Funded by the Interreg Europe policy learning programme, the goal of the GRESS project is to analyse the green economy framework in Europe, pointing out critical aspects and opportunities for SMEs and start-ups in the five territories covered by the initiative. In particular, the project fosters international policy-learning activities in order to strengthen policies' effectiveness in supporting the development and competitiveness of startups and SMEs in the green economy. The five public authorities participating in the project will explore good practices of supporting tools and strategies for green and blue companies in the partner countries (Norway, Greece, Poland, Italy and Bulgaria), with the ambition to try to replicate them in their regional contexts.

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Marino Cavallo, Julia Kristina Culver, Concetta Rau

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Baseline Study in the Gress project partner regions

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Introduction

In the last two years, the European policy framework has undergone major changes in response to both the climate emergency and the dramatic consequences of the Covid-19 pandemic. On the eve of the health crisis, the European Union launched an ambitious climate and environment strategy, the *European Green Deal*, which was accompanied by the EU Biodiversity Strategy for 2030, soon followed by the Sustainable and Smart Mobility Strategy, and legislative measures under the "Fit for 55" Climate and Energy Package committed to further strengthening of Europe's green transition policy, including a new EU Forest Strategy for 2030. During the same period, urgent policy measures to address the health emergency and economic recovery were rolled out — the unprecedented Next Generation EU initiative and its instruments the Recovery and Resilience Facility and RE-ACT EU – amidst growing awareness of the need for a *green, just and transformative recovery*. With the political agreement of the *Special European Council of 17-21 July 2020*[1] setting an *overall climate target of 30%* applicable to the total amount of expenditure from the EU budget 2021-27 and Next Generation EU, this provided a decisive push for the "greening" of European Structural and Investment Funds programmes for 2021-2027 at the territorial level and relevant regional Smart Specialisation Strategies (S3). Within this complex and rapidly evolving policy environment, the GRESS project

1. www.consilium.europa.eu/media/45109/210720-euco-final-conclusions-en.pdf.

addresses two major challenges – *green transition and economic recovery*, with the green economy acting as a driver for innovation, competitiveness, growth and employment and an opportunity to improve social justice and inclusion — a key element of the "Fit for 55 Package" aimed at a socially fair transition.

The Baseline Study brings together five reports outlining the *overall framework for the green economy in the partner regions in Norway, Greece, Poland, Italy and Bulgaria* during the initial phase of the GRESS project up to January 2020. Prior to preparing the regional reports, some key concepts and a common methodological framework[2] were adopted by the partners in order to ensure a harmonised approach across territories that differ in geographical, economic, and political terms as well as in the opportunities for further development of the green economy. The reports that appear as chapters in this publication present the status and trends of the green economy and the dynamics of green growth in the partner regions, illustrating the business climate for green SMEs and start-ups and serving as a *starting point for the exchange of experience and mutual learning process* to be carried on within the project. Emphasis is placed on highlighting the key elements that constitute the background for understanding the setting for the green economy. These elements include the economic framework and territorial characteristics, main policies for the green (and blue) economy, support schemes and instruments, including for start-ups and job creation, as well as the presence of strong regional markets and knowledge clusters for green products and services. Specific companies and institutions are featured in sections of the chapters entitled "voices from the territory" and "cases of innovation", providing concrete examples of the actors and activities of the green economy. One thing that became evident within the project is that European strategies must be translated into policies and solutions adapted to the local and territorial context in order to be effective.

While there are many good practice examples in Europe that build the capacity of green and blue companies, unfortunately not

2. Methodological framework to identify and analyse the regional and territorial situation of the green economy GREen Start-up Support (29 November 2019).

many of these examples are replicated in other regions and remain unexploited, without the potential multiplier effects that could be generated. To address this policy sharing gap, GRESS fosters international policy-learning activities to reinforce the role that the exchange of experiences and the mutual learning process can have on strengthening the effectiveness of other territories' policies in supporting the development and competitiveness of start-ups and SMEs in the green economy. As such, the Study provides the baseline for the five public authorities participating in GRESS to exchange good practices of supporting tools and strategies in the partner territories with the ambition to try to replicate or adapt them in their own regional contexts. As a final outcome, the partners have committed to improving five local policy instruments with new measures and services that will lead to more incentives and improve access to support by green SMEs, higher attractivity of the green economy sector – especially for young start-up entrepreneurs – and increased participation of green products and services in public procurements.

As pointed out by *Mazzucato and Voldsgaard et al.* (2020)[3] in a policy brief that addresses the government role in stimulating the green recovery from the Covid pandemic, "Besides direct public investments, governments should use a wide array of public policy tools to shift private finance towards green investments. These include greening procurement, regulation and taxation policies, and green conditionalities on investments". Such responses represent only some of the policy actions that are featured in the five territories involved in the GRESS policy learning initiative and covered in this publication. These include policy actions that: increase awareness of the opportunities for SMEs in the green and blue economy, expand the number of participants and improve the quality of training programmes for green start-ups, attract more SMEs to participate and succeed in public procurements of green

3. Mazzucato M., Voldsgaard A. *et al.* (2020), *A green economic renewal from the COVID-19 crisis*, UCL IIPP COVID-19 Briefing Papers 04 (June 2020). www.ucl.ac.uk/bartlett/public-purpose/sites/public-purpose/files/04_-_a_green_economic_renewal_from_the_covid-19_crisis.pdf.

products and services, improve access of SMEs to risk capital from outside the local region, make cities and regions more attractive for young entrepreneurs in green sectors, introduce improved incentive schemes for green start-ups, enhance the performance of territorial ecosystems, increase the number of competitive start-ups and spin-offs within the green economy and improve their chances of survival.

Indeed, in the words of European Commission President Ursula von der Leyen, the Green Deal can be "*our motor for the recovery*"[4]. Yet this will be more likely to occur more quickly and efficiently where local and territorial public policies are able to translate the necessities and requirements of the green transition into opportunities for SMEs and start-ups.

Marino Cavallo, Julia Kristina Culver, Concetta Rau

December 2021

4. Video statement on 28 April 2020.

1. Methodology*

The five regional reports were produced by adopting a common methodological framework developed by the external contractor Nomisma SpA, which provided a top-down approach for the analysis of the regional business climate for green SMEs, including existing policies, support schemes and instruments, and the possible existence of strong regional markets and knowledge clusters. Data were collected both through desk research and interviews undertaken by the partner organisations. In some cases, valuable feedbacks and insights were collected during the Regional Stakeholder Group meetings at the local level and were a useful opportunity to bring up discussions and new questions on the existing regional contexts.

Box 1 - Actors and dynamics of the green economy (Culver and Rau, 2019)

The proposed methodology starts from the assumption that the **green economy does not represent an economic sector "per se" but rather a "driver" that is transversal** to the sectors that are characteristic of a territory. For example, in the Emilia-Romagna Region of Italy this "driver" is present within the agri-food sector and in construction, while also being increasingly visible

* By Marino Cavallo, Valeria Stacchini (*Metropolitan City of Bologna*), J.K. Culver, C. Rau (*Nomisma SpA*).

in the machinery and mechanical engineering sector and naturally comprises a core element of the "traditional" sectors associated with the *green economy* such as waste and water management and rapidly developing sectors focused on renewable energy and energy efficiency, electric mobility and green chemistry. Various types of **businesses** are involved in the value chains of the green economy, including manufacturers, materials and component suppliers, logistics operators and legal offices providing intellectual property protection services. **Business associations** can play a key role in fostering networking and promoting awareness of funding programmes and instruments available for green economy businesses. The **financial sector and investors** can provide necessary funding for innovative green economy ventures.

Besides the role of businesses in the green economy, the **public sector** can play an important role as a promoter of "green procurement" and "green investments", particularly in the areas of energy-efficient buildings and sustainable mobility. Commitments made by public authorities to purchase "green products" can have an important boosting effect on green economy businesses, thus stimulating demand-driven processes of innovation.

Universities and research institutions are key actors in the development of the green economy: conducting research and development supporting green economy solutions, cooperating with companies and the public sector, and providing education and training of the next generation of professionals in the green economy. In many EU regions the Regional Operational Programmes (ROPs) of the European Regional Development Fund (ERDF) implement measures aimed at promoting research/academia-business cooperation as well as supporting university/research centre spin-offs in innovative fields such as the green economy.

Finally, the roles of **civil society organisations** and **citizens** in the territory need to be taken into account: the former in terms of their support for green policies and sustainable models of consumption and production, and the latter as consumers of green economy products and services, contributing to the **development of a market** for the businesses of the green economy.

1.1. Key concepts glossary

In order to ensure a harmonised approach throughout territories differing in geographical, economical, political terms as well as on the opportunities for the green economy, the methodological framework additionally proposed a common glossary for key concepts to be equally defined and applied. The following sections will briefly present the main concepts on which all reports are therefore based.

Green economy

The EU's development policy promotes the transformation towards an inclusive green economy that generates growth, creates jobs and helps reduce poverty through sustainable management of natural capital. A green economy offers a pathway to generate economic growth that is inclusive and environmentally sustainable. As pointed out by the European Environmental Agency[1], the term "green economy" is not consistently defined as it is still an emerging concept. The most widely used and authoritative green economy definition comes from the United Nations Environment Programme (UNEP): "[A] green economy [is] one that results in improved human well-being and social equity, while significantly reducing environmental risks and ecological scarcities"[2].

The green economy can refer to sectors (e.g. energy), topics (e.g. pollution), principles (e.g. polluter pays) or policies (e.g. economic instruments). It can also describe an underpinning strategy, such as the mainstreaming of environmental policies or a supportive economic structure[3]. Related concepts are resource efficiency, sustainable consumption and production and the circular economy which are examined below.

1. www.eea.europa.eu/publications/europes-environment-aoa/chapter3.xhtml.

2. UNEP (2011), *Towards a Green Economy: Pathways to Sustainable Development and Poverty Eradication* (advance copy available from www.unep.org/greeneconomy).

3. www.eea.europa.eu/publications/europes-environment-aoa/chapter3.xhtml.

Circular economy

In a circular economy, the value of products and materials is maintained for as long as possible. Waste and resource use are minimised, and when a product reaches the end of its life, it is used again to create further value[4]. While not to be confused with the green economy (as the circular economy may also cover non-green activities and sectors), there are overlaps when circular economy models are applied within the green economy, where resources are reutilised and environmental risks are reduced.

Sustainability

Sustainability results from the use of various strategies for employing existing resources optimally so that a responsible and beneficial balance can be achieved over the longer term. Sustainability implies continuity over time and the non-depletion of resources while also minimising environmental impact. European policy strategy for the next programming period (2021-2027)[5] strongly embraces the UN's 17 Sustainable Development Goals (SDGs) and sustainability is one of the evaluation criteria used in the funding of European projects.

The green economy can incorporate elements of the circular economy and should contribute to sustainability. Green economy initiatives are aimed at reducing environmental impacts and improving resource efficiency and sustainability.

Actors and dynamics of the green economy

The green economy does not represent an economic sector "per se" but rather a "driver" that is transversal to the sectors that are characteristic of a territory. Various types of businesses are involved in the value chains of the green economy, including manufacturers, materials and component suppliers, logistics operators and legal offices providing intellectual property protection services. Business associations can play a key role in fostering networking

4. https://ec.europa.eu/growth/industry/sustainability/circular-economy_en.

5. https://ec.europa.eu/research/pdf/horizon-europe/ec_rtd_orientations-towards-the-strategic-planning.pdf.

and promoting awareness of funding programmes and instruments available for green economy businesses. The financial sector and investors can provide necessary funding for innovative green economy ventures. Besides the role of businesses in the green economy, the public sector can play an important role as a promoter of "green procurement" and "green investments", particularly in the areas of energy-efficient buildings and sustainable mobility. Commitments made by public authorities to purchase "green products" can have an important boosting effect on green economy businesses, thus stimulating demand-driven processes of innovation. Universities and research institutions are key actors in the development of the green economy: conducting research and development supporting green economy solutions, cooperating with companies and the public sector, and providing education and training of the next generation of professionals in the green economy. In many EU regions the Regional Operational Programmes (ROPs) of the European Regional Development Fund (ERDF) implement measures aimed at promoting research/academia-business cooperation as well as supporting university/research centre spin-offs in innovative fields such as the green economy. Finally, the role of civil society organisations and citizens in the territory need to be taken into account: the former in terms of their support for green policies and sustainable models of consumption and production, and the latter as consumers of green economy products and services, contributing to the development of a market for the businesses of the green economy.

The main target beneficiaries of the GRESS project comprise:

- **SMEs**: according to the EU definition, these are businesses with fewer than 250 employees, and a turnover of less than € 50 million or a balance sheet total of up to € 43 million.
- **Start-ups**: these are companies that have been newly set up and operating for a limited number of years, usually less than 5 years. Tax breaks or special tax regimes are offered to start-up companies in some countries. The term start-up is often associated with dynamic technology companies, but a start-up can be any type of business and does not necessarily have to have

outside investors. According to Start-ups.co (UK online platform for start-up advice), one of the key differences between a start-up and a small business is that a start-up has an idea that can be applied and marketed globally. In contrast, a small business is tied to a particular location or market[6].

- **Spin-offs**: a company that has spun off from another company or a university or research institute.

Policy landscape

Whatever the underlying dynamics of the local green economy, in the public policy context it is essential to emphasise the importance of **integrating economic and environmental policies in a way that highlights the opportunities for new sources of economic growth** while **avoiding unsustainable pressure on the quality and quantity of the natural assets**. Promotion of the green economy in Europe involves a variety of measures ranging from economic instruments, such as taxes, incentives, subsidies and trading schemes, through regulatory policies, including the setting of standards, to non-economic measures such as voluntary approaches and information provision.

- **Policy**: a set of *ideas* or plans used as a *basis* for making *decisions*, *especially* in *politics*, *economics*, or business[7]. In the context of this methodology, we refer to public sector policies that affect the territories involved in the GRESS project — these could be EU, national, regional or local policies.
- **Policy measures**: these are instruments used by the European Union as well as public authorities at the national, regional and local levels to promote or discourage certain actions or activities. These can include **incentives**, **subsidies**, **grants**, **tax rebates**, and **trading schemes** (for example the EU Emissions Trading Scheme (ETS) used to compensate for CO_2 emissions). The European Commission has funding programmes available to SMEs that can be used for green economy projects –

6. https://start-ups.co.uk/what-is-a-start-up/.
7. www.collinsdictionary.com/dictionary/english/policy.

depending on the specific topic of the calls for proposal, such funding could come from Horizon 2020 (especially the SME instrument), COSME and LIFE programmes, which were the main instruments at the time the GRESS project was initiated. European regions also use ERDF Structural Funds through the Regional Operational Programmes (ROP) to fund research and innovation as well as provide support to start-ups and job creation in green economy fields. Other instruments include dedicated structures such as business incubators and accelerators (for example the Climate-KIC StartUp Accelerator Italy).

- **Regulations**: regulations are rules made by a government or other authority in order to control the way something is done or the way people or organisations *behave*. Regulations are used to establish procedures and set parameters for acceptable behaviour or characteristics of products and services. For example, the new **EU Single Use Plastics Directive (EU) 2019/904** introduces measures to prevent and reduce the impact of certain plastic products, thus further promoting transition to a circular economy and stimulating green economy businesses by encouraging the prioritisation of "sustainable and non-toxic re-usable products and re-use systems"[8]. National, regional and local regulations can also play a major role in sanctioning non-green behaviour and in encouraging the development of more sustainable and resource-efficient business models.
- **Voluntary approaches**: in contrast to compulsory approaches of regulations, many countries have applied voluntary approaches to address environmental problems. These might include agreements on environmental performance that are negotiated with industry and public programmes in which firms can volunteer to participate, such as **the Environmental Management and Audit Scheme (EMAS)**. On the other hand, **standards** are technical specifications defining requirements for products, production processes, services or test-methods to ensure interoperability and safety, reduce costs and facilitate companies' integration in

8. www.globalelr.com/2019/06/eu-introduces-single-use-plastics-directive-to-promote-a-circular-economy/.

the value chain and trade. These specifications are voluntary and are developed by industry and market actors following some basic principles such as consensus, openness, transparency and non-discrimination. European Standards are under the responsibility of the European Standardisation Organisations (*CEN*, *CENELEC*, *ETSI*) and can be used to support EU legislation and policies to promote the green economy[9].

- **Communications and Awareness raising**: such initiatives are introduced to create awareness and influence behaviour of individuals and businesses in a direction the public authority decides will be favourable for the territory. For example, in the Bologna area communications campaigns have been used to encourage citizens to separate their rubbish and bring used electronic products to recycling facilities, thus also supporting the growth of the green economy with the development of industries that reuse or safely dispose of such materials.

9. https://ec.europa.eu/growth/single-market/european-standards_en.

2. Regional and territorial situation of the green economy – Kristiansand, Norway*

2.1. The territorial economic framework

Norway – a small, open economy

Norway has a population of 5,314,336 and GNI Per Capita $80,790 (World Bank)[1]. Norway is a diverse industrial society with a free market economy and generally low trade barriers. A significant share of the Norwegian economy consists of service industries, including wholesale and retail trade, banking, insurance, engineering, transport and communications and public services. Norway's income level is higher than that of most other countries. Including the petroleum industry, GDP per capita is approximately 20% higher than that of the USA. Norway also ranks highly based on Mainland GDP, where the highly profitable petroleum sector is excluded.

In 2012, the service sector as a whole accounted for approximately 59% of GDP. Norway's petroleum industries, including crude oil and gas extraction, accounted for about 26% of GDP in 2012 but accounted for less after the oil price downturn and was around 20% in 2017 and 2018. 43% of Norway's total exports in 2018 were from petroleum industries. Manufacturing accounted for close to 8% of GDP in 2012.

The exploration and production of petroleum resources on the Norwegian continental shelf has had a major impact on the

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1. www.doingbusiness.org/en/data/exploreeconomies/norway/starting-a-business.

Norwegian economy. Norway ranks as the world's seventh largest oil exporter. Today, the petroleum activity is Norway's largest industry measured in value creation, state revenues and export value (2019). The Norwegian economy is a developed, mixed economy wherein the state controls some of the most important economic sectors. A full 30% of all employees in Norway was working for the government (central and local together) leading the world in public sector employment.

Economic cooperation within Europe

Norway is a member of the European Free Trade Association (EFTA), an international free trade partnership. Norway is a party to the Agreement on the European Economic Area (EEA), which generally includes Norway in the internal market of the European Union (EU). Norway opted out of the EU during a referendum in November 1994. However, as a member of the European Economic Area, Norway partially participates in the EU's Single Market and contributes sizably to the EU budget.

The Agreement on the European Economic Area (EEA) is the cornerstone of relations between Norway and the EU. It brings together the 28 EU member states[2] and the three EEA EFTA states Norway, Iceland and Liechtenstein in the internal market governed by the same basic rules. Under the EEA Agreement, Norway and Norwegians have the same rights and obligations as other EEA countries and their citizens when it comes to trade, investments, banking and insurance, and buying and selling services. The EEA Agreement also covers cooperation in other important areas such as environment, employment, civil protection, enterprise, entrepreneurship and small and medium-sized enterprises.

In order to be applicable in the EEA, EU acts have to be incorporated into the EEA Agreement, more concretely into one of its Annexes or Protocols. Under the EEA Agreement, much of the EU's policy on environment and climate change has been incorporated into Norwegian law. Norway has committed to a target of at least 40% reduction of greenhouse gas emissions by

2. Now 27 member states following the exit of the UK from the EU.

2030 compared to 1990 levels. Norway has been a part of the EU Emission Trading System (EU-ETS) since 2008 through the EEA Agreement. About half of Norway's emissions are included in the EU ETS, making this a cornerstone in Norwegian climate policy.

Doing business in Norway

Norway ranks as number nine in Doingbusiness.org assessment of the world. In terms of starting a business Norways ranks as number 25.

Norwegian authorities have published a general guide to opening a business in Norway. The guide can be found in a handbook (issued by the Goverment), which includes information about tax and national insurance, business accounting and financial reporting[3] in both Norwegian and English languages.

Analysis of Norwegian economy. Assessment and recommendations from OECD[4]

- Improve framework conditions for business activity.
- Address innovation and technology issues, including through: promotion of entrepreneurial skills and STEM skills (science, technology, engineering and maths).
- Encouraging Technology Transfer Offices in universities, stronger evaluations of business-support programmes (notably innovation and R&D schemes).
- Moving towards green growth. Under current policies, programmed measures for reducing domestic non-ETS emissions will need to be combined with non-ETS reductions purchased from EU countries for goals to be met.
- Public procurement is also receiving welcome policy attention. Procurement is a complex area. There are an estimated 3 000 contracting agencies and departments in national and subnational government. Furthermore, procurement is increasingly an instrument in structural policy objectives, for instance regarding social inclusion, green growth and support for small-and-medium enterprises (SMEs).

3. www.altinn.no/starte-og-drive/.
4. OECD Economic Surveys Norway, December 2019.

Business structure and innovation in Norway[5]

In Norway we define small and medium sized enterprises (SMEs) as businesses with less than 100 employees. Businesses with less than 20 employees are categorized as small businesses. Businesses in the range between 21 and 100 employees we define as medium sized businesses. Companies with more than 100 employees are defined as large companies. The SMEs cover more than 99% of all businesses in Norway and around 47% of employees in private sector and nearly half of the gross value added in the country.

In 2018 on national level 26% of employees in private sector were in the small (1-19) business category, 21% within the medium category (20-99) and 53% were employed in large businesses. In the Agder region, where Kristiansand is the regional capital, the corresponding numbers are 31% in the small business category, 20% in the medium sized category and 49% in the large business category.

Start-ups in Norway

A growing number of people in Norway are involved in start-ups. In 2017 around 62,000 new businesses were established, an increase of 3% from 2016. and almost 50% increase since 2009 and around 77% increase since 2000. Even if the number is growing only one in three entrepreneurs were women (2017).

Most start-ups are sole proprietorships which is the most uncomplicated process to set up and allows a large degree of freedom. However, it comes with great risk if the company has growth ambitions. Most sole proprietors do not have this ambition and count for only 3% of total turnover in terms of revenues. Private limited liability companies count for 89% of total turnover in Norway and 77% of employment. Number of start-ups are high in the most populated cities in Norway like Oslo, Bergen and Trondheim.

5. www.nho.no/tema/sma-og-mellomstore-bedrifter/artikler/sma-og-mellomstore-bedrifter-smb/.

Innovation business support system in Norway

The three major actors in innovation are the Research Council of Norway (RCN), Innovation Norway (IN) and Skattefunn – which is an R&D tax incentive – has a different logic and is anchored in the Finance Ministry. Skattefunn is not an incentive for green innovation but R&D in general for all businesses. The Research Council is mainly for research and as such will require longer time for innovations to develop into start-ups. IN is almost alone in its non-technological innovation and wider business support role.

Innovation Norway

Innovation Norway is the Norwegian Government's most important instrument for innovation and development of Norwegian enterprises and industry. IN supports companies in developing their competitive advantage and to enhance innovation. Innovation Norway invests grants and loans for innovative projects in start-up companies and established businesses. In 2018, the company invested NOK 7.2 billion in new projects.

Innovation Norway[6] offers help to Entrepreneurs and promising Start-Ups which have growth ambitions and established an innovative business concept representing something new and significant in the market. One of the main objectives is to help enterprises by removing barriers for global success. Their services will contribute guidance in and assistance to implementations of necessary measures that establishments meet at an early start-up phase. Services focus on: – Idea and Business development, – Build a business model, – How to protect your idea, – How to obtain money, – How to pitch an idea, – Think international.

Start-up grants

Promising start-ups with growth ambitions are eligible to apply for a start-up grant from Innovation Norway. The goal with this financial aid is to stimulate establishment of new enterprises, and the grants need to cover specified activities. The size of the grants given for premarket evaluation range from NOK 50 000

6. www.innovasjonnorge.no/en/start-page/our-services/start-ups/.

to NOK 100 000 depending on project complexity. If a company as a result of a completed premarket evaluation can document further growth potential, the company is eligible to apply for commercialization grants.

The size of a start-up grant for **commercialization** will depend on the complexity of the project and on how much the company has received in grants before. For projects with national potential, the grant can be up to NOK 500 000 and for projects with international potential, up to NOK 700 000.

Agder region and Kristiansand city region

The Agder region is the southernmost region in Norway with a total population of 305,000 inhabitants in 2019 (5.74% of the total population in Norway). The main part of the population is concentrated on the coastline, in the two urban areas around Kristiansand and Arendal/Grimstad. Kristiansand is the major city and hub in the Agder region with 110,000 inhabitants as from January 1st, 2020 after merging with two neighbouring municipalities.

Important industrial sectors in the Agder region are process manufacturing industries, maritime industries including drilling equipment and engineering, software and computer/ICT sector, travel industry, retail trade and services, building and construction industry.

Agder is the leading region in Norway on entrepreneurship and export of processed goods. The industry in Agder is to a high degree based on energy intensive raw materials processing (e.g. aluminium, nickel, and silicium). The region is also host to world leading producers and suppliers to the global energy and maritime industries with strong maritime industry clusters. There is furthermore a strong potential for the production and distribution of clean energy from the region to Europe, as Agder is one of Norway's biggest producers of hydroelectric power (VINN 2015-30).

The major clusters in the region and the regional innovation system support the businesses in terms of competitiveness through shared knowledge and innovation.

The most important contributors to the wealth creation, measured in NOK, are manufacturing industries, mechanical engineering, maritime and offshore supplier engineering and equipment, software, wood processing industries, travel industries, health and care-services, building and construction industries and retail trade and services. The major industries or sectors in terms of employment are building and construction, healthcare and social services and manufacturing/mechanical industries.

However the Agder region is much weaker within business sectors like information, communication and knowledge intensive business services or businesses that work to create a strong **STEM** environment. These services are often strong in the bigger cities.

The exports are mainly from the supplier industries to maritime sector including oil and gas markets, silicon for the solar industries, windmill and automobile supplier industries and high tech processing of metals. In 2018 the total value of the export from the city and region was NOK35.8 bn (or around €3.6 billion), nearly 8% of the total Norwegian export value.

Start-ups in Kristiansand and Agder region

Entrepreneurship in the region has for several decades been strong compared to many other regions in Norway. In 2018 as many as 3,400 new start-ups were founded, close to 6% of total number of start-ups. The entrepreneurship rate in Kristiansand and western part of the region is high and only Oslo and surrounding region have a higher rate. Main share of start-ups can be found within real estate, building and construction, retail and services. Of all founded start-ups from 2012 around 33% were still in business after five years (2017) and more than a third had one or more employees.

2.2. Policies for the green economy

Green economy in Norway

The most widely used and authoritative green economy definition comes from the United Nations Environment Programme (UNEP): "[A] green economy [is] one that results in improved human well-

being and social equity, while significantly reducing environmental risks and ecological scarcities". Norway applies the same understanding of the green economy used by UNEP.

A report on Green *competitiveness* in Norway was published by the Norwegian Government's Expert Committee for Green Competitiveness in 2016[7].

Norwegian politicians should target a reduction in non–ETS emissions by up to 40 percent by 2030. Predictable goals facilitate innovation, willingness to invest and long term industry development. In the next decade, the EU, Norway and Iceland will intensify their climate cooperation by also aligning their actions to reduce emissions from sectors outside the EU ETS, namely agriculture, transport, waste management and buildings; and to enhance benefits of carbon removals from land use and forestry[8].

Analysis of green growth in Norwegian Business – with recommendations

The Ministry of Climate and Environment has a particular responsibility for carrying out the environmental policies of the Government. The Ministry commissioned Ernst&Young to map the status for the green transition in the Norwegian business community in 2019 with special focus in 11 different segments or areas of businesses; Oil and gas, waste and recycling, wood and forestry, business real estate, agriculture, food and beverages, finance, transportation, trade and retail, travel industries, processing industries and shipping. These segments cover around 58% of total Norwegian emissions, and count for majority of emissions directly and indirectly from the businesses in Norway.

Summarised E&Y found the following interesting feedback/results in the analysis[9].

7. www.regjeringen.no/contentassets/02d09ccf1865407obc52e3773b9edbe1/green_competitiveness_executive_summary_nobember_2016.pdf.

8. https://ec.europa.eu/clima/news/european-union-iceland-and-norway-agree-deepen-their-cooperation-climate-action_en.

9. www.regjeringen.no/contentassets/84a01b96cf88453ea542886250cb64fe/tempo-pa-gronn-omstilling-i-norsk-naringliv-ey-2019.pdf.

Value chains and circularity

In general, there is a lack of focus on indirect emissions and circular solutions. The survey shows that several industries have an extensive focus on their own energy consumption. This is despite that most important footprint often stems from indirect emissions, either in the supplier chain or as a result of use of the product. This concerns special industries such as trade, agriculture, food and drink, oil and gas, and real property. Circular solutions can contribute to that waste from one industry can be a resource for another industry.

Requirements in regard to suppliers

Few make specific climate requirements in regard to suppliers. Industries such as trade, agriculture, food and drink, commercial transport and real property are dependent on one another to ensure reductions in important indirect emissions. Nevertheless, the environmental requirements across industries are often very general, and are seldom specifically connected to greenhouse gas emissions or low emission technologies. The questionnaire showed that only 25% experienced demand for green products and services.

Innovation and scaling

Much of innovation is still at the pilot stage and must be scaled. Companies in several industries have launched new technological solutions for reducing emissions, for example, low emission heavy transport in commercial transport, biogas technology and bio-carbon storage in agriculture, food and drink, carbon storage and hydrogen-based energy within oil and gas, and green financial products. These solutions can be central for green readjustment, but for most industries are still at the pilot stage and still not scaled to a level where this can have transformative power.

Prohibitions and requirements

Several of the roadmaps demand specific requirements and prohibitions from the authorities. For example, the trade sector demands a prohibition against food waste, as well as product design requirements with a focus on climatic effect. The real prop-

erty sector wishes to have requirements regarding documentation for materials and emission of climate gases, the finance sector demands requirements regarding climate reporting, and the waste treatment industry demands an increased CO_2 tax on plastic, requirements regarding better sorting out of recyclable waste, waste handling and material recovery, etc.

Financial support

Increased financial support is demanded across the industries, better support arrangements for development, piloting and scaling. Several specifically demand a separate CO_2 fund. For example, the agricultural sector demands a separate fund for bioeconomic projects of 10 billion, commercial property requested increased support for energy leadership in construction, the processing industry support for technological development, and the forestry sector support for pilot projects for bio-based products. "Nysnø"[10] has had its grant increased from NOK 400 mill to NOK 750 mill, in 2018 Enova[11] gave 2.1 billion in support of energy and climate measures, Innovation Norway received a grant of NOK 4.1 billion in 2018.

Requirement for public tenders

Most roadmaps demand requirements for public tenders that emphasize low-emission solutions and reductions in emissions. For example, the roadmap for commercial property demanded clearer emphasis on environmental and circular solutions, trade demands increased organic product requirements in public procurements, commercial transport demands climate requirements in public tenders, the same concerns agriculture, food and drink, forestry *et al.*

Competence

Increased focus on competence is demanded for the industry itself and in the authorities. All roadmaps demand more competence, in their own industry, in higher education and in the

10. www.nysnoinvest.no/en/.
11. www.enova.no/about-enova/.

authorities. A measure that is demanded by commerce is the need for a support arrangement for post-qualifying education. It was recently arranged that Norwegian industrial leaders can take post-qualifying education for digitalisation, and the proposal is that an equivalent arrangement is established for sustainability.

2.3. National and regional/territorial policies to support green start-ups and green jobs

Innovation Norway – business support system with a sustainability focus

Innovation Norway (IN) has taken a proactive role in the effort of steering companies towards thinking and acting in a more sustainable way. When assessing sustainability in individual projects, IN uses a three-part bottom line with economy, environment and society. Profitability, quality and feasibility are important criteria. Applicants are also expected to explain and meet requirements for good business practice. If two projects are otherwise equally good, IN prioritizes what is best for the environment and society.

Today, about 50 percent of the total financial portfolio has an environmentally focused profile. IN believes the most promising opportunities for Norwegian companies can be found in the area of *green innovation*. Other social challenges also require sustainable answers, for example within the health and care sector. In the intersection between the public and private sectors, innovations can be created that can provide the basis for new business.

Norwegian companies can offer new, high-tech and sustainable solutions that meet a number of major societal challenges. These companies are highlighted by Innovation Norway on The Explorer website[12].

12. www.theexplorer.no/.

Regional and local policies to support green growth and innovation in Agder. Regional strategy and plan – Agder

The Regional Stategy's (Agder 2030) main objective is to develop Agder into a socially and economically resilient and sustainable region by 2030. Addressing all UN sustainable development goals is an objective for the regional plan and the authorities. This means developing an attractive region for all with low emission region and society with good living conditions. Reduction of greenhouse emissions with a minimum of 45% by 2030.

Climate actions and a sustainable society is one of the most prioritized fields of the Regional Plan Agder 2030. An important part of the plan is economic growth and business development. GHG emissions will be reduced by 45% within 2030.

Strategic actions in the plan include:

- developing small and medium sized enterprises with scaling capabilities;
- increase the use of innovative and sustainable public procurements;
- implement entrepreneurship as a part of the educational system from secondary school to college and university level;
- further develop business support system and tools for entrepreneurship and business development;
- strengthen policies for entrepreneurship and innovation for green growth and sustainability and circular economy;
- mobilize the business community and public sector for more research, development and innovation and strengthen participation in international collaboration projects and research programmes;
- high employment growth in the region with a focus on sustainable growth;
- develop science and competence centers in the region for green and blue growth;
- facilitate sustainable development enhance renewable energy sources;
- support development of green and sustainable data centers and data processing in Agder;

- support more projects and innovations for increased energy efficiency.

One of the main challenges for the regional plan is that there is a *shortage of available funds* to support the plan.

Roadmap for climate in Agder – a part of the Regional Plan for Agder

The roadmap for climate in Agder is the first in Norway addressing how regional authorities and cities and municipalities in the region can reach respective targets for the low carbon society by implementing policies and actions in their functional areas.

The roadmap consists of four main chapters addressing the most important sectors or areas for emissions:

- transportation;
- building and construction;
- food and agriculture;
- manufacturing and processing industries.

Each chapter includes a number of actions the municipalities can implement to reach the targets and achieve the objectives of reduced emissions.

Another policy instrument for sustainable actions in Agder region is Electric Region Agder. Described as a case later in the report.

City of Kristiansand, Masterplan

City of Kristiansand merged on January 1st 2020 with two neighboring municipalities, Songdalen and Søgne after an 18 month long process since parliamentary decision. The new Masterplan for the merged city of Kristiansand is currently in process and will be finally approved in September 2020. It is already clear that sustainability and the UN SDGs are central in the plan process.

The main objective of the current Masterplan is to address important challenges in the city and how the city can develop strategic tools and actions to reach its goals. The masterplan is divided in two main parts: territorial plan and plan for societal challenges. The plan for societal challenges is based on UN sustainable devel-

opment goals and the existing masterplans in the three merging municipalities.

The overall goal of the masterplan is to strengthen Kristiansand as a "*green and innovative city*". In the masterplan there is an increased focus on sustainable new business ideas, applying technology for green and sustainable businesses and a low carbon economy. An overall policy to strengthen the business community and future competitiveness must be applied and a restructuring of Innovation policies.

Strategic Business Development Plan (BDP) for Kristiansand 2015-2022

The latest BDP was developed and implemented in 2014 and the action plan was adopted in 2015 by the City Council. The plan had four main categories of actions: Competencies/skills, Innovation, International business competitiveness and attractive city region.

Within the category Innovation the BDP has the following targets:

- stimulate and strengthen the entrepreneurship community and culture by targeting youth and entrepreneurship education and training;
- improve access of SMEs to risk capital outside the local region,
- further develop and strengthen regional entrepreneurial training and services, incubators and innovation companies and enhance the performance of innovation ecosystems for SMEs;
- strengthen R&D in the private sector by better collaboration with research/academia and consolidation of the regional innovation centers in the region;
- enabling innovation in public sector by implementing more innovative and sustainable public procurements.

The Kristiansand region Action plan under the Business development plan (2015-2021) includes actions like:

- green technologies: promote Kristiansand region as an advanced city region for development and demonstration of clean tech/ envirotech/green science;

- further develop and strengthen start-up culture and take more advantage of the business support systems for benefit of start-ups and SMEs;
- organize annual start-up days in the city, in the region and at the university;
- organize meetups for start-ups and investors, business angels;
- renewable energy sources, actively stimulate production and use.

2.4. Voices from the territory regarding green start-ups

Innoventus Sør (IS)

Innoventus Sør is a regional innovation company, SIVA incubator (The Industrial Development Corporation of Norway), FORNY agent and Pre-seed Administrator representing Southern Norway. IS focuses on innovation, which is a prerequisite for ensuring growth, new creation and renewal in the region. The company works actively with entrepreneurs, trade and commerce, public agencies and the academic and research world in order to create sustainable solutions for the future. Our business concept is to contribute to the commercialization of innovative ideas that provide growth and employment.

IS does not experience an increase of new start-up-cases within the green economy, but there is a growing consciousness in the business community on sustainability. IS has had more focus on UN sustainability goals. Several of the start-ups now support one or more of UN SDG goals. Several of the businesses regard this as a competitive edge in their efforts to succeed as a business or as a start-up. IS is trying to increase their awareness of the importance of more sustainable business models.

Around 30% of the start-ups in the incubator portfolio support the green elements of the UN goals.

Currently there is no urgent need for specific advisors on the green elements or social impact in the incubator. The staff of advisors can adjust and include sustainability focus when working with the start-ups. According to IS, impact should be an integrated part of the development of each business case. The incubator itself must

have the right focus and competencies to assist the businesses on the competitive advantage when focusing more on the green perspective.

There are very few support mechanisms targeted at green start-ups or impact start-ups. The general impression is that the support mechanisms are neutral or aimed at commercial growth in general. There is no specific early phase support funding for green start-ups. However, the *green technology support fund*[13] from IN does support projects targeted at reducing energy, renewable energy or making industry manufacturing or businesses more energy effective. The green tech fund has a precondition involving more equity from the business itself which is often difficult for a start-up. These companies have a longer time to market and therefore the need for early phase/risk capital is urgent.

The different institutions in the Innovation eco system for SMEs have pointed out that green and blue growth is a prerequisite for future growth. A more coherent ecosystem for sustainable growth and innovation would increase the number of new projects within this segment and the commercialization phase of these start-ups. Early phase risk capital would help getting through the proof of concept stage. There is a lack of capital and equity that can help the businesses through this phase and finally be able to approach the market.

Selling to public markets is often a challenge. The municipalities could become an important contributor for more green start-ups. However, the framework of working with public sector must be more adapted to facilitate small companies and start-ups. Different sets of financing tools should be in place and criterias to become a supplier must be adjusted.

Public sector and municipalities could play an important role and stimulate more green innovation. Often start-ups need to test technology and have proof of concept. Often the bigger cities can play a role here. Enova has a set of tools for larger businesses for such purposes, but not for SMEs and start-ups often in early and critical phase.

13. www.innovasjonnorge.no/no/tjenester/innovasjon-og-utvikling/finansiering-for-innovasjon-og-utvikling/tilskudd-til-miljoteknologiprosjekter/.

All in all IS purpose is to contribute to wealth and business growth in the region by supporting innovative start-ups and SMEs with a commercial growth potential. The owners and financers of the incubator must define a green start-up and prioritize scarce resources. Often green start-ups need more help and access to capital is more difficult.

University of Agder (UiA)

The sustainability goals are a central part of the curriculum in entrepreneurship, often it is «green and good for the environment» that is the first one thinks of. In «Org 207 Entrepreneurship and innovation», a course with 300 students, we have seen that good solutions which resolve problems related to the sustainability goals have been coming to an increasing degree. This is because focus has been laid on that sustainability goals are important to think about during start-up. Some companies have good business cases where they either work towards a specific sustainability goal and construct a business idea around it. Other companies start with a need or problem they themselves have identified and during concept development also take into consideration how their solution shall contribute positively in order to achieve the sustainability goals. Examples of these ideas have the goals of employing and strengthening exposed groups and reducing poverty. These are ideas that in their business model clearly focus on the end customer, but also on the social aspect. Other ideas use alternative methods in order to bring out resources which will be able to replace processes that at present are damaging to the environment.

In «TFL 107 Entrepreneurship for art students» focus is on sustainability goals after the idea phase. The ideas produced here were greatly feasible and have focused to a large extent on social challenges and injustices. The students have used their interest and knowledge of the subject of art to resolve problems in creative ways. Here they have made choices and investigated green methods in which to produce their goods and services. For example, replace plastic with bamboo.

Further, all courses at the University of Agder and at the Norwegian School of Economics receive a review of all their themes in order to include the sustainability goals to a greater extent. In 2020 UiA will offer a new Master programme in entrepreneurship, «shift Entrepreneurship», as an interdisciplinary Master programme. Sustainability goals are the basis here for development of the idea, management of start-up, and measurements of results. The students here shall have an informed and reflective attitude to the various goals, know which they contribute to, and what type of effect the company has on the world beyond profit. A Master programme in circular economics will also be offered.

In the autumn of 2019, the UiA, together with several other actors in Agder, arranged a *3-day start-up*[14] course where the students go from idea to concept to pitches over 3 days. Facilitators from Texas came to implement the course. The sustainability goals were never explicitly mentioned, but nevertheless resulted in several of the business ideas which in different ways are marked by that the students take the sustainability goals and the environment seriously. This was mentioned by the external facilitators as being excellent, and surprising to them taking into account what type of ideas they are used to seeing at the events.

The requirement for an innovation degree challenges the students with green ideas because one is used to thinking of the solution or the degree of innovation of the end product. Whilst in green projects the end product has a low innovation degree, the production process can be innovative. This is a challenge both for us in the UiA, and for students where the focus is mostly put on solution and end product. The sustainability goals set new requirements for business models. Looking at how actors in the market operate at present can be less valuable and it challenges their creativity. Without a creative or innovative business model, it can be difficult to compete with other actors who can often outstrip on cost. This is a challenge we must resolve together with the students.

14. https://agder.3daystart-up.org/.

Ungt Entreprenørskap – "Junior Achievement" (JA)

JA Europe is the largest non-profit in Europe dedicated to preparing young people for employment and entrepreneurship. JA Agder involved 11 110 pupils and students in 2019. 3 493 of these belong to (old) Kristiansand Municipality

For the last two years, EU/JA has had a continuous focus on sustainable value creation in the work with pupils and students during the entire educational course. The work is now even more important seen in conjunction with *Sustainable development* as one of the three interdisciplinary themes in a new curriculum for Norway. Junior Achievement Agder has a close co-operation with the UiA regarding accomplishment of the theme.

EU/JA is now well underway with kick-off for pupils who shall establish their own pupil company as social entrepreneur in their own project through Kavlifondet (14 schools divided between 7 Agder municipalities). This arrangement has a somewhat complex focus on sustainability as a starting point for "Elevbedrift". This is also a part of the project «**The green war**» under the auspices of Kristiansand Municipality. Here pupils shall present their work to the politicians in Kristiansand Municipality.

In connection with the Agder Energi conference[15] 2019 the preparatory pupil activities were carried out as a competition. In all 28 contributions were received. The Conference was held on the 8th and 9th of May 2019 in Kristiansand; «Electric City: The generation after us». The objective with this project is to involve today's young people in contributing to form future society.

In co-operation with the Ministry of Children and Equality, Junior Achievement Norway has contributed to the project «Green and Ingenious!»[16] which is included in strengthening young peoples' knowledge of environment, climate and sustainable consumption. For several years, Agder has been one of the prioritized counties for participation in the project, and supports an area EU already supports, «Pupil companies in the ls-school (*lower secondary school*) and sustainability.

15. http://agderenergikonferansen.no/.
16. www.ue.no/prosjekter/Prosjekter/Gront-og-genialt/Gront-og-genialt.

In connection with the County Championships for Youth Companies 2019, 98 Youth Companies participated in 18 different competition categories. One of these is the Sustainability Prize, and 32 youth companies participated in this competition category in 2019.

Chamber of Commerce, Region of Kristiansand

The Chamber of commerce in Kristiansand has more than 1000 members. In the fall of 2019, the chamber carried out a survey to a selection of its members on important areas, one being sustainability and environment. This survey does not involve start-ups in particular, but it proved a general picture on the awareness of sustainability and necessary actions taken by the business community. 145 businesses responded and figure 1 below shows the response on "implementation of environmental audit scheme".

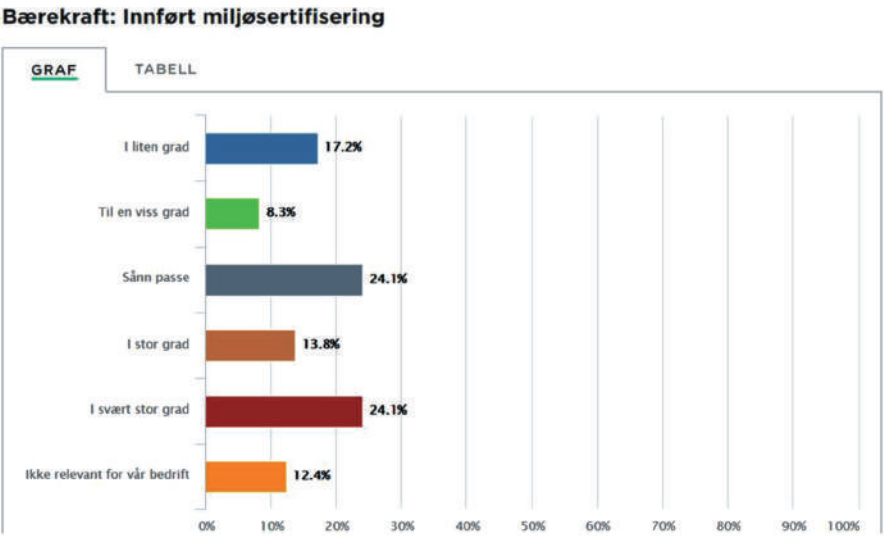


Figure 1 - Sustainability: Business has implemented environmental audit scheme

Close to 50% (gray, blue and green) responded that this has not been and issue and around 37% responded positively. Most critical is that 12.4% (orange) responded that this was not relevant for the business.

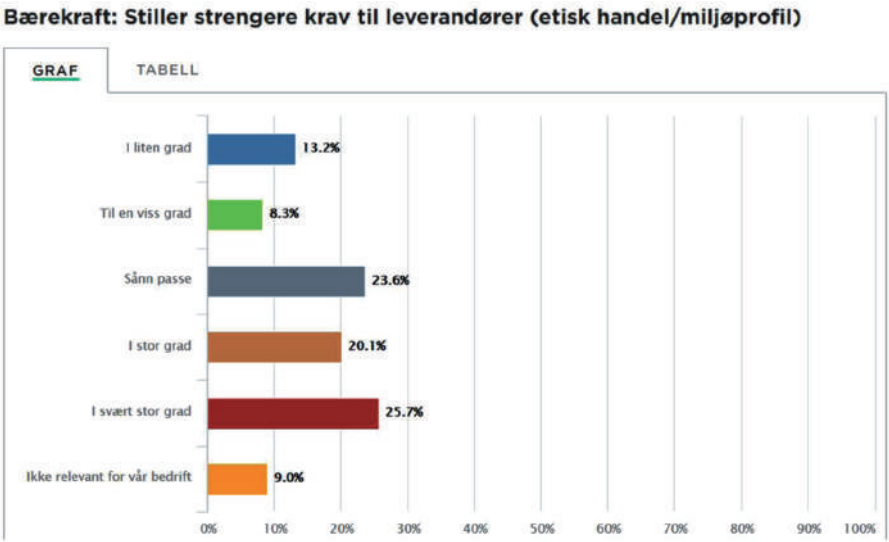


Figure 2 - Sustainability: Do you make demands for your suppliers on sustainability and environmental friendly performance?

45% (red and brown) of the responding businesses responded yes to a large degree. 13% responded that this is not a priority and 9% (orange) responded that this is not relevant at all. The importance of the sustainability goals from UN have made an impact on Norwegian businesses the latest year and many more have now put sustainability and green transition high on the agenda. But still there are some businesses that are lagging behind and not realizing the importance and the necessary actions that must be taken to sustain the competitiveness of their business.

2.5. Case studies of innovation in the territory

Electric Region Agder- policy innovation

The Agder region in Norway has around half of the country's surplus of renewable energy. This gives Agder a unique position in Europe and the world. The vision is a result of over 50 part-

ners from the public and private sector coming together to share a common goal for the region.

The goal of Electric Region Agder is to use our surplus of renewable energy to power our transportation sector, our industry, our machines, and everything else that currently runs on fossil fuels. To achieve this goal, we are building the infrastructure needed, and cooperating between sectors on projects such as: electric passenger boats, electric taxies, a fully electric harbor in Kristiansand and sustainable battery management.

Our secret ingredient is the close cooperation between businesses, the public sector, and funding agencies. Both the private and public sector understand the opportunities in the change to a zero-emission future. This close cooperation is key when developing new green businesses.

BATMAN – case from the processing industrial cluster – creating and capitalizing on a future value-chain

Today, creating a battery and an electric car requires materials to be extracted from the ground. Many of these materials are refined and processed in our region. Materials such as nickel produced at Glencore in Kristiansand. Norway has the highest number of electric cars per capita. This means that we will be the first country that has to recycle and reuse the batteries and material from these electric cars.

Aquasolis Global AS, start-up case from students

Aquasolis Global AS sells clean drinking water in Tanzania. The company was founded in 2017 and has several fountains where they sell their drinking water. This is operated with solar cells in a very energy efficient way, with a business model that functions well.

Agrosense AS. Start-up case

Agrosense AS works with analysis of topsoil in order to give farmers more information on how they can use their resources optimally. This gives a greater accuracy regarding how resources, for example, fertilizer and water, are used. This will help the

farmer to save where it is possible, also including the environment by reducing the amount of chemicals that are used.

3BL. Student start-up case

The student start-up company 3BL is based on all the UN's sustainability goals. In the summer of 2020, 3BL Group shall arrange a sustainability festival in Kristiansand. Through the festival they wish to show the different goals in different ways, but also to contribute with lectures and activities that contribute to inspire and increase the participants' knowledge.

Hentepant[17], start-up case

Hentepant aims at collecting your empty cans and bottles at your doorstep, ensuring that these bottles are being collected and returned to the deposit refund system. Quite a substantial part of the total purchased bottles and cans is being put into the ordinary waste or into the nature. With this method Hentepant can reduce this amount. At the same time you as a consumer can choose an organization/community based organization that will get a part of the refund from the bottles.

Air Products-CO_2 capture system- Corporate idea (Kristiansand)[18]

The ultimate way to capture carbon dioxide from flue gasses is with the use of membrane modules. Membrane technology is an attractive alternative for molecular separations because of its high energy efficiency (no phase change is required to achieve separation), reliability, modularity, and small footprint. Membrane Process Systems do not require any chemicals and neither do they need any regeneration steps. The market potential is enormous when including coal-fired power plants, process industry in addition to the cement industry, and will be substantially extended when including the marine area. Still in development.

17. www.hentepant.no/.
18. www.airproducts.no/products/co2/.

2.6. What will happen: forecasts and policies for the future

The period with an international economic upturn is assumed to have come to an end. With the prospect of an escalation and expansion of the conflict between the USA and China, we envisage an even weaker international economy going forward. This will mean weaker growth impulses for Norwegian export-oriented businesses. From 2020, higher interest rates and lower growth internationally will curb growth, and the Norwegian economy is expected to be almost cyclically neutral in the years leading up to 2022[19].

Norway's currency remains historically weak, the housing market has cooled off, concerns are rising about the future of the oil industry and investments are due to slow down. Norway's state statistics bureau SSB (Statistics Norway) thinks those trends will continue through next year, meaning that the country's long-running economic upturn is about to end.

The government now has put green economy and innovation at top of their agenda for the years to come. However, change demands better coordination between agencies, between municipalities and regions, between various administrative levels, and not least between the government ministries.

The responsibility for the transformation to green competitiveness must be clearly placed with the government. In the Agder region the regional competitive advantages in competence, skills and infrastructure (hydropower, processing industries, maritime and offshore engineering) might be turned into potential new business ideas and technologies in the growing ocean technologies for blue growth or new green methods or innovations in the processing industries. The building and construction industry has grown in recent years, but is facing tough competition from foreign based incumbents that seem more competitive currently. In Agder we have seen growth in the health and care sector in the city region and will most likely continue to see growth in parallel

19. www.ssb.no/nasjonalregnskap-og-konjunkturer/artikler-og-publikasjoner/oppturen-i-norsk-okonomi-snart-over.

with demographic changes in population. The steady growth rate in start-ups each year since the last ten years will probably continue especially in the transformation period that has already started but will be stronger in the years to come. A well functioning eco system for SME innovation is a pre-requisite for start-ups and scaling for growth companies and spin offs. Necessary skills and competencies will become a future challenge in order to remain competitive.

3. Regional and territorial situation of the green and blue economy – Piraeus, Greece*

3.1. The territorial economic framework

Piraeus is the most important port and the third-largest city in Greece after Athens and Thessaloniki with its own regional urban area. According to the 2011 official statistical data, the Municipality of Piraeus covers an area of 10.9 sq.km. and has a population of 163,688 inhabitants (which makes it the fifth largest municipality in the country after the implementation of the "Kallikratis" program).

The wider region of Piraeus constitutes the Regional Unit of Piraeus, which consists of five municipalities (Pireaus, Nikaia – St. Ioannis Rentis, Korydallos, Keratsini – Drapetsona and Perama), with a total population of 448,997 and an area of 50.4 sq.km. The center of Piraeus is about 10 kilometers from the center of Athens.

Piraeus is included in the Region of Attica, which generates almost 50% of Greece's GDP, while the per capita Gross Domestic Product of the Region amounts to € 22,784 (1st place in relation to the other Regions of Greece), while the country's average is at € 16,757.

Piraeus is an important industrial and commercial center of the country, making it Europe's largest passenger port, connecting the capital with the Aegean islands and an important destination for cruise ships in the Mediterranean.

* By Panagiotis Lybereas (*Headway Economic Consultants LTD*).

In 2019, Piraeus Port reached 5 million 20-foot container unloadings (TEUs), bringing Piraeus Port closer to first position in the Mediterranean and possibly among Europe's top 4 ports.

Business-related shipping companies are divided into 4 categories [17]:

- *Shipbuilding*, numbering 447 companies/192 in the Municipality of Piraeus.
- *Construction of Maritime Equipment*, numbering 77 companies/17 in Piraeus Municipality.
- *Supply of Maritime Equipment*, numbering 237 companies/148 in the Municipality of Piraeus.
- *Shipping Services*, numbering 577 companies/409 in the Municipality of Piraeus.

3.2. Policies for the green economy

The global economic crisis, rising commodity prices, the impact on the environment of independent growth, and the recognition that growth models based on increasing consumption of resources and emissions are not sustainable, have brought about the need for a more environmentally oriented economy. This reality has been generally titled as "Green Economy".

The Green Economy concept is a new economic model, whereby economic growth is not necessarily based on increasing environmental risks, depletion of resources and social inequalities. The United Nations has designated the "Green Economy" as an economy that leads to improved human well-being and social justice, while significantly reducing environmental risks and environmental deficiencies. The Green Economy aims at improving well-being, protecting the environment and social justice and can essentially be seen as a green, competitive, resource-efficient, low-carbon economy that will shield growth and jobs, create significant economic opportunities, improve productivity, reduce costs and boost competitiveness [1].

Europe is already on the road to a green economy. This road passes through the circular economy and teaches us to build on

the success of the eco-industries. Sectors such as waste treatment and recycling, water treatment and renewable energy sources have been among the most adaptable and rapidly growing sectors in recent years.

The European Commission's Green Deal [2,3,4] on Europe's climate, which aims at total carbon neutrality by 2050, will create new momentum in all areas. There will be a demand for innovation in product design and manufacture as we are forced to look for and develop a new generation of long-life products that can be reused, repaired, disassembled and their components reused. However, in order to achieve all this, standards are also needed. But there is a need for standards as well as legislation to adapt them to the new era.

In planning this transition to a green economy, the **Just Transition Fund** will have a key role since considerable resources and investment will be made available to support specific areas of the European Union, which will have greater exposure and cost towards Green Europe.

In the political, business and social debate agenda, the green economy has taken a leading role in recent years. However, a new debate has begun within the European Union about the prospects the sea has for the European and global economy in terms of sustainable development. More and more often we will also come across the term Blue Economy (or even Green Economy 2.0). This definition covers a wide range of economic sectors that revolve around the sea. Specifically, Blue Economy covers the following sectors of economic activity:

- Ship transportation & construction.
- Tourism.
- Energy & Raw Materials.
- Fishing.
- Marine Ecosystem.

As the latest developments show, Blue Economy is the next big bet for Greek businesses, especially for the Piraeus region, provided it can be the focal point for the transformation of the Greek economy into a more export-oriented and competitive one.

The impetus for the Green and Blue Economy calls for favorable conditions through the adoption of relevant legislation, policy development in the various sub-sectors, and incentives for businesses, industries and the general public. The aim is to move from an economy based exclusively on the use and depletion of resources and the destruction of the environment, towards a green, competitive economy with resource efficient and low carbon emissions.

The main parameters promoted through the various environmental policies include:

- investing in crucial natural resources;
- incentives to increase resource efficiency, increase productivity, reduce waste and energy consumption, and allocate available resources according to their value;
- promoting market and regulatory measures, such as environmental taxes, removing harmful subsidies, mobilizing public and private funding, investing in green jobs, and supporting green innovative technologies;
- opportunities for innovation through policies that enable new ways of tackling environmental problems;
- creating new markets by stimulating demand for green technologies, goods and services by generating new employment opportunities, and
- improving governance and encouraging private sector involvement.

In Piraeus, the new leadership of Piraeus Port Authority-COSCO plans to make Piraeus Port a "Green" port. It is reportedly planning to develop a ship's **electricity supply** system with the aim of producing zero-emission pollutants while in port. This is a particularly important project as its implementation will be added to the list of social activities of the Authority, while integrating Piraeus into the list of European ports promoting **"green" forms of energy**.

Piraeus is a highly developed and highly productive maritime economy cluster with global interconnections, the center of one

of the most important maritime forces in the world. Proximity to the country's largest urban center offers additional economic interconnections, in addition to commercial advantages, in order to become a maritime economy cluster. Given that the economic crisis has questioned the country's development potential, the conditions for adopting an integrated strategy that will exploit the potential benefits of Piraeus have matured, taking advantage of the corresponding EU policies.

3.3. National and regional/territorial policies to support green and blue start-ups and jobs

Reports on supporting new businesses in the green and blue economy appear in all national, regional and local policy documents, such as:

National Strategic Reference Framework

... The dynamics and opportunities arising from maritime activities are of strategic importance to the overall Greek economy.

... The adoption of the Blue Growth Strategy is a means of enhancing the competitiveness and extroversion of businesses (especially SMEs) and the transition to quality entrepreneurship leading to innovation.

National Research and Innovation Strategy for Smart Specialization 2014-2020 [14]

The National Strategy includes research infrastructures in the field of Environment and Sustainability, as follows:

- the development of offshore, coastal areas and water resources monitoring systems. The completion of a wide range of blue growth activities supporting the development of offshore, coastal areas, water resources but at the same time the sustainable exploitation of marine biological resources in the eastern Mediterranean. At the same time, given the strategic importance of maritime research for Greece, it also includes a prepar-

atory study for the construction of a modern, well-equipped oceanographic research vessel in accordance with international practices and standards related to oceanography;
- the "integration" of hitherto fragmented research infrastructures in the field of Geosciences, Seismic Engineering and Earthquake Protection into a distributed research infrastructure of strategic importance for Greece and Europe;
- the development of a system for monitoring atmospheric composition, changes in solar radiation, climate change and related natural hazards by integrating all existing terrestrial networks into a single research infrastructure. At the same time, the possibilities of creating a national aircraft platform are being explored, which will be used for collecting data for the observation and prediction of air pollution as well as other vital issues such as remote sensing in agriculture, fishing, coastal erosion, monitoring of marine and coastal data pollution, research, natural disasters, etc.;
- optimum waste management and utilization, which responds to the need to respect the country's environmental protection commitments, as well as the significant prospects for enhancing entrepreneurship in this area;
- the protection of biodiversity of terrestrial ecosystems and cross-sectoral plant protection, which contributes to the further development of the strategic sector of agri-food and the exploitation of high value-added domestic products.

National Strategy for the Cyclical Economy – December 2018/ Ministry of Environment & Energy [22]

The National Strategy covers the following areas:

- **Sustainable Resource Management**, with key goals to increase their efficiency, re-evaluate value chains, rationalize waste management, reuse buildings and reuse water or collect rainwater and spring water.
- **Enhancing Circular Entrepreneurship** by encouraging the idea of eco-design, long-life product development, repair, renovation, re-use, refurbishment, promotion of industrial co-exist-

ence (clusters, innovation parks, business incubators, exchange platforms, exchange platforms), promoting innovative entrepreneurship models (e.g. sharing economy), supporting the organic economy, promoting green and circular public procurement, supporting use efterogenon materials.

- **Circular Consumption**, fully informing citizens, utilizing the Eco-label and other incentives, with education and setting goals with regards to sustainable food consumption (prevention of waste, urban cultivation), prevention of excessive use of resources (food-beverages, clothing, packaging), prevention of waste generation through preparation for reuse, repair and recycling, control of retail e-commerce, and ultimately promotion of use services instead of product supply.

Attica Regional Operational Program

... the Operational Programme's objectives include improving cruise infrastructure for the development of "home-porting" and upgrading the cruise service, the overall upgrading of the role of Piraeus to the European port system, improving the competitiveness of cruise tourism at national level...

Smart Specialization Strategy for Attica Region

... the Strategy aims to foster innovative activity in three areas of specialization, including the Blue Economy, which are privileged and with significant opportunities for Attica... the existence of an informal maritime cluster...

Blue Economy and Blue Growth activities are promoted through a series of actions and interventions included in national, regional and local strategy papers.

New Regulatory Plan of Athens – Attica

... Piraeus recognized as pole of International and National Range as well as a fundamental unit of Development Pole Athens-Piraeus... Piraeus is the most important maritime country portal... importance given to "coupling" of Athens and Piraeus centers and the emergence of their centrality...

Integrated Urban Intervention Plan (SOAP) of the Municipality of Piraeus

... The central objective (vision) of the SOAP is to develop the city as a business (maritime, commercial) and tourist metropolitan center of international recognition and scope, but at the same time it also includes social, urban and environmental goals while contributing to its core development city...

Integrated Spatial Investment of Piraeus Municipality

... The strategic goal is to change the city's image and to make Piraeus a Business, Tourist, Cultural, Maritime and Commercial Destination of International Recognition and Scope, with Environmental and Social Value Added for Visitors, Workers and...

Blue Growth [16]

In the framework of the Europe 2020 Strategy, the European Commission's Cohesion Policy, the Adriatic and Ionian Sea Macro-Regional Strategy and the 2014-2020 National Strategic Reference Framework, the Municipality of Piraeus has implemented the "Blue-Growth Initiative" (more information at www.bluegrowth.gr/). It is an innovation competition for the Blue Economy organized annually by the Municipality of Piraeus. It was first implemented in 2014 and the purpose of this competition is to highlight and support the creation of new businesses. To date, the initiative has contributed to the creation of new jobs and businesses, encouraged entrepreneurship and promoted innovative business ideas related to the Blue Economy and the values of sustainable entrepreneurship, thereby helping to improve business culture through the 'BlueGrowth Initiative' benefits and enhancement of business. The basic principle of the Initiative is that the business approach must incorporate three dimensions into a company's performance: Social, Environmental and Financial. This approach is different from the traditional profit-oriented business approach, as it also has a positive social and environmental impact. Based on the successful results, the Initiative was awarded in May 2017 the distinction "URBACT Best Practice". The city of Piraeus seeks to share practices and experiences from the implementation of

the Initiative and to share knowledge with other European cities dealing with Innovation and the Blue Economy.

The Blue Growth program is a key factor in the development of Piraeus, the wider region, and the Country as a whole. The Blue Growth Strategy focuses on the following objectives:

1. develop the framework and the means to facilitate the effective co-operation of stakeholders at different levels of planning and decision-making;
2. promoting knowledge and skills of human resources for the development of the Blue Economy;
3. promote blue entrepreneurship and enhance research, development and innovation in Blue Economy activities;
4. improve (spatial) planning and infrastructures that support sustainable and smart development;
5. the emergence of Piraeus as a hub of information and dissemination of knowledge and information on issues of innovative blue business and Blue Growth.

The time frame of the Plan covers activities until 2024. Specific indicators are provided for monitoring the action plan. Details on the Five **(5) Priorities Axes of the Piraeus Municipal Development Strategy** are further broken down into Measures and Actions and are presented in the following section.

3.4. Voices from the territory regarding green and blue start-ups

3.4.1. *Local Institutions*

- **Municipality of Piraeus**

As mentioned above, the Municipality of Piraeus plays a pivotal role in all actions related to the development of entrepreneurship and support of the green and blue economy in the region. Its actions through BlueGrowth, the implementation of its local programmes, and generally planning for the next programming period include at the heart of the policy, entrepreneurship support actions in the green and blue economy. It should also be empha-

sized that the Municipality of Piraeus has established important cooperation relations with local entrepreneurship and innovation organisations in the region, which are described below.

- **Piraeus Port Authority**

The Piraeus Port Authority SA provides high quality and efficient port services and contributes to the local and national economy by achieving sustainable development. It provides a link between the islands and the mainland and with the ongoing investment program aims to establish itself as the most important Center for Transit, Logistics, Cruise, Container and Vehicles in the Eastern Mediterranean.

- **University of Piraeus**

The University of Piraeus was founded as a "School of Industrial Studies" in 1938 by the Association of Industrialists and Craftsmen, in accordance with Law 5197/1931 and A.N. 28/1936, which in collaboration with the Hellenic Association of Societies of Greece laid the foundation for the economic, legal and technical education of industry executives. Today, it is one of the most important educational institutions in Greece and includes the following schools:

– School of Economics, Business and International Studies
– School of Shipping and Industry
– School of Finance and Statistics
– School of Information and Communication Technologies

- **Pireaus Chamber of Commerce and Industry**

The Chamber acts as the Legislative Counsel of the respective government on commerce, industry and the economy "in general" while at the same time being a strong institution of substantial support to the entrepreneurship of its area, after advising, informing, representing. The Chamber has considerable action in support of entrepreneurship in the region and is a founding member of the cluster of shipping companies (maritime hellas) which aims at systematic and coordinated projection of the Greek Maritime Cluster.

- **Hellenic Chamber of Shipping**

Established in 1936, the Hellenic Chamber of Shipping is a legal entity incorporated under Public Law (governmental organisation) based in Piraeus. The Chamber is the official Advisor to the government on all shipping matters. It carries out its work in close co-operation with, and under the supervision of, the Ministry of Merchant Marine. Members are all vessels under the Greek flag. The major functions of the Chamber include:

- offering opinion on draft legislation proposed by the Ministry of Merchant Marine or other government departments;
- carrying out research and studies on shipping related matters;
- following developments in international maritime legislation;
- offering expert advice on specialised shipping issues;
- proposing measures for the protection and welfare of seafarers;
- attending meetings of international shipping organisations;
- monitoring all legal and technical developments in the shipping field;
- conducting arbitration on maritime disputes.

- **Piraeus Trade Association**

The Piraeus Trade Association is one of the oldest commercial associations in the country, according to its founding statute dated February 14, 1900. It is a legal entity under private law, i.e. a free trade union, governed by the provisions of Law 1712/87 "Professional organizations of traders, craftsmen etc.".

The initiatives of the Association include specific proposals for the upgrading of the city and are aimed at enhancing Piraeus' cultural and social life, along with its economic activity, according to its history and geographical location.

3.4.2. *Business associations or research centers and business support*

- **Blue Lab of Piraeus Municipality**

Blue Lab is the first center to promote and support business innovation exclusively for Blue Growth in Greece. This is a flag-

ship initiative of the Municipality of Piraeus that aims to be a springboard for the development of new business forms, ideas and products using state-of-the-art technology, always in line with the Blue Economy.

It is a modern and technologically advanced physical space that welcomes young people who want to develop technological and entrepreneurial skills, nurturing, through a range of services, the spirit of innovation and entrepreneurship.

In the "blue workshop" of Piraeus Municipality, young people have the opportunity to be fully supported to implement business ideas, to get to know, train and experiment on mainstream technologies such as 3D printing and microelectronics, and to learn about the modern trends of blue growth as they are shaped today.

At the same time, and through a series of parallel activities such as workshops, seminars, presentations, events, etc., the center creates a dynamic communication channel between market and business groups, with the ultimate goal of sharing know-how, good practices and creating opportunities, providing funding, as well as partnerships.

Market-based individuals support participants through a range of center-specific consulting tools tailored to each group's needs, recognizing the uniqueness of each participant and each idea. At the same time, the Blue Lab team closely monitors market and industry developments and ensures that the Lab is always at the center of developments.

Blue Lab aims to be a reference point at both national and European level for the production and development of blue products that shape market trends, promote sustainability and foster growth.

The Blue Lab services are free and companies that have already participated have focused on thematics of the Blue Economy, such as:

- maritime transport;
- shipbuilding activity;
- coastal tourism and cruise tourism;
- blue biotechnology;

- desalination;
- extraction of aggregates;
- fisheries and aquaculture;
- renewable energy sources;
- exploitation of oil and gas fields.

3.4.3. *Innovative companies or start-ups*

The Competition of the Piraeus Blue Growth has actively supported a number of start-ups in recent years. Here are some typical examples of some dynamic companies that stood out for their innovative ideas.

- **PHEE**

PHEE is the first company in the world to use the dead leaves of Posidonia Oceanica as its primary raw material. Seaweed is a part of nature that remains unused. At PHEE, through an innovation developed in Greece, a new raw material is restored to natural balance, promoting the principles of "green" entrepreneurship and the upcycling of natural resources.

PHEE is constantly striving to create products that will not only be competitive in the market but also have a positive impact on the planet's ecosystem. The company works with the competent authorities, leading industries and its customers to ensure that eco-friendly materials regain their reputation and consumer confidence.

- **Enaleia (school for fishermen)**

Enaleia is a social enterprise aiming to make the marine ecosystem sustainable. We created the first professional fishing school in Greece at 2016. The aim was not just to train young people into the fishing sector, create new jobs and make sure that the professional fishing will survive in the future but, at the same time, to provide a high-quality, eco-friendly and ethical education. We teach fishermen how to earn more money, while catching less fish, making sure that the fish stocks stay in a healthy levels.

They also train, empower and motivate old & new fishermen to collect plastic from the sea in a more effective and efficient way than the ones being implemented now. It is a system-based solution, where we want to create motivation for the fishermen to catch less fish and more plastic, so as to enjoy long term benefits in their work. They focus not only on ocean waste cleanups, but on ocean waste management as well (recycling & upcycling). That means that they collaborate with companies and organizations to find ways to utilize this marine litter/plastic at the maximum level possible.

The UN Environment Program selected Enaleia among the Top 5 best initiatives in Europe for 2019 for its positive impact on the environment.

- **SatShipAI**

Consistent maritime surveillance for detecting illegal activities in the oceans remains an open problem: piracy, smuggling, pollution, and illegal fishing are only some of the activities involving rogue vessels that are taking place every day in the vast open seas. The Automatic Identification System (AIS) mainly used for maritime surveillance, beyond its range limitation, is a co-operative system; hence, rogue actors can always switch off their onboard AIS transponder, or even spoof it, thus becoming "dark" ships.

Utilizing state of the art Artificial Intelligence tools and techniques, SatShipAI provides ship information like type classification and size estimation from wide-range satellite imaging, starting from the open & freely available Sentinel-1 data. Such functionality is missing from existing systems, and it can be used to enhance & complement the maritime surveillance capabilities currently provided by AIS and similar solutions.

So, if you are after illegal fishing vessels, smuggling cargo ships, or tankers violating sanctions & embargoes, SatShipAI offers a complementary tool for detecting & tracking your targets in wide-range satellite imaging, operating on data for which no additional acquisition cost is required.

- **Openichnos**

Openichnos, focusing on the integration of IoT management, introduces "The Connected Yacht" approach. Openichnos can now apply features and a group of sensors connected with the tracking device, aiming at providing a full monitoring solution. The adoption of sensors which can provide information about battery, fuel and weather conditions is of great interest in all aspects of transportation sector. Moreover, the company can provide an extension specifically for the niche market, adopting underwater sensors which can detect collisions and can be a valuable information in case of damage disputes.

3.5. Case studies of innovation in the teritory

The key innovation tool for the Piraeus region is the implementation of the BlueGrowth practical competition. The program is in full swing and forms part of the Piraeus Blue Economy Strategy, which is a comprehensive framework of actions that cover all aspects of developing structures and services to support the blue economy in the region.

At the same time, the Municipality of Piraeus actively supports the development of the green and blue economy through the implementation of research/innovative projects, such as:

- **Pop-Machina**

Pop-Machina aims to promote the dynamics and capabilities of the makers' movement and collaborative production for the circular economy within the European Union. The project draws on a range of cutting-edge technologies (factories of the future, blockchain) and industries (urban planning, architecture) to provide the necessary support and help to overcome scaling problems, a typical disadvantage of collaborative production, to identify the areas most in need of substantial intervention and remodel potentially needed but currently unused spaces. Develop an ambitious networking program for members of the maker community, motivate and stimulate events and meetings of manufac-

turers, existing and new creator communities in all municipalities involved.

In each pilot area (such as the Municipality of Piraeus), business-centric/collaborative production processes will be demonstrated, with the main focus on producing feasible and sustainable products from secondary raw materials or other sustainable inputs, based on the needs and preferences of local actors.

- **proGIreg**

The proGIreg – productive Green Infrastructure project for post-industrial urban regeneration is being implemented under the Horizon 2020 program. The main objective is to create four Living Labs in the cities of Dortmund, Turin, Zagreb and Ningbo in urban areas facing the challenge of meta-industrial regeneration. The Municipality of Piraeus as a city-follower will contribute to the design of pilot applications to ensure their feasibility in their local environment, while developing a strategic plan for the management of green areas within its administrative boundaries using solutions from Nature Based Solutions.

- **Green C Ports**

The project aims to develop digital tools and technologies that will be used in different European ports and serve as a basis for testing new technologies such as IoT, Big Data or prediction analysis using artificial intelligence models. For the port of Piraeus, various sensors, meteorological databases, optical imaging cameras and other equipment will be used to predict air quality and noise levels at a future date and time.

3.6. What will happen: forecasts and policies for the future

The future in Greece

Greece is one of the biggest proponents of the new EU Green Deal, and its national energy and climate strategy fully serves the new Green Deal and its central goal of making Europe the first climate-neutral continent by 2050.

The substantial investment required to achieve the flagship objective will be made under the **Sustainable Europe** Plan, which provides for the mobilization of **1 trillion euro over the next decade** through all available EU funding programs and leveraging private resources. Implementing the vision of the European Green Deal requires the full participation and active contribution of all Member States.

The Greek government has specified measures for energy and climate in the National Energy and Climate Plan, which has a time horizon of 2030 and in the Long-term Strategy for 2050. The Plan's central objective is **to reduce overall emissions of greenhouse gas by 2030 over 50% above 2005 levels. It is foreseen to be achieved** through:

1. the **lignification of the economy by 2028**, with all lignite units in operation by 2023;
2. **increasing the share of Renewable Energy Sources (RES) in the energy mix to 35% by 2030**, from about 18% today, which translates to over 60% of RES in electricity consumption;
3. **energy saving** so that final energy consumption in 2030 is lower than in 2017.

It is estimated that the implementation of the actions will stimulate public and private investment of **44 billion euros over** the next decade. At the heart of the investment activity are expected to be:

- the **new renewable energy projects**, not only wind and solar farms, but also new technologies, such as geothermal and offshore parks;
- development and **digitization of electricity transmission and distribution networks**;
- gas **infrastructure** (domestic networks, cross-border pipelines, storage infrastructure, terminals);
- actions to **improve energy efficiency**, especially in buildings and transport. For example, the goal that has been set is to **renovate more than 50,000 homes** by 2030. A significant share of **electricity** in transport;
- **waste** management and measures to promote the circular economy.

It is indicative that **only 60,000 permanent jobs could be created only by the development of RES and the implementation of energy upgrading activities**.

The new NSRF 2021-2027 is **one of the key tools to support investments** that are linked to the national energy and climate strategy.

In the proposals made by the RIS to finance its actions under the new NSRF, the largest sub-budget (**EUR 3.5 billion**) relates to **energy efficiency improvement actions**, which are central to the transition to a more rational development model regarding the use of energy resources.

The role of Piraeus

Piraeus is and will remain the center of the country's Blue Economy. Recent decades, both in Europe and internationally, have marked significant changes, mainly associated with the internationalization of economic activity and changes in the productive structure of developed economies. Despite significant changes in the global economy, the domestic recession, and changes in the sectors that are intertwined with the Blue Economy, Piraeus has proven to be resilient. It concentrates most of the economic and social activities pertaining to the Blue Economy and, as a result, is the host and accelerator of the changes brought about by technological progress and economic developments.

Moreover, the progress of Piraeus depends heavily on the ability of the city to face future challenges, to accept the change and adapt to new circumstances. Piraeus also needs to engage in networks to learn from the experiences of other cities, respond to the challenge of Europe, the technological boom and sustainable development and become a pole of attraction for capital and human resources.

At the same time, Piraeus should overcome the problems of climate change and environmental degradation brought on by the prolonged recession and the new era and should diversify and pursue its own path, seizing opportunities and reducing the risks of changing economies, technological and natural environment. Another area that is expected to be stressed in the near future

is **Waste Management**. The Municipality of Piraeus has already submitted a proposal regarding the procurement of bio-waste bins, waste bio-waste, as well as awareness raising and publicity actions within the framework of the NSRF 2014-2020.

In Piraeus, through the Municipality's Blue Growth Strategy, the foundations for establishing a sustainable and inclusive Blue Growth have been laid. In addition, it is important to mention the 5 pillars that form the basis for today's further development of entrepreneurship in the region:

Creation of Open Trade Centers in the Peripheral Municipalities of the Piraeus Region

The Piraeus Open Trade Center has already been successfully implemented and operates, as it contributes to stimulating the market of the city's shopping center, enhancing the competitiveness of Piraeus businesses, and re-establishing them as attractive destinations for shopping and entertainment, with the ultimate goal of helping them to cope with the adverse conditions of the prolonged economic crisis.

Creation of Maritime Business Cluster and Cluster Logistics

The Piraeus Port Industry presents particular structural problems that either do not allow its sub-sectors to perform with great potential, such as: container handling, Car Terminal, transit center and cruise, or they condemn others to a loss-making situation, such as shipyards and shipbuilding zone, coastal shipping and other branches.

The Chamber, taking a leading role, together with the Hellenic Chamber of Shipping and the Union of Greek Shipowners, launched in a systematic and coordinated manner, the initiative to create the first Maritime Cluster in Greece under the name **"MARITIME HELLAS"**.

In the first phase of this action, an electronic platform (www.maritimehellas.org/) has been designed and operates, which is an open invitation for the strong maritime community of the country to participate in the first Hellenic Maritime System, signaling the possibility to subscribe on a pan-Hellenic scale all businesses in the field of shipping.

Also, given that **Logistics** is the industry that will be one of the key drivers of our country's recovery in the short and medium term, the creation of a relevant Cluster can significantly increase the competition and export-orientation of Greek companies.

Business Service and Interconnection Centers in the Chamber of Commerce

The establishment of Business Service and Interconnection Centers is inextricably linked to the institutional mission of the Chamber, with the aim of strengthening a unified entrepreneurial service framework, with particular focus on developing of innovative ideas and supporting new corporate partnerships, that will start their operation in the wider area of Piraeus.

At the same time, the Centers will contribute to the implementation of policies to encourage the interconnection of Entrepreneurship with the academic community, as well as active interventions to enhance employment.

Actions to attract strategic investment in the Piraeus region

Examples of strategic investments for the Piraeus region may include:

- transit trade infrastructure (eg logistics centers etc.);
- tourism investments (hotel infrastructure, conference centers, etc.);
- business infrastructures (eg office buildings, etc.);
- the utilization of modern financing tools (Public-Private Partnerships, investment schemes, collateral & microfinance tools etc.).
- COSCO's development plan;
- Creating a Business Development Center;
- the creation of the "State of Innovation", a living cell of new ideas and applications that will contribute to economic and social development in the old factory of HROPEI;
- exploitation of Microlimano and the creation of a Municipal Port Fund.

Utilizing buildings and abandoned facilities in the Piraeus region for the development of entrepreneurship

Real Estate Development of the Municipality of Piraeus (The Municipality has about 150 properties and plots that could be utilized, e.g. Piraeus Tower, Ralliou Building, Villa Zachariou, HROPEI etc.). Tools to attract new investment from the municipal authority. It is proposed to set up a special Strategic Investment Maturity Committee with the involvement of local bodies such as the Chamber. Some actions have already been initiated, such as the Piraeus Tower (EBRD-Dimand-Prodea are temporary contractors) and the redevelopment of Agios Dionysios (Dimand and Grivalia).

The **financial crisis** has led to the closure of a large number of businesses, with the immediate consequence of the existence of a significant number of professional buildings that have remained unused in recent years. These spaces can be utilized to house businesses that can give a particular boost to the city's development, including:

- start-ups in cutting-edge areas, such as new technology;
- new level ups in strategic areas for Piraeus, such as shipping, transit and product assembly;
- social economy enterprises;
- enterprises in the field of Cultural & Creative Industries.

In collaboration with other **stakeholders in** the city, the Municipality of Piraeus with the Region can launch an incentive initiative to attract the above businesses to the city, turning it into a Center for Business Innovation and Innovation.

Local government can play a central role in halting the restructuring of productive tissue and reversing the current situation, utilizing the existing infrastructure from Lavrio to Elefsina, focusing on Piraeus and Perama. Investments in globalization need to be exploited to the benefit of local society and entrepreneurship, turning the potential of "globalization" into "localization". The Municipality of Piraeus, in close cooperation with the local authorities, aims to substantially redevelop the area and support innovation and entrepreneurship with a focus on green and blue economy.

4. Regional and territorial situation of the green and blue economy – Westpomeranian Region, Poland*

This document has been prepared at the request of the Westpomeranian Region and it constitutes a part of the GREen Start-up Support" project, which in turn is a part of the European Territorial Cooperation Programme – Interreg Europe 2014-2020, with the participation of the European Regional Development Fund.

The data contained in the document comes mainly from the collections of public statistics (the Statistical Office in Szczecin and the Central Statistical Office), studies published by scientific institutions, universities, self-government organisations and associations, commercial reports made available by marketing and consulting agencies, as well as articles and studies published by specialist portals and publications dealing with innovations, start-ups and issues of "green economy".

4.1. The territorial economic framework

Geography and administration

Westpomeranian Region is located in the north-western part of Poland, on the Baltic Sea coast. It borders on Germany in the west, Wielkopolskie and Lubuskie Regions in the

* By Adam Ustrzycki (*Pretender Research Corporation Ltd*). Quality control by Marta Ciesielska and Aleksandra Filipczak (*Westpomeranian region*).

south and Pomorskie Region in the east. The northern border of the Region is the determined by the coastline of Pomorska Bay and the further part of the Baltic Sea – the length of this border is **185 km**.

Westpomeranian is the **5th** Region in the country in terms of area, occupying the area of **22,9 thousand km^2** which is **7.3%** of the whole country. The population density is **74 people** per 1 km^2.

The region is divided into **21 districts**, of which **18** are **land districts,** and three are municipal districts (cities with the rights of districts). These are: Szczecin, Koszalin and Świnoujście. The Region comprises **114 communes**: **52 rural communes**, **51 urban-rural communes** and **11 urban communes**.

Demography

The population as of June 30, 2019 amounted to **1.698 million people**, of which **51.3%** were **women**, and **48.7% men** (**105** women per **100** men). The population density is **74 inhabitants** per km^2 on average, but it varies considerably between districts. This is due to the fact that most people (almost **25%** of the Region's inhabitants) live in Szczecin, and about **7%** in Koszalin.

Employment and earnings

60.8% of the population of Westpomeranian Region is in productive age, **17.3%** in pre-productive age and **11.9%** in post-productive age.

The number of professionally active people in the third quarter of 2019 was **726 thousand.** The number of registered unemployed (as of November 2019) is **40.8 thousand**, and the unemployment rate for the whole Region is **6.6%**.

There are **231.3 thousand** registered business entities and the average gross monthly remuneration in the enterprises sector in November 2019 amounted to PLN **4 746** (compared to **5 229** for the whole Poland).

The most attractive earnings can be expected by residents of larger cities, the average gross salary of residents of Szczecin is **PLN 5 329** gross, which ranks in **23rd position** on the list of

cities with the highest average earnings. The inhabitants of Police have no reason to complain either, since the average salary there is PLN **4 908**.

Szczecin – Capital of the Region

The capital of the Region, **Szczecin**, is the largest city in Westpomeranian Region, one of the most important economic centres in the north of the country. At the same time, it is the **third** largest city in Poland by area, occupying **301 km^2**, and **the seventh** largest city in Poland by population of **403.9 thousand** (data as of the end of 2019).

There are **70.9 thousand** business entities located in Szczecin, which constitutes **30.6%** of all entities in the Region.

The city is a cultural and academic centre of north-western Poland and is characterised by a high quality of life.

Transport

The Westpomeranian Region fosters transit transport, considering its border-zone location, at the junction of international north-south routes (from Scandinavia to Southern Europe) and east-west routes (from Western Europe to Baltic countries, and farther to Asia). The principal transport structure in the region is formed by roads and infrastructure covered by international agreements and initiatives, which are of major importance to international transport.

On the one hand, the Westpomeranian Region is located at the longest distance from the Capital City of Poland, and its central and eastern areas are characterised by the weakest access to major Polish cities. On the other hand, the border-zone location, together with the access to the European motorways network and maritime transport, provides convenient connections to Western European countries, placing West Pomerania in the national lead. The geographic location, the spatial development of the settlement network, and the seasonally intensive inflow of tourists pose significant challenges for infrastructure development and transport organisation. Socio-economic analyses reveal that the highest development, both in population and economic terms, occurs in

big cities (in Poland Warsaw being in the lead) and in the neighbouring areas with the most convenient access to these cities (making it easy to commute to work). Poland is no exception in this respect. Good access to the human and economic potential concentration centres is one of the prerequisites to development, which automatically puts peripheral regions in an inferior position.

The location in relation to other areas, along with the condition, quality and class of individual transport infrastructure aspects, proves crucial to the regional transport accessibility. The distant location of the Westpomeranian Region from the centre of Poland, and in particular from Warsaw, and the insufficient condition of transport infrastructure, result in its generally limited national accessibility. This particularly concerns Świnoujście – the district town with the longest distance to Warsaw, and with no permanent Świna river crossing. However, despite its peripheral location in relation to the centre of Poland, West Pomerania is one of the most accessible Polish regions as regards European locations, given the Polish-German border, and access to the Western European network of motorways and railway routes. The shortest Polish ferry connection across the Baltic Sea also offers the best access to Scandinavia. It is also worth noting that the Szczecin Seaport is the only Polish port forming part of the Trans-European Transport Network (TEN-T). Another major issue connected with the geographic location of the region refers to access to the entire coastal belt, coastlines of internal waters, as well as small ports and marinas, in the context of tourist traffic which is subject to significant seasonal fluctuations. This concerns both the internal and external traffic, from the country and abroad (including mainly from Germany). Measurements of the daily traffic intensity on national and regional roads fail to reflect the actual intensity on the seaside roads in the summer season, which is when the existing road capacity deficiencies are exposed. With a view to improving the internal and external accessibility of the region, it appears essential to extend the expressway network, to construct ring-roads and to conduct modernisation works enabling speed increase on railway routes[1].

1. The draft version of the Spatial Development Plan of the Westpomeranian Region, March 2017.

The location of Szczecin and its metropolitan area contributes to their accessibility in freight and passenger traffic from external markets, while posing a significant barrier as regards the national transport system. The biggest seven towns and cities in the region (i.e. Szczecin, Koszalin, Stargard Szczeciński, Kołobrzeg, Świnoujście, Szczecinek and Wałcz) are located close to the regional border, which makes access to central Westpomeranian localities significantly limited. Cities located in the neighbouring regions (Gorzów Wielkopolski, Słupsk and Piła) exert an influence on the border-zone areas. Seven major urban centres cannot be accessed in road traffic within one hour from the central and south-western localities in the region. In fact, the limited-access area covers as much as 30% of the region and around 12% of its population. Infrastructure investments are intended to reduce the development disproportions between two large urban centres – Szczecin and Koszalin. The outermost locations of the major urban centres, i.e. Szczecin, the Szczecin Metropolitan Area, Koszalin, Kołobrzeg and Białogard, give rise to numerous expectations and needs connected with providing better transport connections between them.

The situation within the Berlin metropolitan impact zone is also crucial to the condition and development prospects of the regional transport system.

The Westpomeranian Region accounts for approximately 70% of the entire inland freight transport in Poland, corresponding to over 6,000,000 tonnes of cargo. If this means of transport enjoys a growing popularity, the demand may soar to 12,000,000-14,000,000 tonnes. The rich water resources of the Westpomeranian Region, along with the opportunities flowing from their efficient management, constitute major aspects of the socio-economic development policy in the region. The Oder Waterway forms part of the Central European Transport Corridor connecting Scandinavia and South European countries. The Oder – Havel and Oder – Spree canals connect Poland to Eastern Germany, and farther to Western Europe.

The increase and strengthening of the shipping transport, and the modernisation of the Oder Waterway infrastructure are likely to foster the successive development of this means of transport in Poland.

Recognising the opportunity flowing from transport development, the Westpomeranian Region pursues cooperation within the Central European Transport Corridor European Grouping of Territorial Cooperation Limited Liability (CETC-EGTC Ltd) and the Association of Polish Regions of the Baltic-Adriatic Corridor.

The Goleniów airport is the principal Westpomeranian airport, with two smaller ones being located in Zegrze Pomorskie and Szczecin-Dąbie. A separate group of airports is formed by former military airfields in Chojna, Kluczewo, Bagicz and Borne Sulinowo.

West Pomerania is characterised by a relatively high demographic road density, reaching 7.8 km/1,000 inhabitants. This figure results from the specific land use patterns prevailing in the region, and also from the vast forest and water areas, and a limited population density outside the major urban centres. In terms of the total length of public roads, the Westpomeranian Region is rated 12th in the country, and in terms of the road network density – 16th (86.0 km/100km^2). The total length of national roads in the Westpomeranian Region is 1,145.7 km (along with streets located in the stretches of national roads within the administrative borders of towns with district rights), including 139.5 km of expressways and 21.6 km of motorways. The total length of regional roads is 2,109.3 km. Most of these roads, similar to district and commune roads, require modernisation and reconstruction due to their poor surface conditions and technical parameters. Negligence resulting from the insufficient funds on repair works, and on the construction of ring-roads and collision-free cross-roads along the high-traffic routes, has resulted in bottom necks within the road network. These have a material impact on both the accessibility and attractiveness of economic, administrative and tourist centres, as well as seaports in the region[2].

The burden resulting from the Westpomeranian traffic and transport network is diversified in the regional scale. In recent years, the highest burden in road transport has been recorded in the following sections: Goleniów-Szczecin (10,950 vehicles/day),

2. http://eregion.wzp.pl/.

Szczecin-Stargard Szczeciński (10,168 vehicles/day), Szczecin-Lubieszyn (7,735 vehicles/day), Szczecin-Gorzów Wielkopolski (7,552 vehicles/day), Świnoujście-Goleniów (6,250 vehicles/day), and Szczecin-Koszalin (5,926 vehicles/day), with the share of heavy-duty vehicles amounting to 13.5%.

The road burden in the Westpomeranian Region is mainly of an external character, resulting from cross-border traffic which has recorded an increase each year since 1990. Additionally, in the peak tourist season around 8,000,000-9,000,000 vehicles enter the Westpomeranian roads leading to seaside resorts, located both along the Baltic coastline and in the Pomerania Lakeland.

Railway transport has shown a downward trend in the previous decade. In recent years railway transport in the Westpomeranian Region has carried 17,500,000-18,500,000 passengers. The volume of railway freight transport in the Westpomeranian Region has reached 6,000,000 tonnes of internal shipments and 21,700,000 tonnes of external ones, including direct imports and exports. The amount of cargo transported through railway border crossings has reached approximately 800,000 tonnes and 316,000 tonnes, respectively, and in transit without transhipment 392,000 tonnes.

The Westpomeranian Region has:

- two seaports of crucial importance to the national economy: Szczecin and Świnoujście;
- two seaports of regional significance: Police (with the annual transport volume of 2,000,000 tonnes), Kołobrzeg and Darłowo;
- ten small ports: Dziwnów, Kamień Pomorski, Mrzeżyno, Nowe Warpno, Stepnica, Trzebież, Wolin, Dźwirzyno, Wapnica, Lubin, and
- eight marinas: Chłopy, Dąbki, Jarosławiec, Unieście, Ustronie Morskie, Rewal, Międzyzdroje and Niechorze.

The Szczecin, Świnoujście and Police seaports have mainly developed their transport, distribution and logistic functions, and in terms of transhipment volumes, they are among the leading seaports in Poland. Other ports and marinas perform mainly tourist and fishing functions. The Świnoujście seaport features the first Polish liquid natural gas (LNG) terminal.

In recent years the volume of transhipments recorded in the regional seaports reached 22.14 million tonnes, including 13.7 million tonnes (i.e. 61.9%) in the Szczecin seaport (together with Police and Stępnica), 8.3 million tonnes (i.e. 37.5%) in the Świnoujście seaport, 0.13 million tonnes (i.e. 0.6%) in the Kołobrzeg seaport, and 0.0013 million tonnes in the Darłowo seaport.

In relations with Polish ports, the volume of shipments has reached approximately 7.6 million tonnes per year, 4.8 million tonnes (i.e. 72.7%) of which is attributed to outgoing shipments, and 1.8 million tonnes (i.e. 27.3%) to incoming ones. This implies that the volume of outgoing shipments is 2.5-times higher than the incoming ones.

In the light of data concerning total shipments in various transport sectors, it appears that combined transport is of marginal significance, its volume being estimated at only 12 thousand tonnes. However, it is estimated that these shipments may increase by over twenty times by 2019.

Since tourism forms a very important economic area in the region, tourist infrastructure, including hotels, vacation centres, etc., plays a vital role. In total, there are 1,299 accommodation facilities in the region offering 10 places or more. Moreover, various seaside resorts offer accommodation in smaller facilities and apartments intended for tourist rental. The largest group of tourists using the accommodation base in West Pomerania is formed by Poles, although foreign tourists, including mainly from Germany, as well as Denmark and Sweden, are also frequent visitors in the region.

In the context of business infrastructure, office space performs a major role in economic space integration, and the size of the office property market acts as a certain indicator of the business tendency climate, both in the city and region. The office sector is currently developing in many smaller regional cities, such as Szczecin, as well as Lublin, Gliwice or Częstochowa[3].

Important indicators of the office market include the total office area in the city, as well as office area in various (facility standard)

3. Report: Polish office market, 2017 issue. Investments, Architecture, Products. Portal e-biurowce.pl. KRN media, Kraków 2017, p. 98.

classes, and rates for facility rental. The office area in the region has been on the rise in recent years, mainly due to new investments in office buildings in Szczecin. This trend, however, is not as intensive as in other Westpomeranian cities.

Analyses concerning the office market in Polish cities (Kraków, Wrocław, Trójmiasto, Katowice, Poznań, Łódź, Szczecin and Lublin) reveal that the highest vacancy rate of office area, as of 2016, was recorded in Szczecin – 14.7% (and the lowest in Łódź – 6.2%). This results, *inter alia*, from the intensive making up for investment arrears in the context of office space. Only a few years ago, Szczecin had the smallest office area as compared to other analysed cities.

The demand for office space is shaped mainly by enterprises operating in the field of modern business services. Szczecin currently forms one of the major office markets in Poland. In 2016 the supply of office space in the city reached approximately 156,150 square metres, with around 18,300 square metres of offices being still under construction. In 2016 the Storrady Park Offices complex was commissioned for use in Szczecin. This investment comprises three office, commercial and service buildings, the total usable floor of which amounts to approximately 10,000 square metres. Space in this office complex is currently rented by ICT enterprises. The construction of Szczecin Business Plaza, an office and service centre, has also been recently launched in the capital city of West Pomerania. Once completed, the centre will offer 11,100 square metres of usable floor space. Almost the whole space intended for rental as part of the first stage of the investment has already been reserved by future tenants. It covers 2 office buildings to be commissioned in Q3 2017, each comprising 1,500 square metres in total. Two other facilities are planned to be commissioned as part of stage two[4].

There is currently a fairly large selection of modern office space in Szczecin, and the prices of newly erected facilities are relatively high, especially in the city centre. This fosters the activities of incu-

4. Report: Polish office market, 2017 issue. Investments, Architecture, Products. e-biurowce.pl web portal. KRN media, Kraków 2017, p. 98.

bators, accelerators and special economic zones, which offer, *inter alia*, preferential terms of office space rental.

Higher education and science

Higher education is an important element of regional development. The education of graduates increases the attractiveness of the region for investors, and thus the chances for creating new jobs. Higher education institutions and research and development units play an important role in the process of implementing smart specialisations in West Pomerania. As an element of the economic environment, companies are also able to provide modern technologies or innovative solutions according to market demand.

According to the assumptions of the Development Strategy for the Westpomeranian Region until 2030, one of the factors determining the dynamic development of the Region and reducing the development distance to more developed regions of the country is to ensure a high position of the main West Pomeranian universities on the academic map of the country, and in some areas to compete effectively with domestic and foreign scientific centres.

In 2019 the number of students at **23** higher education institutions in West Pomerania was **36 359** people and compared to 2018 the number of students at West Pomeranian universities decreased by **8,4%.**

There are many foreign students coming to Szczecin from abroad, mainly from Germany and Norway. Over 1400 students study here. This is important information for entrepreneurs looking for people fluent in speaking and writing more than two languages. Szczecin is a city that keeps developing for a long time and expands its educational offer which has a positive impact on the city's competitiveness as a centre of modern business services.

Business

Szczecin is one of the ten important centres of modern business services in Poland.

The city has a large investment potential, as evidenced by the increase in employment in the sector over the last three years,

which amounted to **47%.** Currently **43 service centres**, operating here employ **5 600** people, but forecasts indicate that in 2025 it may already be **10 000** employees (it should be noted at this point that the Szczecin labor market is characterised by lower operating costs compared to larger urban centres where service centres in Poland are developing).

Service centres from **11 countries** operate in Szczecin. Apart from Polish entities, the largest part of companies comes from the Nordic countries and Germany. It is worth emphasising that Szczecin is characterized by the highest share of companies from the Nordic countries in the employment structure of service centres in Poland. Entities from Denmark, Sweden, Norway or Finland employ almost **1/3** of the sector in the city (32%).

The biggest employer from the sector are **IT centres** employing **2.5 thousand** people in Szczecin, which means a **45%** share in the employment structure of the sector in the city (as many as 12 percentage points more than in the whole country). A noteworthy specialisation of Szczecin's IT centres is services for the automotive industry (Szczecin is a significant centre in Poland and Europe in terms of the number of companies that develop software for this industry). For companies investing in the city it is also important that Szczecin has a well developed network of hotels and conference centres.

Tourism

The maritime border of West Pomerania, central location in the area of the Pomerania Euroregion, direct border with Germany and close proximity to large agglomerations (Berlin, Copenhagen) and transit and waterways (the Oder River) means that Westpomeranian is an attractive region for tourists from Poland and abroad. This is primarily due to the wealth of nature in the form of beautiful, wide and sandy beaches with dunes and the surrounding Baltic Sea. Rivers, lakes, forests are a paradise for nature lovers, and the existing national and landscape parks and nature reserves in the region enable admiring various species of flora and fauna, which are often not seen in other areas.

Moreover, Westpomeranian has air and ferry connections to many European capitals. From Goleniów you can reach, among others: Warsaw, London, Oslo or Stockholm. From Świnoujście you can take the ferry to Ystad or Trelleborg.

A large number of water reservoirs create an opportunity to practise water tourism – sailing, windsurfing, kitesurfing or water skiing. Ideal conditions for the development of active tourism are created by green areas – forests and parks, through which bicycle, horse and hiking trails or Nordic walking routes run.

West Pomerania is also a unique health resort. Mud deposits, mild climate, brine – all this makes the Westpomeranian's health resorts (Świnoujście, Kamień Pomorski, Kołobrzeg, Połczyn Zdrój, Dąbki), a valuable element attracting patients.

The dense network of wellness & spa centres, characteristic for our region, is also of great importance, especially in the seaside belt.

It is impossible to ignore the cultural values of Westpomeranian Region. The greatest potential is concentrated around historical cities, co-created by defensive and sacred monuments and regional museums. Many of them have a separate, interesting character – their history, traditions and infrastructure. It is a material testimony to the rich history of the region, the result of the clash of West European, Polish and Scandinavian influences. In order to bring closer the history and traditions of the region, many so-called thematic villages were created. These are places situated in beautiful areas, stylized as old villages, whose creators are true passionate people. All this makes these places "vibrant with life", to which tourists are happy to return for both knowledge and entertainment. They are a valuable lesson in the history of West Pomerania, especially for the youngest tourists.

Economic profile

Westpomeranian Region is characterised by its good location in relation to European markets and the Baltic Sea countries. Szczecin (the largest city in the region) concentrates the highest values of the Region's economic potential and is an important transport junction for road and sea transport.

It is precisely the region's location that determines the character of the economy. Direct access to the Baltic Sea (through the port in Szczecin), the Szczecin metropolis and Koszalin-Kołobrzeg-Bialogard functional area with attractive investment areas, industrial processing concentrated in the zones of economic activity, a large number of farms producing organic food, rich, intensively used tourist resources, many spa advantages and a strongly developed accommodation base in the coastal zone – these are the factors conditioning the economic development of the region. In addition, the close vicinity of Germany (the distance between Szczecin and Berlin is only **130 km)** and Scandinavian countries.

The region was until recently associated mainly with the shipbuilding industry and agriculture, today it develops various sectors of the economy, especially those related to modern technologies. This is accompanied by high development potential and diversification of investment areas, often located along important communication routes, newly built expressways or in special areas designated and prepared for investors by local governments. The Region also makes increasingly better use of renewable energy sources, which can be observed through an increase in the number of wind or thermal power plants.

The main advantages of the Region are:

- exceptional location of the region, which gives an opportunity to use in economic activities a wide range of means of transport: water, rail, air and road (location at the crossroads of important international transport routes from North to South and from West to East);
- direct access to the sea and rich maritime traditions (shipbuilding, fishing, coastal tourism);
- location near the European Union's internal border with Germany and closeness to West European and Scandinavian markets;
- well designed industrial and port facilities;
- well-developed higher education and scientific base;
- dynamic development of institutions serving business;

- rapidly growing private sector, including the service sector;
- good ferry connections to Scandinavia and a developed road network and motorway connection to West Europe;
- accessibility for inland navigation – towards Lower Silesia and Berlin;
- large areas of forest and agricultural land – more than half of the Region's area is arable land, which gives opportunities for investment and development of the agricultural and food industry;
- high natural values for the development of tourism (Baltic Sea, Wałeckie and Drawa Lakelands);
- particular investment advantages for the development of tourism, mainly in the coastal zone of the Region and Drawskie and Wałeckie Lakelands;
- large possibilities of renewable energy production (energy crops, wind farms), which, combined with the development of tourism, makes Westpomeranian Region a symbol of sustainable development using modern technologies supporting regional economy.

Westpomeranian Region has been recognised in Poland for many years as a region where knowledge related to wind and biomass energy technologies is developing. The proximity of German regions, which are also dynamically developing their competences in this field, increases the possibilities of transferring the necessary knowledge. Interregional, intercollegiate and industrial cooperation may in the following years allow to start production of components and devices which will be placed on international markets. The starting point for such activities is to use the achievements of domestic companies and foreign investors in the field of design and production.

Industries *with high development opportunities*:

- Future Services (ICT, KPO, R&D).
- Maritime Affairs and Logistics.
- Bioeconomy.
- Agri-food sector (the area of organic farming in Westpomeranian Region is 92 892 ha, which constitutes 19.2% of all organic farming in Poland).

- Renewable energy.
- Green chemistry.
- Tourism and health.

A knowledge-based economy

Knowledge, which is put on an equal footing with other production factors, has a direct impact on raising awareness of the need for innovation. The key direction of innovation development is to connect the areas of science and technology with the economy.

In recent years, the region has taken a number of initiatives in the area of support for innovation development.

Higher education institutions have obtained funds for the modernisation of research infrastructure and have taken measures to strengthen cooperation with enterprises. Business environment institutions and local government units – as well as universities – have shown great activity in expanding incubation facilities for young companies and technology parks. Thanks to structural funds and other public funds, new services supporting the development of innovation on the market appeared. It is now important that these initiatives are correlated with market demand. Despite investments and support received in the period 2007-2013, there are still deficiencies in research infrastructure. There is a growing lack of sectoral research institutions linked to businesses and local government and operating in areas considered as regional specialisations. The share of R&D expenditures in enterprises in relation to GDP is average. The majority of technological and research offers come from the technical sciences sector. The resulting innovative resources are characterised by an uneven distribution, and the concentration of research works mainly in two centres of the region (Szczecin and Koszalin) limits the innovative possibilities of companies operating in the remaining area of the Region.

Clusters play a key role in the implementation of development policy, contributing to the development of entrepreneurship and to expand links between business and science, especially in the areas of smart specialisation. However, they are subject to changes appro-

priate to the situation on the market and needs related to the development of innovation in the economy. The adopted Development Strategy for Westpomeranian Region takes into account these changes in the Region development vision.

The main objective of the activities of clusters in Westpomeranian Region is to stimulate the economic growth of associated entities and create conditions for cooperation between economic entities through:

- establishing new business contacts and building mutual bonds between companies and other clusters in the country and abroad;
- exchange of information, experience and know-how;
- support for the creation of new jobs in the region;
- development of the competence of the staff of the associated entities through training, courses and other events;
- supporting vocational education by awarding scholarships to the best students, organising apprenticeships and creating employment opportunities in the selected sector;
- support in optimising the costs of associated enterprises;
- helping to find new markets;
- supporting R&D activity of enterprises, including in cooperation with research units and foreign partners.

Clusters operating in the area of Westpomeranian Region:

1. The West Pomeranian Chemical Cluster "Green Chemistry".
2. The Maritime Cluster of West Pomerania.
3. The West Pomeranian Maritime Cluster.
4. Metalika Metallurgic Cluster.
5. Berlin-Szczecin-Baltic Sea Waterway Cross-border Cluster.
6. ICT West Pomerania Cluster.
7. West Pomeranian Cluster of Creative Industries.
8. Szczecinek Furniture Cluster.
9. West Pomeranian Construction Cluster.
10. iSynergia West Pomeranian Medical Cluster.
11. sEaNergia Baltic Cluster.
12. West Pomerania eBusiness Cluster.
13. Polish Sailing Cluster.

14. West Pomeranian Development and Business Support Cluster (PGI).
15. Process Management Practice Cluster (PIG).

The blue economy

Świnoujście, Dziwnów, Kołobrzeg and Darłowo situated directly on the Pomeranian Bay, but also Szczecin, Police, Kamień Pomorski and Stepnica located inland play an important role in the whole of activities widely understood as the Maritime Economy. This economy is of fundamental importance for West Pomerania, Poland and Europe. The maritime sector is one of the key engines of economic growth and employment. It is one of the basic determinants in shaping the development policy of countries and regions whose economy is related to the maritime sector.

4.2. Policies for the green economy

An alternative to the existing economic model based on economic growth is the model of the **green economy** as a tool of sustainable development, which, using the values and resources of the environment, ensures the sustainability of economic processes.

The green economy has been adopted as one that supports growth and development while maintaining access to natural capital and ecosystem services on which human well-being depends. It is closely linked to the idea of sustainable development through effective implementation of its objectives. Initiatives to build a green economy taking into account environmental protection needs determine the need to build statistical methods for monitoring and assessing the degree of green economy. Reliable, properly selected and up-to-date data in this area is an important element of the implementation of environmental policies, the use of economic instruments or measures supporting eco-innovation and investment in green technologies and monitoring the effectiveness of these measures. The data can be used by public and private sector actors in decision making and, when presented in

a wider context, can enable them to track changes in the environment, economy and society.

In 2013-2018, about PLN 45 billion from the state budget and energy bills was paid into the energy sector, of which as much as 30 billion went to conventional energy. Renewable energy can count on much more modest support. In 2013-2018, the RES support systems cost Poles less than 15 billion zlotys, i.e. just one third of the total value of subsidies received by the national power industry at that time. However, no changes should be expected in the perspective of the next decade. In 2021-2023, the net cost of the power market will be around PLN 11bn, while the net cost of the auctioned RES support system will be only PLN 0.3bn. Both systems are financed from bills of energy consumers.

Unlike the power market, RES auctions are an optimal support system, both in terms of consumer benefits and environmental effects. This is confirmed by the results of recent tenders. The prices obtained at the auction for new wind and solar power plants, averaged less than 210 PLN/MWh, and once again proved to be lower than market prices. The December power market auction closed with a record high price of almost 260 PLN/kW/year

Wind energy is *the only* **renewable energy** technology in Poland that can already attract significant investments. There is already a network of large wind farms evenly distributed across the country – several wind farms were established in 2009 in Westpomeranian Region (e.g. 32 MW wind farm in Śniatow, 69 MW in Karścino and 50 MW wind farm in Tychow).

In Polish strategic documents it is difficult to find a definition of the green economy, despite many English-language sources. According to the Ministry of Economy in Poland, we are dealing with "green economic development", understood as "a new path of socio-economic development, in a more effective way achieving the goals of sustainable development". In addition, "greening of the economy" is considered in many areas and covers a number of narrower issues, such as the development of clean technologies, renewable energy sources, improvement of energy and material efficiency, change of the consumption and production model for a

more sustainable, integrated product policy, green public procurement, green jobs, or environmental fiscal reform. Therefore, the role of the above-mentioned elements of the green economy is clearly emphasised.

At the national level, there is no document related to creating a development framework for Poland, whose main goal is to support development of the green economy. On the other hand, the issue of creating a low-carbon economy is emphasised more often (e.g. "Polish Energy Policy 2040"). However, some references to green economy can be found. In the document "Poland 2030. The third wave of modernity. Long-term National Development Strategy" from 2012, in the area of activities related to safety and environmental protection (objective 7), the need to launch programmes to encourage, inter alia, for pro-efficiency behavior, diversification of energy sources "to ensure Poland's energy security and transformation towards a green economy". In the latter case, the following directions of intervention were indicated:

- more efficient use of natural resources;
- implementation of the programme for the development of innovative environmental technologies;
- support for leading research centres and enterprises in this area.

The document "Energy Security and the Environment Strategy. Perspective 2020" of 2013 emphasises the facilitation of "green" (favorable for the environment) economic growth in Poland by ensuring energy security and access to modern, innovative technologies, as well as eliminating administrative barriers hindering "green" growth.

In turn, the "Strategy for Innovation and Efficiency of the Economy – Dynamic Poland 2020" under objective 3 – Increased resource and raw materials efficiency points to the need to ensure the increase in the efficiency of the use of natural resources and raw materials, indicating the transformation of the socio-economic system into the so-called greener path, especially by reducing energy and material consumption of the economy.

It is also worth pointing to the "Second National Environmental Policy" of 2000, which 20 years ago emphasised the need for the greening of sectoral policies, i.e. industry and energy, transport, agriculture, construction and the communal economy.

Green economy issues are also included in other sectoral documents. Unfortunately, there is a lack of a national programme for green job creation.

4.3. National and regional/territorial policies to support green and blue start-ups and jobs

Taking into account the current situation of the region and its economic development vision, in the upcoming years West Pomerania is likely to face a number of major challenges. The activities of regional authorities will focus on the development of smart specialisations. This is aimed at expanding the international cooperation and the internationalisation of business activities, thus strengthening the competitive power of the region. Increasing the significance of West Pomerania in international markets is a particularly important aspect. It is expected that the smart specialisations identified as high-potential areas will act as a magnet for newly established enterprises.

The most important issues in the upcoming years will include strengthening and deepening inter-regional cooperation between the market entities concerned, which are aware of the need to exchange experiences and engage in new technological achievements.

An equally important role in the economic specialisation process is expected to be played by joint actions taken by universities and enterprises in the field of both teaching, and research and development.

The objectives assumed in the context of regional development:

- providing enterprises operating in the region with access to financial instruments for innovative undertakings;
- increasing the investment attractiveness of the region;

- ensuring the dissemination of innovative solutions in the poorly developed areas in the region;
- strengthening the human capital;
- developing the scientific potential as a key element of innovative economy;
- improving the structure of business connections and business surrounding.

In 2016 the Westpomeranian authorities adopted the Regional Development Strategy of Smart Specialisations in the Westpomeranian Region. The Marshal's Office of the Westpomeranian Region prepared a project of establishing and developing the regional innovation system to be launched by the end of 2016.

Two major modes of financing business development can be identified in West Pomerania, i.e. instruments based on public resources, coming from both regional and European funds, and private resources coming from private investors or entrepreneurs' own resources. In the case of Polish and Westpomeranian enterprises, it can be noted that, despite the relatively wide availability of EU funds, enterprises' own resources are still the prevailing source of financing innovations.

Business awareness among young people is gradually increasing, *inter alia*, due to searching for various forms of self-employment and finding a way around the problem of unemployment. The need to support entrepreneurship also appears to be increasingly recognised by administrative authorities in the region. This is also reflected in the development of numerous initiatives in the field of entrepreneurship and commercialisation, both at higher education establishments and among non-governmental organisations. This proves how the entrepreneurship support eco-system is expanding in the Westpomeranian Region. However, the synergy effect arising from the activities of various types of organisations is yet to become more pronounced.

For many years political support has been offered by regional authorities for different initiatives promoting entrepreneurship development, also through numerous strategic documents (including the Regional Development Strategy of Smart Specialisations in the Westpomeranian Region 2020+).

Especially important aspects for the Westpomeranian Region include supporting the R&D activities and transferring highly innovative and locally developed technologies. The region promotes best practices in the scope of technology through publications and events, including:

- the Information Bulletin of the Regional Operational Programme of the Westpomeranian Region 2014-2020, and
- the Economic Competition of the Marshal of the Westpomeranian Region.

Support is also provided to various initiatives aimed at strengthening the regional economy, innovation and cooperation between the business and research sectors, *inter alia*, through organising:

- business-business and business-science meetings;
- science-promoting events (e.g. the E(x)plory competition);
- training sessions and conferences.

Innovation support is envisaged in several strategic documents concerning the Westpomeranian Region, including the Regional Operational Programme of the Westpomeranian Region, the Regional Development Strategy of Smart Specialisations in the Westpomeranian Region 2020+, and the Regional Development Strategy. These documents define a number of business support-oriented measures, such as loans, guarantees and support to investments, along with research, land preparation for investments, training sessions, fairs, promotion, consultancy, mentoring, coaching, etc.

This support is assumed to be mainly directed to enterprises, including SMEs introducing novel ideas to the market, and in particular in cooperation with R&D units and entities operating in the field of smart specialisations. Other entities which may apply for support for innovation development and implementation, as part of the innovation-oriented regional policy, include higher education establishments, organisations supporting entrepreneurship, credit and warranty funds, and incubators.

The currently implemented Regional Operational Programme of the Westpomeranian Region promotes the establishing and development of new enterprises. One of the direct ways of supporting entrepreneurship, self-employment and creation of new jobs is to finance various consulting and training initiatives addressed to people willing to pursue such challenges. Information and publicity campaigns are conducted to promote the idea that it is never too late to commence business activity – you only need a good idea and determination.

The sum of over EUR 340,000,000 has been allocated for the economic sector development as part of the Regional Operational Programme 2014-2020. These resources will be rendered available as part of the First Priority Axis: Innovations – Modern Technologies, aimed at increasing the level of innovation and competition of the regional economy. The Regional Operational Programme is closely correlated with the RIS3 strategy. Therefore, the principal objective of the First Axis is to use the potential of smart specialisations, including through increased activeness of enterprises in the field of research and development. The Programme offers support to enterprises at each development stage and is addressed to both companies (directly) and business support institutions (indirectly).

In addition, by hand of the bank-managed Westpomeranian Fund of the Joint European Resources for Micro-to-Medium Enterprises (JEREMIE 2), financial instruments are introduced which support entrepreneurs at the initial stage. These instruments are implemented, *inter alia*, through the following actions:

1.17 Strengthening the process of supporting companies at the early development stage.
1.9 Investing in enterprises through financial instruments.

Financial resources will be allocated for supporting small and medium-sized enterprises, including start-ups, by providing them with financial instruments in the form of capital contributions, warranties, micro-loans, working capital loans, investment loans, loans for the implementation of R&D results, and loans for supporting self-employment and creating new jobs.

As part of Action 1.17, comprehensive incubation support has been envisaged, along with capital instruments, including the provision of new and specialised incubation services through consulting measures focused on advanced business planning, product/service marketing, sales process improvement, innovations, risk analysis and acceleration. Additional support instruments include training courses, workshops, consulting, coaching, mentoring, adjusted to the company's development stage.

With a view to selecting the most promising projects to receive financial support, the Marshal's Office has launched a dedicated department in charge of assessing applications submitted as part of the Regional Operational Programme. At the subsequent stage, experts are engaged to assess the proposed projects before the final decision is made on their financing.

For many years West Pomerania has been invariably in the lead when it comes to regional entrepreneurship. The enterprise-oriented measures taken by the regional authorities are primarily aimed at developing the innovation-driven attitudes among entrepreneurs and increasing the degree of business-science cooperation.

As regards West Pomerania, the development of innovative economy appears of utmost importance, considering that the region is left behind in the innovation ratings. In the previous financial perspective, business support institutions, along with local-government bodies, have displayed a significant level of activeness in developing soft support measures and infrastructure for young enterprises. The already implemented measures will soon be supplemented with other means of supporting entrepreneurship. A significant factor to determine the support provided to specific initiatives will be their correlation with the actual market demand.

Therefore, the support instruments as part of the financial perspective for 2014-2020, within the Regional Operational Programme of the Westpomeranian Region, have been mainly oriented towards increasing the level of innovation and competition of the region through smart specialisations.

In addition, a sum of over PLN 50,000,000 has been allocated for start-ups financing as part of the JEREMIE initiative (with West Pomerania as the pioneering region). This support measure

has provided entrepreneurs with access to a wide array of financial instruments on more favourable conditions. The significant level of flexibility, resulting from an extended withdrawal or settlement period, constitutes an unquestionable asset of this model of financing. The support provided is expected to open new financial opportunities to these enterprises, including especially micro- and small entities, which usually use their own resources to implement innovative solutions.

The concepts and measures discussed above enjoy much support from the Westpomeranian authorities. The Regional Development Strategy of Smart Specialisations in the Westpomeranian Region 2020+ is a guidance document which also bears certain operational features, indicating the need to support young entrepreneurs, including through strengthening the human capital, improving the structure of business connections, fostering the cooperation between business support institutions, and developing scientific potential.

Smart specialisations

The Westpomeranian Region, with its large area, rich history and unique location, is characterised by a relatively high economic diversity.

The smart specialisations identified in the region as the areas in which it intends to specialise and increase competitiveness between 2014 and 2020 have therefore been selected through a two-stage process. Within the Cohesion Policy smart specialisations have been included as a preliminary (ex-ante) condition. This means that the Westpomeranian Region has developed a dedicated strategy to obtain financial support from the Cohesion Fund for implementing the envisaged innovation measures[5].

The concept of smart specialisations assumes that no one can specialise in all fields. This holds true for both entrepreneurs and regions. The idea is to identify strengths and most prosperous

5. The List of Smart Specialisations of the Westpomeranian Region, Strategic Management Department, Marshal's Office Of The Westpomeranian Region, Szczecin, 2016 p. 5.

areas in the region, along with the potential to build the competitive edge. This does not concern specific sectors, but rather activity areas. At the first stage, the Westpomeranian Region identified five major economic areas, referred to as regional specialisations, which provided grounds for determining smart specialisations of West Pomerania, namely:

- **bioeconomy** (based on the natural resources available in the region, along with its economic, scientific and research potential);
- **maritime and logistic activities** (including maritime technologies, i.e. a sector strongly rooted in the region, but one that must respond to contemporary challenges);
- **machinery and metal industry** (the number of entities operating in this area is currently growing in the region, with expanding portfolios of industrial parts; considerable experience in the ship-building area acts as an additional asset);
- **services of the future** (rapidly growing ICT, IT and KPO sectors, as well as creative industries);
- **tourism and health** (the use of natural resources and cultural achievements)[6].

The broadly understood human capital, taking into account both the individual knowledge and skills, social capital and human capital in public administration, acts as one of the key determinants to economic and social development. Its role is particularly important in the regions of developing economies, such as West Pomerania.

In terms of human capital, the Westpomeranian Region's strengths include a very good access to educational infrastructure, a relatively good matching of the educational structure in West Pomerania to labour market needs, the high percentage of students pursuing education in technical and scientific faculties, in relation to the total number of students, and the high and still growing number of people pursuing continuing education,

6. www.coi.wzp.pl/region/inteligentne-specjalizacje.

as compared to other regions. The relatively even distribution of social capital in the region can also be positively assessed, as it paves solid grounds for further human capital investments, with a simultaneous support from public sources.

The Westpomeranian Region displays huge opportunities when it comes to the planning and implementation of human capital support policies. This is due to the wide access to EU assistance funds, and in particular the Regional Operational Programme of the Westpomeranian Region (RPO WZ 2014-2020) and the Knowledge, Education and Development Operational Programme (2014-2020).

The Regional Labour Office in Szczecin acts as the Intermediary Body for four priority axes of RPO WZ 2014-2020. Measures implemented by the Regional Labour Office in Szczecin fostering the creation of new jobs will be of major importance.

Along with improving the qualifications and competencies meeting the labour market demand, the RPO WZ 2014-2020 support will be oriented towards the widely understood development of human capital. This concerns, *inter alia*, further development and improvements in the educational area. Support will be offered to both non-investment and infrastructure-oriented measures. Support for vocational and continuing education is also of major significance to the growth of a modern labour market, which has been reflected in the provisions of RPO WZ 2014-2020.

In turn, the *Knowledge, Education and Development* Operational Programme is implemented on the national scale and is co-funded from the European Social Fund. It was launched with a view to implementing reforms in the field of employment, social inclusion, education, higher education, health and good governance, social innovations and supra-national cooperation. The Knowledge, Education and Development Operational Programme within the financial perspective 2014-2020 arises from the experience and implementation of operational programmes within the previous perspectives, supplementing the Regional Operational Programmes. In the Westpomeranian Region, the function of the Intermediary Body for the projects in question, in charge of

collecting applications and selecting projects for co-funding, is performed by the Regional Labour Office in Szczecin[7].

In the case of smart specialisations, the challenging issues of priority selection and resource allocation should engage stakeholders from business circles to indicate the most promising regional development areas through tailored measures referred to as "the entrepreneurial discovery process". Entrepreneurial expertise is not limited to scientific and technological aspects, as stakeholders combine them with their knowledge on the market development potential, competition and the outlays and services indispensable to initiate a new business.

The synthesis and integration of this previously scattered and fragmented knowledge is likely to facilitate the creation of a new vision of chances and opportunities in the emerging sectors. Such knowledge should be activated, mobilised and supported, as it constitutes the principal element in the smart specialisations selection process. While perceiving smart specialisations as a certain process, one needs to determine the implementation method, the necessary resources, business entities, specialisation identification and development tools, and the possible support instruments.

One stage of the entrepreneurial discovery process in the Westpomeranian Region involved identifying and establishing cooperation between three domains contributing to the smart specialisations process. Activities in this field were based on the assumption that the efficient implementation of the smart specialisations process is conditioned on taking a wider perspective, rather than limiting specialisations to a list of sectors and technologies classified to NACE sub-classes. These should be viewed as a system of interdependent and mutually supportive connections, with prominent roles being assigned not only to entrepreneurs but also to local-government bodies and business support institutions[8].

7. www.coi.wzp.pl/kapital-ludzki.

8. The List of Smart Specialisations of the Westpomeranian Region, Strategic Management Department, Marshal's Office Of The Westpomeranian Region, Szczecin, 2016 p. 9.

Based on the aforementioned criteria, the following eight Smart Specialisations of West Pomerania were identified, in line with the state of knowledge of April 2016:

- large-size water and land structures;
- advanced metal products;
- wood and furniture products;
- environmentally friendly packaging;
- chemical and materials engineering products;
- modern agri-food processing;
- multi-modal transport and logistics;
- products based on information technologies.

In accordance with the methodology adopted, Smart Specialisations of West Pomerania were developed on the basis of the previously identified Regional Specialisations which have proven to make varied contributions to the ultimate establishing of Smart Specialisations. More specifically, most Smart Specialisations have arisen from Bioeconomy, and fewest from Tourism and Health.

4.4. Voices from the territory regarding green and blue start-ups

In recent years, the start-up ecosystem in Westpomeranian Region has developed dynamically. Szczecin is certainly helped by the fact that it is 2 hours away from Berlin, one of the leading start-up hubs in Europe.

This gives local start-ups many benefits in the form of opportunities to participate in international events (conferences, meetings), access to accelerators and attract investors. The best known local start-ups are Wspieram.to, PixelLegend, Finpack Tidio.

Netcamp Foundation is building the largest technological and start-up community in West Poland and has been organizing Start-up Weekend Szczecin for 8 years. It also runs Netcamp Start-up Hours mentoring programme, where start-ups can consult

their project. To increase access to IT staff, the Foundation has also created a vision of "100 programmers for Szczecin", which it wants to train every year to support the development of local IT companies and start-ups.

The vision of the Netcamp Internet Industry Development Foundation assumes the creation of the Silicon Valley in Szczecin and its surroundings. The Foundation has been organising Netcamp for over 10 years – inspiring IT meetings in Szczecin. It is one of the 3 oldest barcamps in Poland. Every 2-3 months it integrates and educates IT specialists, managers and start-ups in an informal atmosphere. Netcamp is an ideal place to meet people from the industry, get a feedback on your project or find a co-founder or employee.

All Start-up Weekend events take place according to a specific model: everyone can propose their idea for a start-up and get feedback from their peers. Teams create the best ideas (as defined by voting) and start a three-day frenzy of creating, coding, designing and approving business models. The weekend ends with presentations to local business leaders.

The ICT West Pomerania Cluster makes it easier for companies to gain knowledge and business contacts. It operates with the aim of economic development of the region through the development of companies from the IT sector and increasing the attractiveness of West Pomerania and the city of Szczecin for employees, investors and local entrepreneurs and students. Although the cluster does not run projects dedicated to start-ups, it strongly supports them. Its idea is to connect smaller technology companies, facilitate their cooperation and contacts with large players, acquire orders and recruit employees.

The Regional Centre for Innovation and Technology Transfer operates within the West Pomeranian University of Technology in Szczecin. It was created in 2009 by merging the Agricultural Academy and the Szczecin University of Technology. RCITT conducts advisory and training activities for companies, scientists, students and graduates of the university in the field of technology transfer, financing of research and development and supporting academic entrepreneurship. Some services are free of

charge. The Centre has also cooperated in organising Start-up Weekend.

The aim of the activity of the **Pomerania Technopark** created by the Szczecin Science and Technology Park is to create favourable conditions for the development of innovation in Szczecin and the region with particular focus on information and communication technologies (ICT). Technopark Pomerania supports technological start-ups, i.e. companies starting their activity in the IT sector, which develop a product or service based on modern technologies. New companies that are tenants are covered by the so-called incubation programme, under which they are offered advantageous office space rental rates and advice in the following areas: business, legal, financial, marketing and PR. Entrepreneurs can also participate in trainings, workshops and many industry events organised by the Technopark, enabling them to broaden their knowledge and skills.

Moreover, Technopark is a complex business environment, where 65 technology companies at various stages of development have their headquarters, which makes it easier for start-ups to establish business contacts and carry out new projects. Such cooperation contributes to faster development of small technology companies – comments Magdalena Ławicka, development specialist for incubated companies.

The idea of organising **SPARKcamp** was born out of the idea of barcamp meetings, whose first initiators were start-up communities in Silicon Valley. Since then, such events have been held all over the world in various forms. The aim of SPARKcamp is to create a place where people can freely exchange knowledge, experience and know-how. During the meetings individual start-up developers, small independent groups related to the IT industry as well as large companies can present their ideas and share information on what projects they are currently working on.

Bizup has been cooperating with innovative and interesting projects in the region for years. It supports them with knowledge and links them with potential business partners. Such activities allow them to take the right direction and achieve excellent results. Thanks to cooperation with the Regional Centre for

Innovation and Technology Transfer, West Pomeranian Regional Development Agency (Zachodniopomorska Agencja Rozwoju Regionalnego (ZARR SA)), Business Link or Information Society Development Foundation, Bizup provides comprehensive support at an early stage of each project development.

West Pomeranian Regional Development Agency was established in 1994 as a joint stock company in which the main shareholder is the Self-Government of Westpomeranian Region. The main objectives of the agency are broadly defined promotion of the region and economic activation and assistance to small and medium enterprises. For over two decades, ZARR SA has been supporting entrepreneurs in West Pomerania, among other things, by implementing projects co-financed by the European Union. Among them we have: WeP UP! International project West Pomeranian ICT Start Up Hub" project (hereinafter referred to as "WeP UP"), which aims to create a friendly environment for the development of the start-up ecosystem in West Pomerania. ZARR SA, the initiator and at the same time the leader of this initiative received a grant of 750 thousand euros from the European Commission. The project is aimed primarily at start-ups from the ICT sector, which are at the stage of an idea or prototype, as well as more advanced projects looking to enter international markets, which is possible thanks to cooperation with partners from Italy, Germany and Estonia. The initiative started in February 2018 and ended in July 2019.

We also implemented the Acceleration Programme, thanks to which several entrepreneurs with innovative business ideas or at an early stage of development of their ideas could learn from scratch how to set up and run a start-up. Soon, the project will include the One-Stop-Shop Internet platform. It is to be a treasury of knowledge about West Pomeranian start-ups and the whole innovation ecosystem. It will allow entrepreneurs to talk about their business, present their idea also on the European market, establish business contacts and interest potential investors.

There are over **4 thousand** IT companies operating in Westpomeranian Region (of which 2.5 thousand in Szczecin), which employ about 5 thousand specialists. More than 2.5 thousand people

study IT in the region, and every year around 400 students graduate. As Maciej Jankowski emphasises, the IT industry is one of the key factors for the development of Szczecin, there are many companies developing software for the automotive or fintech industries. The IT Cluster, which associates over 80 companies, is also active.

Last year there was a slight increase in training support for start-ups (Wep-up project), and on 21 February 2019 the City of Szczecin together with the start-up community created Szczecin_Up – a mentoring program for creative entrepreneurs.

4.4.1. *Green start-ups/companies*

Brand HO :: LO upcycling is the undisputed pioneer in the Polish market.

Every year since 2004 the company produces bags, backpacks and accessories made from recycled advertising banners, coming from the outdated promotion of companies and institutions.

Upcycling of HO :: LO is the manifestation of personal style, a contemporary outlook and conscious pro-ecological attitudes. Multiplying brand equity through promotional activities in the spirit of creative development and eco materials "popromocyjnych" accordance with the latest European trends.

https://ho-lo.pl/

Clochee introduced a new eco brand to the market, discovered by chance and developed over time at a natural pace. The duo behind Clochee are: Justyna Szuszkiewicz an experienced cosmetic developer and Daria Prochenka a skilled businesswoman. Their passion, knowledge and ability translates into providing an efficient, healthy and 100% eco product.

The company wants to show that going back to nature is not just an empty phrase but it is the best recipe and beauty source. Their products meet strict European standards. They use only selected natural ingredients and rely on certified organic sources allowing beauty products to bring you closer to nature.

www.clochee.com/

Red Snake

Red Snake is the leader of heating foils in Poland – electric heating, which in combination with renewable energy from photovoltaics is the most economical and comfortable heating system available on the market. They help to switch from inefficient energy sources to modern heating, which is not toxic. The brand's mission is to provide primary needs in the era of full automation and digitisation. The direction of activities is to create solutions that maximally serve people and the environment, which is why they develop their products and services towards modern buildings with automation and energy management systems.

https://redsnake.pl/?lang=en

4.5. Case studies of innovation in the territory

For several years in Western Pomerania, research initiatives have been focused around topics such as bioplastics, intelligent and active packaging. The Centre of Bioimmobilisation and Innovative Packaging Materials (CBIMO) of the Faculty of Food Sciences and Fisheries of the West Pomeranian University of Technology in Szczecin boasts the greatest scientific achievements in this area. Its experience is also used in other areas where packaging plays an important role in ensuring the quality of products. In addition, there is a Packaging Platform in the region, operating within the structure of the Green Chemistry Association, which is a National Key Cluster, bringing together 14 economic partners operating in the JPA in the packaging and related industries.

The main goals of the Centre of Bioimmobilisation and Innovative Packaging Materials are:

- promote a healthy society through health-oriented food additives and application of bioimmobilisation processes in pharmaceutics and medicine;

- contribute to environmental protection through innovative solutions based on intelligent materials and processes of selective bioconversion; and
- develop pro-ecological food packaging.

The Centre of Bioimmobilisation and Innovative Packaging Materials provides help in research on application of bioimmobilisation for various technological and industrial processes, such as:

- biotechnological processes of conversion and waste recycling;
- protection and control of bioactive substance release; and
- materials selection and design of new systems for bioimmobilisation based on biopolymers and their derivatives.

The Centre also provides assistance in definition of packaging material performance, design and selection of:

- environmentally friendly materials and innovative packaging technologies;
- modification methods of cellulosic and plastic packaging materials; and
- innovative methods of obtaining functional products in the form of water dispersions and powders.

One of the FP7 projects in which the Centre participated was related to New Generation of Cellulose Fibre Based Packaging Materials for Sustainability. The two main objectives of this project were to conduct top-level research & devise innovative solutions for sustainable packaging and advance the state-of-the-art in sustainable packaging.

4.6. What will happen: forecasts and policies for the future

Despite the fact that the Polish economy has indicated a relatively stable growth over the years, as evidenced by the successful prevention of economic recession during the recent global financial crisis, Polish enterprises are generally smaller and less inno-

vative than the European ones. The share of R&D expenditure in the Polish GDP is also much lower than in most EU countries (reaching 0.87% as compared to the European average of 2.02%). These trends also prevail in West Pomerania, with the majority of regional enterprises being micro- and small entities, characterised by relatively short survival periods. In fact, very few Westpomeranian entities trade in modern technologies or engage in R&D activities.

The analysis of GDP-related data reveals that the economic role of West Pomerania, as compared to other Polish and EU regions, has decreased in recent years. Despite the steady regional GDP growth, the Westpomeranian share in the national GDP has remained insignificant.

As compared to the whole country, the Westpomeranian Region is characterised by vast forest areas and a large share of surface waters. It also features the largest special protection area of birds and their habitats in Poland. The natural conditions in the region, which provide the basis for tourist sector activities, are no longer a major development direction. The Westpomeranian Region aspires to become innovative and to attract a large number of entities operating in the field of technology, research and development. Although numerous measures have been taken to this end, their tangible outcomes have yet to become visible.

Despite the significant number of business support eco-system actors in the region, the cooperation between BSIs and other entities is still rather poor, which inhibits the functioning and development of the regional innovation system.

It is nonetheless a positive finding that both the regional authorities and business stakeholders have come to realise that the specificity of innovative processes triggers the necessity to engage and establish cooperation between as many entities as possible, and that the interaction and permeation of many branches of knowledge is likely to lead to new business ideas and solutions. In consequence, a wider perspective is increasingly employed when it comes to innovations. This also pertains to both technology-unrelated and social innovations which, as has been recognised, are based to a large extent on the values flowing from direct contacts.

Such contacts, in turn, foster information exchange and knowledge dissemination.

West Pomerania is a good starting point for development in the Baltic Sea region and the macro-region of Western Poland. Specific natural conditions determine the development of certain areas of the economy, especially those based on the blue economy, covering all activities related to maritime economy (manufacturing activities and related transport branches) and the green economy, oriented towards improving the quality of human life while reducing threats to the natural environment, including tourism, agriculture and forestry, production of energy from renewable sources – in each case characterised differently than those taking place in Poland as a whole. Thanks to the advantages related to the production of energy from renewable sources, West Pomerania has the potential to develop a green economy. Therefore, the Region wants to be a leader of blue and green development in Poland and as well as in the Baltic Sea Region. For this to happen, the Region must undertake a number of activities to support the green economy, including counteracting unfavourable changes in law.

For example changes in the law implemented since 2015 make investments in wind power plants less profitable, and their location more difficult. Current legal conditions call into question the possibility of developing a green economy based on renewable energy, in particular wind energy. It is also necessary to change the approach to space management, use of natural resources and development of green economy forms based on them. Provided that the region's brand and the quality of the goods created in its area are skilfully managed, then systematic raising of ecological standards and consumers' expectations may be a factor positively stimulating the economic profile of the region. In each case, the category of the green economy must be gradually transferred from the level of aspiration and activity categorisation into the practice of creating and functioning of products and services, using mature, environmentally friendly technologies. A natural consequence of taking into account the "green" profile of the West Pomeranian economy is radicalism in treating a wide range of consequences, challenges and opportunities related to it. After

implementing a number of actions the Region will be able to recapitalise on its geographic position and the associated growth potential of the blue and green economy. Thanks to intensification of technology transfers, absorption of scientific research results and entrepreneurship of the region's community, innovation and market competitiveness of the small and medium enterprises sector will be improved. The level of technological advancement of the regional economy will increase, while concentrating on the areas of the most dynamic development.

5. Regional and territorial situation of the green economy – Metropolitan city of Bologna, Italy*

5.1. The territorial economic framework

Italy is the fourth largest economy in Europe, with a population of 60.4 million and a per capita income of € 29,220 in 2018[1]. It has the second largest manufacturing base after Germany but is also an important agricultural and food producer. There are sharp differences in regional socio-economic development, mainly between north and south, but also between urban and rural areas. Located in northern Italy, the Emilia-Romagna Region has a roughly triangular shape, defined by the Po River plain, the Apennine mountains and the Adriatic Coast, and a population of 4.4 million. The Region's economy tends to grow faster than the national economy: the real growth rate of regional gross value added (GVA)[2] was +1.4% in 2016 and +1.8% in 2017, compared to +1.1% and +1.5%, respectively, for Italy as a whole. Recent estimates show the national economy slowing to a near standstill with only 0.2% growth in 2019 and not more than +0.5% growth in 2020, while the regional trend was estimated at +0.5% in 2019 and is expected to rise only slightly to +0.8% in 2020[3].

* By Marino Cavallo, Metropolitan City of Bologna, Julia Kristina Culver, Concetta Rau, Nomisma SpA.

1. Eurostat.
2. Eurostat, at basic prices in terms of percentage change over the previous year.
3. Unioncamere Emilia-Romagna on the basis of data from Prometeia.

The Metropolitan Area of Bologna is located at the centre of the Emilia-Romagna Region, bordering Tuscany to the south and the provinces of Modena (to the west), Ferrara (to the north) and Forli-Cesena (to the east). The terrain varies from the flat plains of the Po valley in the northern half of the territory, to the hills and Apennine mountain areas in the southern part. Major motorways (*autostrade*) and rail-lines intersect at the city of Bologna, which acts as the hub of the Metropolitan Area and is the capital of the region.

Figure 3 - Map of Bologna Metropolitan Area. Source: Bing maps

With its location at the main crossroads between Italy's northern and central areas, Bologna not only represents an important logistics centre, but is also at the core of a vibrant industrial culture that extends along the via Emilia, a former Roman road which runs from Milan to Rimini. The territory's **economic system** is characterised by a dynamic entrepreneurial fabric that has created excellences both in manufacturing and in services over the years. Market leaders as well as small suppliers of components and technologies operate in various segments of the local economy. The skills and knowledge generated by the University of Bologna and other nearby universities (University of Modena and Reggio-Emilia and University of Ferrara) and various research institutions combined with local entrepreneurship have contributed to making the area a centre for important industrial groups, successful commercial brands and international research. It also has numerous co-operative organisations, a highly developed service sector, cultural and touristic attractions and a world-class trade fair organisation.

There remains a sharp contrast between the level of economic activity in the communities along the via Emilia and those in the mountain areas. Yet in recent years the mountain areas have become a testing ground for experimentation with sustainable agriculture and tourism and renewable energy models.

The **Apennine mountain area** of the metropolitan territory accounts for around 45% of the land area (1,678.9 km^2), with peaks that reach elevations of nearly 2,000 metres above sea level. Bisected by two strands of the A1 Autostrada (the former main motorway and the new "*Variante Valico*" that links Bologna to Florence), the area frequently experiences access difficulties due to severe weather in winter.
In 2017 the mountain area population reached 153,737 inhabitants, accounting for 15.2% of the metropolitan population in that year. After several decades of depopulation, closure or moving of businesses and loss of employment, compounded by a lack of social activities and educational opportunities for young people, in the last two decades the mountain territory has benefitted from a substantial influx of population from urban areas of the City of Bologna – so much so that former residents of the city now account for around one-fifth of the aggregate population in the mountain areas. These transfers were motivated above all by the desire to live in a better, more comfortable and less congested ecological and social environment.
Further impetus to development has come from the definition of a **sustainable economy district** in the Apennines that is to function as an incubator and testing place for the **new circular economy** to be developed in concert with the multiservice companies operating in the reference area of the **Agro-energy District of the Apennine municipalities** and a feasibility study has been conducted for setting up an **organic agriculture District** (***Distretto Bio***)[4].

According to the latest available estimates[5] for 2018, Bologna ranks third among the Italian provinces in terms of per capita added value (€ 36,785). While the Bologna area economy has recovered and recently surpassed pre-crisis levels, after a peak in annual value-added growth of 2.1% in 2015, growth has slowed in subsequent years (+1.4% in 2016, +1.8% in 2017 and 2018). Yet compared to the national economy, which is basically at a standstill[6], the economic system centred on Bologna continues to grow, driven in particular by its production sector and by the advance-

4. Rapporto Apennino; https://progettodistrettobio.bolognappenino.it.
5. Istituto Tagliacarne.
6. Unioncamere Emilia-Romagna – Regione Emilia-Romagna, Rapporto 2019 sull'Economia Regionale.

ment of the tertiary sector associated with IT, communications, planning and engineering and development of high-tech services, as well as a strong gains in tourism, stimulated by the proliferation of low-cost flights and access to high-speed train services. The area is part of the Emilian Food Valley and contains the industrial districts of the automotive and packaging industries. Exports continue to be in surplus and act as a driver of the regional economy. Unemployment has dropped from 8.2% in 2013 to 5.6% in 2018, with a labour market participation rate of 76.8%[7].

Table 1 - Profile: Metropolitan city of Bologna

Characteristic	**Details**
Population (2019)	1,014,766: 489,312 males; 525,454 females
Surface area/ population density	3,702 km^2; Average population density: 273.2 inhabitants/km^2
Geographical/ geological characteristics of territory	Varied geographic features: plains, hills and mountain areas (Apennines). NW part of territory was hit by a **major earthquake in 2012** that led to introduction of an updated seismic code for buildings and increased public funding for the affected communities
Climate/ environmental vulnerabilities	Vulnerability to dramatic climate events (high winds, tornados, hail, extreme rainfall, etc.), **high temperatures/heat waves, flooding**, erosion, **landslides**. Serious **air pollution** along via Emilia & plains area, **new insect pests/disease vectors**. Consumption of soil
Impermeabilisation of soil	9.9% Emilia Romagna; 9.4% Bologna Province
Municipalities	55; Includes 7 united municipalities
Main municipalities/ n. of inhabitants	Bologna: 390,636; Imola: 69,798; Casalecchio di Reno: 36,584; San Lazzaro di Savena: 32,518
Renewable energy	Consumption of electric power generated by renewable energy: 19.2% Emilia-Romagna; 14.1% Province of Bologna (2017); n. of PV systems: 9436 systems (291.3 MW capacity) in Metropolitan area of Bologna (2018). Main sources: PV solar, followed by hydropower

7. Istat, statistiche per le politiche di sviluppo.

Table 1 - continued

Characteristic	Details
Separation of waste	Emilia-Romagna is one of first regions in Italy to separate trash. ER goals: recycle min. 70% of urban wastes, differentiated collection of 73% of trash; deposit in dump max 5% of waste; Raise the share of differentiated waste collection to 70% by 2025 and 80% by 2030. Urban waste separation: 63.8% Emilia-Romagna; 59.3% Bologna Province (2017)
Climate adaptation Plan	BLUE AP (Bologna Local Urban Environment Adaptation Plan for a Resilient City)
Promotion of green Procurement	Promotion of green procurement policies among institutions, procurement offices and public and public-share companies operating in the territory. **Protocol of Understanding** between Municipality of Bologna, Metropolitan City, trade and sectoral organisations to apply tendering principles in the perspective of circular economy and environmental protection
Agro-energy District of the Apennine municipalities	Established to provide a range of services of advice and technical assistance to the municipalities on energy use in buildings and urban use. Use of plant cuttings and forest materials, cuttings and agricultural wastes for biomass. Promotion of composting to reduce garbage tax. Introduction of circular economy principles and processes

Sources: Nomisma, based on Agenda Metropolitana per lo Sviluppo Sostenibile; ERVET, La Green Economy in Emilia-Romagna; Istat indicatori BES, statistiche per le politiche di sviluppo. Rapporto Appenino

The metropolitan area of Bologna is home to a prestigious university and several important research and advanced computing centres, including CNR's ISAC[8], a branch of INGV, INAF, CINECA and ENEA. ENEA's **Brasimone Research Centre**, located in the Apennines, is one of the major national and international research centres dedicated to the study and development of technologies in the sectors of fourth generation fission and magnetic fusion nuclear fusion. This centre has recently been awarded €4.5 million worth of regional funding to develop three high technology projects. In 2017 the city of Bologna was selected to become the new location of the

8. Institute of Science of the Atmosphere and Climate.

Data Centre of **the European Centre for Medium Range Weather Forecasts (ECMWF)**, representing the arrival of an important research and observation structure that provides a capacity to support the monitoring of the achievement of Sustainable Development Goals as well as gain a better understanding of the dramatic phenomena that can result from climate change.

As of 31/12/2018, the number of companies registered in the province of Bologna reached 87,006[9], accounting for 21.9% of the companies in Emilia-Romagna (396,921).

Emilia-Romagna ranks third in Italy after Lombardy (2935) and Lazio (1231) and just ahead of Veneto (892) for the number of start-ups. A search of the company register[10] shows that there are **930 start-ups operating in Emilia-Romagna,** with **one-third (312) of these in the Bologna province**, while the number of **registered innovative SMEs** in the region is **135 for the region** and **38 for Bologna province**.

The green economy in the territory

According to the regional **Observatory of the Green Economy** (*Osservatorio GreenER*), in 2019 the Emilia-Romagna Region had a total of **6210 green businesses**-companies that in some way or another were part of the regional green economy.

These are companies that may belong to environmental sectors, for example water cycle, waste disposal, renewable energy, but also include others which – regardless of the sectors to which they belong – have made their production processes or products more sustainable; in addition, there are companies that supply innovative technologies, products and services aimed at reducing environmental impact. Of these green businesses**, 1149 companies** or 19% of the regional total **(**up from 999 companies and 18% of the regional total in 2018) are located in **Bologna province**, which has the highest share of green businesses in the region, followed by Modena (16%) and Reggio-Emilia (13%) provinces.

9. Istat reporting on data from Infocamere Movimprese.

10. http://start-up.registroimprese.it/isin/search?2 search conducted on 14/01/2020. Operating less than 5 years.

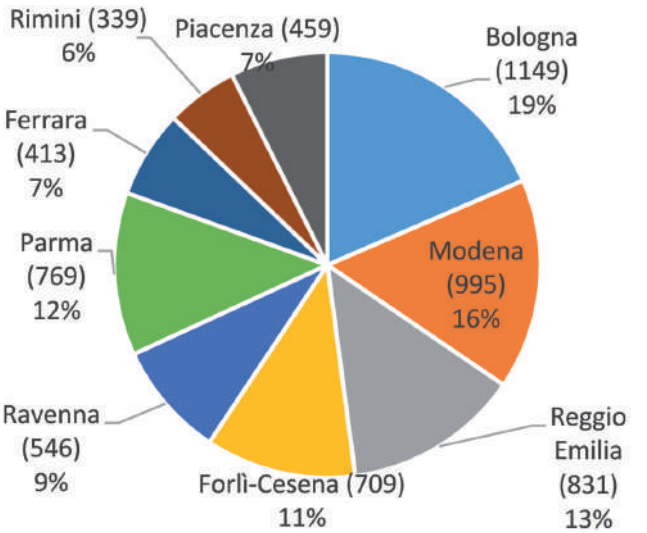


Figure 4 - Green economy companies in Emilia-Romagna, 2019. Source: greenER Osservatorio

The figure below, referring to 2018, shows that the most important sector of activity for green companies in Bologna province is agri-food (agroalimentare), followed by renewable energy and energy efficiency, waste cycle and mobility. Indeed, for the region as a whole, 47% of the green companies are businesses active in the agri-food sector, followed by 10% of companies involved in the waste cycle and 9% in mobility[11].

In 2018 the number of green jobs in Italy was estimated by Symbola[12] to have reached 3.1 million, or 13.4% of overall employment. In the Emilia-Romagna Region the share of green jobs was estimated to be around 15% of total employment (second highest share after Trentino-South Tyrol), with 301.7 thousand persons working in green jobs-accounting for nearly 10% of Italy's green jobs.

11. ERVET, La Green Economy in Emilia-Romagna, 2018. Note that the updated data of the GreenER Observatory (May 2019) show that the share of agri-food declines to 42% in 2019 due to an increase in other sectors.

12. Symbola, GreenItaly 2019.

The main actors of the green economy in the metropolitan area of Bologna include not only companies that engage in green activities and services, but also the **public sector** as a provider and procurer of municipal and **environmental services** (**Consorzio Bonifica Renana**), **multi-utilities** such as **Gruppo Hera (**which recently acquired **COSEA Ambiente**, an environmental services operator in the mountain area**)**, and the **research organisations and university centres** that provide research outputs, create spin-offs and spill-overs, and provide the human resources and knowledge components for green economy enterprises.

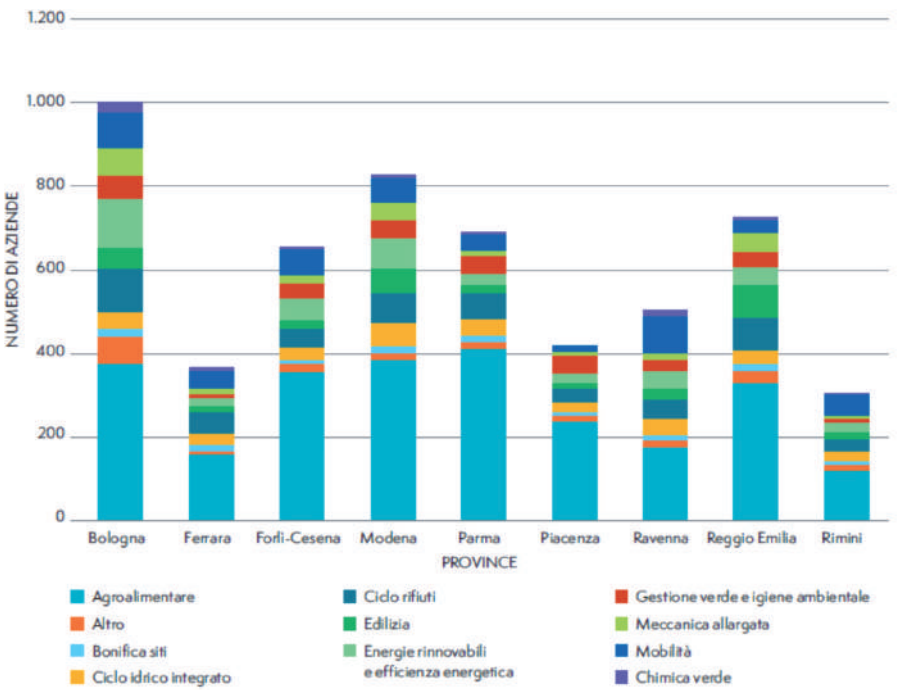


Figure 5 - Sectoral allocation of green economy businesses by province in Emilia-Romagna Region, 2018. Source: ERVET, La Green Economy in Emilia-Romagna, greenER Osservatorio

O**rganic agriculture** is another key area of the green economy-organic farms represent 6.1% of all farms in Italy and 8% of the farms in Emilia-Romagna. Indeed in 2018 Italy was a world leader in terms of the share of organically cultivated surface area (15.5% of national UAA), ahead of Spain (9.7%), France (7.5%), Germany (9.1%), and the UK (2.7%)[13]. Emilia-Romagna ranks fourth in the country in terms of total acreage of organically cultivated terrain (after Sicily, Puglia and Calabria; these 4 Regions account for 51% of the entire national organic surface area). A leading example of a company that is active in the agri-food sector is **Alce Nero**, based in San Lazzaro di Savena and operating since 1978, working together with more than 1000 organic farmers and food processors to bring healthy and organic food products to national and international markets.

5.2. Policies for the green economy

National level

In line with the agreements made in September 2015, Italy has committed itself to incorporating the strategic objectives (SDGs) of the UN Agenda 2030 for Sustainable Development within its economic, social and environmental policy planning framework. Agenda 2030 represents the cornerstone for promoting sustainable development according to four guiding principles: integration, universality, inclusion and transformation.

The UN Agenda 2030 set the stage for Italy's **National Strategy for Sustainable Development (*Strategia Nazionale per lo Sviluppo Sostenibile*, SNSvS)**, published by the Ministry of the Environment and Protection of the Territory and the Sea (MATTM) in October 2017. The SNSvS has as its primary objective the improvement of conditions for socio-economic welfare in Italy: reducing poverty, inequalities, discrimination and unemployment; ***ensuring environmental sustainability***; rebuilding trust in institutions; improving opportunities for professional growth, study, and training; and

13. Symbola, GreenItaly 2019, citing SINAB "Bio in cifre 2019".

restoring competitiveness to businesses through a fourth industrial revolution based on innovative and sustainable technologies.

The main national level measures that encourage circular economy or green investments include the following:

- **Green Public Procurement (GPP)** is defined in EC Communication (COM (2008) 400) "Public procurement for a better environment" as "a process whereby public authorities seek to procure goods, services and works with a reduced environmental impact throughout their life cycle when compared to goods, services and works with the same primary function that would otherwise be procured". GPP is a ***voluntary instrument***, which means that EU Member States and public authorities can determine the extent to which they implement it[14]. GPP was initially incorporated into the Italian legislative framework under the European Directive 2004/18/EC, but it was through the implementation of the Law of 28 December 2015, n. 221, containing "Environmental provisions to promote measures for the green economy and to contain the excessive use of natural resources" (the so-called "environmental clause" of the 2016 Stability Law), that the "green procurement" of the Public Administration assumed an *obligatory nature*[15]. **Art. 34 of Legislative Decree 50/2016**, subsequently amended by **Art. 23 of the corrective decree n. 56/2017**, requires that procurement offices contribute to achieving the environmental objectives set out by the Action Plan for the Environmental Sustainability of Consumption in the public administration sector through the inclusion of the **minimum environmental criteria** (so-called "CAM", adopted by decree of the Minister of the Environment and Protection of the Territory and the Sea) in the technical specifications and contractual clauses for services of any amount. Furthermore, the minimum environmental criteria need to be considered as among the award criteria in the preparation

14. https://ec.europa.eu/environment/gpp/what_en.htm.

15. https://ec.europa.eu/environment/gpp/pdf/Buying-Green-Handbook-3rd-Edition.pdf.

of tender documents when applying the criterion of the most economically advantageous offer, pursuant to Art. 95, paragraph 6, Legislative Decree 50/2016. The minimum environmental criteria must also be taken into account as much as possible in the case of contracts relating to restructuring interventions, including demolition and reconstruction, depending on the type of intervention and the location of the work to be carried out (Art. 34, paragraph 2, Legislative Decree 50/2016).

- **Provisions concerning ESCOs**. ESCOs (Energy Services Companies) represent a sector of the green economy on which regulatory attention has been growing in recent years. Indeed, the Ministerial Decree of 7 March 2012 already required the Energy Services companies that work with Public Administrations to comply with UNI CEI 11352[16]; but it was Legislative Decree 102/2014 on energy efficiency that provided a key stimulus to the development of this sector, requiring mandatory UNI CEI 113525 certification for ESCOs that offer services for energy diagnosis and obtaining Energy Efficiency Certificates (or White Certificates).
- **National Energy Efficiency Fund (FNEE)**. Launched at the end of 2017, the FNEE is an incentive that supports interventions aimed at achieving national energy-efficiency targets in line with the provisions of the Kyoto Protocol. The financial resources allocated for the incentive amount to around € 310 million (through 2020) supporting guarantees (30%) and subsidised loans (70%). The beneficiaries are businesses (with some sectoral limitations), ESCOs and Public Administrations.

16. The UNI CEI 11352 standard defines the requirements for companies that provide energy services (ESCOs): an ESCO certified under this standard is able to offer contracts that guarantee results to its customers. An ESCO is remunerated on the basis of the energy savings achieved (Financing Through Third Parties). These contracts have become increasingly diffused in both industrial and civil contexts, because they allow companies to concentrate on their "core" activities by relying on sector specialists for the management of their auxiliary systems (boilers, co-generators, inverters, compressed air plants, etc.) and by providing new financial resources (Third Party Financing, White Certificates).

Made Green in Italy: The Ministry of the Environment and the Protection of the Territory and the Sea (MATTM) adopted a voluntary national scheme "**Made Green in Italy**", which is based on the Product Environmental Footprint (PEF) methodology for determining the environmental footprint (as defined in the Commission Recommendation 2013/179/EU) and is applicable to products, understood as goods and services, including intermediate products and semi-finished products. The Regulations for implementation of this voluntary national scheme for the assessment and communication of the **environmental footprint of products** went into effect on 13 June 2018.

Figure 6 - The "MADE GREEN IN ITALY" voluntary label. Source: www.minambiente.it

In line with the **National Strategy for Sustainable Development**, various actions regarding the green economy have been introduced in the **Italian Budget Law for 2020**, including the following:

- The **Green New Deal** will provide budget allocations of € 470 million for 2020, €930 million for 2021, and € 1.4 billion for the years 2022 and 2023. A part of the budget allocation – a share of not less than €150 million for each of the years 2020, 2021, 2022 – will be destined for interventions to **reduce greenhouse gas emissions**, while €20 million a year (for 2020, 2021, 2022, and 2023) will be destined for initiatives to be launched in the environmental economic zones (which are located within national parks).
- **Eco-bonus**: The eco-bonus has been reconfirmed for 2020, allowing tax deductions for energy-efficiency building renovations, micro-cogeneration plants, building restructuring, as well as purchase of high energy-efficiency class furniture and home appliances following home renovation. The eco-bonus also applies to entities that manage public housing and those with social purposes. Tax deduction rates will remain unchanged from the previous year, i.e. 65% deduction for **energy requalification** interventions.

- **Plastic tax**: A new plastic tax, starting from July 2020, has been introduced. The tax will amount to € 0.45 per kilogram of plastic, including in TetraPak products. Recycled plastic products and composite products with a plastic percentage lower than 40% are excluded from the measure.
- **Green bonds**: Green bonds are another instrument that can be used to finance interventions by state administrations and to support programmes to combat climate change, to promote energy conversion, circular economy, environmental protection and social and territorial cohesion.
- **Green projects supported by Ministry of Economy grant guarantees**. The Ministry of Economy (MISE) might provide grant guarantees up to a maximum of 80% for investment programmes and operations, also through public private partnerships, for the realisation of economically sustainable projects. The objectives are ***decarbonisation***, realisation of the ***circular economy***, ***urban regeneration***, ***adaptation and mitigation of the risks deriving from climate change***.
- **Business tax credits**. For 2020, 2021 and 2022 business tax credits are foreseen for companies that undertake environmental projects using new assets. Tax credits cover 10% of the expenses incurred for patents, consultancy and employees.
- **Biogas incentives**. Incentives are foreseen for biogas plants that have been in operation from 2007 and onwards. The incentives will be paid for the amount of energy generated from renewable sources for a maximum of 15 years, though the final go-ahead on this particular incentive lies with the European Commission.
- **Eco-school plan.** A national plan for interventions for the energy efficiency of public schools is also envisaged, following a decree from the Minister of Education.

New Renewable Energy Decree 2019-2021 – The new ministerial decree concerning incentives for renewable energy sources for the three-year period 2019-2021 (the "New MD RES") was approved by the Ministries of Economic Development and the Environment on 4 July 2019 and entered into force on 10 August 2019. The new MD RES aims to support electricity production by renewable

energy resources, in particular: ***onshore wind, hydroelectric plants, plants powered by landfill gas and residual gas from purification processes, and photovoltaic systems***. However, the following sources are excluded: offshore wind, biogas plants, geothermal, biomass and bioliquid plants, ocean and solar thermodynamic systems. This exclusion is justified by the need to provide different and separate incentive schemes for those sources that have reached a high level of development, thus allowing a significant reduction in costs, as opposed to those sources that still remain highly innovative and are not widely diffused, while also having much higher costs. The New MD RES introduces support tariffs that are lower than those provided under the previous MD 2016[17].

Regarding investments in renewable energies, PV solar remains the most important renewable energy source in the Metropolitan area of Bologna. While there was an exponential increase in solar PV systems and generating capacity (supported by national incentives) between 2007 and 2013, this market has flattened out due to the reduction of subsidies. It remains to be seen what impact the new renewable energy decree will have on the Bologna territory's renewable energy capacity (in 2017 only 14.1% of the electric power consumed was generated by renewable energy, compared to 19.2% for the region as a whole).

Regional level

Emilia-Romagna was the first region to sign the memorandum of understanding with the **Italian Alliance for Sustainable Development (ASviS)** to raise awareness of the importance of *Agenda 2030 for sustainable development* and to prepare a ***Regional strategy for sustainable development***, using funding provided by the Ministry of the Environment for this purpose, in order to address the 17 Sustainable Development Goals through actions by the State, Regions and individual Municipalities.

Of particular relevance to sustainable development are the objectives set by the **Regional Energy Plan (PER)**. Launched in 2017,

17. www.dlapiper.com/it/italy/insights/publications/2019/09/the-new-res-decree-2019-2021-future-for-the-renewable-energy-sector/.

the PER envisages investments of **€ 248.7 million** through 2019; of these resources, around **€ 104.4 million** come from Regional Operational Plan (ROP) ERDF 2014-2020 funding through Priority 4 actions in support of the low carbon economy. By **2030** the Emilia-Romagna Region seeks to achieve:

- a **40% reduction in climate-changing emissions** compared to 1990 levels;
- a **27%** increase in coverage of consumption through **renewable energy resources**; and
- an increase in **energy efficiency** to **27%**.

To achieve the above objectives, the Region has focused on **deployment of European Structural Funds as a driver of sustainable development**, thus also establishing conditions for innovative ideas and projects. The ***Smart Specialisation Strategy (S3)***, required by EU regulations for the 2014-2020 programming period, addresses innovation at the regional level and is an integral part of the Regional Operational Programme (ROP) ERDF. Also in this case, Emilia-Romagna has put *sustainable development at the core of this strategy*, which serves as a transversal driver for all the priorities of the ROP, in some cases through specific dedicated actions and in others through support for interventions with environmental impacts.

The ROP Emilia-Romagna ERDF 2014-2020 has a dedicated thematic priority, **Priority 4-Promotion of the low carbon economy in the territories and in the production system**, which promotes energy efficiency and savings and the development of renewable energy sources by public entities and companies, within an overall context of sustainable development of the territory. The planned targets include: reducing energy consumption of industrial production processes and public buildings by 20% and increasing the energy production from renewable sources by enterprises by 20% and for self-consumption by 25%. The objectives of the Priority are:

- Promoting the reduction of energy consumption of businesses and the production of energy from renewable sources for self-consumption, also through creation of ecologically equipped production areas;

Table 2 - S3 Priorities in Emilia-Romagna as Encoded in the «Eye@RIS3» Tool

S3 Priority	Description
Providing healthy and safe food (agri-food)	Producing healthy and safe food products with **minimised environmental impact and with enhanced ecosystem services, zero waste** and adequate societal value. **Sustainable agriculture**, functional foods and nutraceuticals, **sustainable and smart supply chain, technologies and machines** for the agri-food industry, **sustainable and innovative packaging**
Sustainable construction	New construction materials and building techniques for **sustainable construction**. Sustainable **buildings, building redevelopment, smart buildings and cities**, innovative technologies in building construction and redevelopment
Mechatronics and the motor industry	New technologies and materials for the motor industry and other productions. Automated systems, **smart and sustainable manufacturing**, robotics, intelligent transport systems
Healthy living, care services and products (Life Sciences)	New technologies and medical devices to improve patients' care, diagnosis and treatment. New diagnostic methods for chronic and complex diseases. Regenerative medicine. Diagnostics and biomedical devices. Digital transformation for healthcare (e-health)
ICTs and new technologies for tourism, cultural and creative industries	Cross-sector innovation area: ICTs and new technologies for tourism, valorisation of cultural heritage and creative industries. **New technologies for the diagnosis, recovery, management and enhancement of cultural and environmental resources**. Technologies and models for co-creation of new experiential and cognitive experiences. Digital platforms and web services for tourism and cultural promotion. New technologies and digital contents for communication of products and services

Source: https://s3platform.jrc.ec.europa.eu/regions/ITH5/tags/ITH5

- Promoting the reduction of energy consumption in public buildings and structures and the introduction of systems for the production of energy from renewable sources;
- Promoting sustainable mobility in urban areas through the introduction of intelligent transport systems, the expansion of the fleet of eco-friendly buses and trolley buses and an increase in bicycle paths and areas with 30 km speed limits in order to moderate traffic congestion.

The total resources allocated to the Priority 4 amounted to € 104,379,054 (around 21.7% of total ROP resources of € 481,895,272). The data presented to the Supervisory Committee of 5 December 2019 demonstrated a high level of implementation of the Priority: the resources committed as of the end of the year had reached €106.05 million euros, or 101.61% of the budget.

Table 3 - Priority 4 projects under the ROP Emilia-Romagna ERDF 2014-2020

Calls for proposals and support measures	**N. of projects**	**Investments** (€ Mln)	**Contributions awarded (€ Mln)**
Energy requalification of public buildings	277	100.7	31.0
Renewal of rolling stock	80	15.4	13.0
Intelligent transport system	2	1.7	1.7
Energy part of Multipurpose Fund (*Fondo Multiscopo*)	458	40.5	40.5
Total	817	158.3	86.2

Source: Emilia-Romagna Region

Then there are other Thematic Priorities, particularly Priorities 1 and 3 of the ROP Emilia-Romagna ERDF 2014-2020, in which the focus on sustainable development and the green economy is a driver across sectors (covered in Section 5.3 of this chapter).

Furthermore, the Emilia-Romagna Region supports the development of the green economy through the system of the **Regional high-technology network** and the related **Technopoles**, as well as through the **Rural Development Plan 2014-2020**, and the **Regional Integrated Transport Plan "Prit 2020"**.

In order to monitor the progress of the green economy in Emilia-Romagna and regularly publish updates on line, the **Regional Observatory on the Green Economy (Osservatorio GreenER)** was set up in June 2013. Initially managed by ERVET, it is now **managed by ART-ER** under an Agreement with the Region. This Observatory is active in:

- Providing thematic and/or specific insights on the main green economy value chains, to verify a transversal development of the green economy and the enhancement of the regional production system also in an international perspective.
- Developing innovative tools to support the development of a green economy that is rooted in the territory and capable of generating and upgrading employment.

The overall outputs of regional policies that support the green economy can be seen in Table 4, keeping in mind that many of these efforts were aimed at building the capacity of the research and innovation system and not necessarily market-ready outputs with immediate effects on the regional economy.

Table 4 - Overall outputs of Regional Policies to support Low Carbon Energy and Environmental Sustainability and Ecosystem Services

719 projects financed	380 financings of companies	1,650 non-beneficiary companies involved	332 financings of research laboratories
117 contracts with research laboratories	3 new companies set up	55 patents directly generated by supported projects	€347.12 million worth of investments
€ 215.94 million worth of contributions	1,349 researchers involved	530 new researchers	2,785 persons trained

Source: www.regione.emilia-romagna.it/s3-monitoraggio/output.html (accessed 29/01/2020)

Territorial and local level

Several key policies are relevant to the development of the green economy in the metropolitan territory, also involving extensive collaboration between the City of Bologna and the Union of Municipalities.

Most important among these policies are the following:

- The ***Bologna Charter for the Environment: the metropolitan cities for sustainable development***: Signed by the mayors of the

metropolitan cities on occasion of the G7 for the Environment meeting held in Bologna in June 2017, the charter identifies **8 themes** related to the UN Sustainable Development Goal 11 "*making cities and human settlements inclusive, safe and sustainable*" with specific measurable and monitorable objectives and targets. The charter focuses on specific environmental issues: sustainable use of land; circular economy; adaptation to climate change and reduction of risk; energy transition; air quality; water quality; ecosystems, urban green areas and protection of biodiversity; sustainable mobility. It outlines the main principles for sustainable development.

- **Metropolitan Agenda for Sustainable Development**, adopted in July 2018 – Framework document for territorialisation of sustainable development, according to the principles and commitments made in the **Bologna Charter for the Environment** and the **UN Agenda 2030.** Provides guidance for the metropolitan policies, also identifying tools for local monitoring in the 8 thematic areas defined in the Bologna Charter.
- The **Sustainable Urban Mobility Plan (PUMS)**, adopted at the end of 2018, foresees reliance on cleaner public transport modes, including electric buses and trams, bicycle rentals, bike lanes as well as innovative mobility concepts (i.e. electric car sharing) and actions for sustainability of logistics and distribution.
- **Metropolitan Strategic Plan** (**PSM 2.0**, July 2018): Among the objectives of **PSM 2.0** is to "aim the promotion of new businesses towards the strategic topics of the **circular economy**, entrepreneurship in culture and new tourism, digital, services for healthcare and social wellbeing, industry of taste and nearby economy ('0' km)". It foresees setting up a ***District of the sustainable economy in the Apennine area*** to function as an incubator and area for experimentation of the circular economy.
- The **Bologna Local Urban Environment Adaptation Plan for a Resilient City (BLUE AP)** is recognised as a good practice at the European level. The plan was further developed under the LIFE project RAINBO, which introduced innovative approaches to water resource management and responses to urban heat waves.

5.3. National and regional/territorial policies to support green start-ups and green jobs

At the national level, the green economy received an important boost from the Italian government's decision to provide tax incentives for companies and building owners to invest in renewable energies and energy efficiency renovations of buildings (**ContoEnergia**) more than a decade ago. However, while these measures stimulated the growth of activities related to renewable energy (in the Bologna province, particularly in solar PV, but also biomass and small hydropower) and building renovation, these were not specifically aimed at supporting green start-ups and or green jobs.

The **Ministry of Economy (MISE)** has established a support scheme (***finanziamenti agevolati per imprese e cooperative sociali***) that provides for the granting of subsidised loans for investment programmes aimed at creating or developing social enterprises. The beneficiaries are micro enterprises and SMEs, including non-profits and cooperatives. Eligible sectors include: industry; tourism; commerce; buildings; audiovisual services; ICT; transportation; energy; agriculture; fisheries and maritime activities; health; culture; social, non-profits and other organisations; pharmaceuticals; and food. Thus, also green economy start-ups and activities could be supported.

In the territory of the Metropolitan City of Bologna, the **most important support to green start-ups and green jobs comes from the Regional Operational Programme (ROP) supported by the European Regional Development Fund (ERDF)**. However, it is important to point out that ROP support is aimed at developing the *research and innovation capacity* (Priority 1) of the region's companies and research organisations and the stimulation of *competitiveness of the enterprise system* (Priority 3) and *not specifically aimed at green start-ups and green jobs*, though these could be promoted by these programmes.

Regional Operational Programme (ROP) ERDF 2014-2020

Priority 1 – Research and innovation. This priority aims at strengthening the regional research and technology transfer network for

businesses. The supported interventions seek to increase the ability of companies to introduce new solutions and products, also through collaborations with research bodies, promoting innovation paths in strategic areas of the regional production system, strengthening the research of the high-tech network, promoting valorisation of laboratories and innovation centres through international collaborations and participation in European programmes such as Horizon 2020 and COSME, as well as supporting the development of high tech start-ups.

The objectives of the Priority are:

- strengthening the technological capabilities of the laboratories of the high-tech network through the acquisition of new equipment and instruments;
- increasing business innovation activities by providing support to research projects of enterprises, the acquisition of services for technological innovation, the adoption of innovative process and product solutions and research and development projects in collaboration with research bodies (centres, universities, etc.);
- strengthening the regional and national innovation system by supporting the participation of local actors in technological specialisation networks and in complex projects;
- supporting the creation and consolidation of high-tech start-ups.

The resources allocated to this Priority amount to € 140,568,582. Calls for proposals have been activated concerning the following:

- support for the management of the Technopoles of Emilia-Romagna;
- support for the acquisition of innovative services by SMEs;
- promotion of investments in Emilia-Romagna under Regional Law 14 of 18/07/14;
- **incentives for innovative start-ups**;
- support for small and medium-sized enterprises organised into networks for the realisation of innovation projects;
- strategic **industrial research projects aimed at priority fields of the S3**;

- attraction of investments in advanced sectors of Industry 4.0;
- strategic industrial research projects in the energy sector – Call for groupings of research laboratories;
- research and development projects of enterprises – Call for small, medium and large enterprises in individual or associated form;
- strategic industrial research projects – Call for groupings of research laboratories.

Priority 3 – Competitiveness and attractiveness of the production system. In order to increase the competitiveness and attractiveness of industry, the Priority focuses on supporting the growth of productive investments, the internationalisation of businesses, the **creation of new businesses**, promoting, among other things, direct incentives and interventions to support access to credit. A total amount of €120,473,818 has been allocated to the Priority which seeks to promote the following objectives:

- creating and consolidating micro, small and medium-sized enterprises;
- supporting the introduction and effective use of ICT tools in SMEs;
- qualification and innovation of entrepreneurial activities in areas with a greater tourist vocation and growth opportunities in the cultural and creative supply chains;
- restarting the investment system's propensity to invest;
- supporting internationalisation processes;
- improving access to credit through provision of guarantees for growth, diversification and internationalisation projects.

Among the measures that were activated are the following:

- Support to businesses for the Promotion of investments in Emilia-Romagna under Regional Law 14 of 18/07/14;
- Support to micro, small and medium enterprises in order to sustain productive investments;

- **StartER Fund**[18] providing loans at a subsidised rate, allowing up to 100% of the submitted project to be financed;
- **Regional Microcredit Fund** providing no-interest loans to support more liquidity, investment in innovation, in goods and services or to revitalise the structure of the company;
- **Support to launch and consolidation of innovative start-ups in the municipalities most affected by the seismic events of 2012.**

Dedicated funds for companies that can be used for start-ups and green economy activities

StartER Fund: A Multi-purpose fund providing subsidised financing for private partnerships, the "business" part of the fund promotes the **creation of new businesses** and supports the **growth of enterprises** operating in the sectors covered by the **S3, so it can also be used for green economy activities – even though this is not its focus**. It supports the creation of new businesses with a minimum value of € 20,000 and up to € 300,000. It is implemented by the Emilia Romagna Region and managed by Unifidi Emilia Romagna as part of the ROP ERDF 2014-2020 actions for the competitiveness and attractiveness of the production system. Beneficiaries are individual companies or associations of companies, established in a period not earlier than 5 years from the presentation of the application for funding. Permitted interventions: interventions on instrumental properties, purchase of machinery and equipment, acquisition of patents, licenses, brands, launching, expenses for participation in fairs and promotional interventions, consultancy, expenses of personnel assigned to the project, material and stocks, rental costs of premises, costs of production of technical documentation necessary for submitting the application.
Regional Microcredit Fund: While also not specifically dedicated to the green economy, it is a financial instrument for those who want to improve their business by having more liquidity, investing in innovation, in goods and services or to revitalise the

18. Unifidi Data ultimo aggiornamento: 13-12-2019, www.cittametropolitana.bo.it/progimpresa/Fondo_Starter_nuove_date_per_presentare_la_domanda www.fondostarter.unifidi.eu/.

structure of the company. The Fund can provide up to € 25,000, without interest and with only the costs of a background check (*istruttoria*) and a credit guarantee. It is possible to apply until December 31, 2020. Access to the microcredit fund is available to: self-employed workers and freelancers operating in Emilia-Romagna, VAT holders with no more than 5 years of operation at the date of application, and with a turnover of up to € 100,000; freelancers enrolled in professional associations or members of professional associations included in the MISE list (Law 4/2013); sole proprietorships, partnerships, simplified limited liability companies or cooperative companies continuously operating in Emilia-Romagna, which at the date of the application have been started for no more than 5 years with an annual turnover of up to € 200,000; the aggregate forms between professionals with the same requirements as for businesses. Admissible investments include: innovation, ICT products and solutions, organisational development, new products and/or services that present concrete potential for the development and consolidation of new employment, training, even of a university or postgraduate school nature aimed at improving their own professional qualities and technical and managerial skills or those of their employees. The Fund also addresses liquidity needs related to the development of the business, including personnel costs[19].

Other measures and structures

The **Emilia-Romagna START CUP**, organised by ART-ER and the Emilia-Romagna Region, is a competition for innovative business ideas in the fields of life sciences, ICT, **cleantech & energy**, and industrial sectors. Research centres and universities that present the best business plans benefit from a training and mentoring path to encourage creation of new highly innovative businesses that involve industrial associations, incubators and public administrations throughout the region. During the final event, selected teams will present their project in front of an audience of investors, venture capitalists and market players.

19. Emilia-Romagna Region.

In addition to the above regional measures, the Metropolitan City of Bologna has worked closely with a range of partners to stimulate the environment for start-ups and has set up a number of innovation and technology incubators in the centre of Bologna – some of these provide green economy services. The Metropolitan City is a member of the **Emilia-Romagna STARTUP platform** and **IncrediBol** – *Creative Innovation in Bologna*, a project aiming to promote the growth and sustainability of the creative sector in Bologna and Emilia-Romagna. Since 2001 the Metropolitan City has built up and coordinated **BAN Bologna** (business angel Network), a network of informal investors and companies affiliated with Italian and European BAN networks.

Almacube is the incubator and innovation hub of the University of Bologna, providing services and support to spin-offs and start-ups (mentorship, networking, financing), and is sponsored by Confindustria Emilia Area Centro, which is a member of the incubator, and Intesa San Paolo bank.

5.4. Voices from the territory regarding green start-ups

A key actor in the support to green start-ups is **ART-ER** (Attractiveness Research Territory-Emilia-Romagna), a consortium created through the recent merger of ASTER and ERVET[20]. ART-ER is dedicated to fostering the sustainable growth of the region through the development of innovation and knowledge and promoting the attractiveness and internationalisation of the territorial system. Established by L.R. #1/2018, ART-ER operates on a non-profit basis.

Besides managing the afore-mentioned **Observatory on the green economy** (Osservatorio greenER) which monitors the development of the green economy in the Region, it coordinates the **Climate-KIC for Italy** (see next section of this chapter) and **Emilia-Romagna STARTUP**, which provides *direct support to start-ups* through the **Serre di ART-ER** and the above-mentioned

20. ASTER, the regional research and innovation agency, and ERVET, the Region's in-house sustainable territorial development agency, were merged in December 2018.

START CUP competition for innovative business ideas. Set up in 2011, **Emilia-Romagna STARTUP** has developed a community of 450 innovative start-ups and 80 organisations.

Le Serre di ART-ER (the greenhouses of ART-ER) is an **ART-ER incubator**, managed in cooperation with the Municipality of Bologna and supported by regional co-funding. Housed in the offices of the Golinelli Foundation in the Giardini Margherita greenhouse area, the incubator can host up to 7 companies and business projects that have a high level of knowledge, innovation and creativity. While ***not specifically aimed at green start-ups, several green start-ups have been supported by the incubator***, including **Sfridoo** and **Agromet**. The incubator provides services and support (Infodesk), hosts events, and participates in European initiatives. The accelerator process of the Serre di ART-ER, accessible through a competitive call, foresees: use of furnished offices with access to services (WiFi, conference rooms, printer, cleaning and security) for a subsidised rent of € 70 per month per office; entrepreneurship training through events and lectures; a dedicated ART-ER tutor who coordinates the acceleration process of each beneficiary and identifies opportunities for putting the beneficiary in touch with other actors in the regional ecosystem; access to the ART-ER Mentor Board; access to networking events; counselling on topics associated with starting up a company; Demo Day involving investors, institutions, and companies at the end of the process.

The following table lists several green start-ups that were supported by different public structures and measures, including an initiative from the previous ROP ERDF SPINNER 2013.

Table 5 - Selected green start-ups in the Bologna Metropolitan area

Start-up	Location	Supported by	Business Description
Agromet	Bologna	SPINNER 2013 ART-ER, Climate-KIC, DEMO-CENTER SIPE, Le Serre di ART-ER	Agro-meteorological products and services with high technological and innovative content for companies whose activities are weather-sensitive, mainly in the agri-food sector. The consultancy evaluates interactions between agronomic practices and weather-climatic conditions, creating innovative services and software to help the large-scale retail sector improve logistics for sales of fruits&vegetables. The goal is to help customers improve organisation & planning, reducing wastes caused by poor management of resources, respecting green policies and safeguarding the environment.
ArgiTech srls	Bologna	ART-ER	**Production and sales of premixed plasters based on clay and natural and recycled products for bioconstruction.** The main innovation is the product "Argi Lite Bio Thermal Plaster": a clay-based indoor thermal plaster, made with organically grown hemp, recycled cellulose and recycled cellulose flakes.
Bettery	Bologna	**Horizon 2020 SME Instrument phase 1; StartCUP; UniBo Launch pad Climate-KIC**	Spin-off of University of Bologna's Chemistry Department, Bettery aims to commercialise patented university research. The NESSOX (NEw Semi-Solid flow lithium Oxygen) battery presents advantages over batteries already on the market or under

Table 5 - continued

Start-up	Location	Supported by	Business Description
			development: higher-energy density, faster recharging, safety and environmental sustainability due to absence of critical elements and heavy metals, and high thermal stability of the electrolyte. The technology combines the lightness of lithium/air batteries and the flexibility and modularity of redox flow batteries, Nessox could extend EV driving range to more than 600 km under normal use and can be recharged quickly by filling-up with "charged" liquid. *National prize for Innovation in Clean Tech & Energy; Premio Next Energy, Premio Marzotto*.
GREEN IDEA® Technologies	Bologna	**Smart & Start-Invitalia Ventures, EthicalFin, Emilia-Romagna STARTUP Alma Cube Climate-KIC**	An innovative start-up specialised in the eco-sustainable management of IT Products, aimed at revolutionising the market of IT products through application of a virtuous model for the Circular Economy, through the development of advanced and automated digital technological services that allow companies to achieve excellent environmental results and economic benefits aims to become a leader in Circular Soft ICT. *Recognised as a European eco-sustainable supplier*.

Table 5 - continued

NostrAEnergy	Bologna	SPINNER 2013	Provides consultancy in energy savings through the design, production and marketing of innovative processes for energy requalification & climate change mitigation in civil and residential settings.
PROLIBO Srl	Imola	ART-ER	Engages in the study, production and sale of biological purifiers using sequential discontinuous reactors powered by renewable energy sources, as well as both traditional and renewable energy production plants; collection and treatment of wastes; and development and realisation of high technological innovation projects on behalf of companies.
Sfridoo	Casalecchio di Reno	ART-ER, Le Serre di ART-ER Climate-KIC	first Italian online portal that allows companies to buy and sell their production wastes and residues. marketplace for supply and demand in the reuse and recycling market, following the principles of the circular economy. *ER-Rsi Award – Responsible Innovators (2019*).

Sources: www.emiliaromagnastart-up.it; www.bettery.eu

5.5. Case studies of innovation in the territory

Two cases of policy innovation in the territory were selected. The first regards the Climate-KIC innovation accelerator aimed at creating new businesses and business ideas and the second regards the DistrettoBio project.

Case 1. The **Climate Knowledge and Innovation Community (Climate-KIC)** of the European Institute of Innovation and Technology (EIT) has contributed significantly to the promotion of green entrepreneurship and to the development of Europe's human capital for climate-related innovations. Among the initiatives of the Climate-KIC is the ***High-performance Accelerator for start-ups and SMEs*** focused on *cleantech commercialisation in order to boost climate-related innovations into valuable, investable businesses*. Early-stage start-ups and SMEs get an opportunity to boost their growth, to cross national borders and to become worldwide technology leaders with substantial climate impact.

Climate-KIC Srl (headquartered in Bologna) promotes the EIT Climate-KIC initiative in Emilia-Romagna and throughout Italy and coordinates the Italian organisations that participate in the community. It undertakes three main types of activities: support to innovation, training and education, and promotion of entrepreneurship. The **Climate-KIC Start-up Accelerator** in Italy **has been coordinated by ASTER (now ART-ER)** since 2011 and, in 2018, cooperation was initiated with two important innovation support actors from the Autonomous Province of Trento: **Trentino Sviluppo** and **Trentino Innovation Hub**. The start-up programme supports the development of entrepreneurial projects and innovative start-ups from all over Italy that operate in topics associated with climate change. Beneficiaries have access to **mentorship, training and grants** under an **18-month programme covering 3 successive phases**:

- phase 1 – to acquire basic knowledge and **elaborate a business model** for the start-up;
- phase 2 – to **meet the first clients** in order to validate the business model;
- phase 3 – to develop the market and get ready to **meet investors**.

The start-ups that gain access to all three phases benefit from a **grant worth €50,000, participate in training sessions, receive**

individualised mentorship and have an opportunity for access to a master class, networking events, fairs and international competitions reserved to start-ups selected through different acceleration programmes supported by the Climate-KIC at the national level. For example, the Bologna-based Climate-KIC has supported four of the local green start-ups listed in Table 5: **Agromet**, **Bettery, GREEN IDEA Technologies and Sfridoo**.

Case 2. The **DistrettoBio** initiative supports the development of the green economy in a rural mountain area. Implemented by the Local Area Group (LAG) of the Bolognese Apennine area, the project is implementing a feasibility study for an organic agricultural district (**DistrettoBio**), building on Emilia-Romagna's strength as a producer of high-quality traditional as well as innovative food products. Besides conducting an in-depth study of the organic production potential of the territory, identifying the producers and processors, distributors and consumers of organic products, as well as products that could become organic, it also evaluates the sustainability, territorial management and school lunch facilities of the involved local authorities and identifies actions for awareness, sensitisation, involvement and public diffusion. The initial findings show that 33% of the cultivated area in the LAG is organic. Among the organic agricultural products produced, more than 70% are hay/forage, while the main crops are seed crops/cereals, chestnuts, fruit, grapes, vegetables and potatoes as well as other products. The second phase of the project develops a participative process. Rather than waiting for "green" activities to develop autonomously, the project takes a "systemic" approach, seeking to understand the underlying dynamics, the public and private actors, resources and territorial capacities and then involves stakeholders in a participative approach to facilitate an exchange of views, sensitisation and formulation of shared objectives. The role of local public authorities can be to stimulate and provide examples of innovation in local processes to adopt a circular economy in intervening in the area of wastes, transport, public buildings, energy, environmental services, agrifood purchases, and promoting

active citizenry through extensive communication and dissemination activities to increase the awareness. The project is currently ongoing and is supported by the **European Agricultural Fund for Rural Development (EAFRD)** and the Emilia-Romagna **Rural Development Programme (PSR).**

5.6. What will happen: forecasts and policies for the future

The development of the green economy has been a key objective during the current EU programming period 2014-2020, particularly in the European Union **Green Action Plan for SMEs** (2014) which rests on two important priorities for the European economy: supporting SMEs and promoting resource efficiency. It aims "to contribute to the re-industrialisation of Europe… by enhancing SMEs competitiveness and supporting green business developments across all European regions, notably in view of the fact that, at this stage, significant differences in resource efficiency exist between sectors and Member States"[21].

Yet with the new European Commission taking office in December 2019, it has become evident that the green economy targets for the future will be far more ambitious that the previous goals for 2020. The preparations for the new Programming period 2021-2017 have put far more emphasis on Climate Action, and in particular the translation of the European Goals into the territorial context. The **European Green Deal** and the decarbonisation goals for 2035 and 2050 are foreseen to have strong impacts on transport, manufacturing, energy use and agriculture as will the **EU Single Use Plastics Directive (EU) 2019/904** that goes into effect in 2021.

In 2019 the City of Bologna renewed its adherence to the *Covenant of Mayors for Climate and Energy* after the City Council's approval of the resolution that commits the local bodies adhering to the European level Covenant to ***reduce by 40% the emissions of carbon dioxide and other greenhouse gases*** by 2030.

21. COM/2014/044 http://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:52014DC0440.

Besides addressing the decarbonisation aspects of European policy, the Metropolitan city has committed itself to recycling and reduction of waste in order to realise the **Objectives of the Charter for the Metropolitan cities through 2030**. This charter calls for achieving more ambitious European goals such as preparation for reuse and recycling of 60% of municipal waste, landfilling of max. 10% of waste, according to EU Directive 2018/851. In this context, the Emilia-Romagna Region seeks to achieve the most ambitious regional objectives (minimum objectives: recycling of 70% of urban waste, separate collection of 73% of waste, landfilling of max. 5% of waste, under the Emilia-Romagna Law ER 16/2015). The Region has an ambition to reduce waste production to below the European average (483 kg/capita, Eurostat data updated to 2016 – the region is currently at 642.5 kg/capita[22]) and raise separated waste collection to at least 70% in 2025 and 80% by 2030. The medium-term objectives for 2021 call for reaching a 60% overall recycling rate (by Hera) and reaching a 70% packaging recycling rate (by Hera).

Furthermore, in the ***Scenario for 2021-2050***: the **Metropolitan Territorial Plan** (*Piano Territoriale Metropolitano, PTM*) and the **General Urban Plan lll** (*Piano Urbanistico Generale, PUG*) seek to achieve "*zero soil consumption*" through the careful monitoring of urban planning and to increase the socio-economic impacts of Nature-based Solutions (NBS) in Bolognese and metropolitan territory. Achieving sustainable urban mobility under the Sustainable Urban Mobility Plan (PUMS), through increasing electrification and cycling options, is another key objective.

These future challenges represent excellent opportunities for the growth of businesses involved in the green economy. Of particular interest are opportunities in the packaging, agri-food and mobility sectors as well as construction/building renovation and renewable energy/energy efficiency sectors.

22. Annuario Statistico 2019, Istat.

6. Regional and territorial situation of the green economy – Sofia, Bulgaria*

6.1. The territorial economic framework

Analysis of the overall economic conditions and dynamics in Bulgaria

Bulgaria is an Eastern-European, post-soviet country which experienced a significant economic transformation over the last three decades from a planned and centralized economy focused on heavy industry to a market-based and open economy, currently an EU member.

The GDP of the country is steadily growing ever since 1992 with a growth rate of 1.6% over the last decade to reach EUR 6550 in 2018 (Eurostat, 2019). The European Commission has produced an economic forecast for continuous growth of the GDP in the next years of around 3% and steady unemployment rate of 4%.

The distribution of the GDP among the economic sectors remains steady over the last decade with agriculture accounting for 4.69%, industry with 28.44% and services with 66.87% for 2017. In a regional perspective, there are significant discrepancies between the regions meaning that the southern regions in general produce more than the northern regions (National Statistical Institute, 2019). The following map represents the GDP in million EUR for 2016 per regions. It is evident that the economic activities are centralized in the capital region of Sofia while at the same time

* By Elitsa Petkova (*Cleantech Bulgaria*).

the majority of the other regions fall behind with slow economic activity and demographic challenges.

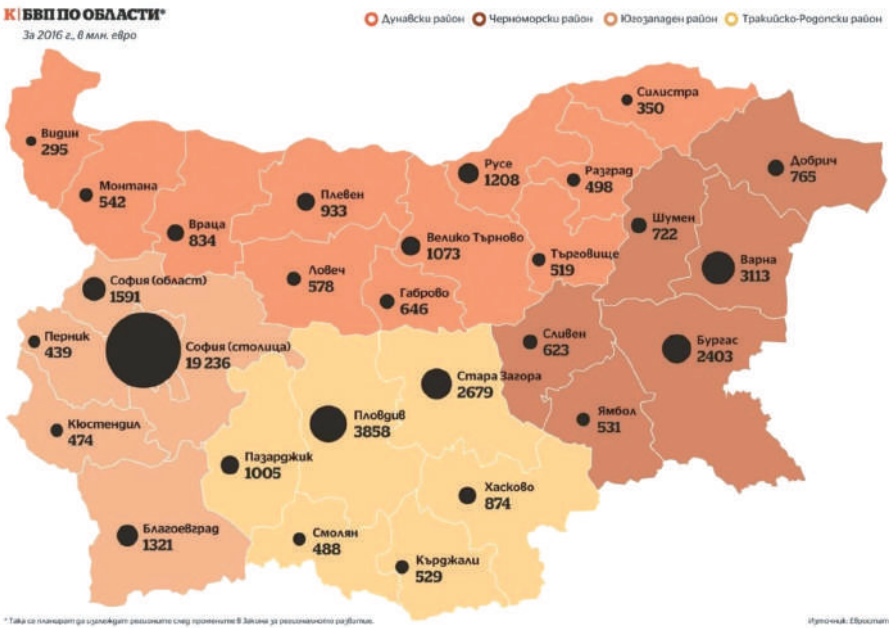


Figure 7 - Political-economic map of Bulgaria. Source: www.capital.bg/politika_i_ikonomika/bulgaria/2018/11/09/3342063_novata_karta_na_bulgariia/

The sectoral structure of the Bulgarian economy differs significantly from that of the other EU countries. Similarly to the global and EU conditions, the main driver of the Bulgarian economy are the SMEs, but the share of SMEs in high-tech, knowledge intensive services and R&D is extremely low and therefore the stimulation of entrepreneurship and start-ups in these sectors is really important. According to a SWOT analysis by the Ministry of Economy Bulgaria is ranked the last in the EU according to the priorities in the Small Business Act 2012 – "Internationalization" and "Innovation" and is in the bottom also for "Environment". Productivity of the SMEs is below the average for EU-28. The Operational Programme "Innovation and Competitiveness" (OPIC) 2014-2020 as a part of

the implementation of EU structural and investment funds (ESIF) in Bulgaria supports the capacity of enterprises for easier access, sustainable development and presence on markets but the SMEs still face limitations related to high production costs and the need for optimization of production chains, the use of obsolete production technologies, lower quality of products in some sectors.

The performance of Bulgaria in the green economy can be assessed as one of the poorest among the EU Member States based on the following indicators:

- policy efforts are mainstreamed namely to improving the general SME financing, building of new labor skills and extending producers' responsibility for materials and products and these activities are mainly financed through the EU programmes;
- the Bulgarian economy is the most resource intensive economy in the Union. The industry costs of protection and restoration of the environment in Bulgaria are significantly above the average among the other Member States with continuous increase of 15% on an annual basis. The manufacturing industry has the highest expenditures;
- the Bulgarian economy is the most energy intensive economy in the Union. It has the highest consumption of energy per unit product of GDP or with 77.34% more than the average level within the EU;
- the performance within the eco-innovation field is again below the EU-average and Bulgaria ranks last in the eco-innovation index of the EU-28 (identified as a modest innovator together with Romania) regardless of the ambitions of the country in the Smart Specialization Strategy to improve to a moderate innovator by 2020;
- Bulgaria is the last in the EU-28 in the output of environmental goods and services per unit of gross domestic product with only 2.7%.

These indicators signal urgent need for mass improvements in both economic and policy in the direction of the green and blue economy. Furthermore, the necessity for transfer of foreign knowl-

edge and practices to enhance the performance is essential (Revision of the Economy in the Balkans: Change Policy Not Climate!, 2018).

6.2. Policies for the green economy

For the purposes of the GREen Start-up Support (GRESS) project, the policy instrument identified for the partner region of Bulgaria is the nation-wide Operational Programme "Innovation and Competitiveness" (OPIC). Due to the national scope of OPIC, this chapter will go through national policies only.

National Strategy for SME Promotion 2014-2020

"National Strategy for SME Promotion 2014-2020", also called "Small Business Act", is a political document with mid-term nature by which the Government of the Republic of Bulgaria has demonstrated its vision of government policy to support SMEs in the country, harmonize their policies in this area with the policy of the European Union. The need to create about 12 000 new SMEs distributed in the relevant sectors of the economy, especially in the industrial and knowledge-intensive services, has also been taken into account. The strategy builds on ten thematic areas for intervention with defined strategic goals for 2020 and guidelines for action. The following table outlines the most relevant ones.

Particularly for the latter thematic area on Environment and the associated strategic goal, the strategy identified as relevant the following criteria to observe and act on: Innovations with environmental benefits; Share of SMEs with measures of resource efficiency; Share of SMEs that have received public support for the introduction of measures to resource efficiency; Share of SMEs satisfied with public support in the field of environment; Share of SMEs offering "green" products or services; Share of SMEs with a turnover of over 50% generated from "green" products or services; Share of SMEs that have received public support for the production of "green" products or services; Share of SMEs satisfied with public support for the production of "green" products or services.

Table 6 - Priority areas and Strategic goals in the Small Business Act 2014-2020

Priority area	**Strategic goal 2020**
Entrepreneurship	Bulgaria is a place in which entrepreneurial initiative has all the conditions for a quick and easy start-up and implementation.
State Aid and Public Procurement	Bulgaria is a country where SMEs have a free and competitive access to public procurement system which is fully electronic. State aid for SMEs is available. All the rules of the legislation in the field of competition are explicitly designed to promote more innovative and entrepreneurial business environment.
Access to Finance	Bulgaria is a country in which SMEs have free access to financing in all phases of the life cycle of an enterprise of seed and start-up capital through venture capital, growth capital, mezzanine financing and credit guarantees.
Skills and Innovation	Bulgaria is a country in which SMEs invest in R&D, creating their own or in collaboration and marketing of new or improved products and services, introduce new or improved organizational or marketing processes.
Environment	Bulgaria is a country in which SMEs invest in energy efficiency, developed and marketed, and used in the production "green" products. The state provides financial incentives for this purpose and informs entrepreneurs about all the possibilities on the way to "green" technologies.

The main financial instrument for the implementation of the actions in the Small Business Act is foreseen to be the Operational Programme "Innovation and Competitiveness" (OPIC) which is represented in the following paragraphs. OPIC 2014-2020 contributes to achieving the objectives in five priority areas of the National Strategy for Promotion of SMEs – entrepreneurship, access to finance, skills and innovation, environment and internationalization.

Operational Programme "Innovation and Competitiveness" (OPIC) 2014-2020

OPIC is a country-wide instrument to tackle the challenges in the Bulgarian economy. Besides addressing the challenges and priorities identified in the Small Business Act, the programme is closely related to the objectives for Growth and Jobs and

Bulgaria's contribution to achieving the three complementary types of growth according to "Europe 2020":

- smart growth: developing an economy based on knowledge and innovations;
- sustainable growth: promoting a greener and more competitive economy and a more efficient use of resources;
- inclusive growth: fostering a high-employment economy leading to social and territorial cohesion.

OPIC 2014-2020 directly engages in smart growth (under priority axes 1 "Technological development and Innovation" and 2 "Entrepreneurship and capacity for growth for SMEs") and sustainable growth (under priority axes 3 "Energy and resource efficiency" and 4 "Removing bottlenecks in the security of gas supplies"), aiming at complementary effect in terms of inclusive growth.

In the context of the green economy OPIC has contributed to addressing the main challenges in the Bulgarian economy by touching upon some of the thematic objectives (TO) of the European Regional Development Fund (ERDF) regulation i.e.:

Table 7 - Connection between Thematic Objectives of ERDF, Priority Axes and Investment Priorities in OPIC

Thematic objective of ERDF	**Priority axis in OPIC**	**Investment priorities in OPIC**
TO 3 Enhancing the competitiveness of SMEs	2 "Entrepreneurship and Capacity for Growth of SMEs"	2.1 Access to finance for supporting entrepreneurship
		2.2 Capacity for SMEs to grow
TO 4 Supporting the shift towards a low-carbon economy in all sectors	3 "Energy and efficiency" resource	3.1 Energy technologies and energy efficiency
TO 6 Protecting the environment and promoting resource efficiency	3 "Energy and efficiency" resource	3.2 Resource efficiency

The indicators and target values set under OPIC for 2023 (when the execution of the last projects will conclude) on the investment priorities are described below:

Table 8 - Performance indicators and target values in OPIC for 2023

Investment Priority in OPIC	**Indicator**	**Measurement unit**	**Baseline value in 2012**	**Target value 2023**
2.1	Number of enterprise survivals up to 2 years	%	74.5	77.0
2.2	Export volume of goods and services achieved by SMEs	Billion EUR	8.1	9.18
2.2	Productivity of SMEs	Value added at factor costs (BGN in thousand)/ employed persons	16.8	19.3
3.1	Energy intensity of the economy	TOE per 1000 EUR of GDP	0.671	0.604
3.2	Share of SMEs with measures of resource	%	85	93

The particular support of OPIC on SMEs and start-ups under the above-mentioned investment priorities is namely in the following actions:

- financial instruments in support of entrepreneurship including financial instruments combined with grants;

- encouraging entrepreneurial ideas in areas related to European and regional challenges and sectors defined in the National Strategy for Promotion of SMEs;
- general productive investments for enhancing the production capacity for growth through effective and efficient use of the factors of production and through creation of opportunities for adoption and adaptation of European and international knowledge and technology;
- support for specialized services to SMEs to develop and strengthen the management capacity;
- support for the growth of businesses by improving the quality and by promoting the use of ICT and services;
- support for the implementation of activities and services for direct benefit of the business development and opportunities for SMEs export;
- support for increasing the energy efficiency in enterprises by conducting audits for energy efficiency;
- institutional support for sustainable energy development by building capacity for quality and quantity of services provided to enterprises;
- support for pilot and demonstration initiatives to increase the resource efficiency in enterprises or group of enterprises.

In a green economy context, the following guiding principles for the selection of operations will be given a priority:

- promoting operations whereby the end result will contribute to mitigate or adapt to climate change;
- projects in RIS3 areas of smart specialization will be given priority;
- principle of sustainable development – The Managing Authority will ensure compliance with the principle of sustainable development on the funding of operations under OPIC (Ministry of Economy, 2015).

Innovation Strategy for Smart Specialization of the Republic of Bulgaria 2014-2020

The Innovation Strategy for Smart Specialization of the Republic of Bulgaria (RIS3) has the nature of an ex-ante conditionality for OPIC 2014-2020 and aims at ensuring an effective and coordinated management of innovation processes. The strategy deals with the approach of determining thematic objectives (based on the so-called entrepreneurial discovery process) with the potential to become generators of growth for achieving significant economic impact at regional and national level.

The Innovation strategy for smart specialization is a new approach to economic development, which is based on targeted support for identified technological niches that are promising and where business is interested to invest, and where human potential is available.

The vision of the RIS3 is formulated as "By 2020 Bulgaria must make a qualitative leap in its innovation performance at EU level to tackle public challenges in the field of demography (reverse brain drain and youth entrepreneurship), sustainable development, intellectual capital and the nation's health". The strategic goal is by 2020, for Bulgaria to move from the group of "modest innovators" to the "moderate innovators" group.

The strategic goal will be realized by achieving two operational objectives:

- objective 1: focus the investment for the development of innovation potential in the smart thematic areas (for creation and development of new technologies leading to competitive advantages and increase in the added value of domestic products and services);
- objective 2: support for accelerated absorption of technologies, methods and others. Improving resource efficiency and application of ICT in enterprises from all industries.

The thematic areas identified are "Informatics and ICT", "Mechatronics and Clean Technologies", "Health life and Biotechnology industries" and "New technologies in creative and recreative industry".

In a green economy context, the thematic areas "Mechatronics and Clean Technologies" and "Health life and Biotechnology industries" are relevant. The RIS3 strategy identifies the Clean Technologies focus on transport and energy sector – storing, saving, effective distribution of energy, electric vehicles and eco-mobility, hydrogen-based models and technologies, no-pollution technologies, technologies and methods for inclusion of waste products and materials in other production.

The main challenges outlined are related to establishment of cooperation along the whole value chain, as well as creating completed and complex products which are considered as lacking and in need of additional science-business cooperation, cluster support, support for TTO's and other good practices of EU.

The "Health life and Biotechnology industries" thematic area covers among other priorities these three relevant to the green economy context:

- "blue" technologies and application of new methods and technologies in sustainable use of sea and river resources;
- production plants for the extraction of clean electricity and industrial water;
- green/bio based economy (in accordance with the scope of definition of "Innovations for sustainable growth: Bio-economy for Europe"). Bio-based products are "products, that are entirely or partially produced from materials of biological origin, with exception of materials, imbedded in geological formations and/or focalized" (Ministry of Economy, 2017).

6.3. National policies to support green start-ups and green jobs

In order to stimulate the creation of green jobs in Bulgaria, a pilot trial measure began in the period 2011- 2014, with a budget of EUR 2.55 million. The aim was to support some 3654 jobs, including 3034 new jobs (within the operational programme "Human resources", co-financed by the EU Structural Funds, namely ESF and ERDF).

After 2014, the creation of green jobs is performed through joint measures between the Ministry of Environment and Water and the National Employment Agency under the Employment Promotion act from 2010. The following table presents the created green jobs under the measure since 2015:

Table 9 - Creation of green jobs under national measures for the period 2015-2018

Year	Green jobs created	Employers involved
2015	106	29
2016	89	12
2017	80	12
2018	58	19

The pilot showed that efforts were concentrated in the first years followed by a continuous drop of work placements in the subsequent years (Ministry of Environment and Water, 2020).

6.4. Voices from the territory regarding green start-ups

Sofia Municipality

Sofia is the first region in Bulgaria to pull ahead from modest to moderate innovator and shares about one third of the country's environmental goods and service which is growing with 14% average (€ 1,939.25 mln) and of the market activity of eco-products and services with annual growth of 10%.

Over the last 10 years the enterprises in Sofia region have realized innovation projects with green growth impact of over € 119 bln.

Sofia Municipality became the first municipality in Bulgaria with its own RIS3 –the Innovation Strategy for Smart Specialization of Sofia, which once again underlines the importance of two of the four sectors in the national ISIS for the development of Sofia – Informatics and ICT and new technologies in the creative and recreational industries. Sofia Investment agency makes efforts to

concentrate and cluster knowledge intensive business and support its transformational role towards low carbon economy.

Sofia is an early adopter for Bulgaria of regional development instruments for support of business environment – the Municipal Guarantee Fund for SMEs (MGFSME) with budget for guarantees of € 1.2 mln and Sofia Investment Agency's 'Start-up Sofia Accelerator.

MGFSME gives priority to innovation driven projects by women entrepreneurs, people under 35 and above 50 years old, with a significant social and ecological effect and high potential for creation of new jobs.

'Start-up Sofia Accelerator' is an initiative of Sofia Municipality to support innovative, start-up and social entrepreneurs in their process of preparing for application for funding from banks and investors. The 3-month accelerator offers grants of up to 5000 euro per project and provides mentoring, communication and institutional support, access to shared workspace and the start-up environment etc.

Around 2000 start-ups were created in the country between 2013-2018, and about half of the start-ups that received funding still exist today, according to data from the Bulgarian Ministry of Economy. An overwhelming percentage of the start-ups were created in Sofia. In 2015, Forbes magazine ranked Sofia in the top 10 cities around the world to launch a start-up (Sofia Investment Agency, 2019).

Since 2016 the EIT Climate KIC Accelerator has been operating in Sofia through Cleantech Bulgaria – the official country hub of EIT Climate-KIC and InnoEnergy. It attracts more than € 1.4 mln of EU funding for green-tech entrepreneurs resulting in 20 incorporated cleantech companies and 12 eco-products and services launched on the market.

In 2018 Sofia Innovation Lab was established by the Sofia Development Association with 150 m2 space dedicated to developing the skill of the future. Over 12 000 participants in innovation events, workshops, including hackathons were reached only for 2018.

Business associations or research centers and business support organizations

The Bulgarian Start-up Association (BESCO) is a non-governmental organization that acts as a bridge between start-ups, private and institutional investors, the government and other stakeholders in the innovation industry. The organization members are more than 160 from diverse sectors (including incubators, funds, co-working spaces) and work collaboratively on proposing major policy and economic improvements and measures for supporting start-ups to the public and other responsible authorities in Bulgaria (Bulgarian Start-up Association, 2020).

Start-up Navigator (www.start-upnavigator.eu/) is an online platform that collects in one place comprehensive information on the start-up ecosystem in Bulgaria, analyzes its needs and addresses them. By providing interactive maps on start-ups, business services, investors, accelerators, co-working spaces and corporates, the platform helps entrepreneurs in finding information on everything needed for their starting business. One of the major aims of the platform is to facilitate the connection between established businesses and start-ups as well as other stakeholders in their journey of customer acquisition.

Innovative companies or start-ups

Even though Bulgaria ranks last in the EU Innovation Scoreboard, impressive examples of innovative start- ups have emerged in the recent years. The start-ups listed here are funded by EIT Climate KIC Accelerator programme but tend to show significant progress in market survival and business development with the green solutions they produce.

Nasekomo is a company that produces sustainable insect products for the feed and agriculture industry. This solution drives circular economy by transforming organic agro-industry by-products into animal proteins through Black Soldier Fly (BSF) insect farming. The frass produced by the insect is an organic low-carbon-footprint fertilizer, an alternative to the traditional fossil-fuel based fertilizers. It also prevents the impoverishment of soil by re-injecting in the ground various micro-elements taken for the

local agricultural coproduction. Further application is that the solution does not require arable land.

Due to vertical farming it takes up far less land than traditional protein production methods. Last, but not least this solution helps keep the value chain plastic free by replacing fish meal with insect meal in the aquaculture feeding (which currently has high fish-in-fish-out ratio that is expected to further increase unsustainably) and thus preserve oceans' biodiversity. Since its establishment in June 2017, the company has achieved few significant milestones i.e.:

- January 2018 – Chivas Venture finalist for Bulgaria
- February 2018 – First round of 1M EUR raised from private investors
- June 2018 – Demo factory in Bulgaria fully functional
- December 2018 – The team grows 6 times since inception to support growth
- February 2019 – Nasekomo is among the 5 insect producers in Europe to secure needed permits for sale of insect protein.
- April 2019 – Nasekomo is accepted in the Climate-KIC Accelerator program that supports green companies developing sustainable solutions
- June 2019 – First several tons of insect meal shipped to clients in the European union – pet food and aquafeed producers. (Nasekomo, 2020)

Biomyc revolutionizes the packaging industry by developing innovative packaging solutions from sustainable feedstocks – crop waste and the root structure of mushrooms – creating eco-friendly composite material that rivals plastic foam. All materials are completely biodegradable. The company combines cutting edge technologies, eco design and product management to bring sustainable innovation to the market and to enable circular business models. Biomyc is a European winner of the Start-up Europe Awards in category Green for 2017, selected as one of the cleantech top 30 start-ups from the EIT Climate- KIC accelerator in 2017 and an award winner at the Sustainable Future Forum, initiated by the Green for Growth Fund in 2018 (Biomyc, 2020).

Hyperfold is another example of green innovation in Bulgaria that takes material usage on another level. It represents a collapsible technology that offers new design and superior functionality for packaging and reusable products. Similar to origami, Hyperfold allows thin tubular-shaped containers fold to less than 10% of their initial volume. This solution helps solving the plastic waste problem in two ways. Firstly, the development of a range of practical reusable products that truly replace the most common packaging. Secondly, bringing more responsible disposal of bulky packaging, lowering waste volume and optimizing the recycling process. In the end of 2019, Hyperfold has just started serial production of their origami bottles which are expected to arrive on the market in the early 2020 (Hyperfold, 2020).

6.5. Case studies of policy innovation in the territory

Starting in 2019, Cleantech Bulgaria in cooperation with EIT Climate-KIC initiated a project called "Deep Demonstration on Circular Economy in Bulgaria". Bulgarian decision makers have an incentive and ambition to work towards the circular economy (CE), yet a long way to go and much knowledge to gain along the way. The CE is a complex interdisciplinary concept, which requires a system-based approach to tackling all aspects of CE (resource efficiency, waste, bio-economy, education etc.). The Ministry of Economy was identified as a problem-owner.

The initial activity to be undertaken was a mapping of circular economy policies, programmes, instruments, initiatives and action plans in the public sector. Subsequently, with an official decree of the minister of economy an interministerial working group on the topic of circular economy was created where state experts from the identified relevant ministries (Ministry of Economy, Ministry of Environment and Water, Ministry of Education and Science, Ministry of Energy, Ministry of Agriculture and Foods, Ministry of Regional Development and Public Works and Ministry of Social Policy and Labour) were appointed. The experts committed to participate actively in the working sessions organized and to

provide input on the information needed and outputs produced towards achieving the main objective of the working group and the Deep Demonstration activity-holistic approach through synergy creation between existing and upcoming strategic documents, priorities and instruments supporting the circular economy transition in Bulgaria which will be done in a complementary manner in contrast to the work in silos currently established.

As a result of the meetings held and the co-creation process conducted in 2019, a more aligned and firm vision for the development of the deep demonstration activities in 2020 is established through a mutually agreed work plan developed. The main achievement of the Deep demonstration then will be the setting of actual pilot activities through a portfolio brief developed, which will be realized within the upcoming programming period 2021-2027. The activities should serve for demonstration of opportunities for synergy creation between different ministerial instruments supporting the development of a circular economy in a complementary manner, where resources are utilized in the most efficient way possible and priorities and goals of all partners have been equally and successfully achieved.

The deep demonstration activity has initiated a novel process of collaboration among six ministries participating actively in the process. This said, according to the deep demonstration logic of activity the process has finalized only the intent phase where in 2020 the stakeholders involved with the support of Cleantech Bulgaria and EIT Climate-KIC will move into the framing phase with an end goal of developing an actual portfolio brief to be realized in 2021 and beyond.

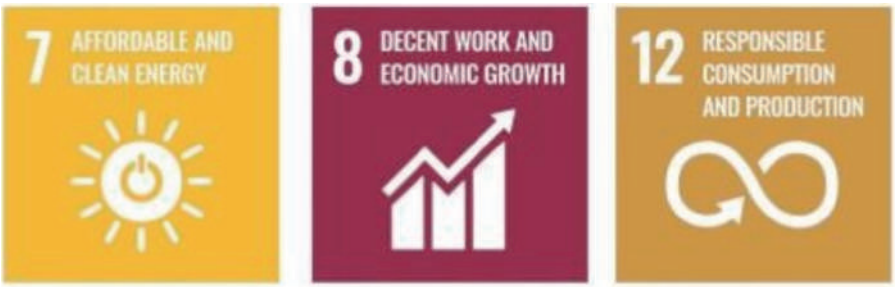
Stakeholders have expressed their reliance on Cleantech Bulgaria and EIT Climate-KIC's expertise in the field of system innovation in the circular economy policy domain, considering as well the local specificities and what can actually work on ground. Such a holistic approach has not been applied previously and thus opens a wide field for exploration and experimentation. Nevertheless, activities and solutions provided should be specific enough considering the seriousness of the task taken up and the co-creation partners involved. Based on this activity Cleantech

Bulgaria and EIT Climate-KIC have the opportunity to show the capacity and expertise the wider EIT community can bring in developing such high-level policy instruments stimulating a country's economy.

6.6. What will happen: forecasts and policies for the future

The Bulgarian government is ambitious in terms of guiding the country in the direction of sustainable development and future growth and this is evident with the preliminary work on the National Development Plan "Bulgaria 2030". Even though the document is still in a draft phase, it is ranked as a highest order framework document in the hierarchy of the national programing documents and determines the vision and common goals of the development policies in all governing sectors.

The Plan identifies three strategic aims, five development axes and 13 national priorities (connecting of each development axis and national priority to the relevant UN SDGs). Development axis 2 "Green and sustainable Bulgaria" fits to a great extent to the purposes of this analysis. The axis covers three national priorities including Circular and low-carbon economy that touches upon the respective SDGs:



The main focus of the priority "Circular and low-carbon economy" is improving resource efficiency, and energy efficiency in particular by following the principles of the circular economy

and stimulating the implementation of low-carbon, resource-efficient and no-waste technologies. As stated above, the Bulgarian economy is the most resource-intensive in the EU and it is crucial to decrease the resource usage at a faster pace compared to the other Member States. The intention is to implement a transition from disposal to prevention, reuse, recycling and recovery of a great amount of the waste generated by industry and households in order to transform the economy from linear to circular model. The implementation will be conducted by the following targeted actions:

- support for the enterprises to perform eco-innovation activities, including new eco-products and technologies;
- creation of jobs in the field of green and blue economy;
- reducing the amount of waste generated in the production processes, including public procurement projects;
- improvement of energy-efficiency of the industry by implementation of economic stimuli for greater energy efficiency of the business;
- implementation of market stimuli for reduction of energy consumption of the business including encouragement of investments in energy-efficient equipment;
- increase of the share of renewable energy in order to minimize the dependency on imported fossil fuel;
- waste management: Increase of the share of composted bio-waste and recycled household waste, waste from construction compared to the amount sent to landfill; Accessibility to separate waste collection systems; Extended "producer responsibility"; Application of the principle "Polluter pays";

7. Conclusions

The ambition of the present document was to gather the analysis of the green economy regional framework in the five GRESS project partner regions, in order to enable a deeper and more consolidated understanding of the existing factors and policies playing a role in fostering the sector in these territories. The analysis was based on the assumption that territories are living systems continuously in evolution where diverse interests, economic drivers, social factors and policy instruments may influence further development and allow valuable services for green start-ups and SMEs to develop. For this reason, a deep understanding of the existing situations in the regions was necessary as a starting point for the GRESS project to pursue the objective to improve policies and reinforce SMEs' competitiveness in the green economy.

In particular, the analysis focused on the diverse peculiarities of each project region in terms of existing policies at national or regional level, types of stakeholders involved, support services and innovation instruments, main start-up economic sectors and potential for the future. The analysis provides evidence of the fact that all countries consider the green economy as a driving sector for more resilient and sustainable territorial development and they are all positively influenced by the European policy framework stimulating and supporting the green economy. Nevertheless, fundamental differences may be found in the main green economy sectors to be fostered, the actual status of development of specific policies and instruments for the sector, as well as in the integration

of European policies with national and local policies providing strategic orientation and operative support instruments. For instance, in some cases it was found that the national policies for innovation and green development are highly integrated with specific regional and local policies, as in the case of Kristiansand and the Metropolitan City of Bologna. However, whereas in the first case more attention should be paid to indirect emissions and supporting scaling-up processes, in the latter case the financing instruments and support services accessed by green start-ups and enterprises at regional level are currently not specifically designed for them and a more specific focus at this regard is needed in the future. On the contrary, Sofia municipality is trying to boost green start-ups development through acceleration programmes, even if at Bulgarian national level national policies still play a more central role and the dependency on European funds is still significant.

A further interesting point emerging from this initial analysis is that the demand for more green products and services is not perceived as sufficiently high till now and that more incentives might be provided by public institutions through the adoption of Green Public Procurement. As a matter of fact, a generally positive asset in some countries is the presence of a wide variety of actors – businesses, university and research institutions, public institutions, public service providers – having a proactive role in fostering the sector and working in close cooperation to provide green businesses with more complementary tools. The analysis also showed that more policies for the increase in green jobs are probably needed in most of the project territories.

The positive case studies and best practices collected will particularly have a central role in the mutual learning exchange phase of the project, through which the partners will have the chance to exchange among each other and try to integrate the lessons learnt in the existing policy instruments addressed at local level. Indeed, interregional learning is one of the main dimensions fostered by projects funded under the Interreg Europe programme, which promotes exchange of experiences among diverse European regions for them to learn from each other and build innovative policies in their territories.

This Study acts as a preliminary analysis of the existing strengths and weaknesses of each project region and was complemented in the following months by a survey addressed to start-ups and SMEs in the green economy.

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   Chamber of Commerce, Kristiansand region (Mr Roar Osmundsen)
   University of Agder, Center for Entrepreneurship and Innovation, (Dean Mr Bjørn Tore Flaaten)
   Ungt Entreprenørskap, Junior Achievement, Agder (Mr Aleksander Lien)
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