below:

Basque Country

Induced business investment (€) per Euro of public support

Clean Tech tax deductions (2010-2020) = €4

Innovation grants (2014-2020) = €21

Support for ecodesign (2005-2020) = €178

Source: Ihobe 2020

Ecodesign – which includes the Ecodesign Center, the Ecodesign Hub and SME ecodesign projects assisted – is therefore considered by far the most cost-effective support measure for the circular economy.

Ihobe also seeks to adopt a more demand-driven approach, through its own awareness raising actions for businesses, concentrating on the following topics:

- Green Product Policy Drivers: mainly the EU Ecodesign Directive, Green Public Procurement (GPP), Green Supply Chain Management (GSCM) and Circular Business Models for product durability and product value retention.
- Green Materials Policy Drivers: mainly the Integrated Pollution Prevention and Control (IPPC) Best Available Technologies Directive, EU Plastic Strategy, EU Critical Materials Strategy. The priority materials for the region are metal alloys, polymers, minerals and wood.

Ihobe's budget for promoting eco-innovation is relatively modest at €2.1m for 2020, all sourced from the Regional Government. Ihobe highlights the importance of leveraging private investment, noting the overwhelming strength of major companies in dictating demand conditions for its own supply chains and acknowledging the crucial role of the Ecodesign Centre in this regard.

### **Monitoring the circular economy transition**

The Basque Country Government publishes a comprehensive monitoring document, every two years, with data and commentary in line with the requirements of the EU Monitoring Framework for Circular Economy established in 2018. In the document, the Region supplements the data needed for the EU Framework with

values for complementary indicators relating to domestic materials consumption, resource productivity, material flows per capita and total waste treatment per capita. The Region also commits itself to developing further indicators beyond the EU framework and is working on possible indicators to measure spending on eco-innovation, development of ecodesigned products, new dematerialised business models introduced, etc.

In addition, from 2022, there will be two-yearly monitoring reports for the region's Circular Economy Strategy, which will report on progress achieved under each of the measures of its first Action Plan to 2025. There will also be an external Assessment Report for the Action Plan, produced in 2025, which will be used as the basis for developing the following Action Plan.

#### **4. Achievements**

After a decade of intensive collaboration on eco-innovation, some 239 industrial companies of the Basque Country are already applying circular practices or models – such as ecodesign, servitisation (i.e. products as services), remanufacturing, life cycle assessment, environmental declarations etc.

The Ecodesign Centre has been instrumental in almost doubling turnover expectations, since 2015, for ecodesigned products and services to €7bn/year. Its large company members now enjoy better 'green' credentials – such as Iberdrola increasing corporate reputation as the first multinational implementing the EU's Organizational Environmental Footprint, or Eroski heading Greenpeace's 'Green Retailers Ranking' in Spain. Others have built market lead based on ISO 14006 ecodesign certifications, like Siemens Gamesa.

The Circular Economy Innovation Programme has seen 130 completed demonstration projects, with potential to create 12 new circular businesses, achieve additional turnover of €85m/year and generate 230 new green jobs in SMEs. In terms of environmental impact, it is expected that these projects will contribute to a reduction of 350,000 tonnes of CO<sub>2</sub> equivalent/year and to a saving of raw materials of some 400,000 tonnes/year.

The Ecodesign Hub has contributed to a significant increase in the employability of youngsters, with a throughput of 130 graduates with circular economy skills since 2016. Outputs include 147 green projects developed by skilled graduates in the region, including 118 in-factory. Around 60% of the graduates are recruited by local companies, with SME satisfaction rates reaching 84%.

The well-publicised results from these three initiatives are inspiring. They show numerous examples of Basque companies introducing circular product or process innovations, which have led to tangible productivity improvements through material savings and/or reduced energy consumption in the short term, with improved image and greater market access, leading to increased sales later on.

#### **Key success factors and lessons learnt**

The central success factor for the Basque Country is that it began early with promoting eco-innovation. The example of the Ecodesign Centre shows that lifecycle thinking certainly pays off, but it has taken some 10 years for the region to develop a pipeline of graduates with the necessary skills for this approach to be internalised in a critical mass of local companies.

Another important ingredient has been the S3 implementation system, with its Working Group structure to encourage effective EDP. The S3 approach has therefore helped the region bring its different eco-innovation initiatives together so that they mutually support each other. Public subsidies for eco-innovation have helped provide a 'hook' to initiate circular thinking, but additional advice and support close to businesses available through the network of initiatives, have been essential in bringing about success.

Ihobe nevertheless considers that pro-active greening of supply chains has been slower than expected. The agency acknowledges that greater efforts are needed to increase the adoption of circular approaches by SMEs – starting with improved awareness and understanding of 'green' policy drivers, and new 'green' market opportunities. Other key challenges for the future include the disposal of Non-Hazardous Waste and product end-of-life, in the context of the new European regulatory framework for waste, as well as the generation of a stable and safe market for secondary raw materials.

#### **5. Replicability**

Ihobe has always sought to benchmark policy tools it has found elsewhere in the EU and has adapted certain aspects of other countries' policies into its own instruments – such as the Dutch Vamil Tax deduction system, the UK WRAP Programme and the Swedish CPM Center for Life Cycle Thinking.

As regards dissemination of Ihobe's experiences elsewhere, three main platforms are used:

- the European Knowledge Network for Resource Efficiency (EREK), now being integrated in the EU Cluster Collaboration Platform);
- the EU Regular Meeting on Integrated Product Policy and Circular Economy (where Ihobe co-represents Spain) and the EU Environmental Footprint Working Group;
- the Spanish Network of Heads of Environmental Protection Agencies and their Green Economy Working Groups.

There has not yet been any full-scale replication transfer from Ihobe, but there have been requests in recent years from the Scottish Government and the German Region of Baden Württemberg to transfer the Basque Ecodesign Centre, of which the latter is currently being analysed.

*"Businesses we have supported often say the most important thing for them was not the grant money. It was actually the new learning they gained about how to integrate circular thinking into their strategies, as well as the chance to exchange experience with other companies facing similar challenges."*

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List of the main Basque industries in ecodesign, ecoefficient manufacturing and materials circularity: <https://www.resourceefficient.eu/sites/easme/files/Ecodesign%20resource%20efficiency%20circular%20economy%20in%20Basque%20Industries.pdf>

Basque Country Clean Technologies List: <https://www.ihobe.eus/publications/basque-clean-technology-list>

### **3. Green Deal on Circular Procurement in the Centro Region, Portugal**

#### **Summary of the case**

The Centro, Portugal, Green Deal project stems from collaborative interaction in the working groups of Centro Region's Smart Specialisation partnership during 2018, which resulted in 'Circular Procurement' being defined as a key priority of Centro's new Regional Agenda for the Circular Economy. The initiative is based on the Dutch 'Green Deal' model for promoting Circular Procurement, which is also followed by regions in Belgium and France.

Centro's Regional Coordination and Development Commission (CCDRC) coordinates the Centro Green Deal Network, comprising 13 entities: five intermunicipal associations, three municipalities, two polytechnic schools, one university, one hospital and CCDRC. By signing a Letter of Commitment, each participant body is committed to launch two pilot Circular Procurement tenders and share all the knowledge gained from these experiences within the Network. Smart Specialisation governance methods are employed to ensure that the Network is a genuine sharing community. As part of their initiation, Network members participate in several workshops focused on topics aligned with circular economy principles and their connection with procurement, namely the EC Green Public Procurement Training Programme.

Circular Procurement tenders have so far been launched by network members in fields such as school meals provision, supply of specialist working clothes, electric vehicles acquisition and purchase of reusable and recyclable materials. Network members are now better understanding the potential economic benefits of Circular Procurement, as well as how it can reflect positively on their organisation's image and standing in the region. A national Monitoring Group has been established, with a view to future scale-up and replication to other Portuguese regions. The initiative also features a strong element of EU-level exchange and learning. Centro is involved in establishing a European network of regional Green Deal initiatives following the Dutch model, as well as participating in the EC DG Regio Pilot Action 'Strategic Public Procurement', under which further technical support and guidance is provided by OECD.

#### **1. Territorial context and challenge faced**

Portugal's National Circular Economy Action Plan 2017-2020, adopted in 2017, remarks that the country's economy has a 'slow metabolism' overall. The analogy refers to Portugal's tendency to accumulate materials, extracting and importing more raw materials than the amount of finished goods the country exports. The Plan also highlights Portugal's material productivity, which has evolved slower than the EU average over the last 10 years and some five times more slowly than its neighbour Spain. Transition to a circular economy therefore represents a major challenge for Portugal. To address it, the Plan calls for action at three interlinked levels:

- Macro actions - impacting on systems to help society adopt circular economy principles;
- Meso actions - relating to the value chains of key materials-intensive sectors such as construction, logistics, agriculture, forestry and the food industry;
- Micro actions - regional or local initiatives to bring circular solutions to societal challenges.

Within this framework, in early 2018, the National authorities invited each region to propose its agenda for circular economy action.

#### **2. Aims and ambition of the initiative**

Centro, one of Portugal's less-developed regions, drew inspiration from its Smart Specialisation Strategy (S3) in building its first strategic approach to the circular economy transition. In response to the National Action Plan, five principal priorities of Centro's Regional Agenda for the Circular Economy were defined, through the collaborative dynamics of Centro's S3 platforms and working groups:

- Research and Technological Development;
- Circular Procurement;
- Education, awareness and capacity building;
- Business strategies and industrial symbioses;
- Circular economy as a driver for innovation and territorial cohesion.

The S3 approach ensured that the Centro Agenda's circular economy priorities would have a high degree of operability, correspond to capacities available in the region and represent a firm commitment from the region's main stakeholders and institutions.

In adopting Circular Procurement as one of their key priorities, Centro's S3 partners recognised the particularly strong transformative potential of this tool. Since Public Procurement accounts for some 14% of EU GDP, they understood that using public purchasing power could be a highly feasible way to push for greater 'circularity' from suppliers, thereby achieving important gains in efficiency and reductions in waste throughout entire product life cycles.

Thus, in early 2019, the Region began implementation of a specific regional initiative on Circular Procurement, which is the subject of this case. Through the new initiative, 'Centro Green Deal', Centro has become Portugal's leading region in the Circular Procurement experiment. In this position, Centro reports back systematically to the National authorities on its on-going Circular Procurement findings. It represents an inspiring case of a territorial action working from the bottom upwards – with each acquisition of a circular product or service potentially triggering beneficial effects in the local, regional and national contexts.

### **3. Content and implementation of the initiative**

CCDRC had already developed valuable knowledge on how to promote circular economy through previous involvement in EU multi-regional projects, such as:

- SCREEN (Synergetic Circular Economy across European Regions - Horizon 2020): exploring operational synergies between research and innovation investments from Horizon 2020 and European Structural and Investment Funds (ESIF), on eco-innovation and circular business models.
- REPLACE (REgional PoLicy Actions for Circular Economy - Interreg Europe): capitalising on lessons learnt under the SCREEN project with the common objective of improving Regional Operational Programmes (ROPs).
- CircPro (Smart Circular Procurement - Interreg Europe): disseminating knowledge on Circular Procurement practices between 10 European regions, including also Alentejo from Portugal.
- URGE (circUlaR buildinG citiEs – URBACT): designing integrated circular urban policies in the construction sector.

Boosting Circular Economy amongst SMEs (European Commission DG Regio Pilot Action): promoting and encouraging SMEs in their transition to a circular economy.

The main impetus for the Centro Green Deal initiative came from the Dutch national model. The practical guide 'Circular Procurement in 8 Steps' (2018) results from this initiative and is currently being translated to Portuguese. Following bilateral contacts between Centro Region and the Dutch Government two experts from the Dutch Ministry of Infrastructure and Water Management (Rijkswaterstaat), made visits to the region to conduct workshops for interested regional entities about the Dutch experience in launching their own Circular Procurement Green Deal and its subsequent replications in the regions of Paris Île-de-France and Flanders.

#### **Governance of the initiative – a sharing community following S3 operating methods**

Centro's Green Deal is led by Centro's Regional Coordination and Development Commission (CCDRC), the deconcentrated regional branch of Portugal's National Administration, responsible for environment, land use, urban planning and regional development. CCDRC is also the Managing Authority of Centro's regional level ESIF Operational Programme.

CCDRC set up and coordinates the Centro Green Deal Network, comprising 13 entities: five intermunicipal associations, three municipalities, two polytechnic schools, one university, one hospital and CCDRC, which all joined on a voluntary basis. The network membership is therefore predominantly public sector and research, in keeping with the nature of the initiative. S3 partnership operating methods are nonetheless employed to ensure that the network is a genuine sharing community, based on systematic consultation and exchange of experience between the participants.

In operational terms, the Network was formalised by the signing of a Letter of Commitment defining the duties and rights of each member entity in the Centro Green Deal initiative. In this way – as in the Dutch Green Deal – each participant committed to:

launch two Public Procurement procedures, incorporating circular economy principles, by the end of the project; and share all the knowledge gained during these Circular Procurement experiences, thereby contributing to a fully collaborative learning network.

For its part, CCDRC undertakes to enhance the learning experience by holding regular meetings of the Network throughout the implementation of the initiative. During these meetings, the participants share the lessons learnt on their pilot experiences and identify successes and difficulties. CCDRC also promotes workshops and training sessions, on an ongoing basis, to meet specific learning needs identified by Network members. In addition, a dedicated virtual and internal platform for Network members with documents and other information relevant to the initiative, has been set up. Details from the project can also be found on a microsite created for the Regional Agenda for Circular Economy within the CCDRC website.

Costs for CCDRC have been minimal, beyond the time of the small team charged with organising and participating in meetings, information management and monitoring.

### **Participation in EC Training Programme on Green Public Procurement**

A key initial stage of the initiative has been the participation by members of the Network in the EC training programme on Green Public Procurement (GPP). This comprehensive programme comprises six modules covering all relevant legal, strategic, practical, circular and market-based aspects of GPP, as well as 10 operational modules focusing on specific product groups. The training materials are all openly available online and are delivered regularly in several Member States, including Poland, Portugal, Romania, Bulgaria, Croatia, Cyprus, Estonia, Hungary, Latvia, Lithuania and Malta. In Portugal, the National Laboratory of Energy and Geology (LNEG), in cooperation with CCDRC, delivers this training. An important requirement of the EC training programme for Green Deal Network members is that the same persons each participate in at least four modules.

### **Launch of the first Circular Procurement procedures**

At the time of writing, implementation of Centro Green Deal is still on-going and many of the pilot procedures remain to be completed. Circular Procurement tenders have nevertheless been launched in the fields of:

- school meals provision;
- electric vehicle purchase for healthcare service delivery;
- supply of specialist working clothes;
- purchase of reusable and recyclable materials.

In the case of school meals provision, for example, a key requirement of the tender was to deliver meals containing organic food products, through processes ensuring reuse of food waste, use of environmental-friendly materials and cleaning products with eco label – all at no extra cost than the fixed amounts within the schools' framework agreement.

The remaining pilot tenders are expected to be launched later in 2020 and during the course of 2021.

### **Monitoring provisions**

Results from the Centro Green deal, in addition to providing data for the EU level monitoring framework for circular economy, include complementary indicators relating to:

- numbers of products/services covered by circularity criteria;
- number of good Circular Procurement practices identified and disseminated;
- environmental and economic impacts – i.e. reduced emissions, waste, costs vs. traditional options.

An important component of the multi-level governance of the Centro Green Deal has been the creation of a national Monitoring Group, which integrates entities with Portugal-wide responsibilities and/or projects in the field of Public Procurement. The Monitoring Group includes, for example:

- Entity of Shared Services of Public Administration (ESPap);
- National Laboratory of Energy and Geology (LNEG);
- Institute of Public Markets, Real Estate and Construction (IMPIC);
- Portuguese Environment Agency (APA);
- National Innovation Agency (ANI);
- Agency for Administrative Modernization (AMA);

- National Association of Portuguese Municipalities (ANMP).

CCDRC keeps the Monitoring Group updated on progress under the Centro Green Deal, with the aim of making Centro's experiences a success case to inspire potential new national level developments and opportunities.

#### 4. Achievements

As the initiative is currently underway, it is still too early to compile monitoring information in relation to the above-mentioned indicators to which it will contribute. Nevertheless, a number of general lessons are already visible.

##### Lessons learnt

One of the most notable lessons is that a straight copy of the Dutch Green Deal experience is not really appropriate, or possible for Centro, since local customs and mentalities differ between the two places – not least with regard to peoples' willingness to purchase previously used items. An approach which is specific to the Portuguese context needs to be built up.

Many public bodies in the region are afraid of adopting Circular Procurement, since it can appear to run counter to established rules on open competition – for example, by favouring local/short supply chains. Costs are also perceived to be higher with Circular Procurement in some cases. There is therefore a tremendous need for capacity building to raise awareness and build expertise, particularly for smaller public bodies on how to navigate relevant regulations to introduce circularity into Public Procurement procedures to full advantage.

Experience from the initiative shows that capacity building activities work best when technicians and decision makers from the same organisation have the opportunity to learn together. This effort needs to go in parallel with capacity improvements also in local companies to help them deliver more circular products and services, as well as with further refinement of regulatory frameworks.

The power of the successful example is also visible as more of the participants involved come to understand not only the potential economic benefits of Circular Procurement, but also how it can reflect positively on their organisation's image and standing in the region - sustainable, responsible and innovative.

#### 5. Replicability

The composition of the Monitoring Group reflects the importance attached to the initiative at National level and its potential for scale-up and wide replication within Portugal after the first edition is completed. Centro is also involved in the establishment of a wider European network of regional Green Deal initiatives following Dutch model. In addition, CCDRC participates in national and international conferences related with circular procurement, sharing the experience of Centro Green Deal and getting to know practices of other regions/countries involved in similar learning communities and projects.

In 2018 Centro applied to join the EC DG Regio Pilot Action 'Strategic Public Procurement' and the application was approved later that year, illustrating the EC's interest in the Centro Green Deal experience. Under the Pilot Action, Centro receives technical support and practical guidance from the OECD Public Procurement Department to help further develop its Circular Procurement activities, as well as practical exchanges with the other regions involved. At the end of the Pilot Action, the results and good practices arising will be disseminated via EU-level channels to all Member States enhancing opportunities for further replication.

*"We believe that Circular Procurement is a most powerful transformative tool because it can reach market actors directly, in large scale and in a relatively short space of time"*

Ana Pires, Centro Green Deal Team, Regional Coordination and Development Commission Centro (CCDRC).

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Netherlands 'Green Deal' Circular Procurement Model:

<https://circulareconomy.europa.eu/platform/en/knowledge/circular-procurement-8-steps>

European Commission GPP Training Toolkit: [https://ec.europa.eu/environment/gpp/toolkit\\_en.htm](https://ec.europa.eu/environment/gpp/toolkit_en.htm)

European Commission DG Regio Pilot Action 'Strategic Public Procurement':

[Countries and regions to benefit from new support in implementing strategic procurement in the field of Cohesion Policy - Regional Policy - European Commission \(europa.eu\)](#)



## **4. Hauts-de-France – direct citizen participation in green energy transition.**

### **Smart Specialisation approaches foster increased local ownership and longer-term political commitment to energy transition in difficult areas**

#### **Summary of the case**

A component of the current Hauts-de-France regional Smart Specialisation Strategy (S3) – known locally as the ‘Third industrial revolution (Rev3)’ – includes experiments to achieve an active engagement of citizens in the green energy transition. These experiments centre around increased local ownership of green energy investments, including financial ownership. As an extension of the Entrepreneurial Discovery Process (EDP) at the core of the region’s S3, various instruments are being tested to ensure a strong role for citizens, together with businesses communities and public authorities, in implementation of green S3 approaches at local level.

Such instruments include the establishment of a Municipal energy company as a cooperative, with citizens as founders and key players, direct investment of citizens in green Municipality initiatives and widespread use of new savings accounts dedicated to green and local investment projects. In addition, a manual for local authorities has been produced and diffused, gathering a wide range of practical tools and mechanisms to run citizen-based initiatives for green transition.

This collection of experiments responds to difficult transition challenges in a large, territorially and socially fractured region – birthplace of the recently infamous ‘gilets jaunes’ phenomenon. The Rev3 model in Hauts-de-France is based on participative governance with a strong place-based dimension. By involving citizens and local authorities – even in the most remote places across this large territory – the region intends to demonstrate the relevance of bottom-up and inclusive approaches to green S3 implementation, showing the way forward for an extended EDP concept.

Matching technological advances with evolutions in the demand-side is seen as a necessary lever for successful green transition. Decentralised and bottom-up initiatives, with a visible impact on the daily lives of citizens, are proving to be a powerful way of maintaining political commitment to green transition in the longer run. The experiments with citizen engagement in Hauts-de-France provide inspiring and replicable examples for other EU regions confronted with similar challenges.

#### **1. Territorial context and challenge faced**

Hauts-de-France, a former mining region, is the poorest region in metropolitan France in per capita GDP. With a population of nearly 6 million people, it is also one of Europe’s largest and has stubbornly high rates of unemployment. Since the widespread decline of its heavy industrial base, which reached a peak in the 1980s and 90s, the region is still experiencing strong de-industrialisation trends. Hauts-de-France is characterised by economic, social and territorial fracture, where development is concentrated in a few key locations, with others being left behind. Certain locations in the region suffer severe socio-economic difficulties – even to the extent of mounting social unrest, as witnessed recently in the ‘gilets jaunes’ phenomenon.

The current Hauts-de-France Smart Specialisation Strategy (S3) was developed with the aim of reinforcing the knowledge-based economy in the newly formed region, based on synergies between the S3 of the two former regions of Nord-Pas-de-Calais and Picardie, merged into the new larger Hauts-de-France region in 2015. The regional authorities are therefore strongly engaged in a strategy to develop future-oriented industries and attract talent and investment evenly across the region, where feasible. One of the five S3 strategic directions is the so-called ‘Third industrial revolution (Rev3)’. This covers the challenges of transition towards the industry of the future, renewable energy, energy efficiency, circular economy and servitisation (i.e. product-as-service) systems, with the overall perspective of decarbonising the economy by 2050.

There is an increasing awareness by authorities and businesses in the region, of the need to accelerate the green transition. However, greater awareness and a change of attitudes and behaviours by the wider population, including its poorest communities, is also understood to be a crucial ingredient. The region enjoys a long history of participative democracy practices and has attached a strong emphasis on citizen engagement in transition-oriented policies.

## 2. Aims and ambition of the initiative

In the context of S3, the Regional Council has facilitated a range of Rev3 measures, incentives and guidance for local authorities to encourage strong citizen engagement in green transition. The starting point is the acknowledgement that it will not be sufficient to support new value chains and the transformation of the regional economy only from a supply-side and technological point of view. Evolutions in the demand-side are also needed to provide the necessary complementary levers for successful transformation.

The participative approach at the heart of S3 – the Entrepreneurial Discovery Process (EDP) – has been enhanced in the region to create an entirely new strand of the Rev3 implementation apparatus. Originally targeting primarily institutional and economic actors, a new dimension was added to Rev3 in 2018 to give a firm push to the mobilisation of local communities and citizens.

## 3. Content and implementation of the initiative

Three concrete examples illustrate the potential of this new grassroots approach to low-carbon energy transition in different parts of the region.

### **Mine de soleil (Solar mine) in Loos en Gohelle**

As part of its global strategy for becoming a fully renewable energy territory by 2050, the Municipality of Loos en Gohelle has set up an innovative company structure dedicated to the production of solar energy from public and private buildings. The company has a genuine partnership structure, incorporating two local businesses specialised in the production and distribution of energy, a bank and first and foremost, the citizens of Loos en Gohelle.

The citizens are not only funders or ‘sleeping partners’, but also have a say in managing the project. The citizens therefore represent a dedicated official partner within the managing structure of the company, drawing a return on their investment as any investor would. The project will lead to the installation of 2,500 m<sup>2</sup> of solar panels and an annual production of 440 MWh, with an overall investment of €571,000.

### **Grassroots green transition in Fourmies**

The Municipality of Fourmies is located in the outer periphery of the Hauts-de-France region - not exactly at the heart of decision centres or trade corridors. Fourmies chose a few years ago to focus on energy transition in order to build its economic renewal. As part of that strategy and after several successful public and private initiatives, the Municipality opened up the opportunity for its inhabitants to participate financially in investment projects involving renewable energy and/or energy efficiency.

Through their investment decisions, the citizens now actually choose their own priorities in the Municipality’s strategy. Projects vary from the production of solar energy from the roof tops of local schools, to the opening of repair cafés and co-working facilities etc. The citizens gain a return on the money they invest in transition projects. This provides a strong motivation to see the projects succeed and generally convinces citizens of the opportunities to be gained from a transition strategy.

### **Rev3 Savings Account**

In 2015 the Regional Council convinced a national bank to develop a financial product designed to finance projects developed under its Rev3 transition strategy. This mechanism is unique in France.

The Rev3 Savings Account is accessible to any individual looking for a way to invest his, or her, savings and receive a regular return, at the same time ensuring that their savings will contribute to sustainable transition. The interest rates typically range from 0.75% (on first tranche of €15K) to 0.15% (for higher amounts). The bank lends with favourable interest rates to Rev3 projects in renewable energy, circular economy, sustainable transport etc. in the region, ensuring that citizens’ savings are used for green transition in their own local area.

### **Wide citizens involvement: extending the ‘fourth pillar’ of the entrepreneurial discovery process**

The above three examples illustrate the enhancement of the EDP approach to embrace its often-neglected citizen-centred fourth helix. While Rev3 and traditional funding models target companies and relatively large transition projects, here the focus is on smaller-scale, territorially distributed initiatives for green transition, where citizens and local authorities provide the driving force from the bottom upwards.

This new approach to green transition is based on a two-way process. On the one hand, local authorities inform citizens, provide impulse and follow up on initiatives. On the other hand, citizens contribute actively to the

design, implementation and evaluation of public policies. Citizens have therefore a say in the choices of the projects in the first two initiatives and are the first to see the end results. In Fourmies, they are consulted also afterwards when it comes to evaluating the implementation of the strategy. In Loos en Gohelle, they get a return on investment and are part of the management of the initiative.

The system is also founded upon on strong cooperation between regional and local authorities. The latter are seen as best placed to promote and support societal change on the ground, while the regional authorities act as facilitators, providing guidance and support for communication and sharing of good practices across regional territories.

### **Innovative funding and other tools for bottom-up green transition**

Since the types of place-based transition initiatives experimented upon in Hauts-de-France do not easily fit into traditional funding mechanisms, a range of dedicated financing tools have been put in place to support them:

- Loos en Gohelle: the development company has been set up in the form of a cooperative, in which one share amounts to €50. One of the partners, 'SEM Energies renouvelables', a regional public/private company set up to enhance and invest in renewable energy projects, received support from ERDF;
- Fourmies: the mechanism implemented is the first funding campaign in the region for participative loans, to be managed by a local community in partnership with a national bank;
- The Rev3 Savings Account is another original model, with the novel character of targeting only local investments in transition projects.

In addition to these specific funding tools, the Regional Council is also developing training and guidance for administrators, to help them prepare grassroots initiatives for other funding sources.

### **The lessons learnt from participative transition experiments**

The overarching lesson learnt from the initiatives in Hauts-de-France is the necessity to incorporate a societal dimension and citizen participation, at grassroots level, to successfully engage the whole regional territory on a green transition path. In practical terms, these local authority experiments have been found to display the following characteristics:

They are not too costly to implement and are in line with restricted budgets available at local level;

Their format is adaptable to the diversity of local communities;

They generate rapid and easily measurable results;

They are attractive and innovative in terms of mobilising citizens more easily;

They also take on board economic actors, so that benefits in terms of jobs and value creation are combined with citizens involvement;

Crucially, these approaches have all been tested in the region and lessons have been learnt from their implementation.

## **4. Achievements**

Taken together, the different projects implemented have made a significant contribution to local energy self-determination involving local authorities and citizens, thereby strengthening the territorial dimension of the region's S3. Economic benefits are tangible for citizen-investors:

- In Fourmies and Loos en Gohelle: solar energy investments have been made with increased leverage of citizens' funds thanks to involvement of a combination of public subsidies – including European Structural and Investment Funds (ESIF). In Fourmies, it has been calculated that the payback time from this investment is 7 years. Economic benefits will also accrue to local companies that will install the power stations, as well as to households receiving returns from their savings' investments. Environmental benefits will be gained from the production of renewable energy, in addition to pedagogical benefits through the use of this investment for teaching pupils of the community.
- The Rev3 Savings Account only funds local and green projects, which are visible to investor-citizens. With 2,600 accounts and €40m of funds collected, some €13,7m has already been

invested in local transition projects. The mechanism is seen as a success throughout Hauts-de-France.

Importantly, these initiatives also contribute to sustained political commitment to the overall transition strategy over time. In Hauts-de-France, decision-makers are particularly sensitive to the societal impacts of transition. Decentralised and bottom-up initiatives, with a visible impact on the daily lives of citizens, are therefore proving to be a powerful incentive to maintaining political commitment in the longer run.

The experimentation is now translated, at regional level, into an official strategic framework 'Citizen Transition in Rev3', defining the scope, actors and types of actions for these and future initiatives.

## 5. Replicability

The small-scale demonstration cases examined here form part of a broader mobilisation initiative across the territory of the large Hauts-de-France region. Under the Rev3 strategy, they are fully intended to be replicated around the region: 20 similar experiments, with very diversified profiles, are already underway in different parts of Hauts-de-France.

A good practice guide, based on 30 inspiring actions already implemented in the region (selected from 200 initiatives) is being made public to encourage replication by different local authorities Hauts-de-France and beyond.

*"Using citizen loans as a leverage for energy transition is not only a great way to ensure that challenges are addressed by all. It also contributes to economic development of the territory, through jobs and wealth creation."*

Mickaël Hiraux, Mayor of Fourmies

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### Websites:

A web site to understand the overall dynamic: <https://rev3.fr/comprendre/>

A presentation of the Loos en Gohelle initiative: <https://plansolaire.loos-en-gohelle.fr/site/>

The Fourmies website and platform: <https://www.fourmies.fr/pages/page-lendosphere-31102019.html>

The regional savings account: <https://www.moneyvox.fr/livret/troisieme-revolution-industrielle>

Good practice guide: <https://rev3.fr/appropriation-citoyenne/collectivites-et-citoyens-mobilises-pour-rev3/>

## **5. S3 facilitates circular economy transition for local companies in Northern Denmark**

### **Summary of the case**

The Northern Denmark Smart Specialisation Strategy (S3) places a strong focus on reinforced local partnerships to achieve innovation-based development. The industrial area of Aalborg – seen in the regional S3 as a key development dynamo – has followed this line by developing a new local partnership to boost industrial symbiosis, in and around the Port of Aalborg, between 2017 and 2020.

The initiative brought SMEs in the Port industrial area together with the University of Aalborg and local public authorities, in addition to public utilities, in an enhanced Entrepreneurial Discovery Process (EDP) focused on green transition. As a result, 42 circular business models for industrial symbiosis were developed involving 25 companies located in the same area, with the help of University facilitators. Together, these new business relationships have led to significant decreases in energy consumption, material use and greenhouse gas emissions. At the same time, they have brought substantial economic benefits thanks to product innovation and savings from the use of waste as resources, as well as radically changing the thinking of many SME managers for good.

A new ‘sustainable business development tool’ – the GAIA tool - was developed to support companies changing their business model. Precise data were collected by the University facilitators on both positive and negative effects of new green business models, whilst under development, as well as during and after implementation. Capitalizing on this pilot experience, the Port of Aalborg now increasingly acts as an integrator, promoting collaboration and symbiotic development of businesses and the local community, ensuring the diffusion of the experiment for the benefit of the whole region.

The findings from the experimentation in the Aalborg Port industrial area illustrate how such areas can evolve to drive sustainable growth, by building real trust through strong and lasting partnership between the different players involved. The key elements of the S3 approach - a holistic development perspective, an enlarged EDP, improved governance models and smarter monitoring systems, have all played a part in nurturing and adding value to these achievements. The fact that the industrial area in question can be considered relatively ‘normal’, or ‘standard’, makes this an inspiring case of strong relevance for a great many similar industrial areas throughout Europe.

### **1. Territorial context and challenge faced**

The area around the Port of Aalborg is the most industrialised part of Northern Denmark. The Port has been a vital hub for trade and industry for centuries, not only for Denmark but also for Scandinavia as a whole. The area combines a port function with that of an industrial and business park. The industrial area of Aalborg is progressively evolving towards a more knowledge-based development, benefiting from the presence of Aalborg University, with its long history of working closely with industry in Denmark and internationally. In line with the Smart Specialisation concept, the Port of Aalborg has developed a strategy to differentiate itself from other ports. Aalborg’s ‘Intelligent Port Strategy’ aims to reinforce the partnership between all local stakeholders, evolving from a classic port infrastructure into a knowledge- and development-based, multimodal logistics hub.

Green transformation is a major challenge faced by the Aalborg industrial area. Denmark may have become world famous for its industrial symbiosis complex in Kalundborg, but small, ‘normal’ Danish industrial areas like Aalborg have not yet adopted such practices. Up until very recently, companies in Aalborg, like in many other industrial areas in Denmark, have been insufficiently aware of the need to adapt their business models and to think in a greener and more circular way.

### **2. Aims and ambition of the initiative**

The Regional Strategy for Growth and Development in Northern Denmark - the regional Smart Specialisation Strategy (S3) - places a strong emphasis on in-depth collaboration between all players in the region, particularly around Aalborg, a key development dynamo. In this context, ‘Environment++’, an ambitious strategic collaboration initiative was put in place by a partnership between a large number of local operators from the ‘triple helix’, seeking to turn the Aalborg East business park into an incubator for sustainable practices and circular business models. The fundamental premise of Environment++ is that sustainability is the key to future

growth and jobs, and that Aalborg East should establish itself as a development platform for green solutions for the rest of the region.

The project 'Facilitated Industrial Symbiosis for Energy and Resource Efficiency' has been implemented under Environment++. The project developed symbiotic relationships between SMEs in the industrial area, with a view to optimising resource use among co-located companies. It sought to make genuine circular business models the new normal for the area, whilst at all costs avoiding 'greenwashing'.

### 3. Content and implementation of the initiative

The 'Facilitated Industrial Symbiosis for Energy and Resource Efficiency' project was a 2½-year (2017-2020) project based on partnership between the Port of Aalborg, the Danish Centre for Environmental Assessment at Aalborg University, the network of businesses located in the area, public utilities (water, energy) and local authorities.

Specialist facilitators, mobilised under the project, helped companies identify material sources that could be exchanged with other companies, training them to change their way of thinking and to adopt greener business practices. The industrial symbioses were checked for their wider impact on sustainability, with each individual company and its business model viewed as part of a larger system of secondary and derived effects.

To support the identification of green opportunities and benefits, the 'GAIA' tool was developed under the project as a simple means of identifying knock-on environmental impacts of the business models. Importantly, GAIA takes a value chain approach to assess sustainability, while SME business models are typically limited to a single part of a value chain, or sometimes just to one business. The University facilitators helped participating companies calculate both positive and negative effects, when developing green business models, guiding them towards true environmental sustainability.

The following are examples of symbioses that were implemented during the lifetime of the project:

- Designer furniture from waste materials;
- Collaboration on reuse of pallets and cardboard;
- Local handling of oil-mixed liquids;
- Repair of white goods and power tools;
- Transition to renewable energy based production;
- Recycling of plastic sheets and agri-foil;
- Product development based on resource-thinking;
- Symbiosis showing the way to recycling glass fibre;
- Leasing of industrial transportation equipment.

The project was supported by mainstream ERDF from the Operational Programme Innovation and Sustainable Growth in Businesses 2014-2020 and a substantial investment by Port of Aalborg. The latter was a necessary component to allow for the participation of the University, which does not itself **have budget lines to co-finance** ERDF grants.

#### **Expanded Entrepreneurial Discovery Process**

In line with the S3 Entrepreneurial Discovery Process (EDP) approach, the initiative broadened partnerships beyond the one-to-one business-research collaboration that was already prevalent in the region, due to the closeness of Aalborg University with companies. Active involvement of local SMEs was ensured by 'Business network 9220', the association of businesses in the area the House of Energy, a cluster for sustainable energy technologies. Broader inclusiveness was achieved through the participation of several public partners, including the Port Authority, local authorities and public utilities – who all played important roles in the initiative. A better integration of the planning departments of local authorities was seen as a value-added of the development strategy. As a result of the project, industrial symbioses are now taken into account in spatial planning strategies in the area.

The interaction between university and businesses brought benefits for all parties. Latest research results, knowledge and insights from the University were often decisive in assessing green business development opportunities. At the same time, research partners also gained new knowledge throughout the project, including through a Business PhD collaboration with the Port of Aalborg.

## **Governance structure**

A specific governance model was implemented for the initiative. A Reference Group was set up, consisting of all local partners from the 'triple helix' with an enhanced role for local authorities. In addition, national authorities were involved (i.e. the Danish Business Authority) as well as a representative from the Kalundborg symbiosis, with the aim of learning and exchanging with other sister projects beyond the region.

Thanks to the Environment++ initiative, the Port of Aalborg has taken up a new role in facilitating industrial symbioses, as experimented upon in the project, as well as generally playing a more prominent role in the economic development of the area. The project was also supported by an Industrial PhD, who followed its implementation in order to describe the role and importance of facilitation for the emergence of industrial symbioses.

## **Monitoring for green and economic impacts**

The experimentation carried out under the project was accompanied by detailed monitoring, using a system jointly developed by companies and researchers aimed at gathering data on both environmental and economic impacts. After the project, the monitoring work was transferred to and further used by the Port Authority. The university continues the work on the assessment of economic benefits from industrial symbioses and plans publications in this subject area, based on real-life experimentation.

## **4. Achievements**

Working with more than 25 companies, the project developed 42 green business models for industrial symbiosis. Together these new business relationships have led to significant decreases in energy consumption, material use and greenhouse gas emissions. At the same time, they have brought substantial economic benefits thanks to product innovation and savings from the use of waste as resources.

### **Environmental benefits**

The industrial symbioses will achieve energy savings of more than 3,000 KWh and CO<sub>2</sub> emissions reductions totalling 10,000 tonnes per year. This is considerably more than expected, highlighting that industrial symbiosis is vital in helping companies become greener. Beyond the reduction of energy and greenhouse gases, the symbioses have several other beneficial environmental impacts. The project led to high material savings, whilst also helping to minimize the transport of materials via trucks, implying less air pollution and less micro plastic from wear and tear of tires.

### **Economic benefits**

The symbioses created under the project also generated considerable economic benefits - direct economic gains, as well as other positive effects, which, indirectly or in the long-term, can lead to an improved bottom line for companies. The range of benefits observed in the project is wide:

- Reduction of waste disposal costs;
- Lower material purchasing costs;
- Income through product innovation and new products;
- New markets or customer groups;
- Capacity and competence building;
- Improved company culture and work ethics;
- Improved image for the company;
- Social benefits and job creation.

These economic benefits differ between symbioses, but mean data have been calculated as follows:

- €140,000/year: the typical direct value of symbioses that create new products and product innovation;
- €4,000-7,000/year: the typical direct value of symbioses that use the waste of one company in the production process of another.

Several lessons were learnt for successful industrial symbioses, as follows, paving the way to green transition of industrial areas:

- Many untapped symbiosis opportunities exist and can be realised when adequate relationships are created between companies. Facilitation plays a key role for obtaining such benefits;
- Environmental assessment is needed during business development to test sustainability and avoid greenwashing - as demonstrated by the successful use of the GAIA tool;
- New and digital technologies are not sufficient - there is a need for mentality change throughout the system;
- Symbioses breed symbioses. It is a cumulative process.

Key success factors in this experiment were the strong partnership among the local actors involved, the investment of necessary resources to facilitate the business development which took place and the Port of Aalborg's strategic vision, which played the vital catalytic role.

## 5. Replicability

The Industrial Symbiosis experience in Aalborg East has a high degree of replicability. It is also sustainable in the sense that it will continue after the end of the public funding, ensuring lasting impacts. SMEs involved in the project have changed their mindset by thinking in a more systemic way and will continue to search for profitable synergies in the future. The availability of the GAIA tool offers practical support for replication of this new orientation toward green business models.

The Port of Aalborg has further developed its integrator mission, by hiring facilitators from the project on a permanent basis, to support further interactions and the search for synergies between companies in the industrial park. The Port is planning to offer such facilitation services for a fee, possibly offset against future company savings from symbioses, with a view to ensuring commercial viability of the model. The spatial planning procedures of the Municipality have already been adjusted to take better account of the need and possibilities for industrial symbiosis.

New internships and Industrial PhDs at Aalborg University, attracted by the favourable environment, will continue the cross-fertilisation between research and green business development. At the national level, Environment++ has become part of the 'Ambition Green Hub Denmark' partnership, where exchanges with several 'sister projects' are taking place. The experience of Aalborg in transforming an existing industrial area attracts much attention, as it complements other industrial symbiosis initiatives that tend to focus on greenfield investments.

Overall, the project demonstrated how an industrial area considered 'normal', or 'standard', can make an important leap towards green business development, which is a true inspiration for a great many similar industrial areas throughout Europe.

*"In Aalborg East, we want to be the world's most sustainable industrial area. It is a very ambitious vision, but we have all the right building blocks for it and a fantastic, shared enthusiasm."*

Mette Schmidt, chairman of Business Network 9220

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### Websites:

'Facilitated Industrial Symbiosis for Energy and Resource Efficiency' project

[https://vbn.aau.dk/ws/portalfiles/portal/364232227/B\\_redygtige\\_Synergier\\_Publikation\\_web.pdf](https://vbn.aau.dk/ws/portalfiles/portal/364232227/B_redygtige_Synergier_Publikation_web.pdf)

'Green Business development through Industrial Symbiosis. The GAIA model':

[https://vbn.aau.dk/ws/portalfiles/portal/344766093/GAIA\\_AAU\\_juni\\_2020.pdf](https://vbn.aau.dk/ws/portalfiles/portal/344766093/GAIA_AAU_juni_2020.pdf)

'The Intelligent Port'. Port of Aalborg's strategy:

<https://portofaalborg.com/about-port-of-aalborg/the-intelligent-port/>

The Kalundborg Symbiosis: <http://www.symbiosis.dk/en/>



## **6. Green transition becomes reality in Ii Municipality, Oulu Region, Finland. Delivery of a long-term strategy for a carbon-neutral Municipality driven by Smart Specialisation and social innovation**

### **Summary of the case**

Carbon neutrality is increasingly talked about, but few places in Europe can be said to be close to achieving it. The Municipality of Ii, in the region of Oulu, Northern Finland is a notable exception. The Municipality is expecting to record an 80% reduction in CO<sub>2</sub> emissions (from 2007 levels) by the end of 2020. The Oulu region's Smart Specialisation Strategy (S3) approach and support to the region from ESIF have significantly helped bring the transformative local agenda of Ii to life, in order to achieve this success. The Municipality, its people and its development company, Micropolis, continue to implement their green transition strategy, firm in their collective view that its ambitious vision of carbon neutrality will soon be fully realised.

The integrated project portfolio of Ii Municipality responds perfectly to a key objective of the Oulu regional S3 in terms of advancing the use of clean technologies and green energy. Ii's strategy is also substantially in line with three other key ingredients of the Oulu S3. Firstly, proactive involvement of citizens and stakeholders in an Entrepreneurial Discovery Process (EDP) has been a crucial success factor, capitalising on important skills in competencies within the partnership and guaranteeing local ownership. New tools have been developed from the EDP and deployed, such as green public procurement and innovative ways to stimulate active involvement of children in climate action. Secondly, a synergetic multi-level governance model involving local, regional and national authorities has ensured effective policy alignment in line with the S3 model. Thirdly, smart monitoring systems have been put in place to collect quality data from the different projects, delivering valuable insights into a wide range environmental and economic benefits achieved.

The story of Ii provides a successful demonstration of the benefits of combining the application of new technologies with social innovation to drive forward energy transition, capturing above all a strong and lasting citizens' engagement in the shift towards a greener society. Ii proves that there can indeed be local solutions to global challenges. The Municipality believes that it can be a frontrunner in encouraging much larger change, as a role model to inspire replication in other EU regions.

#### **1. Territorial context and challenge faced**

The Municipality of Ii encompasses a town of some 10,000 inhabitants and its immediate surroundings, neighbouring the city of Oulu, capital of the Oulu Region. The Municipality has been in the frontline fighting against climate change for years.

The proximity of Ii to the Arctic region has spurred recognition by its leaders and citizens of a stark reality. Climate change is already happening there and is directly affecting the economy and peoples' lives. Past pollution events from oil spill and peatland runoff into rivers flowing into the Baltic Sea have added to raised awareness of the need to protect the fragile environment and to shift towards alternative energy sources. In Ii, fighting climate change has become everybody's collective responsibility, no matter how small its community may seem.

#### **2. Aims and ambition of the initiative**

A decade ago, Municipal leaders and stakeholders joined forces and decided together to address the challenge through a wide range of voluntary initiatives from grassroots level. The partners in Ii developed ideas and plans around a clean energy transition, culminating in a long-term integrated strategy for a fully carbon-neutral Municipality. This ambition fitted particularly well with the priority domain 'Clean Energy' of the Smart Specialisation Strategy (S3) 2014-2020 of the Region of Oulu.

#### **3. Content and implementation of the initiative**

There has been strong cross-fertilisation between Ii's green transformation strategy and Oulu Region's S3, both in their preparation and throughout their implementation.

### **Extended Entrepreneurial Discovery Process (EDP) for local ownership and commitment**

The Entrepreneurial Discovery Process (EDP) operating at the heart of the Oulu S3 was harnessed and extended to build up and maintain a high degree of citizen participation in li's strategy. The EDP approach is clearly visible in the co-creation of li's strategic priorities and the identification of projects, through wide involvement of a 'quadruple helix' of actors - public authorities, enterprises, technology or research organisations and citizens. This has helped ensure substantial local ownership and commitment, as well as practical inputs from all sources - not least in terms of ideas to design and implement an innovative range of actions in pursuit of the Municipality's zero-carbon goal.

### **Strong multi-level governance ensuring policy coherence**

The governance of li's strategy is characterised by an interweaving of three levels of public authority - local, regional and national. The grassroots ideas coming from the Municipality have been consistently supported by the Oulu Region in the framework of its S3. The national level in Finland has been strongly supportive of li's strategy and the Municipality is frequently consulted during the development of related national programmes. The Municipality's economic development agency, Micropolis, is responsible for implementing, coordinating and ensuring continuum and synergies between the different projects supported under li's strategy.

### **Wide variety of funding sources**

Many of the projects and initiatives developed under the li strategy have been financed from mainstream ERDF through the Council of Oulu Region, some of them in the context of the Oulu S3. Various other EU sources are also used according to the nature of different projects, including Interreg and Rural Development Funds. Funding from national programmes also plays its part in supporting these efforts. The role of the town of li's budget methodology is an important element. The various action lines and projects are secured into the budget and all departments have to report on their contribution to the strategy. The Municipality Report, published annually, places a strong emphasis on climate actions undertaken and their achievements.

### **Examples of projects supported**

The topics addressed under li's strategy have evolved over time. The strategy has remained flexible enough to accommodate new developments at EU level, as well as new technologies coming on-stream to address different target groups and different elements of the clean energy transition. Among the projects implemented by li Municipality under the strategy, the following are particularly worthy of note:

- **'Productive distributed local energy'** (2015-2018): the project aimed at creating new green energy related business and increasing employment in the bio-energy sector, by proposing measures for the conversion of oil heating systems to local renewable energy sources. The results of the project showed that in small-scale premises, oil could be replaced by geothermal heating and in the large-scale premises by bio-based fuels. Kick-starting the project was initially publicly funded, but now it is financed entirely from private sources.
- **'New competitive advantages for Municipalities from low-carbon solutions'** (2015 – 2017): in this project special attention was paid to encouraging Municipalities to cut their carbon emissions by implementing new cleantech solutions, as well as using renewable resources and efficient environment-conscious procedures. Successful project results are multiplied around the Oulu region, to eight other Municipalities under a follow-up project (2018 – 2021).
- **'Innovative low-carbon public services'** (2015-2018): the project was based on inclusiveness - people living in the Municipality designed new services in collaboration with the local designers' association. As a result, many public services were re-designed, such as the zoning of the town centre to make it more climate-friendly. The most successful result, however, was the empowerment of the citizens themselves in the response to the shared challenges of climate change mitigation.
- **'Smart Traffic 2020'** (2018-2021): this on-going project aims to provide an intelligent digital traffic solution for tourism and commuting. It promotes high-speed public transport and combines this with private traffic options, thereby reducing traffic emissions and ultimately boosting competitiveness of the region as a whole.
- **'CircLab'** (2019-2021): the project aims at developing local competence and service models in circular economy as a nutrient recycling cluster. Micro-seaweed solutions are used to clean industrial waste waters to create valuable nutrients for further green growth.

## **Innovative tools supporting implementation**

Several innovative tools have been used by the Municipality to support these projects. Green public procurement is one such tool. Here, li uses sustainability as the leading principle. The procurements follow the Resource Efficient li Roadmap, under which all the different Municipal departments have agreed on the key aims of zero waste, no overconsumption, no emissions and sustainable employment. These aims are reflected in procurement tender specifications and selection/award criteria.

Another effective tool has been the active engagement of children and young people in climate action through deployment of a so-called '50/50 model' in all schools and nurseries. Under this model, pupils are involved in measuring the consumption of water, heat and electricity in their school buildings. The children then receive back, for their classes' own use, 50% of the money saved by energy/resource efficiency improvements subsequently put in place. In this way, the children learn that it is indeed possible to mitigate against climate change and that there are tools they can use for making the change, which are economically profitable. The children are generally excited to be working on such projects and bring these key messages back into to their homes. The 50/50 model is regarded as an important investment at the heart of li's climate work, in anticipation of the day when these children have leading roles in society.

## **Systematic monitoring of environmental and economic outcomes**

Special efforts are deployed by the Municipality to monitor the individual and collective outcomes of the various projects. Energy, heat and water data are collected in real-time from public buildings. Data on CO<sub>2</sub> reduction are gathered. Data on financial impact of energy savings on public budgets are collected and used to support the case for the various elements of the strategy. Monitoring information is also systematically collected on new business and new jobs creation.

## **4. Achievements**

The impressive achievements of li Municipality confirm the benefits of its strategy's integrated nature and the strength of commitment of the wide range of participating stakeholders. The Municipality has decreased its dependency on fossil fuel dramatically and relies increasingly on local production of energy from renewable sources - wind, hydropower, geothermal and solar. Solar power generation is said to be effective even in winter, due to strong reflection of light from the snow. li currently produces 10 times more renewable energy than it consumes.

Key outcomes achieved by the Municipality include:

- Reduction of CO<sub>2</sub> emissions by 63% from 2007 to 2018, with target of 80% emissions reduction (from 2007 levels) by 2020 about to be met;
- Cost savings of renewable energy and energy efficiency investments are more than €0.5m per year and the payback time has been around 3-5 years;
- Tax revenue income from wind power of €1.6m per year (a figure expected to double in the coming year);
- New cleantech business investment in li of €200m;
- 80 new permanent jobs created (in a town of 10,000 inhabitants).

Beyond these quantified outcomes, the Municipality is rightly proud of the depth of its citizens' engagement in the green transition. The following success factors have been identified for li's transition into a greener Municipality:

- A strong empowerment of citizens in green transition, with all generations united around the goal of carbon neutrality;
- Sustainable political commitment of long duration;
- A climate of trust involving all stakeholders fostered by the strong governance and participation of a wide range of actors, in line with S3 principles;
- A positive role of the development company Micropolis, which, as a private non-profit company, is able to bypass local bureaucracy and act swiftly to support projects and strategy implementation;
- The deliberate linkage between the strategy and the town's budget and the explicit duty for all Municipality departments to provide reports on their contribution to the strategy;

- Credibility rapidly gained through the development of a robust strategy and the ability to demonstrate benefits gained from it, supporting recognition at the level of the region and the country and beyond;
- Strong communication, using a variety of media nurturing recognition from outside (a case in point here is the Annual Climate Festival, which attracts considerable attention from far beyond the Municipality).

Ii has received wide recognition for its successes and has attracted great attention through international media coverage. This, in turn, has supported further societal engagement and political endorsement of the Municipality's strategy for the longer term.

## 5. Replicability

The experimentation results from Ii are now replicated in some 20 other municipalities in the Oulu region and beyond. Ii is part of the Finnish national programme 'Towards Carbon Neutral Municipalities (HINKU)', which brings residents, experts and companies together to create and carry out solutions in reducing greenhouse gas emissions.

*"Working for the climate is now the new way of life in Ii: we achieved this because decision is taken with everybody on board"*

Leena Vuotovesi, CEO of Micropolis Oy

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Leena Vuotovesi - CEO of Micropolis Oy - [leena.vuotovesi@micropolis.fi](mailto:leena.vuotovesi@micropolis.fi) +358 40 751 4318

### Websites:

The strategy for a Ii as a fully carbon-neutral Municipality  
<https://www.ii.fi/en/climate-actions-and-renewable-energy>

Finnish national programme 'Towards Carbon Neutral Municipalities (HINKU)  
<https://carbonneutralfinland.fi/en-US/Hinku>

## **7. Strategic Research and Innovation Partnership on Circular Economy in Slovenia**

### **Summary of the case**

Slovenia's Strategic Research and Innovation Partnership (SRIP) - Circular Economy is a cross-sectoral strategic cluster-type organisation, born in 2016, out of the country's Smart Specialisation Entrepreneurial Discovery Process (EDP). Located in the city of Maribor, in the 'less developed' Eastern Slovenia region, SRIP – Circular Economy is now one of the five SRIPs making up the implementation architecture of Slovenia's Smart Specialisation Strategy (S3). It brings together State actors, large companies and SMEs, knowledge institutions, facilitators, innovation users and NGOs in a quadruple helix approach, dedicated to addressing a major multi-faceted green challenge for society.

The EDP on circular economy in Slovenia was intensified for the development of the SRIP Action Plan and continues into its implementation. The EDP is organised as an inclusive and interactive bottom-up process, in which SRIP members from different environments collectively identify new activities in six circular economy focus areas. The SRIP offers its members a full range of support services including professional assistance in developing circular business models, collaboration in larger research and development projects and internationalisation through networking and cooperation. Key tools developed by the SRIP include the Competence Centre for Circular Economy, focused on human resource development in a future circular business context.

The activities of individual SRIP members have focused on a wide range of relevant 'circular' technologies relating to reuse, remanufacturing and secondary raw materials, whilst members have gained new key competences in areas such as Life Cycle Analysis and Cradle to Cradle certification. Many SRIP members have been successful in circular economy related public tenders for different national Ministries, some of which co-financed by ERDF, as well as EU tenders under Interreg and Horizon 2020 programmes. Slovenia's Government supports internationalisation of SRIP activities, with a view to scale-up and replication. This includes SRIP and SRIP member participation in various key European platforms and multipliers, such as the Thematic Smart Specialisation Platforms (TSSP), Vanguard Initiative and European Institute of Technologies (Climate KIC and Raw Materials KIC).

#### **1. Territorial context and challenge faced**

With a total population of just over 2 million, Slovenia is covered by a single Smart Specialisation Strategy (S3), yet the Western and Eastern halves of the country have markedly different characteristics. Whilst Western Slovenia is home to the majority of research institutes and is classified 'more developed' in EU Cohesion Policy terms (2014-2020), most of the industrial companies involved in labour-intensive and waste-generating activities, are located in 'less developed' Eastern Slovenia.

The European Commission (EC) Environmental Implementation Review 2019 for Slovenia highlights several examples of good practices emerging in the country overall, including one of the EU's highest shares of environmental tax revenues and significant recent increases in waste recycling rates. The Review also notes that a growing number of Slovenian projects are presented on the European Circular Economy Stakeholder Platform's website.

Slovenia has embraced the circular economy concept as a key driver for innovation in its business base and for promotion of territorial cohesion between the Western and Eastern halves of the country. There are, however, numerous challenges to be overcome in achieving the critical mass of innovation needed, including insufficient financing available on the market for SMEs in higher risk innovative fields, important skills and knowledge gaps in SMEs and an under-supportive regulatory environment.

#### **2. Aims and ambition of the initiative**

Slovenia's S3 (branded 'S4' in Slovenia – i.e. 'Slovenia Smart Specialisation Strategy') already follows a green orientation with one of its three major priority areas 'Circular', standing alongside 'Industry 4.0' and 'Digital'. This 'Circular' priority area has three niche priorities, 'sustainable tourism', 'sustainable food production' and the most transversal, 'Networks towards Circular Economy', which is implemented through the Strategic Research and Innovation Partnership (SRIP) - Circular Economy.

The SRIP - Circular Economy aims to achieve a sustainable increase in the efficiency and competitiveness of Slovenia's businesses in the transition to a circular economy. The SRIP is a public-private cluster-type innovation eco-system in its own right. Unlike many cluster organisations, the SRIP is not organised around the needs of a single sector. Instead, its ambitions are distinctly cross-sectoral, with special priority given to the following six focus areas:

- Sustainable energy;
- Biomass and alternative raw materials;
- Secondary raw materials;
- Functional materials (e.g. sustainable composites, advanced packaging);
- Processes and technologies;
- Circular business models.

SRIP – Circular Economy is one of the nine SRIPs of Slovenia's S3 implementation architecture, co-financed by the Ministry of Economic Development and Technology (MGRT) and instrumental in facilitating dialogue between the government, local authorities, research institutes, business and other stakeholders. The SRIPs were founded in response to a special Call launched as a collaboration between the three lead Slovenian Ministries responsible for economy, technology, science and EU Cohesion Policy, with respect to each main S3 priority domain. The Call was designed on the basis of an intensive Entrepreneurial Discovery Process (EDP) convened in 2015, involving a series of web based and face-to-face workshops, including events open to general public.

### **3. Content and implementation of the initiative**

Before the S3 in Slovenia and the formation of the SRIPs, entrepreneurial knowledge was fragmented – particularly in a new field like circular economy. Many SMEs lacked appropriate connections to EU-level platforms and other partnerships to help boost the internationalisation so vital to Slovenian economic actors, given the country's size and location.

#### **Governance of SRIP – Circular Economy: a 'quadruple helix' approach**

The founders of SRIP - Circular Economy are the Chamber of Commerce and Industry of Štajerska (management function), the National Institute of Chemistry and the Faculty of Chemistry and Chemical Technology of the University of Maribor. The SRIP office is located in the city of Maribor, Eastern Slovenia, where it can best serve the interest of companies furthest away from the centre and knowledge institutions.

The SRIP operates on a multi-sectoral cooperation principle, bringing together State actors, large companies and SMEs, knowledge institutions, facilitators, innovation users and NGOs in a 'quadruple helix' approach. The SRIP's activities are 50% co-financed by central Government and member contributions. In addition to the Governing Board, the Programme Council and the Technology Council oversee activities in each of the six focus areas. SRIP membership is open for newcomers and the composition of the governance structures must reflect the membership balance.

#### **Intensification of the Entrepreneurial Discovery Process (EDP) for SRIP Action Plan**

The EDP approach undertaken prior to setting up the SRIP – Circular Economy was intensified for the development of the SRIP Action Plan and continues into its implementation. The EDP is organised as an inclusive and interactive bottom-up process, in which SRIP members from different environments (business, academia, NGOs, policy etc.) collectively identify new activities in the six circular economy focus areas, for the SRIP to explore and promote. Such activities may relate, for example, to potential new value chains for research collaboration, to the building of joint capacities in advanced laboratory and computer equipment for demo-pilot projects, or for the development of specific new circular products and services. Governmental policymakers in the partnership assess the outcomes emerging from this interaction and suggest ways in which the identified potentials might be realised.

#### **Services offered by the SRIP – Circular Economy**

SRIP – Circular Economy offers its members a full range of support services, including:

- professional assistance and training in the transformation to circular business models and the introduction of new technologies, eco-design and digitalisation – including materials passporting and blockchain tracing systems;

- brokerage for cooperation in national and international consortia for research and development projects, as well as joint development of high-tech products and innovative services in the field of circular economy;
- support for market development, particularly internationalisation, through networking and cooperation in existing and newly formed value chains, plus co-organisation of international events connecting stakeholders from different economic and knowledge sectors relevant to the circular economy.

The SRIP also keeps members continually informed of new developments in the circular economy field in Europe and beyond, including changes in legislation, public tender opportunities etc.

### **Specific tools to promote the circular economy transition**

In recognition of the vital role of skills in the transition to a circular economy, the SRIP established the Human Resources Development Committee shortly after its foundation. Members of the Committee are drawn from representatives of academia and companies in the SRIP membership. The Committee has been responsible for drawing together profiles and content of the key professional competencies required in different spheres of circular business. It has also developed training curricula for building relevant circular skills.

Based on the results of the Committee's activities, the SRIP subsequently established the Competence Centre for Circular Economy. Some 20 different circular competences for managers, researchers and other employees in companies are made available to SRIP members in the Competence Centre. Relevant training is delivered through the Centre on core topics such Life Cycle Analysis and individual career planning for employees in circular businesses.

Additional tools used by the SRIP include the proactive promotion of Green Public Procurement and the fostering of cooperation between all the SRIPs in Slovenia's S3 partnership structure – both of which can deliver particular value, given the transversal nature of the circular economy field.

## **4. Achievements**

Since its establishment in 2016, the activities of SRIP – Circular Economy have enabled improved collaboration and knowledge transfer between R&D institutions, large companies, SMEs, government bodies and NGOs active in relevant fields, including increased participation in joint research projects. SRIP members have gained new key competences, such as in Life Cycle Analysis and Cradle to Cradle certification, as well as better understanding of circular business models and related career planning.

The activities of individual SRIP members have focused on a wide range of relevant technologies, like new wastewater treatment techniques, hydrogen deployment, reuse of batteries, remanufacturing, new functional products and secondary raw materials – such as, bioplastic and building materials. SRIP members have been successful in various public tenders in circular economy fields for different national Ministries, some of which co-financed by ERDF. There have also been notable successes in EU tenders under programmes such as Interreg Europe and the Danube Transnational Programme, as well as under Horizon 2020. Specific project examples supported by members of the SRIP include:

### **POLY CIRCULARITY - Waste as a source of secondary raw materials**

Partners: Surovina (SME – lead), plus seven other SMEs and one NGO - European Cultural and Technology Centre Maribor (social enterprise)

The demo pilot project aims to develop innovative technologies for chemical and biochemical decomposition of packaging waste (plastic bottles) into high-quality secondary raw materials with added value for independent use (gases, chemicals, oils / fuels, etc.), or incorporation into new products such as biopolymers. It builds on innovative technology resulting from the Horizon 2020 project Resyntex. The project has strong emphasis on increasing public awareness of excessive plastic and textiles consumption, as well as new concepts of plastic/textile waste collection and treatment.

### **CellCycle - Biomass for development of advanced materials and bio-based products**

Partners: Pulp and Paper Institute (lead), plus eighteen other SMEs and academic institutions from both Western and Eastern Slovenia

CellCycle exploits the potential of biomass for development of advanced materials and bio-based products. It aims to move beyond fragmentation to create new value chains based on industrial symbiosis, through cascading utilisation of biomass. The project is essentially a cooperation platform for research teams and SMEs specialising in manufacturing and processing technologies, biotechnologies and nanotechnologies. It contributes

to long-term competitiveness in important Slovenian industrial sectors - chemicals, textiles, paper, wood processing, construction, engineering, automotive and energy.

#### **WCYCLE - a new circular business model for City of Maribor**

Partners: WCYCLE Institute Maribor (NGO - lead), Municipality of Maribor, Public Holding Company of Maribor, research institutions

WCYCLE was created by five Maribor utilities companies in 2017, with the aim of closing material loops produced in urban areas every day, bringing tangible benefits for public services and citizens. Different WCYCLE sub-projects foresee reuse of brownfield areas, reuse of wastewater in combination with rainwater, reuse of construction waste and innovative reuse of biowaste together with soil from construction works. Two main demonstration projects currently running in the city of Maribor are:

'Soil 4 food': using urban biological and mineral waste to produce certified soil, using fermentation and pyrolysis technology, food production and other city needs. The project received acclaim and ERDF support as an EC DG Regio Urban Innovative Action in 2018;

Cindarella: Horizon 2020 project making demonstration buildings and road sections from recycled construction material.

When implemented all WCYCLE activities will contribute to better management of material streams, increased exchange of materials between SMEs and an improved environment for citizens.

The SRIP – Circular Economy has added value to all of these projects, mainly by motivating different members to participate in them initially, providing on-going advice and support during implementation and assisting with the dissemination results, with a view to potential replication and/or new follow-up projects.

#### **5. Replicability**

All of the SRIPs in Slovenia's S3 implementation partnership benefit from dedicated central Government measures supporting piloting, demonstration and internationalisation of SRIP activities. In addition, the Government has signed partnership/cooperation agreements with various key European platforms and multipliers, including:

Thematic Smart Specialisation Platforms (TSSP) - SRIP partners are members of different interregional partnerships under Industrial Modernisation, Energy and Agri-Food Platforms, with pilot projects and action plans being designed;

Vanguard Initiative – pilot projects on Bioeconomy and Efficient and Sustainable Manufacturing;

European Institute of Technologies (Climate KIC and Raw Materials KIC) to foster transfer, through deep demonstration, to circular economy.

Some of the results from previous Horizon 2020 and Interreg Europe projects, involving SRIP members, are now facilitating spill-over to larger communities of SMEs and other stakeholders in Slovenia and elsewhere. Some members of SRIP – Circular Economy are already successfully established in international value chains and networks through export activity, representing an additional market-based value for the SRIP.

*'Setting up a SRIP on Circular Economy, back in 2016, was an experimental move encouraged by the work of pioneer scholars, researchers, NGOs and propulsive enterprises. Now, circular economy features in the Action Plans of all nine SRIPS under the Smart Specialisation Strategy, because of growing demand from the market for circular approaches'*

Marko Hren – Smart Specialisation Coordinator, Smart Specialisation Coordination Division, Government Office for Development and European Cohesion Policy

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Website:

<https://srip-circular-economy.eu/>

WCYCLE Soil 4 Food project: <https://www.uia-initiative.eu/en/uia-cities/maribor>

Cinderela project: <https://www.cinderela.eu/>

CellCycle project: <http://celkrog.si/?lang=en>

Poly Circularity demo pilot project: <http://www.ios.si/english/projects/>  
<https://www.surovina.si/o-podjetju/projekti/odpadki-kot-vir-sekundarnih-surovin-poly-kroznost>

## **8. WaterCampus Leeuwarden.**

### **Creating Water Technology solutions through an open innovation ecosystem with pivotal linkage to Smart Specialisation in the Northern Netherlands**

#### **Summary of the case**

WaterCampus Leeuwarden is a dynamic open innovation ecosystem in the field of water technology, based in Friesland, Northern Netherlands. It has a track record stretching back over 17 years, of bringing SMEs, higher education institutions and research organisations and end users together to generate successful, collaborative and sometimes world-leading solutions to European and global water-related challenges. The WaterCampus makes a substantial contribution to the green transition through the scale of its operation, its international reach and numerous links with education.

The establishment of WaterCampus Leeuwarden predates the first Smart Specialisation Strategy (S3) in Northern Netherlands by over a decade. The WaterCampus had a strong influence on the development of the S3 approach in the region and has been actively involved in the region's S3 partnership since the outset. The acclaimed Entrepreneurial Discovery Process (EDP) in the Northern Netherlands owes much to the WaterCampus open innovation ecosystem. Involvement in S3 processes has also helped in strengthening the position of the WaterCampus and water technology, increasing the visibility and in attracting global talent. The WaterCampus is fully involved in stakeholder discussions on the draft S3 and Northern-Netherlands ESIF Operational Programme (OP) for the 2021-2027 period.

Water technology has wide application right across the priority areas of the new European Green Deal – particularly in relation to climate action, clean energy for all, resource efficient industry for a circular economy, zero pollution, preserving and restoring ecosystems and biodiversity and developing a fair, healthy and environmentally-friendly food system. The WaterCampus facilitates business investment for innovative solutions in precisely these green policy priority areas, which can collectively contribute to the paradigm shift needed for a green and resilient economy.

#### **1. Territorial context and challenge faced**

The Netherlands is the most densely populated country in Europe. The country is the second exporter of agricultural products in the world, after the US (WTO 2019) and is home to many chemical companies. Its situation in the delta of the river Rhine - catchment area of a substantial part of European population and industry - means that high levels of accumulated pollution end up on the Dutch doorstep. The purification of water prior to usage, as well as the treatment of urban and industrial wastewater, have long been of utmost importance for the Dutch. Already known for its proud tradition in building dykes and water defences, the Netherlands has therefore also had to develop particular expertise in water technology. In this context, Friesland in the Northern Netherlands, has emerged as a world-renowned centre for water technology, with many leading SMEs in the sector located there. In 2019, the turnover of companies in the Friesland water technology sector was €480-510m, with 90% of companies expecting revenue growth in the next five years.

In the broader perspective of climate change, many parts of Europe and the wider world are confronted by challenges of either flooding or water shortage, which the Northern Netherlands, through its history and ingenuity, is already well-equipped to help them address. The recent COVID-19 crisis has provided an important reminder of how essential clean and reliable water supplies and wastewater treatment are for resilience and continuity in modern day global society. Beyond the availability of clean fresh water, water technology has growing application in other crucial 'green' challenge areas facing the world today.

#### **2. Aims and ambition of the initiative**

WaterCampus Leeuwarden is a major innovation and business development hub, which has been in operation since 2003, bringing together education, research, business and public authority actors in water technology. Following a Smart Specialisation approach, the Watercampus seeks to exploit the considerable potential of the sector to further strengthen the competitive advantage of the Friesland area. By fostering top-level business innovation in this field, the WaterCampus aims not only to support local growth, but also to address a broad panoply of water-related challenges at European as well as global levels - including harvesting clean water

from various sources, enhanced natural water production, renewable energy generation and storage, pollution reduction, sustainable water use in industry and for a circular economy.

### 3. Content and implementation of the initiative

The physical WaterCampus was developed with support from the City of Leeuwarden and mainstream ERDF from successive Northern Netherlands Operational Programmes (OPs), including for a major expansion in 2015. Today, it comprises research infrastructure with specialist chemical, microbiological and molecular laboratories, an incubator for water technology companies with conference facilities. There are some 200 persons employed on site. For larger scale testing, the WaterCampus offers access to 5 demo-sites, within a 50km radius of Leeuwarden allowing live demonstration in municipal and hospital wastewater technologies, desalination and sensor applications.

#### **Strong linkage with Smart Specialisation processes in the Northern Netherlands and beyond**

Clean, safe water is one of the four main priorities of the Northern Netherlands Smart Specialisation Strategy (S3) for 2014-2020. The WaterCampus has been involved in the Northern Netherlands S3 partnership since its outset. This has been greatly appreciated by the S3 coordinating body, Northern Netherlands Alliance, for the innovation knowhow the WaterCampus has brought to the table through its place-based ecosystem approach. Being an active player in the Northern Netherlands S3 processes has, in turn, served to strengthen the position of the WaterCampus and the role of water technology in the region's innovation-led drive for economic development.

Today, the WaterCampus remains a key participant in S3 stakeholder discussions in the region, particularly in the context of the recently created Northern Innovation Partnership. In this role, the WaterCampus has suggested input for the draft S3 and Northern-Netherlands OP for the 2021-2027 period, in the context of Friesland's anticipated reclassification as a 'transition' region.

The WaterCampus also participates in the interregional S3 Thematic Platform 'Water Smart Territories', established in 2019 and co-led by Aragon, Centre-Val de Loire and the Province of Friesland, with a total of 20 European member regions. Through this platform, companies from the WaterCampus ecosystem can engage with problem owners in other EU regions and build a foundation for future investments using different vehicles, potentially including the new EU Interregional Innovation Investment instrument (I3). This wider EU-level S3-related networking has helped the WaterCampus increase its visibility and attract more diverse European and even global talent into its activities.

#### **Partnership governance structure**

The governance of the WaterCampus is founded on partnership, which has grown organically since 2003. Its principal managing partners, forming the Governing Board, are:

- Wetsus - European Centre of Excellence for Sustainable Water Technology;
- Water Alliance – the Netherlands national cluster organisation for innovative water technology SMEs;
- Centre for Excellence Water Technology (CEW) - linked to universities of applied sciences and supporting demonstration and upscaling.

Other main partners are:

- City of Leeuwarden and Province of Friesland;
- CIV-Water (Centre for Innovative Craftsmanship - Water) – liaison organisation for water technology in Vocational Education and Training (VET) Schools;
- BioBizz hub - centre for scale-ups/ small business to test and validate their innovations, in order to bring new technology to the market;
- Water Application Center (WAC) – a research centre providing state-of-the art facilities for experimentation in the field of water technology.

The WaterCampus has a strong involvement in education, from primary and secondary levels, to university BSc, MSc up to PhD and MBA, as well as professional vocational training and adult learning. Its relationships with schools, VET-institutions and universities of applied sciences on, or within the vicinity of the Campus are well established. In addition, over 220 company members and 25 research centres have an ongoing commitment. The total annual budget of the WaterCampus in 2019 was €20.3m (of which €16m public – Regional, National and Research Institutes – including €2.2m EU grants, plus €4.3m from private sources).

## **Open innovation based on an enhanced and continuous Entrepreneurial Discovery Process**

In terms of S3, the modus operandi of WaterCampus Leeuwarden is a continuous Entrepreneurial Discovery Process (EDP) in itself. The WaterCampus embodies an open innovation ecosystem built through a chain of links – both on the campus and beyond it – between education, research, test programmes, specialist laboratories and demo sites. This also involves cooperation with key EU cross-border partnerships, such as the European Institute of Innovation & Technology (EIT) RawMaterials Innovation Community and through the Interreg Europe project iWATERMAP. The EDP is further enhanced to international level through the WaterCampus' established global network, in addition to the EU level 'Water Smart Territories' S3 Thematic Platform.

Managing partner Wetsus organises a demand-driven research agenda, in which 50 professors from 20 universities, from 9 EU countries, collaborate with 106 companies to develop water technology solutions. This collaboration follows a deliberately inter-disciplinary approach, with regular meetings between the professors, company members and PhD students, to maximise cross-fertilisation of ideas in relation to specific challenges, while ensuring commercial relevance.

### **Examples of WaterCampus projects**

The WaterCampus has been instrumental in a wide range of water technology projects since its inception, including development of innovative solutions for drinking water, wastewater, process water, agriculture, water reuse, circular economy (recovery of minerals, metals, nutrients, cellulose); production of biodegradable bioplastics from waste water sludge, direct air capture of CO<sub>2</sub>, tackling of multi-resistant bacteria from pharmaceuticals, renewable energy (salinity gradient energy) and sustainable stationary energy storage. WaterCampus is world leading in a number of these innovative technologies.

WaterCampus partners are active in many EU programmes, including Interreg A, B and C, LIFE, COSME, Horizon 2020 and ERASMUS, as well as various national and regional programmes, local programmes and support schemes. A few recent examples of projects supported are presented below.

#### **BAoBaB: Blue Acid/Base Battery**

BAoBaB is a €4m Horizon 2020 project, which ran from 2017 to 2019, with 6 European partners from 3 different countries, featuring strong involvement from Wetsus at the WaterCampus and Dutch start-up AquaBattery. The project explored new solutions for energy storage through a combination of Electrodialysis (ED) and Reverse ElectroDialysis (RED). The aim was to develop this next generation technology from TRL3 to TRL5, as a reliable and environmentally-friendly way of storing renewable electricity at kWh-MWh scale for application at user premises or at substation level. The start-up AquaBattery has since gone on to develop an innovative award-winning product, which stores electricity solely using water and table salt and is now bringing this to market.

#### **Upscaling of bioplastic production from sewage sludge and organic waste**

In September 2020 the largest factory producing PHBV bioplastic from sewage sludge and household waste was established by the Water Authority Brabantse Delta, using a technology developed at the WaterCampus. The upscaling is based on a cooperation agreement between five Dutch water authorities, Friesland company Paques, waste handling company HVC and the Foundation for Applied Water Research STOWA. The new facility is capable of producing larger batches of PHBV material, crucial for development of bioplastic products and for further commercialisation of this technology in Europe.

#### **European Platform for Vocational Excellence (PoVE)**

WaterCampus management partner CIV-Water received an EU grant of €1m in 2019 from the ERASMUS programme to set up a European Platform for Vocational Excellence (PoVE) for the water sector in Europe. The project unites VET institutions in the water sector (research centres, colleges and state/semi-state bodies) from the Netherlands, the United Kingdom, Latvia, Malta and the Czech Republic, which have a common interest in developing the full potential of VET in sustainable growth and innovation in the European water sector. All the actors located at the WaterCampus provide active contributions to the implementation of the PoVE project, enabling VET students to work, together with students from universities of applied sciences, in SMEs during testing phases.

#### **Hydraloop BV**

In 2018, start-up company Hydraloop Systems BV, moved into the WaterCampus Business Centre, to enable further development of their innovative product – a complete household water recycling system. Later that year, the product won the Water Alliance 'Innovation Stimulation Award' for its ability to recycle some 85% of

water used in the home. Through the WaterCampus international network, Hydraloop was subsequently put in contact with the Water Council in Milwaukee USA. The product went on to achieve a major success in early 2020 by winning the 'best of the best' award at the major U.S. consumer electronics trade show CES in Las Vegas – according to the judges, 'in view of its potential to reduce domestic water consumption significantly and negate one of the inevitable effects of climate change: water shortages'. Hydraloop's order book is now more than full and it is expected to grow into a company of 20 employees in the near future in Leeuwarden, plus 6 in the US.

WaterCampus generally aims to support complementary projects covering the whole TRL chain in a given water technology, from research to market.

### **Monitoring**

An overall monitoring picture of WaterCampus activity is published in the WaterCampus Monitor. The Monitor presents financial performance data, as well as quantified progress against a wide range of Key Performance Indicators (KPIs). Some examples of these KPIs are set out below. The WaterCampus Monitor is published on an annual basis.

WaterCampus Leeuwarden	
Examples of Key Performance Indicators	
WaterCampus network:	
-	Number of participating companies
-	Percentage of SMEs / Percentage of foreign companies
-	Number of public research institutes /participating research chairs
Education and scientific:	
-	Number of PhD-students and postdocs / MsC thesis students
-	Number of scientific papers in international journals
Entrepreneurship:	
-	Number of spin-off companies
-	Number of patents (submitted, filed and granted) / patents transferred
-	New technologies developed / existing technologies optimised
Internationalisation:	
-	Number of international partners / international financial contributions
-	Number of international researchers
-	Number of international exchanges realised
Source: WaterCampus Monitor 2019 / Wetsus 2020	

### **4. Achievements**

Based on cumulative information contained in the 2019 Monitor, the WaterCampus - since it was established has been instrumental in:

- the generation of over 50 water technology start-ups;
- the development of over 80 high-value water technology patents.

Several of the companies supported by the WaterCampus have won national and international awards, including the AquaBattery and Hydraloop examples referred to above.

As regards academic achievements, the WaterCampus has seen:

- over 100 PhD graduations;

- publication of over 700 highly cited scientific articles.

In 2019 alone, there were 139 MSc thesis students in Wetsus and WaterCampus partners were involved in 138 international cooperation projects.

The key success factor for the WaterCampus is its integrated and open innovation model. The WaterCampus is able to bring together a critical mass of research and innovation actors -entrepreneurs, researchers, business developers and policy makers - on a continuous basis. This creates important synergies in the innovation process, crowding in finance for higher risk research and innovation and reducing time to market for novel technologies and solutions.

## 5. Replicability

Internationalisation is an existential feature of the WaterCampus' approach. Bringing Dutch expertise in water technology to the wider world is its raison d'être. Managing Partner, Water Alliance, has developed a global network to cooperate with water technology hubs in the USA, South-Korea, Singapore, Israel and China through the Global Water Tech Hub Alliance (GWTHA). The GWTHA network connects supply with demand for water technology innovation on global level, brokering between problem owners and innovative SMEs, wherever they happen to be located.

The WaterCampus sees further potential to support replicability and upscaling through the S3 Thematic Platform 'Water Smart Territories' and the new Horizon Europe WATER4ALL partnership.

*"Water is often taken for granted and overlooked by policy makers, yet water availability will become a more and more pressing issue, especially in the context of climate change adaptation. Water and water technology can bring effective solutions to many green transition challenges."*

Pieter de Jong – EU Representative Wetsus & Watercampus Leeuwarden

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[Wetsus - https://www.wetsus.nl/](https://www.wetsus.nl/)

Interregional S3 Thematic Platform 'Water Smart Territories' - <https://s3platform.jrc.ec.europa.eu/water-smart-territories>

## **9. SMBio-LNG. Sustainable Mobility using renewable Liquefied Biomethane - Lombardy, Italy. Smart Specialisation Platform supports interregional partnership for new sustainable European fuel supply chains**

### **Summary of the case**

Sustainable Mobility using Biomethane - Liquefied Natural Gas (SMBio-LNG) is an innovative industrial demo case, under the Vanguard Initiative's Bioeconomy Pilot, on turning waste into green energy for sustainable mobility. Specifically, SMBio-LNG aims to make a convincing case on the viability of sustainable trans-regional supply chains for production distribution and sale of liquefied biomethane for heavy vehicles. Biomethane is produced exclusively from renewable sources generally considered as waste, such as manure, agricultural residues and agro-industrial by-products.

The demonstrator involves the Italian regions of Lombardy, Piedmont and Emilia-Romagna. The Smart Specialisation Strategies (S3) of these regions all share the use of bioenergy and sustainability of mobility as key areas of focus: SMBio-LNG aims to explore opportunities for joint implementation of these S3s' ambitions on a trans-regional basis. The initiative is led by the Lombardy Green Chemistry Association (LGCA), a cluster-type organisation bringing together companies with universities and other research centres and NGOs in the bioeconomy field from Lombardy. The governance structure also comprises public authorities from all three regions, as well as private companies representing all stages of the supply chain. The Entrepreneurial Discovery Process (EDP) encourages crucial interactions between these actors to optimise availability of local feedstock, ensure adequate technological innovation at each stage and promote a friendly regulatory environment for sustainable biomethane supply.

The demonstration supply chain is now operational with the opening of its final element in September 2020, the refuelling station in Lombardy. Thanks to this initiative an innovative transport company is the first in Italy to use liquefied biomethane for its fleet, locally produced and not imported. The model is already proving profitable economically, in addition to the environmental benefits it brings, associated with the reduced use of fossil fuel in heavy road transport. The innovative business model was created with support from the Technical Assistance Facility (TAF) of the Thematic Smart Specialisation Platform for Industrial Modernisation (S3P-Industry) of the European Commission (EC).

The TAF input is facilitating the next phase of SMBio-LNG, namely replication of the business model to other European regions with similar S3 objectives, in the context of the Vanguard Initiative's Bioeconomy Pilot. North Rhine Westphalia, Germany, and Upper Austria have shown particularly strong interest in this regard so far.

### **1. Territorial context and challenge faced**

To achieve the climate neutrality ambition of the new European Green Deal, Europe must reduce emissions from transport by 90%, by 2050. This will be a major challenge for all European regions, which need to boost investment in non-fossil-based alternative fuels, well beyond current levels, to reach industrial-scale capacities and achieve full commercial operation. Biogas derived from waste can have a key part to play in meeting the EU's transport emissions reduction target, touching on both energy transition and circular economy aspects of the Green Deal. Its deployment is also supported by the recently adopted EC Strategy to Reduce Methane Emissions<sup>13</sup>.

Italy has particular strengths in the biogas sector, as the second-largest producer in Europe and the fourth in the world, with some 1,600 biogas facilities. Normally, the biogas is used for heating and electricity generation applications. It is estimated that Italian biogas production will reach 10 billion m<sup>3</sup> by 2030. Turning waste into new sustainable biobased products and green energy is a key feature of the Smart Specialisation Strategies (S3) of the three northern Italian regions of Lombardy, Piedmont and Emilia-Romagna, which border with each other. These regions have some of the highest concentrations of livestock in Italy, as well as the highest density of biogas plants, as part of their drive towards decarbonisation of the agricultural sector.

The S3 of the Lombardy Region, places strong emphasis on circular economy and bioeconomy. Bioenergy and biomethane are important focus areas in the S3, given that Lombardy is the second region in Italy for bioenergy. Lombardy boasts good management and recovery of biodegradable waste and a high level of recycling and recovery in the management of sewage sludge, supported by high-level skills.

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<sup>13</sup>COM(2020) 663 final of 14.10.2020

In Emilia-Romagna, due to the agro-industrial vocation of the area, there are significant quantities of waste biomass that can be used as raw material for the production of biomethane. There is a dense natural gas distribution network and a large number of vehicles are already powered by natural gas. For these reasons, Emilia-Romagna assigns a key role to biomethane in the context of its S3.

The S3 of Piedmont Region uses research and innovation to transform sectors of local industrial tradition, designing new trajectories and building new knowledge and skills to respond to evolving societal challenges. The strategy is guided by the principles of smart growth, environmental and energy sustainability. Bioenergy and sustainability of mobility are at the heart of the strategy.

Based on this strong shared potential for innovation-led development of an interregional supply chain for biomethane – transformed from biogas as a vehicle fuel – the three regions, led by Lombardy, established the partnership for Sustainable Mobility Bio-LNG – ‘SMBio-LNG’ – in 2019. In view of growing wider EU interest, notably from North Rhine Westphalia (Germany) and Upper Austria, SMBio-LNG was incorporated shortly afterwards into the S3 Platform’s Vanguard Initiative as a use case under its Bioeconomy Pilot.

## **2. Aims and ambition of the initiative**

The SMBio-LNG initiative aims to show that deploying liquified biomethane in heavy transport can be a highly practicable part of the emissions reduction solution for Europe. It does so by setting up a demonstration sustainable supply chain, with functioning business model, starting from biological waste for biogas production, on to liquefaction, distribution and sale of biomethane. The model presents a working view of circular economy principles turned into reality, including reduced distances travelled by the fuel, theoretical independence from external gas sources and a zeroing of CO<sub>2</sub> emissions.

The initiative seeks to show that this business model is feasible and replicable, not only to serve the market on a regional scale, but also involving the entire interregional level production/logistic chain, to create a biomethane market supply chain at European level.

## **3. Content and implementation of the initiative**

This SMBio-LNG biomethane supply chain demonstrator is based on strong partnership between the Italian regions of Lombardy, Piedmont and Emilia-Romagna. The biomethane is produced exclusively from renewable sources generally considered as waste, such as manure, agricultural residues and agro-industrial by-products. A key advantage of the biomethane solution is that it is perfectly compatible with natural gas and can be distributed using existing Liquified Natural Gas (LNG) infrastructure.

The model also leverages the expertise of three leading companies in the production, liquification and transportation of biogas. Production of the biogas is managed by the Speranza Agricultural Cooperative based in Candiolo in Piedmont, a major actor in the livestock sector, which combines the production of meat and milk with that of biogas from livestock waste and agricultural by-products. Another Piedmont company, Criotec Impianti Spa, deals with the liquefaction of biomethane, whilst HAM Italia, an Emilia-Romagna company, is in charge of the transport and logistics of liquid biomethane tanks.

Finally, there is the biomethane refuelling station in Sondrio, upper Lombardy, developed by Gruppo Maganetti Spedizioni Spa, one of Italy’s leading heavy truck and logistics companies and a major partner in SMBio-LNG. Gruppo Maganetti is currently engaged in the fuel conversion of its heavy-truck fleet to liquified biomethane. The new supply chain is intended as a fully operational working facility for Gruppo Maganetti, in addition to its demonstration characteristics for replication and potential future upscaling.

### **Governance**

Lombardy Green Chemistry Association (LGCA), the Region’s Cluster of Bioeconomy and Green Chemistry, coordinates the SMBio-LNG initiative. LGCA comprises 52 members from the region, including 27 SMEs, 7 large companies, 6 NGOs, 6 universities and 6 research centres. It exists to promote the regional bioeconomy in Lombardy and encourage cross-regional cooperation in bioeconomy and circular economy sectors, thereby supporting S3 implementation in the region.

Public authorities from all three Italian regions participating in the demonstrator are represented in the SMBio-LNG governance structure. The involvement of public authorities is important from the land-use planning point of view in particular, since good planning, policy harmonisation and citizen involvement are the key to successful development of biomethane plants.



For the private sector, Gruppo Maganetti coordinates all relevant actors along the supply chain of production, processing/liquefaction distribution. The governance model is based on agreement among participating companies and endorsed by the regions and policymakers where the facilities are located.

SMBio-LNG is currently financed from the private resources of Gruppo Maganetti and Cooperativa Agricola Speranza, totalling €3.5m over 3 years. It also incorporates public incentives made available under the Italian Biomethane Decree for the production of biogas.

#### **Entrepreneurial Discovery Process**

For the demonstration case, SMBio-LNG's Entrepreneurial Discovery Process (EDP) can be characterised chiefly as 'triple helix'. The business model encourages the integration into financing and policy measures of all the players in the supply chain, starting with primary producers, education and research providers, industry and transport operators. In this way, SMBio-LNG offers new business opportunities based on circular paradigms of production and consumption by encouraging interaction between operators from different environments. This has enabled a coordinated approach to creating the supply chain, optimising availability of local feedstock, ensuring adequate technological innovation at each stage and working towards a friendly regulatory environment for biomethane supply. Interaction between different stakeholders on the deployment of the business model is further supported through the Open Innovation platform of the Lombardy Region.

As a use-case of the Bioeconomy Pilot of the Vanguard Initiative, SMBio-LNG is able to benefit from a series of actions to support interaction with clusters, policymakers, universities, companies etc. from different European regions, such as matchmaking sessions, webinars and living labs. An EU-wide Vanguard Initiative webinar event in September 2020, for example, gathered some 50 participants from eight regions – including, outside of Italy, Wels in Austria, Slovenia, Flanders in Belgium and Central Sweden.

#### **4. Achievements**

At the current stage of implementation of SMBio-LNG, the demonstrator supply chain has been completed with the opening, in September 2020, of Gruppo Maganetti's biomethane refuelling station in Lombardy. To further enhance the supply chain and start a commercial activity on an industrial scale, a larger liquefied biomethane distributor is due to be completed by the end of 2020.

Through the new supply chain, 2,000 tonnes of liquefied biomethane can be delivered each year. This covers the annual needs of 65 heavy trucks – some 7 million km. Moreover, the experience demonstrates that using liquefied biomethane is profitable for Gruppo Maganetti. The model developed shows positive and growing Earnings Before Interest, Taxes, Depreciation, and Amortisation (EBITDA) of more than 25% of the investment, with positive and increasing cash flows, at year 5. Gruppo Maganetti is the first Italian company, and one of the first in Europe to use liquefied biomethane, locally produced and not imported.

#### **Key success factors**

Crucial to the success of this demonstrator has been the strength of collaboration between the Italian regions involved, based on the prominence of waste to green energy priorities in their respective S3 and circular economy strategies. The S3 approach has been instrumental in bringing together the actors from different sectors focused on the shared goal of making the new supply chain a reality.

Another important success factor so far has been the selection of the SMBio-LNG use case for support from the Technical Assistance Facility (TAF) of the Vanguard Initiative. This brought specialist inputs from corporate finance experts and legal experts from leading consulting companies to bear on improving the business plan for the demonstrator supply chain. Special attention was paid here to attracting private investments in order to encourage further replication of the model.

#### **5. Replicability**

SMBio-LNG is now working on bringing about replication of the sustainable biomethane supply chain in other regional contexts. To this end, SMBio-LNG coordinates a series of activities involving other European regions, such as:

- mapping of relevant sector operators at European level;
- verifying the state of technological innovation in relevant sector operators at different locations;

- industrial feasibility assessment for use of different feedstocks according to local availabilities;
- analysis of industrial policies for the development of biomethane supply chain.

North Rhine Westphalia, Germany and Upper Austria have expressed keen interest in the above activities, whilst a tonnes/year analysis is being developed for a company operating in Slovenia. The SMBio-LNG project also aims to demonstrate the possibility of developing a low-impact biomethane supply chain in the heart of the Alps, protecting the three main resources of the territory - the health of those who live there, the surrounding environment and the tourism industry. The model can be replicated and adapted in other European regions according to the types and availability of local biomass.

The replicability drive of SMBio-LNG is supported by the Bioeconomy Pilot of the Vanguard Initiative. The pilot gathers some 18 European regions linked by a common vision in their S3 on the importance of sustainable biogas in the transition toward a more sustainable economy. SMBio-LNG's dialogue with potential private investors and biogas producers from different European regions is facilitated, thanks to the S3P-Industry's TAF input.

*"Several Italian companies, in collaboration with universities and charging centres, have begun running heavy road vehicles on renewable biomethane, significantly improving the sustainability of road transport and local public transport. However, there remains vast potential to expand this segment, as well as that of water transport, in the quest for the major reductions needed in CO<sub>2</sub> emissions."*

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SMBio-LNG context presentation - Vanguard Initiative Bioeconomy Pilot:

<https://www.assolombarda.it/governance/gruppi/chimici/informazioni/presentazione-ilaria-re>

Open Innovation platform of the Lombardy Region:

<https://www.interregeurope.eu/policylearning/good-practices/item/1306/the-open-innovation-platform-of-lombardy-region/>

## **10. Baltic Sea Region – interregional cooperation on circular bioeconomy. Demonstrating the potential of shared Smart Specialisation approaches to promote green transition**

### **Summary of the case**

Interregional policy learning experiments in the Baltic Sea Region (BSR) are demonstrating new ways to untap the potential of the bio- and circular economy, through projects focusing on trans-regional greening supported by regions' Smart Specialisation Strategies (S3s). By linking their own regional priorities to Europe-wide value chains, regional authorities around the BSR are refining S3 governance structures and extending Entrepreneurial Discovery Processes (EDP) for a more systematic cooperation on closing bio-material loops.

Different BSR interregional projects have helped to reinforce cooperation around e.g. key bio-circular value chains throughout the macro-region. Supported by a new interregional governance arrangement - the 'BSR S3 Directors' Network' - a stronger, sustainable footing for macro-regional S3 can be realised.

The S3 Directors' Network initiated the 'BSR S3 Ecosystem Platform' project (2019-2021) that has recently delivered three reports with a strong focus on green transition, EDP and interregional S3. These are: 1) first-stage value chain mapping analysis of the Circular Bioeconomy across the BSR, 2) an accompanying value chain mapping manual and 3) a good practice study/capitalisation report based on interviews with nine BSR regions that have been lead partners or partners in S3-focused Interreg projects. Many cases of the latter study provide evidence on using S3 as a tool to foster bio- and circular economy.

Better, more fine-grained data on resources, partners, assets and infrastructures have been gathered by BSR regions, through the above efforts, to provide improved policy intelligence. New partnerships and new tools have been tested at interregional level. For example, the value chain mapping exercise for circular bioeconomy, which identifies potential for networking bio-refineries across borders.

Prospects therefore look good for further strengthening of policy cooperation, across BSR, to boost innovation in support of European Green Deal objectives in 2021-2027. Building on the strong momentum created during the current period, new perspectives are emerging from the learning gained in partnership to grasp the opportunities presented by the new Interregional Innovation Investment (I3) mechanism foreseen.

### **1. Territorial context and challenge faced**

The Baltic Sea Region (BSR) covers Latvia, Lithuania, Estonia, Denmark, Sweden, Finland, Poland and the regions of Germany bordering the Baltic Sea, plus two non-EU territories - Norway and regions of Russia. Under the framework of the EU Strategy for the Baltic Sea Region, these territories cooperate with a view to using existing structures and funding more efficiently, through cross-border synergies, supported by EU Structural and Investment Funds under the Interreg Baltic Sea Region Programme. The three BSR cooperation domains are:

- 1) Protection of the sea;
- 2) Enhancing connectivity in transport and energy;
- 3) Increasing prosperity, notably through fostering innovation.

The latter goal has mobilised BSR innovation actors, who have developed multiple joint initiatives and research and innovation projects.

The BSR is well endowed with bio resources (sea, forests...) but it is also facing important challenges in terms of pollution, waste, CO<sub>2</sub> emissions, etc. Reinforcing the bio- and circular economy in the region has been identified as a way to respond to these environmental challenges and also create new economic opportunities. Relevant resources and initiatives, however, are fragmented. By identifying and capitalising on complementarity within value chains and infrastructure (e.g. bio-refineries...), industrial symbioses and circular economies can be deployed on a wider scale.

### **2. Aims and ambition of the initiative**

Developing bioeconomy and circular economy are priorities in many of the Smart Specialisation Strategies (S3) adopted in the EU BSR regions and countries. A range of interregional initiatives with a green dimension have been implemented, involving Baltic Sea territories in a variable geometry setting. These have shared the dual

aims of drawing useful lessons for S3 design and implementation in individual territories, as well as establishing stronger cooperation along interregional value chains.

### 3. Content and implementation of the initiative

The following three examples of bio- and circular economy interregional projects financed by the Interreg BSR Programme provide an insight into the BSR's commitment towards EU Green Deal ambitions.

#### **RD12Club (2017-2020): Biobord - Network of Bioeconomy Regions and Innovation Hubs**

'RD12Club' project aimed to boost smart bioeconomy development in the rural areas of the Baltic Sea Region, through enhancement of knowledge on bioeconomy strengths and actors of the project partner regions.

Main activities of the project were initially to develop bioeconomy profiles for the partner regions and SWOT analyses of the related regional innovation ecosystems. Regional action plans for each partner and a joint action plan were then established. A key output has been the creation of the 'Biobord Platform' - a web forum that connects bioeconomy business and research actors in the BSR, providing matchmaking services, online events, group sessions for project development and updates from the network members.

The Biobord has become an important intelligence tool for both regional bioeconomy mapping and interregional project development. It has proved particularly useful for S3 implementation in bioeconomy and is transferable to other fields. Biobord has been used to support targeted collaboration between SMEs in the bioeconomy sector from various rural areas in BSR through mutual consultations and technological support, as well as larger events: workshops, hackathons etc. Innovative solutions by bioeconomy actors featured in BioBord include:

- a small Finnish company has developed a mobile application for connecting rural entrepreneurs with services and workforce, focused on farmers in rural areas, including a location-based map as well as capacity for information sharing;
- a Latvian research organisation is developing a decision-making support tool for agricultural primary production enterprises and farms by utilising the technological opportunities offered by sensor-equipped drones;
- a Norwegian wastewater treatment plant has been converted into a ground-breaking resource recovery facility using innovative biological wastewater treatment.

The Biobord development continues within a 'Biobord Network' established in October 2020 between the former RD12Club project partners. The network aims to secure the future of Biobord and further develop the bio-economy network in BSR and Europe-wide.

#### **BSR Stars S3 (2016-2019): Smart specialisation through cross-sectoral bio-, circular- and digital ecosystems**

The 'BSR Stars S3' project sought to develop more integrated interregional innovation support infrastructures, linked to S3 implementation in the bio- and circular economy and digitalisation fields. The activities include:

- mapping of bio-economy test and demonstration facilities in the BSR;
- implementation of an interregional innovation voucher pilot scheme, connecting key Nordic testbeds by offering SMEs vouchers to access testbeds across borders;
- a transnational accelerator camp as a tool to engage 'triple helix' representatives from regions around the Baltic Sea, using business acceleration and value chain support methods in solving selected regional challenges related to circular economy and sustainable development.

The project resulted in transnational promotion of the circular economy in BSR by bringing stakeholders together to share information and experiences from ongoing circular economy and industrial symbiosis initiatives in various regions. A key outcome was a comprehensive list of recommendations ranging from detailed mapping of material flows to specific trans-national financial incentives.

#### **BSR S3 Ecosystem Platform (2019-2021): bioenergy and combining forces in bio-refineries**

The BSR S3 Ecosystem Platform project has made efforts to identify the scope for the networking of the BSR's bio-refinery infrastructures.

The first stage circular bio-economy value chain mapping exercise has been completed and a related manual to support value chain mapping in the BSR context has been compiled. The manual is designed to be applicable in broadly any domain or discipline. Drawing on existing datasets, supplemented by a questionnaire (circulated for completion to 16 BSR regions from 7 BSR countries), the mapping exercise provides analytical insights on value chains in circular bio-economy. It focuses on the most innovative part of the bio-economy that concerns highly cross-sectoral activities, including bio-based products, cascading use, utilisation of organic waste streams and organic recycling.

#### **Governance for interregional S3 cooperation**

In 2018, the BSR S3 Directors' Network was set-up, composed of senior regional Directors who have a key responsibility for overseeing strategic direction for S3 in their regions. This strategic coordination mechanism emerged from the opportunity to capitalise on the multiple cross-border initiatives, avoiding fragmentation of efforts. The main coordinator of the Network is Region Västerbotten, Sweden.

The Directors' Network notably initiated the BSR S3 Ecosystem Platform project. The Network aims to strengthen the BSR's collective capacity to share innovation knowledge and experience and to consider options and actions for joint S3 working across the BSR. In this way, it plays a key role in the sustainability of BSR initiatives. The Network's post-2020 ambitions are strongly aligned to EU Green Deal objectives, supported by the twin-transition agenda in energy and digitalisation.

#### **4. Achievements**

The BSR interregional initiatives have generated important achievements in terms of improving individual S3s based on trans-regional policy learning, as well as reinforcing cooperation around interregional value chains throughout the macro-region.

##### **Improving individual S3s based on trans-regional policy learning**

Regions involved in these BSR initiatives have improved their policy instruments for S3 implementation thanks to learning and adopting good practices from other regions. According to the Baltic Institute's Capitalisation Report, they are now "better equipped to develop new policies and implement new technologies and cooperation models in order to move towards bio-based circular economy".

The regions have also gained new insights for improving their S3 governance models. Strong facilitation skills and the ability to find ways to engage different stakeholder groups, through the "neutral management approach" of the bodies coordinating the cooperation initiatives, have been noted as particular ingredients for success.

As a result, involved regions have been able to further develop and refine their Entrepreneurial Discovery Processes (EDP). In the 2020 report 'Smart Specialisation in the Baltic Sea Region – Learning towards Macro-regional Specialisation' Johanna Leino concluded that:

Regions have increased efforts towards wider stakeholder involvement in regional S3 processes, although the adoption of quadruple helix has not yet replaced the traditional triple helix approach to EDP;

Major challenges of EDP are related to communication with the different types of stakeholders and methods of coordinating their participation in discussions so that it enhances stakeholders' motivation and brings added value;

A systematic approach that includes creation of roadmaps and concrete action plans for each S3 priority, as well as regular stakeholder group meetings to update the roadmaps, is effective in ensuring continuous EDP. However, domination by a few stakeholders should be avoided.

##### ***Reinforcing 'green' cooperation around interregional value chains throughout the macro-region***

BSR regions have been able to identify cooperation partners active in bioeconomy value chains. RD12Club, with its Biobord platform, for example, has enabled the development of S3-related European networks during their implementation. The Joint Action Plans include transnational actions and measures to be implemented in cross-regional partnerships. Biobord has generated 11 cooperation projects, fosters increased knowledge about bioeconomy opportunities and enables businesses to develop green innovations and find partners.

Regions have tried and tested new policy instruments with an interregional dimension. For example, BSR Stars S3 tested tools such as a transnational S3 accelerator camp and a transnational pilot voucher for SMEs to

access bioeconomy test facilities. These are both leading to new international business cooperation projects, as well as new partnerships between technology organisations and testbeds in the bioeconomy across the BSR.

Thanks to new evidence emerging from the projects, participating regions have gained a better understanding of the potential cooperation possibilities across value chains in the macro-region. The BSR S3 Ecosystem Platform has mapped specialist expertise in relevant technologies, as well as leading firms in circular bioeconomy and developed a methodology and a manual for this mapping. The Biobord platform provides data on regional bioeconomy profiles, whilst the BSR Stars S3 project has made an inventory of test and demonstration infrastructures to benefit SMEs in the bioeconomy.

Through these initiatives and the linkages between them (e.g. the BSR S3 Ecosystem used the information base created by the BioBord platform), the S3 approach has succeeded in creating an effective basis for new avenues of cooperation on bio- and circular economy across the diversity of BSR regions.

### **Key success factors and hurdles for interregional S3 cooperation**

The success of these interregional initiatives depends on several factors:

- Strong and continuous political commitment is a key condition for sustainability of the projects' results and their mainstreaming into policies, at regional and macro-regional levels;
- A deliberately strategic use of Interreg programmes has been made to contribute to shared goals, rather than as a mere funding sources for constellations of projects;
- Strategic coordination - the establishment of the BSR S3 Directors' Network has been instrumental in working towards strategic use of and synergies between projects.

Some difficulties have been encountered when analytical or policy tools have been designed too rigidly. The need to devote increased attention to adaptability to the variety of contexts across the BSR has been highlighted as a major lesson.

## **5. Replicability**

Replicability and transfer of experience is at the heart of each of the BSR interregional initiatives. Thanks to the continuity of cooperation beyond the individual projects, regions in the BSR have access to a permanent pool of experiences and partners in order to replicate good practices from one territory to another. One success factor for this continuity lies in the creation of policy linkages at strategic level, which are nurtured by and survive beyond the different projects. Notably, based on various BSR cooperation initiatives, the region of Helsinki-Uusimaa, the Hamburg City State, the Capital Region of Denmark and the Stockholm region have established a permanent S3-oriented strategic partnership – now also adding the Amsterdam Metropolitan Area.

The Biobord tool is planned to be maintained after the end of the project thanks to partners' high motivation, commitment and own funding. It continues to support BSR-wide cooperation with the establishment of a formal network, providing a good basis for replication of experiments and initiatives.

*“Macro-regional S3 for the bio-based and circular economy represents a real opportunity for greening our economies. The prerequisites to make it work are identification of potential transnational value chains, active involvement of public, research and business sectors and transnational exchange of expertise, leading to lasting transnational partnerships.”*

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### Websites:

BSR S3 Ecosystem Platform: [www.baltic.org/project/baltic-sea-region-smart-specialisation-ecosystem/](http://www.baltic.org/project/baltic-sea-region-smart-specialisation-ecosystem/)

RD12Club project: <http://www.rdi2club.eu/>

Biobord Platform and Network: <https://biobord.eu/>

BSR Stars S3 project: <http://www.baltic.org/project/bsr-stars-s3/>

Reports:

First-stage value chain mapping analysis of the Circular Bioeconomy across the BSR

[http://www.pa-innovation.eu/wp-content/uploads/2020/09/High-level-value-chain-mapping-in-BSR\\_pilot\\_report\\_final.pdf](http://www.pa-innovation.eu/wp-content/uploads/2020/09/High-level-value-chain-mapping-in-BSR_pilot_report_final.pdf)

Value chain mapping manual

[http://www.pa-innovation.eu/wp-content/uploads/2020/09/High-level-value-chain-mapping-in-BSR\\_Manual\\_Final.pdf](http://www.pa-innovation.eu/wp-content/uploads/2020/09/High-level-value-chain-mapping-in-BSR_Manual_Final.pdf)

Study “Smart Specialisation in the Baltic Sea Region – Learning towards Macro-regional Specialisation” by the Baltic Institute of Finland

[http://www.pa-innovation.eu/wp-content/uploads/2020/10/Smart-specialisation-in-the-BSR-2020\\_final.pdf](http://www.pa-innovation.eu/wp-content/uploads/2020/10/Smart-specialisation-in-the-BSR-2020_final.pdf)

## Annex 2 Interviews for final selection and in-depth analysis of cases

Region/Project	Date	Interviewees
Wallonia	11 September	Bernard Piette – CEO Logistics in Wallonia
Slovenia	14 September	Dragica Marinič – Coordinator of SRIP-Circular economy
Hauts-de-France	15 September	Christian Traisnel – Competitiveness Pole Circular Economy TEAM2
Hauts-de-France	16 September	Yannick Giry – Regional Council Hauts-de-France
SMBio-LNG	22 September	Virtual workshop with SMBIO partners
SMBio-LNG	28 September	Anita Tregner-Mlinaric – META Group
Oulu	14 October	Leena Vuotovesi – CEO of Micropolis Oy
Hauts-de-France	19 October	Sylvie Depraetere – Regional Council Hauts-de-France
Algarve	16 October	Daniel Guerreiro – Commission for Coordination and Development of the Region of Algarve André Pacheco – University of Algarve
Slovenia	20 October	Dragica Marinič and Simona Vajnhandl – SRIP-Circular economy Marko Hren and Simona Hocevar – Ministry of Economy
Liberec	20 October	Ivana Ptáčková – Region Liberec
Baltic Sea Region	21 October	Johanna Leino– the Baltic Institute of Finland
North Netherlands	21 October	Luc Hulsman – Northern Netherlands Alliance – SNN
Wallonia	21 October	Francois Heroufosse – General Director, Wagralim
Centro	23 October	Teresa Jorge, Ana Pires and Sophie Patricio – Commission for Coordination and Development of the Region of Centro
Groof	27 October	Nicolas Zita – Council for Economic Development of the Building sector (Luxembourg)
Basque Country	28 October	Ander Elgorriaga Kunze – Circular Economy Area – Ihobe
Crete	29 October	Maria Kassotaki – Managing Authority Region of Crete
North Netherlands	30 October	Pieter de Jong – WaterCampus Leeuwarden
Climate KIC	2 November	Cristian Matti and Annalisa Spalazzi – Climate KIC
North Jutland	4 November	Lone Kørnøv and Ivar Lyhne- Aalborg University
SMBio-LNG	11 November	Ilaria Re – Consorzio Italtotec



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