

Support for the process of coordination and development the work of the EUSAIR pillar Environmental Quality in Innovation

***Innovation Expert analysis – Eco-innovations & circular
economy***



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Summary

The study was prepared as a result of the outsourcing activity from the innovation experts to support the process of coordinating and developing the work of the EUSAIR (TSG3) 3rd Pillar - Environmental Quality in the field of innovation. The aim of the study is to prepare the grounds for further planning of activities to stimulate eco-innovation and elements of circular economy across the defined flagships in TSG3 (3MSP, ASOSCoP, ICZM & SME and PET HAB ECO).

The methodology and structure of the study follows the guidelines received in the call for experts and was harmonized with the Facility point Izola along the preparation of the study. The study is structured and divided in 7 chapters, as follows: 1. Background of the study and methodology presentation, 2. Setting the context of eco-innovation and circular economy, 3. Presentation of best practices of eco-innovation and circular economy in EUSAIR TSG3, 4. Project and transnational programs related to TSG3 – Environmental quality dealing with eco-innovation and circular economy, 5. Proposals to stimulate eco-innovation and circular economy, 6. Sources used in the preparation of the study and 7. Appendix with detailed presentation of the reviewed projects in chapter 4.

Context definition - circular economy and eco-innovation

As emphasized above, we have focused on eco-innovation and circular economy during review and identification of projects and as well best practices. One of the solutions in order to protect environment are eco-innovations. Eco-innovations are a subset of all innovation in an economy (Wagner 2008). Eco-innovation is defined as “any innovation that reduces the use of natural resources and decreases the release of harmful substances across the whole life-cycle” (Eco-Innovation Observatory 2013). Eco-innovations provide a win-win situation for companies and environment (Horbach 2008) and are further “central to the promotion of sustainable and smart growth because of the benefits, which can be brought to the economy and the environment” (European commission 2012).

On the other hand, a broader and the newest concept on which we focused is circular economy, defined by the Ellen MacArthur Foundation as “an industrial system designed to be regenerative that aims to rely on renewable energy; limits, tracks and reduces the use of toxic chemicals; and eliminates waste through the design of materials, products, systems and business models.” Circular economy is a model of industrial ecology that suggests concrete solutions to achieve a sustainable way of living and an environmentally friendly economy (Kobza and Schuster 2016). Different to the linear model, the innovative circular economy approach comprises life cycle thinking and considers both stocks and flows. Thus, ideally, also at a product’s end-of-life stage, materials should serve as a resource, in order to be led back into the cycle.

Best practices

Altogether have been identified 4 best practices dealing with eco innovation and circular economy: two from Slovenia, one from Greece, and one from Croatia. Business practices have been analyzed

with the same questionnaire along different aspects in order to describe their eco-innovation or circular economy business practice. We have encompassed the following information, such as short presentation of the company, in addition of their eco-innovations with demographics, motives and drives to start with eco-innovation and which problem it addresses, main barriers and obstacles in its implementation, as well as stakeholders involved, benefits of their eco-innovation, potential rewards and funding, future vision of the company and lessons learnt, where relevant.

Companies and organizations behind the innovations have been on different stages of development, from a pilot projects implemented (Clera One), to very developed ones, with the international/global presence and operations (Turing Turbine, Agena Marin, and Enaleia). Best practices identified vary significantly also in their activities/approaches. **Enaleia (Greece)**, a non-profit enterprise was proposed because through their circular economy business practice “Mediterranean Clean-Up”, with which they aspire to implement a wide-scale cleanup of marine plastic in the Mediterranean region in collaboration with professional fishers. The marine plastic collected by fishermen and the used fishing equipment is recycled and upcycled, being integrated into the circular economy.

Toring Turbine (Slovenia) is example of eco-innovation, which solutions are being implemented in more then 72 countries and have references from almost every industry dealing with water. With their eco-innovation, a specific turbine, which efficiently, innovatively, and sustainably transfers and injects air to water, supplies water with life. Their aerators last longer, need less energy and are simpler for maintenance. Similarly, **Clera One (Slovenia)** is also an example of eco-innovation, but in its early stages, with only pilot projects implemented. Their eco-innovation is a water recycling system for laundry rooms, to help them use water more sustainably. The system collects wastewater, puts it through a filtration system to clean it up, and so reuses it.

Agena Marin (Croatia) is a producer of solar boats; electric boats that are truly sustainable, are long-lasting and made of eco-materials. The design of the boats is cost-effective, while minimizing the negative impact on the marine environment. The historic boat's line styling was inspired by the vessels from the 1920s. Built with a vacuum infusion technique, it uses a "sandwich" core made mostly of recycled PET bottles. With the help of advanced engineering, they have managed to create a light but robust, innovative boats. The economical cruising speed is 5 knots, and maximum around 6,5 knots with 6 kW outboard engine

Project and programs analyzed related to TSG3 with eco-innovation and circular economy elements

This study has proposed a framework for classification and monitoring the inclusion of eco-innovation elements and practices related to circular economy within EU co-financed projects under selected program schemes (transnational programs - Interreg, Horizon program and Life program) for the TSG3- Environmental quality and specifically for each of the four flagships, as follows:

- monitoring and management of marine protected marine species,
- sustainable development of the coastal and maritime zones,
- protection and enhancement of natural habitats and terrestrial ecosystems,
- transnational contingency plan in the event of accidents at sea.

We have identified projects that cover the abovementioned flagships and have been implemented in the time period 2014-2020. We focused on projects that indirectly or directly engage or promote eco-innovation (*refers to any innovation that reduces the use of natural resources and decreases the release of harmful substances across the whole life-cycle*) or any other element of circular economy (*is the main alternative to the linear “use and throw” model that is currently used – this circular model aims to minimize the environmental cost of production processes and products as much as possible during their life cycle in order to be more efficient in the use of resources, commonly known as well as reduce, recycle, reuse*). In addition, we searched for and identified the elements of general innovation, eco-innovation or circular economy. Moreover, we classified further the detected innovation based on the Oslo Manual into product, process, organizational or marketing innovation.

Based on review of projects we came to the following conclusions. Following the abovementioned criteria, we identified 98 projects that pertain to Environmental quality, of which:

- 21 projects have been found to cover monitoring and management of marine protected marine species,
- 38 projects for sustainable development of the coastal and maritime zones,
- 30 projects for protection and enhancement of natural habitats and terrestrial ecosystems,
- 9 projects for transnational contingency plan in the event of accidents at sea.

Moreover, focusing on flagships and different types of program schemes, we can summarize that regarding the four flagships of Pillar 3 – environmental quality, the majority of projects pertaining to the flagship monitoring and management of marine protected marine species were Horizon projects (14), followed by 4 Life projects and 3 Interreg projects. Regarding the flagship sustainable development of the coastal and maritime zones the majority of projects were Interreg projects (27), followed by 8 Horizon and 3 Life projects. There were 18 Interreg projects pertaining to protection and enhancement of natural habitats and terrestrial ecosystems, 9 Life and 3 Horizon. Finally, the lowest number of projects has been identified for the flagship transnational contingency plan in the event of accidents at sea, 7 Horizon and 2 Interreg, and neither one Life project.

In addition, regarding budget, the projects pertaining to Environmental quality, were estimated to 1 581 627 196,65 EUR. In more details, in monitoring and management of marine protected marine species have been invested 931 316 980,31 EUR, in sustainable development of the coastal and maritime zones 494 087 604,16 EUR, in protection and enhancement of natural habitats and terrestrial ecosystems 128 629 383,69 EUR, and finally, in transnational contingency plan in the event of accidents at sea 27 593 228,49 EUR.

Focusing on innovation, the majority of reviewed projects indirectly promote or engage, implement eco-innovation or other elements of circular economy, however we have found elements of innovation, eco-innovation or circular economy in all together 39 projects, among those 12 projects had elements of general innovation and 27 projects elements of eco-innovation or circular economy. Many projects develop product, organizational or process innovation, some also demonstrate elements of marketing innovation – as awareness raising. The majority of projects include networking, transnational cooperation, co-creation and engagement of citizens, public and many as well focus on technological innovations as software and hardware and similar elements that lead eventually to better sustainability or less harmful effects on the environment.

The analysis of the projects showed also that the projects that either started in the previous financial perspective (and have not been completed by the end of 2020) or are starting, contain more elements of eco-innovation and better address the circular economy (at least from general description), so we advise to establish ongoing monitoring of funded projects and how they address these elements of eco-innovation and the circular economy by individual funding programs, pillars and last but not least flagships. Therefore, the **mentioned monitoring approach in this study can also be a pilot framework**, according to which funded and implemented projects up to the level of individual flagships would be reviewed and monitored also in the future.

Proposals to stimulate eco-innovation and circular economy

Identified EU policy instruments already in use in that aim to address the environmental impact along the whole life cycle and directly or indirectly focus on circular economy and are relevant also for TSG3 include: the EU Ecolabel, green public procurement, and the Environmental Management and Audit Scheme (EMAS), Extended Producer Responsibility (EPR), Eco-design for material efficiency and the pilot Product Environmental Footprint.

Similarly, as other studies propose, we believe that the **involvement of consumers is the key for stimulation of eco-innovation and circular economy business practices**. This should be done by engaging them in concrete activities/actions/competitions, and second by trying to influence their awareness with different promotion activities to change their mindset and values, thus influencing their (consumer/user) behavior and lifestyles toward higher levels of sustainability, starting with female consumers, who, according to studies (Hojnik et al. 2019), express greater environmental concern, consciousness of eco-products, and perceived environmental responsibility than male consumers.

Next concrete proposal would be setting up regional **“ECO-INNOVATION-LIVING-LABs”**, that would be best positioned within academic institutions and would operate on different levels. With such positioning, they might influence, perform and coordinate educational and research activities on one hand and be the facilitator in the regional stakeholder networks outside the academic institutions. At the same time would be economically viable, since some operation costs of their operation would be partly covered from other ongoing activities and finally, would capitalize on the accumulated knowledge and networks about innovation and circular economy. Additionally, a spillover effect might be expected that could be gained by transferring such knowledge into study programmers for educating future generations of entrepreneurs and citizens.

ECO-INNOVATION-LIVING-LABs might perform, develop and coordinate the next activities to stimulate eco innovations and circular economy business practices:

- A **“Think-tank”** and consultation body for the transfer of program documents into implementation strategy for smaller regions, areas or cities, representing a link from macro to micro;
- Develop and maintain a **digital repository** of business practices about circular economy and implemented eco-innovations, with their descriptions and contacts, with better segmented in terms of relevance for specific stakeholders, industries etc., leading to a regional, systematic repository;

- **Showcase how selected eco-innovations really work in practice**, but exposing to companies that this might have also positive economic effects of their operation, demonstrating how can users be engaged in them and co-create them;
- **Propose educational seminars, workshops and academies** about eco-innovation implementation for different target groups in collaboration with academics and professionals;
- **Organize local, regional and potentially international challenges** as competitions for the best ideas/practices eco-innovation and circular economy (on different levels of education; primary, secondary, university level) to increase awareness and influence consumer values;
- **Marketing and PR activities**, with focus on social media, influencers, building communities and “movements” (e.g. “#me too for....our planet....clean ocean...nature preservation”).

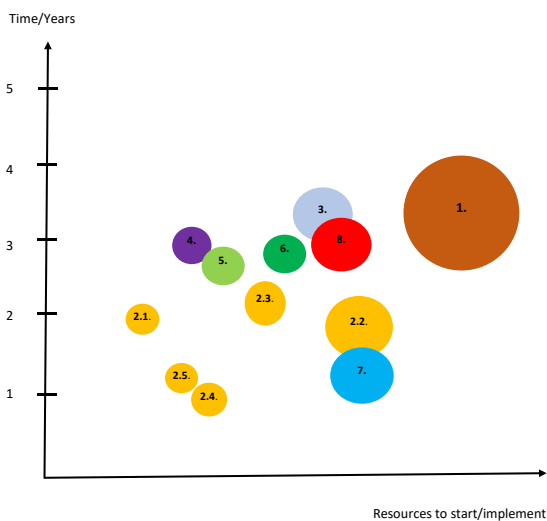
Other proposals include:

- **Develop interdisciplinary educational study programs** on post-gradual levels, focused on management of sustainable development, summer business schools, inclusion of professionals as guest speakers into undergraduate study programs;
- **Create local networks of stakeholders and partners** to introduce eco-innovation and circular economy practices in order to explore the possibilities of coordinated activity, vertically connect different stakeholders, and contribute to overcome identified barriers;
- **Develop and propose more public tenders for adoption of eco-innovation and circular economy to include different kind of organizations of thematic clusters** with focus on specific innovation elements related to eco-innovation and business practices about circular economy (build on identified projects with eco-innovations and circular economy business practices);
- **Measure the regional eco-innovation performance** to drive regions’ ambitions while benchmarking them against other regions and increase their performance (upgrade of eco-innovation index relative for country benchmark);
- **Further study key obstacles of implementation of eco-innovation**, since relatively few projects with elements of eco-innovation and circular economy have been identified among the completed and analyzed projects;
- **Continue monitoring, research, data collection, analyses, identification of trends and best practices** of circular economy and eco innovation, as well as funded projects, potentially with the framework developed and used in this study.

Proposals have been classified upon experts’ subjective evaluation of the time needed to start/implement specific measures and the approximation of the needed resources (in a relative sense, compared among other proposed measures), see figures below. Most time and resource intensive proposals include program calls directed toward marketing innovation in circular economy – awareness rising and promotion activities, ongoing monitoring, research & data collection, development of formal educational programs, development of local network of stakeholders, while the proposals that could be fastest started and partially implemented with lowest resources, include: challenges and competitions, consultations, seminars and workshops, all activities performed within the eco-innovation labs.

Color/Number	Measure/proposal
1.	Program calls directed toward marketing innovation in circular economy – awareness rising and promotion activities
2.1.	Eco-innovation-living-lab: consultation body
2.2.	Eco-innovation-living-lab: digital repository of business practices about circular economy and eco-innovations
2.3.	Eco-innovation-living-lab: demonstration of operation & effects of eco-innovations and circular economy business practices to wider public and businesses
2.4.	Eco-innovation-living-lab: seminars, academies, workshops
2.5.	Eco-innovation-living-lab: challenges as competitions for the best ideas/practices eco-innovation and circular economy
3.	Local networks of stakeholders and partners to introduce eco-innovation and circular economy practices
4.	Thematic clusters with focus on specific innovation elements related to eco-innovation & circular economy
5.	Benchmark of regions eco-innovation performance
6.	Study of key local obstacles for implementation of eco-innovation and circular economy business practices
7.	Continuation of monitoring, research, data collection, analyses, identification of trends and best practices of eco-innovation and circular economy
8.	Formal educational programs (masters), summer schools, guest lectures

Source: Own categorization



However, there is not a one-size fits-all solution over the wide scope of challenges associated to their faster and wider implementation, but the approach should be incremental, systematic, coordinated, and inclusive, to engage all relevant stakeholders, if we want it to be effective.

1. Background and methodology

This study was prepared as a result of the selection process for innovation experts to support the process of coordinating and developing the work of the EUSAIR (TSG3) 3rd Pillar - Environmental Quality in the field of innovation. The specific objectives for this pillar are:

- To ensure a good environmental and ecological status of the marine and coastal environment by 2020 in line with the relevant EU acquis and the ecosystem approach of the Barcelona Convention.
- To contribute to the goal of the EU Biodiversity Strategy to halt the loss of biodiversity and the degradation of ecosystem services in the EU by 2020, and restore them in so far as feasible, by addressing threats to marine and terrestrial biodiversity.
- To improve waste management by reducing waste flows to the sea and, to reduce nutrient flows and other pollutants to the rivers and the sea.

Two topics are identified as pivotal in relation to environmental quality in the Adriatic-Ionian Region, as a functional area primarily defined by the Adriatic and Ionian Seas basin, covering also an important terrestrial surface area, it treats the marine, coastal, and terrestrial areas as interconnected systems. Attention to land-sea linkages also highlights impacts of unsustainable land-based activities on coastal areas and marine ecosystems. **The two topics concern:**

Topic 1 – The marine environment,

Topic 2 – Transnational terrestrial habitats and biodiversity.

The service is performed under the EUSAIR Facility Point project, co-financed by the INTERREG V-B Adriatic-Ionian Cooperation Program 2014-2020, the European Regional Development Fund (ERDF) and the Instrument for Pre-Accession Assistance (IPA II), as well as national funds. **The activities of the innovation experts in this tender foresee the preparation of a study as grounds for further planning of activities to stimulate eco-innovation and circular economy across the defined flagships in TSG3:**

- 3MSP - Monitoring and management of marine protected species,
- ASOSCoP – Transnational contingency plan in the event of accidents at sea,
- ICZM & SME – Sustainable development of the coastal and maritime zones and
- PET HAB ECO – Protection and enhancement of natural habitats and terrestrial ecosystems) and the presentation of the methodology as well as the results achieved in 2 meetings of TSG3 members or Facility Point project partners.

Concretely, based on the guidelines related to methodology and content specified in the tender and guidelines received by the contracting authority, **the methodology and the structure of the study is as follows:** Chapter 1 presents the backgrounds of the tender and the context in which the study was set.

Chapter 2 presents the definition of the eco-innovation and circular economy we used in the following chapters as methodological reference to identify the co-financed projects on specific flagships including eco-innovation and circular economy. In setting the context we followed the definitions and examples of good practice of the United Nations and European Union portals in the field of eco-innovation: https://ec.europa.eu/environment/ecoap/index_en.htm_en and

<http://unep.ecoinnovation.org/> as well as the key pillar document EUSAIR Action plan concerning the European Union Strategy for the Adriatic and Ionian Region.

Chapter 3 presents the best practices of eco-innovation and circular economy identified in the participating countries. The aim was to identify one best-practice per participating country (Slovenia, Croatia, Greece, Italy, Albania, Bosnia and Herzegovina, Montenegro, Serbia and North Macedonia), in best case scenario 9 but not less than 4 best practices (depending on availability by individual participating country). The approach toward their identification was twofold. First, a detailed desktop research was performed across different online forums, web pages, portals...and second, with help of the contracting authority, an invitation was sent to all members of TSG3 in participating countries, asking for their support in identification of best practices on their national level, related to eco-innovation and circular economy. In the second stage all identified holders of best practices were contacted, asking them for potential interview or in-written description of their best practice, with their permission for its presentation. Following the UN and EU portals presented in the chapter, as well as the Eco-Innovation Observatory – Biannual Report 2018, a uniform template was developed to present the identified best practices. Finally, 4 best practices were identified and presented from 3 participating countries (Slovenia 2x, Croatia, and Greece). The best practices will be further rearranged and presented by the contracting authority and their external experts also in a graphical, eye-catching template and uploaded in the online archive of the Facility Point project knowledge base, that will be accessible also to wider public.

Chapter 4 proposes a very extensive analysis and identification of projects from cross-border and transnational programs within the period 2014-2020, which are related to TSG3 - Environmental Quality, as a first and second criteria for selection. The third criteria for their selection foresaw that they include activities/outputs/elements that directly or indirectly relate to eco-innovation, and the circular economy. Finally, the identified projects were presented along the four flagships of TSG3 (3MSP, ASOSCoP, ICZM & SME and PET HAB ECO). The main body of the text in chapter 4 presents a summary of the analysis and the most innovative projects and their outputs/activities related to eco-innovation and circular economy identified across the flagships, while the entire analysis is presented in more detail in Appendix, at the end of this document.

Chapter 5 builds on the work done in the previous chapters, with analyses of many reference documents related to innovation policies, eco-innovation and circular economy, with the aim to develop proposals for measures to promote eco-innovation and the circular economy. They are presented and structured to address individual stakeholder groups and their specific needs. The chapter concludes with the classification of proposals according to the time and resources needed for their implementation or their start. Chapter 6 presents the references and sources used in the study preparation, while the Appendix in chapter 7 presents in details the analyzed project along the four specific flagships that include circular economy business practices or some eco-innovations.

2. Eco-innovation and circular economy

Rapid economic growth has led to over-consumption and over-utilization of natural resources (Chen and Chai 2010) and is thus urging for eco-innovations, circular economy and more sustainable practices. As a response, various governmental and academic institutions have emphasized the need for sustainable development, consisting of three pillars: **economic (profit), ecological (planet) and social (people)** (Vermeir and Verbeke 2008). Facing the grim consequences of environmental degradation, natural resource preservation is not just a major pillar of sustainable development, but a matter of survival (The 2030 Agenda for Sustainable Development and the SDGs 2018). The growing importance of environmental orientation is also echoed by the aforementioned issues, moreover, as a result of growing concern about the sustainability of the natural environment, green issues have become increasingly important to corporate decision makers (Keszey 2020). In addition, every year, Europeans generate 25 million tons of plastic waste, of which less than 30% is recycled. Plastic makes up 85% of beach litter. There are two strands to tackling plastic ocean pollution. First existing plastic pollution must be removed from the ocean and second, new ways must be found to curtail the entry of new plastic waste to the oceans. (European Commission, 2018)

One of the solutions in order to protect environment are **eco-innovations**. Eco-innovations are a subset of all innovation in an economy (Wagner 2008); however, eco-innovation is only one type among various innovation types. One of the definitions of eco-innovation proposed by Eco-Innovation Observatory (2013) defines them as “any innovation that reduces the use of natural resources and decreases the release of harmful substances across the whole life-cycle”. Eco-innovations provide a win-win situation for companies and environment (Horbach 2008) and are further “central to the promotion of sustainable and smart growth because of the benefits, which can be brought to the economy and the environment” (European commission 2012). Moreover, eco-innovation can help SMEs access new and expanding markets, increase productivity, attract new investment into the business, increase profitability across the value chain, and help them stay ahead of regulations and standards (Eco-innovation manual, 2021). Other benefits, which companies can seize from eco-innovation’s implementation, include cost efficiency through cost savings, improved corporate image and relationship with local communities, access to new green markets and gain of superior competitive advantage (Shrivastava 1995). Eco-innovation plays an increasingly important role for the competitiveness of companies. Based on a sample of Slovenian companies, the findings demonstrate that in general, more innovative companies are more likely to engage in eco-innovation and more likely to derive cost benefits (efficiency) from different types of eco-innovation (Hojnik et al. 2017).

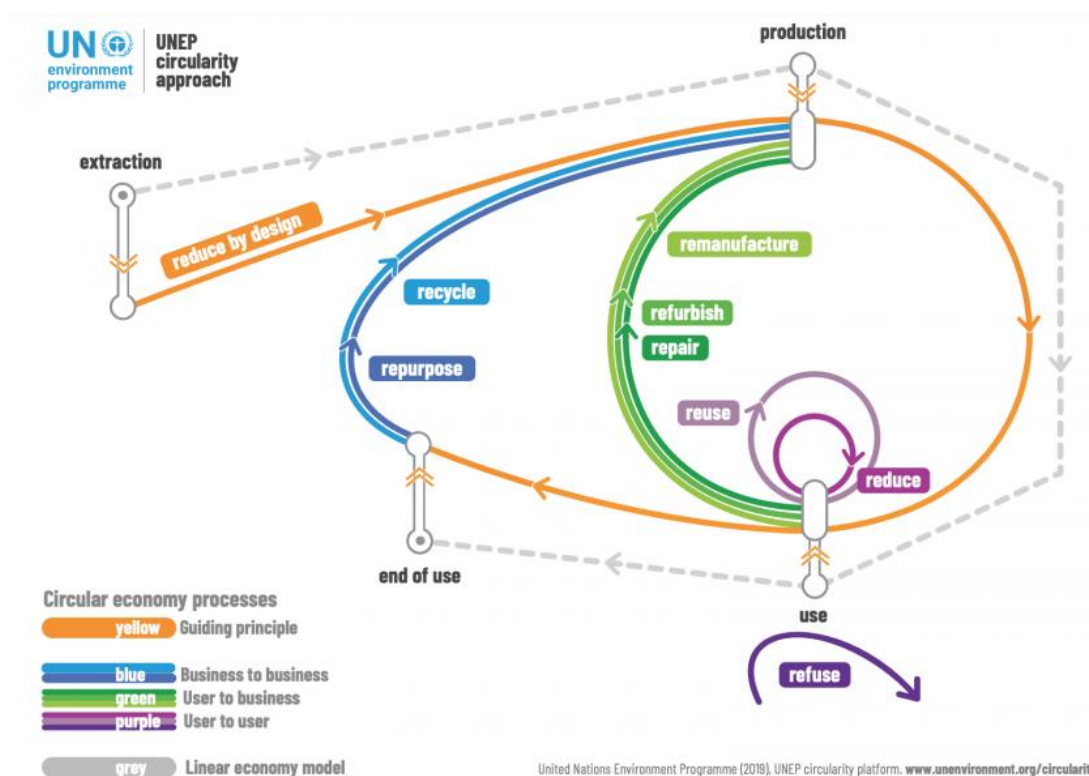
In addition, the newest concept for the pursuit of global sustainability is **circular economy** strategy, which has in the last five years gained intensive attention in research. According to the definition provided by the Ellen MacArthur Foundation, the circular economy is "an industrial system designed to be regenerative that aims to rely on renewable energy; limits, tracks and reduces the use of toxic chemicals; and eliminates waste through the design of materials, products, systems and business models."

In December 2015, the European Commission adopted a Circular Economy Action Plan to give a new boost to jobs, growth and investment and to develop a carbon neutral, resource-efficient and

competitive economy. The 54 actions under the action plan have now been completed or are being implemented, even if work on some will continue beyond 2019 (European Commission 2019). The action plan promoted for the first time a systemic approach across entire value chains. With it, the Commission has mainstreamed circular principles into plastic production and consumption, water management, food systems and the management of specific waste streams (European Commission 2019).

The first step of building a circular economy is circular design and production processes. Products and services designed in a circular way can minimize resource use and foster materials' reuse, recovery and recyclability down the road. Various EU policies already address resource efficiency: beyond the Eco-design directive and Energy-labelling regulation, these policies also include voluntary tools, such as the EU Ecolabel or Green Public Procurement criteria. As second, we need to empower consumers. The transition towards a more circular economy requires an active engagement of citizens in changing consumption patterns. Environmentally responsible consumption, or green consumerism is the integral link that closes the virtuous spiral of the "circular economy" (European Commission 2019). Green consumerism is defined as the continuation of global consumerism action that started with consumers' awareness about their rights to get the proper product that is safe and eco-friendly (Handayani and Prayogo 2017). The third concept of building a circular economy is about turning waste into resources. Sound and efficient waste management systems are an essential building block of a circular economy. Followed by closing loops of recovered materials. Boosting the use of secondary raw materials (SRMs) is one of the objectives of the circular economy action plan. In addition, the EU Strategy for Plastics in a Circular Economy is the first EU-wide policy framework adopting a material-specific lifecycle approach to integrate circular design, use, reuse and recycling activities into plastics value chains (European Commission 2019).

Figure 1: Circularity approach (UN environment program, 2021)



The relationship between concepts eco-innovation and circular economy is intertwined. Circular economy is a model of industrial ecology that suggests concrete solutions to achieve a sustainable way of living and an environmentally friendly economy (Kobza and Schuster 2016). Different to the linear model, the innovative circular economy approach comprises life cycle thinking and considers both stocks and flows. Thus, ideally, also at a product's end-of-life stage, materials should serve as a resource, in order to be led back into the cycle. In a nutshell, the circular economy proposes concrete solutions (Kobza and Schuster 2016). Eco-innovation, likewise, offers a huge market for enterprises and has become one of the cornerstones of the European Union strategy in response to the global environmental and economic challenges being faced (Eco-innovation Observatory 2018). Eco-innovation is defined as "the introduction of any new or significantly improved product (good or service), process, organizational change or marketing solution that reduces the use of natural resources (including materials, energy, water and land) and decreases the release of harmful substances across the whole life-cycle" (Eco-innovation Observatory 2018). It is recognized in many studies and policy documents that developing eco-innovation capabilities and practices has significant commercial potential across all economic sectors. At the same time, reducing uncertainty about future market developments will help boost investment and accelerate innovation in environmental technologies, products and services (Eco-innovation Observatory 2018).

In our review of existing projects, aimed to identify those including general and specific (eco-innovation) innovation elements, we followed the classification Oslo manual, which classifies innovations into four types: product innovation, process innovation, marketing innovation and organizational innovation (Oslo Manual 2018) according to specific characteristics:

- **Product innovation:** A good or service that is new or significantly improved. This includes significant improvements in technical specifications, components and materials, software in the product, user friendliness or other functional characteristics.
- **Process innovation:** A new or significantly improved production or delivery method. This includes significant changes in techniques, equipment and/or software.
- **Marketing innovation:** A new marketing method involving significant changes in product design or packaging, product placement, product promotion or pricing.
- **Organizational innovation:** A new organizational method in business practices, workplace organization or external relations.

3. BEST PRACTICES of eco-innovation and circular economy in EUSAIR TSG3

Altogether 4 best practices have been identified dealing with eco-innovation and circular economy. They have been analyzed with the same questionnaire along different aspects of their eco-innovation or circular economy business practice, such as short presentation the company, with demographics, presentation of their eco-innovation, motives and drives to start with eco-innovation and which problem it addresses, main barriers and obstacles in its implementation, as well as stakeholders involved, benefits of their eco-innovation, potential rewards and funding, future vision of the company and lessons learnt, where relevant. Following is their detailed presentation.

3.1 Best practice: Enaleia (Greece)

Eco-innovation or best practice

Title/name: Mediterranean CleanUp

www: <https://enaleia.com/>

Size of company (number of employees/turnover): 10-15 employees, turnover around 500.000 EUR annually

Year of establishment: 2016

Key products/services: Educational Services, Fishers Engagement on sustainable fishing methods and marine protection, facilitation of the integration of marine plastic into the circular economy

Main markets: Greece, Italy, Kenya



Company's description: Enaleia is a social, non-profit enterprise with a vision to make the marine ecosystem sustainable. It started in 2016 as the first school of professional, environmentally driven fisheries in Greece, educating fishers on sustainable fishing methods such as fishing tourism. During that time, we discovered that fishers also caught a significant amount of marine waste, mostly plastic, in their nets while fishing. So, we decided to do something about that. This fact initiated us to start the Mediterranean CleanUp project. Through the "Mediterranean Clean-Up" project, we aspire to



implement a wide-scale cleanup of marine plastic in the Mediterranean region in collaboration with professional fishers. The marine plastic collected by fishermen and the used fishing equipment is recycled and upcycled, being integrated into the circular economy. Since the launch of Mediterranean CleanUp, we have expanded our activities in

two continents, Europe and Africa, while in collaboration with more than 1.500 fishers in Greece, Italy, and Kenya, we have collected more than 250.000 kg of marine plastic and fishing gear. In this way, all our projects are aligned with three pillars: Education, Mitigation, and Prevention.

Description/presentation of eco-innovation: The most impactful contribution of our project is that we have created one of the largest, most efficient, and cost-effective marine plastic cleanups in Europe. We have managed to achieve it through engaging the fishing communities that collect plastic from the bottom of the sea. What makes our work different compared to other similar projects is the concept that we have captured. Specifically, we utilize existing economic activities, and already established networks to clean the bottom of the sea and mitigate overfishing. Consequently, without creating any further negative externality from our actions, we have achieved to optimize the positive externalities from the fishing activities, without using additional resources or increasing the process's carbon footprint. Another element that makes our work unique is the education we provide to fishers since it requires a profound change in their mentality. Thus, our solution's innovation is not placed in any technological hub or any experimental lab, but it is hidden in real life and what we do is to reveal it and put it into practice.

Motivation/drivers to start with eco-innovation:

Enaleia started operating in 2016 as the first fishing school in Greece when unemployment had skyrocketed to 29%, while at the same time, the fishing industry declined. The average age of the country's professional fishermen was 63 years (Ministry of Rural Development), and there was a great need for new human resources. While designing the training, we went on fishing trips to map the whole procedure. During our first trip, we were shocked to find out that fishers also caught a significant amount of plastic waste in their nets, which they discarded back to the sea – we took a can out of the nets, and its expiration date was 1987. For this, we decided to act. There is no point in bringing out new fishers if there are no fish. So, we started training our fishermen to collect plastic and bring it to port. Another factor that initiated us to act is that, according to WWF, the International Maritime Trade and Fisheries Industries account for 20% of the plastic entering the Mediterranean Sea each year (WWF Report - 2019). Thus, our aim is to provide a holistic approach to marine plastic pollution and overfishing in the long term so that people and nature can co-exist in harmony.



Thus, our aim is to provide a holistic approach to marine plastic pollution and overfishing in the long term so that people and nature can co-exist in harmony.

Main barriers, obstacles or challenges in adoption, development or implementation of eco-innovation: The most critical challenge to implementing our project has been mobilizing the fishing communities and local stakeholders, as such activities require a profound change in the existing mentality. Given our current presence in 28 locations, another challenge had also been to adapt to each location's legal specificities. As for the external risks, the most crucial one has been the

evolution of COVID-19 even after the vaccination phase since we had to define whether and what actions we had to take online and find ways to evaluate our process properly. We managed to overcome these challenges by focusing on each group on a case-by-case basis and redefine the main objectives that each group has in its participation in our network. In any case, our experience from all this period and our close cooperation with the fishing communities prove that all types of risk are measurable and with due flexibility on our part we can achieve important milestones.

Which stakeholders have been engaged in the development and implementation of eco-innovation; how they contributed; were they critical? The most critical stakeholders engaged in the development and implementation of our eco-innovation have been:

The fishing communities: Our projects, by definition, are addressed directly to the fishing communities, meaning people with low educational and economic status-in most cases, low-wage migrants- however, with a strong potential to contribute to climate action. Our education is based on an understandable and manageable process to transmit the educational content in the best way possible. Specifically, in most cases, our training takes place on the field, meaning the ports, or even on the boats during their activities. In this way, fishers feel more comfortable absorbing new ideas both practically and theoretically, and they gradually become our primary drivers for climate action.

Our certified upcycling and recycling partners: Our certified partners undertake proper waste management of the collected materials and facilitate the integration of marine plastic and fishing gear into the circular economy. Currently, we have achieved through certain partnerships and blockchain technology to produce ocean plastic pellets that could be used as raw material for sustainable products. In this way, we prolong the life cycle of collected marine plastic, utilizing the circular economy model to its maximum.

Civil society organizations, public authorities & policymakers: We build strong partnerships with local communities to accelerate our actions' impact and increase our social intervention significantly. Already, we have accomplished more than 50 national and international partnerships for saving our oceans. Moreover, in order to prevent future marine plastic pollution, we have started to work with the Greek government, providing them with data on the marine plastic the fishers catch. The aim is to find out which are the most common items polluting the sea, and vote for new laws to regulate it.

Main benefits from eco-innovation (economic, environmental, others):

From the beginning of our eco-innovation, we have provided the below socioeconomic benefits:

- Through our projects, we have trained more than 1.500 fishers to collect plastic from the sea, having collected more than 250.000 kgs marine plastic and fishing nets so far,
- More than 65% of the collected material is integrated into the circular economy and gets upcycled into new products, much higher than any other ocean cleanup activity.
- We have expanded our activities in 3 different countries (Greece, Italy, Kenya) on 2 continents with the potential to replicate our project in many more countries.
- In order to prevent future marine plastic pollution, we have started to work with the Greek government, providing them with data on the marine plastic the fishers catch, to find out which are the most common items polluting the sea, and vote for new laws to regulate it.

- Together with the local community of the Greek island of Ithaca, we have organized a massive cleanup, collecting more than 74.000 kgs of marine plastic waste from the island in just one week.
- Together with our recycling partners, we are able to turn the marine plastic that we collect into pellets and flakes that can be used for product creation.
- We have accomplished more than 50 national and international partnerships for saving our oceans.
- We have trained more than 150 unemployed people, connecting them directly with the labor market through our fishing school.
- Through the "Fish Smarter" project, we have trained more than 300 fishers on exploiting sustainable fishing tourism to increase their incomes without overfishing.

National or international support, funds, rewards: Enaleia, since its establishment, has been awarded in domestic and international youth entrepreneurship competitions, such as the foundation's competition Angelopoulos-Clinton, the Blue Growth Competition, while our most recent distinction has been our distinction as winners of Ashoka's Green Skills Innovation Challenge. At the same time, we receive the support of many environmentally driven Charitable Organizations and Multinational Companies, while a significant component of our revenues comes from our facilitation services for integrating the collected marine plastic into the circular economy. These revenues stem from companies that want to use marine plastic to create new sustainable products, such as Gravity Wave and Ecoalf in Spain.

Enaleia has also received critical international distinctions for our innovative work in the Mediterranean. Our Co-founder and director, Lefteris Arapakis, has received the title of the [European Young Champion of the Earth for 2020](#), by the UN Environment Program, and the title of [Ambassador of the Mediterranean Coast for 2021](#) by the UN Environment Program- Mediterranean Action Plan. This national and international support help us maximize our global impact and strengthen our mission for a plastic-free sea.

Company's vision/mission and further plans:

Mission: To solve two problems that correlate to a great extent: Reduction of fish stocks & Plastic pollution of the oceans

Vision: A sustainable marine ecosystem, including humans

Further Plans: In the following months, we plan to expand our Mediterranean CleanUp project in North Africa and Southeast Asia, places that face significant marine plastic and overfishing problems, and where fishermen could participate as changemakers. Our long-term goals include creating a sustainable business model based on sales, increasing the revenues from the marine plastic pellets, and reinvesting it into setting up new cleanup initiatives in areas with intense marine plastic pollution and strong fishing communities. Thus, the next step is to find the markets where we could fit to generate revenue streams that would make us financially independent and sustainable, creating even more socio-environmental impact

Lessons learnt: The main lesson learned from our experience is that optimism is our main weapon against the climate crisis. Given our humanity's necessity to act for climate now, we say to the future eco-innovators to start today solving problems that really bother them. We believe that through leading with our example, we can make a global impact, motivating policymakers to implement the

sustainable development goals in a way to be more beneficial to the fishing communities, our primary drivers for climate action.

3.2 Best practice: Toring Turbine (Slovenia)

Eco-innovation or best practice

Title/name: Toring Turbine TT200® aerator

www: <https://toring.com/>

Size of company (number of employees): 1-10 employees

Key products: Toring Turbine TT200® aerator

Main markets: USA, Sweden, Poland, Mexico, Chile, Colombia, Indonesia, Malaysia, Kenya...



Company's description: Toring Turbine is flexible, innovative and sustainable company which strives to provide the best energy efficient solutions for water, wastewater and recycling. Our team has knowledge and skills to implement cost-effective, fast to deliver projects with cutting-edge, state-of-the-art technologies. With 11 years of experience, our products are used in more than 72 countries as part of the 242 worldwide projects. We have references from almost every industry dealing with water. Today, together with our 12 distributors we cover the most important markets, as we have tendency to spread on even more interesting new markets.

Description/presentation of eco-innovation: The Toring Turbine TT200® is a highly efficient and environmentally friendly device that operates on the basis of unique technology. It differs from competitive products in the way air is transferred to water, using natural laws of physics to its advantage. The key element is the TT200® turbine rotor, which uses the twin physics principles of precession (as applied to rotating fluids) and centrifugal force. Precession creates the low-pressure zone which draws in the surface air. Once inside the turbine chamber, this air is discharged rapidly through the power of centrifugal force. There are two important factors that further distinguish TT200® turbine. First, the centrifugal force slings the air outward at a high speed in a lateral direction. Second, tests in a clear water tank have shown that the dissolved oxygen is also pushed downward up to 4 meters below the surface. These forces create a mixing and sheering action which produce and disperse micro bubbles. The device does not need an additional supply of air under pressure, which is the reason for a smaller number of elements, easier maintenance and significant energy savings.

Motivation/drivers to start with eco-innovation: It all starts and ends with our tag line – We supply water with life. There is no greater motivation than that.

Main barriers, obstacles or challenges in adoption, development, or implementation of eco-innovation:

If you do what you deeply believe in and have a clear

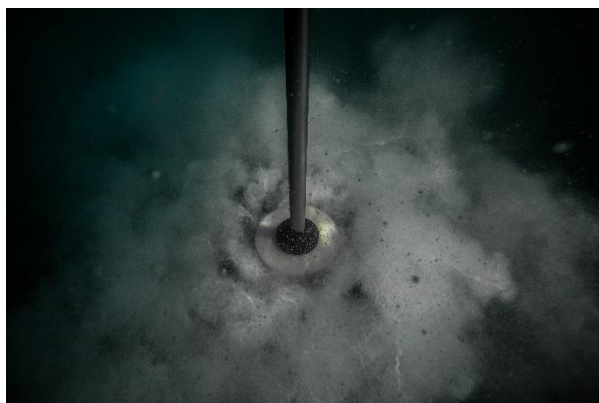
goal and vision, obstacles are not something you pay attention to but just move forward believing that you will motivate others to join the common goal - to help the environment as best as possible. Main benefits from eco-innovation (economic, environmental, others): Toring Turbine Aerator TT200® oxygenates by injecting air into water and not water into the air. It takes a lot less energy to push air into water compared to water into air. This is the reason why the Toring Turbine Aerator TT200® is able to outperform competing aerators having up to seven times more kW.



1. OXYGEN TRANSFER EFFICIENCY We can achieve excellent results thanks to micro-nano bubbles technology. 2. POWER CONSUMPTION EFFICIENCY Toring Turbine Aerator TT200® in some cases led to a reduction in power consumption by almost 60%. 3. QUALITY CONTROL Toring Turbine runs a quality control program on several of the components of Toring Turbine Aerator TT200® so that we deliver trouble-free system. 4. OPERATING MAINTENANCE One of the biggest advantages of the Toring Turbine aerator TT200® is that low to no maintenance is ever required. 5. BUILT TO LAST Toring Turbine Aerator TT200® last longer than any other aerator in its class in the market today.

National or international support, funds, rewards:

- Primorska Business Award - 2011 University Incubator of Primorska
- Award for Innovation - 2013 Regional Chamber of Primorska
- Diploma for Excellent Innovation - 2013 Chamber of Commerce and Industry of Slovenia
- The Best Applied Innovation - 2014 SPIRIT Slovenia
- The Best Environmentally Friendly Product - 2016 Slovenian Annual Environmental Meeting
- Award for Innovation - 2017 Regional Chamber of Primorska



Company's vision and further plans: We have a clear and exciting vision for the future. A vision that has driven us from the moment the original idea of turbine aerator has come from the brilliant mind of innovator and visionary Alfred Zajič. He turned his dream for a cleaner environment into reality by creating one of the most efficient water aerators up to this day.

Our future is about following that path and creating the kind of excellence that comes from a unique combination between sophisticated design and outstanding performance.

In order to achieve these results, we push the limits, exceed the expectations, and with each new product we expand boundaries of possibility. *The future awaits, with new products, new projects and no limits.*

3.3 Best practice: Clera.One (Slovenia)

Eco-innovation or best practice title/name: Water recycling system for laundry rooms

www: <https://www.clera.one>

Size of company (number of employees/turnover): 2 co-founders, turnover: 0 (pilot phase)

Year of establishment: 2020

Key products: Water recycling system for laundry rooms

Main markets: Germany, Netherlands, France, Denmark, Norway, Ibiza

Company's description: The mission of Clera.one is to help prevent the disastrous effects of environmental degradation, pollution and water scarcity. Water scarcity and microplastic pollution are emergent global problems that need forward thinking solutions. Therefore, the company introduces the cutting-edge water recycling system for laundry rooms which will allow laundry rooms to use water sustainably.

Description/presentation of eco-innovation: The water recycling system allows laundry rooms to use water sustainably, as it takes the standard laundry process and makes it better. All of the wastewater typically released from washing machines into the environment will instead go through the Clera.One device. Clera.one system collects wastewater, puts it through a filtration system to clean it up, and so reuses it. With the use of Clera.one device laundries will save water, energy, money and will not pollute the environment with toxic wastewater.

Motivation/drivers to start with eco-innovation: Water's scarcity is a looming global threat, as 30 to 40 % of the world is already experiencing severe levels of water scarcity.

- Water consumption levels are soaring – tripling since the 1950s.
- About 80% of the world's wastewater is discharged back into nature without treatment.
- Nearly two thirds of the world's water consumption is used in corporate supply chains.
- Individuals ingest approximately 5 grams of plastic per week, while the full health effects of microplastics on the human body are still unknown.
- Microplastics spell big problems for future generations as the long-term effects could be potentially disastrous.
- Clera.one solves the problem of wastewater, cleans it up and so reuses it. For each washing cycle of laundry there is no need to use drinkable water.



Main barriers, obstacles or challenges in adoption, development or implementation of eco-innovation: We all know there is a big trend for eco-innovation and sustainability. But in the end, for the vast majority, the price wins over eco-innovation, which is usually more expensive. Re-buyers know that the vast majority is not prepared to pay more for eco-innovation; consequently, they can't increase profitability with eco-innovation. In addition, a vast majority of CEO does not see an opportunity to become an environment-friendly brand and makes only a marketing case from their eco-innovation efforts. Finally, for investors invest in an eco-innovation is an excellent trendy, but in the end, they must see an expected ROI in the business.

Which stakeholders have been engaged in the development and implementation of eco-innovation; how they contributed; were they critical?

Since the company is still in the pilot phase, the main stakeholders are the laundries that allow the device and technology to be tested. During product development, the company has tested the device and received feedback from other companies and individuals, which has allowed it to develop and adapt solutions based on the specific needs of the market.

Main benefits from eco-innovation (economic, environmental, others): The main benefit is to lower the carbon footprint and so contribute to climate change. In the European Union 38.598.179 kg of CO₂eq is used to wash the wiper sheets for a bed place in a year. Clera.One will lower carbon footprint at 34.738 tt CO₂eq, which represents the equivalent to driving a car around the world 4.296 times.

National or international support, funds, rewards received: Company has been supported from Climate-KIC and water scarcity by EIT.

Company's vision/mission and further plans:

Mission: The mission of Clera.one is to help prevent the disastrous effects of environmental degradation, pollution and water scarcity.

Further plans: In November 2021 the company will run a pilot program with the Speed Queen laundry chain in Berlin. The goal is to demonstrate benefits of investing in green technology means increase ROI per laundry room. The company will try to create radical change by leveraging industry, NPO's and the public by developing a "pull" effect on people who want to protect the planet and turn them into brand evangelists through social media. With the help of Parley for the Oceans and 4Ocean, who are working to reduce plastic consumption, the Clera.one will encourage the public to call on laundry companies and demand a better future.

Lessons learnt: Do not be too emotional and think of how much good you can do for the planet. Rather sell investors the story about the impact you have on the environment, because in the end investors are only concerned about ROI.

3.4 Best practice: Agena Marin (Croatia)

Eco-innovation or best practice title/name: SolarFerry

www: <https://agena-marin.com/>

Size of company (number of employees): 10 employees, owner Mladen Peharda

Year of establishment: 2010

Key products: SolarFerry, semiSubmarine, TaxiCat

Main markets: Croatia, Italy, Greece, Spain, Montenegro, Maldives, Seychelles, France, Mexico, Bonaire, St. Maarten



Company's description: Agena Marin d.o.o. was established in 2010 by Mladen Peharda, who is the owner and R/D of the company. Company mission is: »We do not sell boats, we sell proven business solutions!« That means that besides just selling the 'bare product', we offer our customers full support in organizing and running their business. Good result of this approach is 55 PAX which was ordered by loyal client from the island of Krk/Croatia. Company's first product was 12PAX semiSUBMARINE and so far we have implemented it on more than 50 attractive places in the world in over 13 countries. Beyond just creating the perfect vessel for our clients, we also feel an incredible sense of responsibility to our planet. In 2021 the company made significant progress toward sustainability and presented the new product SolarFerry - a fully sustainable, eco-friendly, and cost-effective commercial boat that uses only solar and electric power sources.

Description/presentation of eco-innovation: Solar ferry is a fully sustainable, eco-friendly and cost-effective commercial boat that uses only solar and electric power sources. The economical cruising speed is 5 knots, and maximum around 6,5 knots with 6 kW outboard engine. 1.800 watts

of flexible solar panels on the roof charges the battery bank. The solar roof capacity with battery bank enables more than eight hours of cruising time, depending on the speed and load. Length of the boat is 8.5 meters (27 ft.), and it can accommodate up to 12 passengers on board. Beam is 2,49 m and the draft is 0,50 m.

The historic boat's line styling was inspired by the vessels from the 1920s. However, the boat's design is not only about aesthetics; the hull is designed for minimal resistance and impact on the ecosystem. The boat's modern construction technology is also eco-friendly. It is built with a vacuum infusion technique, using a "sandwich" core made of recycled PET material.



Motivation/drivers to start with eco-innovation:

The main motivation for the company's owner, Malden Peharda, was to go with an electric boat that is truly sustainable. At the same time, the boat has to look pretty and sexy, and so to be a real eye-catcher. As petrol engines will be restricted in the future, we are trying to keep up with this process and combine it with the personal challenge of building sustainable, long-lasting boats that use eco-materials.

Main barriers, obstacles or challenges in adoption, development or implementation of eco-innovation:

The biggest challenge in developing and implementing eco-innovation is to find a concept for a boat that really works, is well designed and cost-effective, while minimizing the negative impact on the marine environment.

Which stakeholders have been engaged in the development and implementation of eco-innovation; how they contributed; were they critical?

We have done the development of the SolarFerry within the company. With some buyers we are real partners and together we try to protect marine life and the environment.

Main benefits from eco-innovation (economic, environmental, others): Environmental benefit through the use of green technology: An essential element in bringing the SolarFerry idea to life was that the end product has minimal impact on the environment. That's why the boat's modern construction technology is eco-friendly. Built with a vacuum infusion technique, it uses a "sandwich" core made mostly of recycled PET bottles. With the help of advanced engineering, we have managed to create a light but robust, innovative boat.

Environmental benefit through zero emissions: Our solar electric boats are intended for passenger transportation, for professionals who care about the environment as well as their image. We make it possible for tourist operators to offer their customers a clean and quiet navigation, free from CO2 emissions, noise, and vibrations – sustainability in its truest form. One of the most striking features of the Solar Ferry is its hull. In harmony with nature, it's specially designed for minimal impact on the ecosystem. It doesn't consume fossil fuels and doesn't produce greenhouse gasses and electric motors do not spill oils or produce exhaust fumes that damage the environment.

Economic benefit evident through energy efficiency: Solar Ferry uses only solar and electric power sources, so you can sail at zero cost. Autonomy is a minimum of 8 hours at 5 kn or 40 nm using batteries only. The 1,800 watts of highly efficient photovoltaic panels on solar roof extends battery life making it more than enough for serious commercial applications and complete sustainability.

Social benefit: Solar Ferry's environmentally sustainable design allows you to sail in complete silence, accompanied solely by the murmur of the waves passing by the hull. This means you can enjoy nature in its purest form.

Company's vision/mission and further plans: In line with the company mission "We do not sell boats, we sell proven business solutions!" we will continue to design well performing boats from scratch, at affordable prices and as sustainable as possible.

Lessons learnt: Due to the covid situation, material prices have increased, so we need to be even more effective and careful in selecting cost effective but suitable sustainable materials to design the best boats for our end customers.

4. Project and transnational programs related to TSG3 – Environmental quality dealing with eco-innovation and circular economy

In this chapter we present the projects (transnational and cross-border – Interreg, Horizon and Life) that focus on Environmental quality and in more details are divided based on the following four flagships of TSG **pillar 3 – environmental quality**, as follows:

- **monitoring and management of marine protected marine species**,
- **sustainable development of the coastal and maritime zones**,
- **protection and enhancement of natural habitats and terrestrial ecosystems**,
- **transnational contingency plan in the event of accidents at sea**.

We have identified projects that cover the topics below and have been implemented in the time period 2014-2020. Moreover, in the appendix we have in more details presented the analyzed projects, while in this chapter we have as well presented the ones that indirectly or directly engage or promote **eco-innovation** (*refers to any innovation that reduces the use of natural resources and decreases the release of harmful substances across the whole life-cycle*) or any other element of **circular economy** (*is the main alternative to the linear “use and throw” model that is currently used – this circular model aims to minimize the environmental cost of production processes and products as much as possible during their life cycle in order to be more efficient in the use of resources, commonly known as well as reduce, recycle, reuse*).

For the selection and identification of relevant projects focused on Environmental quality and the pertaining flagships we have reviewed the following databases:

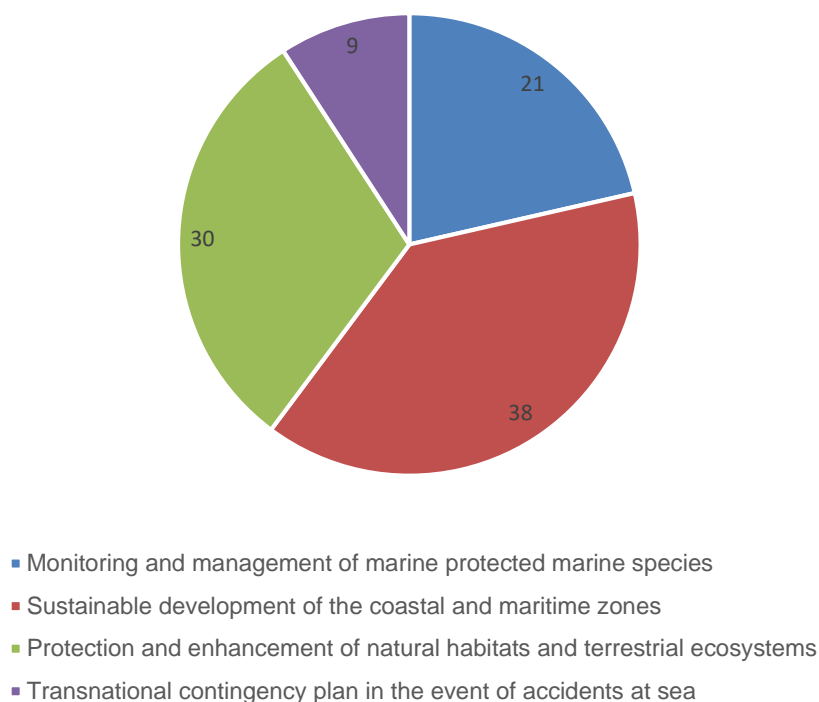
- [Projects and documents - Keep.eu](https://www.keep.eu/);
- https://ec.europa.eu/regional_policy/en/projects/;
- [https://webgate.ec.europa.eu/life/publicWebsite/index.cfm](https://webgate.ec.europa.eu/life/publicWebsite/index.cfm;);
- [https://cordis.europa.eu/search?q=contenttype%3D%27project%27%20AND%20\(programme%2Fcode%3D%27H2020%27\)&p=3520&num=10&srt=/project/contentUpdateDate:increasing](https://cordis.europa.eu/search?q=contenttype%3D%27project%27%20AND%20(programme%2Fcode%3D%27H2020%27)&p=3520&num=10&srt=/project/contentUpdateDate:increasing)

Based on review of projects we came to the following conclusions. First of all, we have in more details presented **98 projects that pertain to Environmental quality**, of which:

- **21 projects** have been found to cover **monitoring and management of marine protected marine species**,
- **38 projects** for **sustainable development of the coastal and maritime zones**,
- **30 projects** for **protection and enhancement of natural habitats and terrestrial ecosystems**,
- **9 projects** for **transnational contingency plan in the event of accidents at sea**.

The flagship in which the majority of projects have been identified is **sustainable development of the coastal and maritime zones**, followed by protection and enhancement of natural habitats and terrestrial ecosystems, and monitoring and management of marine protected marine species. **Only about a quarter of all identified projects were related to monitoring and management of marine protected marine species.**

Figure 2: Shares of financed projects regarding the flagships of TSG pillar 3 – environmental quality



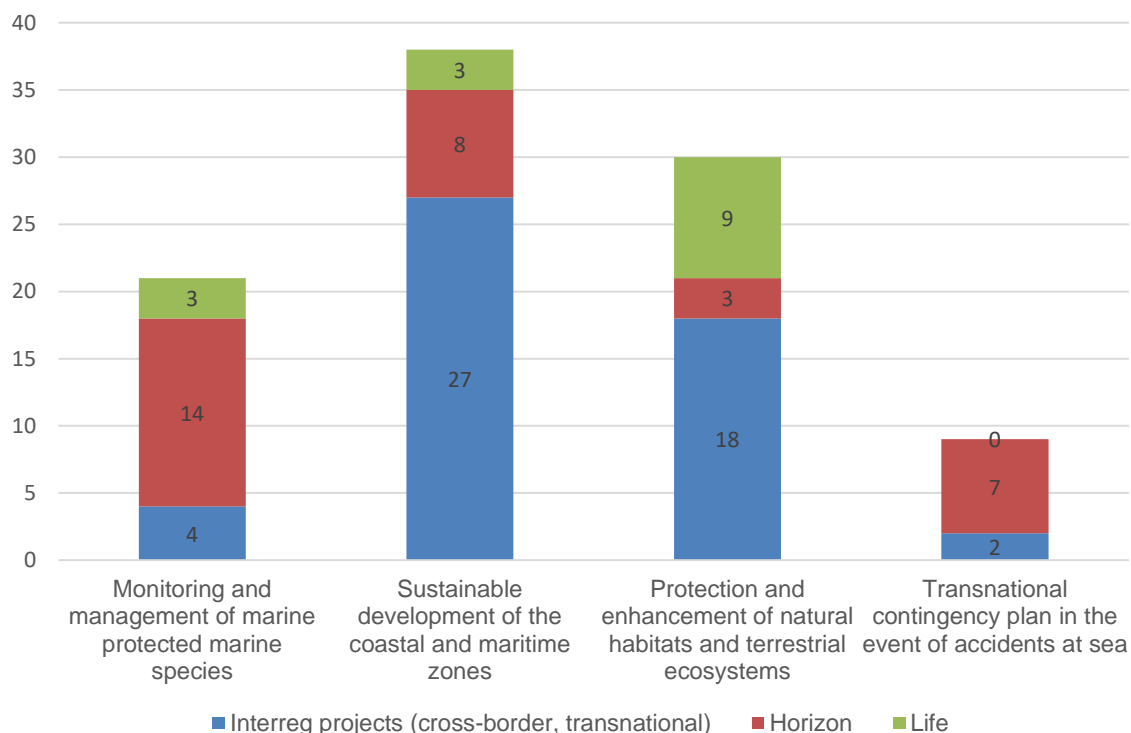
Regarding the 4 flagships of Pillar 3 – environmental quality, the majority of projects pertaining to the flagship **monitoring and management of marine protected marine species** were **Horizon projects (14)**, followed by **4 Life projects** and **3 Interreg projects**.

Regarding the flagship **sustainable development of the coastal and maritime zones** the majority of projects were **Interreg projects (27)**, followed by **8 Horizon** and **3 Life projects**.

There were **18 Interreg projects** pertaining to **protection and enhancement of natural habitats and terrestrial ecosystems**, **9 Life** and **3 Horizon**.

Finally, the lowest number of projects has been identified for the flagship **transnational contingency plan in the event of accidents at sea**, **7 Horizon** and **2 Interreg**, and **neither one Life project**.

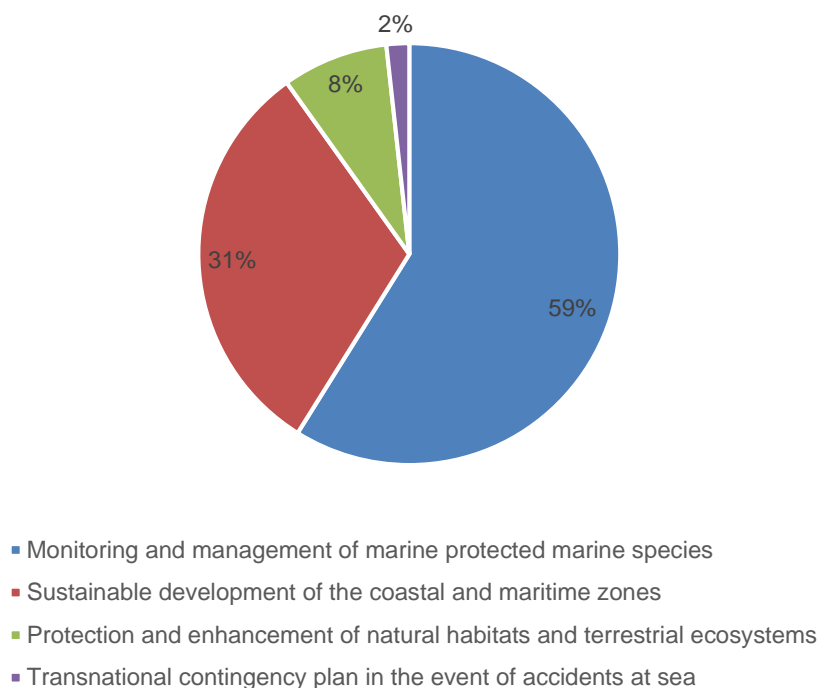
Figure 3: Shares of projects regarding the flagships of TSG pillar 3 – environmental quality and operational program



All together in budget, **the projects pertaining to Environmental quality, were estimated to 1 581 627 196,65 EUR**. In more details, in **monitoring and management of marine protected marine species** have been invested **931 316 980,31 EUR**, in **sustainable development of the coastal and maritime zones** **494 087 604,16 EUR**, in **protection and enhancement of natural habitats and terrestrial ecosystems** **128 629 383,69 EUR**, and finally, in **transnational contingency plan in the event of accidents at sea** **27 593 228,49 EUR**.

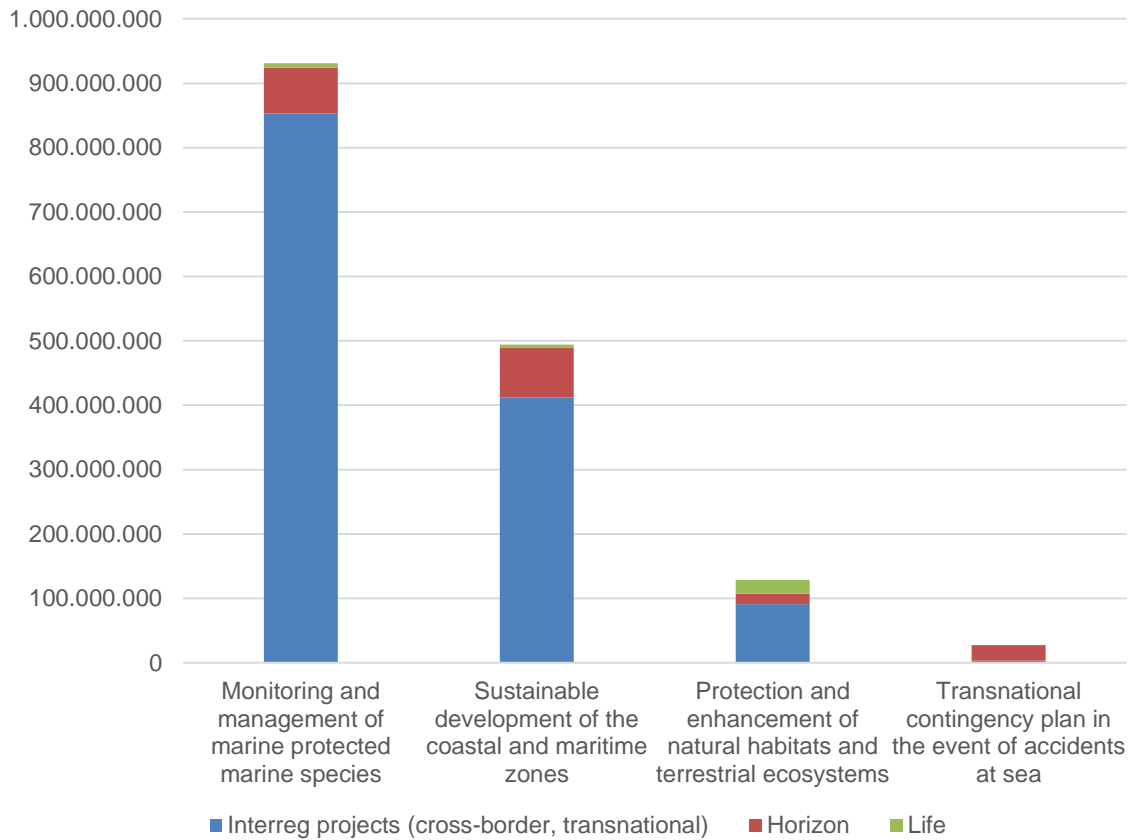
Related to budget distribution of projects, we can conclude that the majority of budget or the biggest share has been invested in monitoring and management of marine protected marine species, followed by sustainable development of the coastal and maritime zones. The least of budget has been dedicated to projects pertaining to protection and enhancement of natural habitats and terrestrial ecosystems and transnational contingency plan in the event of accidents at sea.

Figure 4: Budget in EUR for projects regarding the flagships of pillar 3 – environmental quality



Regarding the 4 flagships of Pillar 3 – environmental quality, we can see **that the majority of budget present Interreg projects for three flagships**, as follows **monitoring and management of marine protected marine species**, **sustainable development of the coastal and maritime zones**, and **protection and enhancement of natural habitats and terrestrial ecosystems**. Only for the flagship **transnational contingency plan in the event of accidents at sea**, the majority of budget present Horizon projects.

Figure 5: Budget in EUR for projects regarding the flagships of pillar 3 – environmental quality and operational program

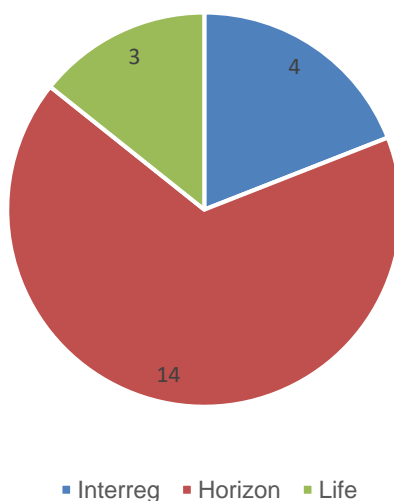


Finally, the majority of these projects indirectly promote or engage, implement eco-innovation or other elements of circular economy, however we have found elements of innovation, eco-innovation or circular economy in all together 39 projects, among those 12 projects had elements of general innovation and 27 projects elements of eco-innovation or circular economy. Many projects develop product, organizational or process innovation, some also demonstrate elements of marketing innovation – awareness raising. The majority of projects include networking, transnational cooperation, co-creation and engagement of citizens, public and many as well focus on technological innovations as software and hardware and similar elements that lead eventually to better sustainability or less harmful effects on the environment.

4.1 Monitoring and management of marine protected marine species

Regarding the flagship **Monitoring and management of marine protected marine species** we have identified **4 Interreg projects**, **14 Horizon projects** and **3 Life projects**.

Figure 6: Number of projects regarding the operational program



Among these projects we have **identified elements of general innovation in 2 Interreg projects out of 4**, as follows: **Compass** and **MEDSEALITTER**, however no eco-innovations or elements of circular economy have been identified through projects review. Among Horizon projects we have identified the elements of eco-innovation or circular economy in **7 out of 14 Horizon projects**, while **no elements of eco-innovation** were found among **3 Life projects**.

Table 1: Projects that include elements of innovation, eco-innovation or circular economy

Project title	Innovation elements / Eco-innovation or circular economy elements
Compass (Collaborative Oceanography and Monitoring for Protected Areas of Species)	Demonstrates innovative approach, organizational innovation. Specifically, by bringing in the expertise and experience of scientists from across the region, the project is building cross-border capacity for the effective monitoring and management of Marine Protected Areas (MPAs). Researchers are developing long-term monitoring strategies for highly mobile protected species, including marine mammals and salmon, and providing the infrastructure needed for baseline oceanographic and ambient noise monitoring.
MEDSEALITTER (Developing Mediterranean-specific protocols to protect biodiversity from litter impact at basin and local MPAs scales)	Example of organizational innovation. Project aims at networking representative MPAs, scientific organizations and environmental NGOs for developing, testing and applying efficient, easy to apply and cost-effective protocols to monitor and manage litter impact on biodiversity.

<p>ATLAS (A Trans-AtLantic Assessment and deep-water ecosystem-based Spatial management plan for Europe)</p>	<p>Organizational and process eco-innovation. ATLAS creates a dynamic new partnership between multinational industries, SMEs, governments and academia to assess the Atlantic's deep-sea ecosystems and Marine Genetic Resources to create the integrated and adaptive planning products needed for sustainable Blue Growth. ATLAS will gather diverse new information on sensitive Atlantic ecosystems (incl. VMEs and EBSAs) to produce a step-change in our understanding of their connectivity, functioning and responses to future changes in human use and ocean climate.</p>
<p>Co-creating a decision support framework to ensure sustainable fish production in Europe under climate change</p>	<p>Organizational eco-innovation of developing new forecasting models, which will ensure the sustainable fish production in Europe under climate change. The underlying biological models are based on single species distribution and production, as well as multispecies interactions. Forecasting models will provide production scenarios that will serve as input to socio-economic analysis where risks and opportunities are identified, and early warning methodologies are developed.</p>
<p>Open Ocean Fish farms</p>	<p>The OCEANFISH system is a flexible submerged system of cages, which is recognized as product eco-innovation. It is an excellent example of how humans can take better advantage of oceans in a highly sustainable manner and at the same time solve significant ecological challenges. Gili Ocean Technologies aims to become the leading off-shore (Open Ocean) aquaculture company. This will be achieved through the operation of fish farms as well as through the delivery of turn-key projects for other fish farmers based on our extensive off-shore fish farming expertise and advanced technologies.</p>
<p>AQUAEXCEL2020 (AQUAculture infrastructures for EXCELlence in European fish research towards 2020)</p>	<p>As a great example of organizational eco-innovation, AQUAEXCEL2020 will be a key vehicle in the improvement of aquaculture research practices to the benefit of industry through finalized research and innovation, and of excellent science through the development of highly innovative methods and approaches such as Virtual Laboratories, standardized experimental fish lines and nano-sensors. As it will provide a world-class platform for all types of fish culture research, from biology to technology, in all types of rearing systems, with all major EU fish species, it provides also the example of product innovation.</p>
<p>TASC MAR (Tools And Strategies to access to original bioactive compounds from Cultivation of MARine invertebrates and associated symbionts)</p>	<p>TASC MAR project, as an example of process eco-innovation, aspires to develop new tools and strategies in order to overcome existing bottlenecks in the biodiscovery and industrial exploitation of novel marine derived biomolecules (secondary metabolites and enzymes) with applications in the pharmaceuticals, nutraceuticals, cosmeceuticals and fine chemicals industries. The marine dedicated cultivation and extraction equipment will be built and validated. These unique improvements will ensure sustainable</p>

	supply of biomass and promote the production of high added value bioactive marine compounds.
EO4wildlife (Platform for wildlife monitoring integrating Copernicus and ARGOS data)	EO4wildlife main objective is to bring large number of multidisciplinary scientists to design, implement and validate various scenarios based on real operational use case requirements in the field of wildlife migrations, habitats and behavior. These include enhancing scientific knowledge of pelagic fish migrations routes, reproduction and feeding behaviors for better species management; and setting up tools to assist marine protected areas and management. As such, the projects contribute to organizational eco-innovation in term of collaboration among different stakeholders and inclusion of new management processes .
A Holistic Opto-Acoustic System for Monitoring Marine Biodiversities	The SYMBIOSIS project, as an example of product eco-innovation , provide a mature, cost effective autonomous optco-acoustic prototype for the characterization, classification, and biomass evaluation of six target pelagic fish. The processing will be made in a real-time fashion onsite, and the results will be sent to a shore station. The system will be completely autonomous and will withstand three-month deployment without recharging.

Notes: Interreg projects (cross-border and transnational); Horizon projects; Life projects; **Bold are eco-innovation or circular economy elements**

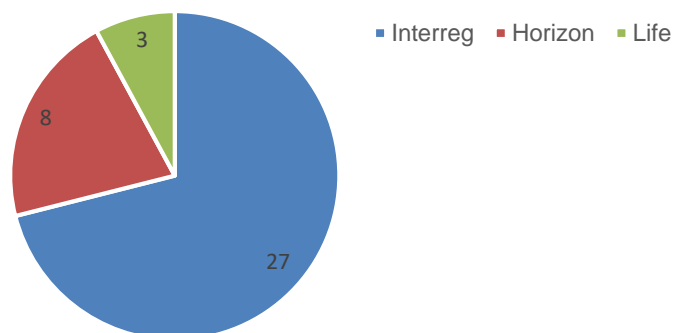
Within **4 Interreg projects** we have identified elements of **general innovation (mostly organizational innovation)** in **2 Interreg projects**, focused on innovative approach and networking for developing, testing, and applying efficient, easy to apply and cost-effective protocols to monitor and manage litter impact on biodiversity.

Among **14 Horizon projects**, that directly or indirectly cover the wide area of monitoring and management of marine protected marine species, **7 projects** included at least **one type of eco-innovation**. In 4 projects the elements of **organizational eco-innovations** were identified and are mostly evident in terms of collaboration and dynamic relationship building among different stakeholders, as well as an implementation of new forecasting models or new management processes, which will contribute to more sustainable way to monitor and protect of marine protected marine species. Two projects included an example of **product eco-innovation** (AQUAEXCEL2020 with the introduction of world-class platform for all types of fish; and autonomous optco-acoustic prototype for the characterization, classification, and biomass evaluation of six target pelagic fish in SYMBIOSIS projects) which will consequently help to preserve rare marine species. ATLAS and TASCAMAR projects through the development of new tools and strategies contribute to significant improvements in **processes**.

4.2 Sustainable development of the coastal and maritime zones

Regarding the flagship **sustainable development of the coastal and maritime zones** we have identified **27 Interreg projects**, **8 Horizon projects** and **3 Life projects**.

Figure 7: Number of projects regarding the operational program



We have identified **elements of innovation, eco-innovation or circular economy** in **14 Interreg projects out of 27**, **7 with general innovation elements**, while other **7 projects have elements of eco-innovation or circular economy**. Among these projects we have **identified elements of general innovation** in the following projects: **AdriaMORE, TOPSOIL, Technological transfer, and eco-innovation for the environmental and marine management in the port areas of the Macaronesia, MarRisk, ARIEL, MyCoast and SUPAIR**. And **elements of eco-innovation or circular economy** in the following ones: **ENVISUM, BLASTIC, CleanAtlantic, Circular Ocean,**

Blue Circular Economy, MadCrow and ACT4LITTER. Among **Horizon projects** we have identified the elements of eco-innovation in **4 projects**. In addition, **1 Life project** (out of 3 identified) includes the elements of eco-innovation.

Table 2: Projects that include elements of innovation, eco-innovation or circular economy

Project title	Innovation elements / Eco-innovation or circular economy elements
AdriaMORE	Project with product innovation that upgraded an existing platform for the monitoring and management of hydrometeorological risks such as storms or floods along the Adriatic coastline included software development, installation of a wind profiler and acquisition of a firefighting vessel. AdriaMORE conducted a variety of research, innovation and technological development activities. It contributed both software and hardware components to the existing decision support system.
TOPSOIL	The testing, development and deployment of different investigation methods has been carried out to map topsoil layers and its properties in 16 pilot areas. This includes an electromagnetic tTEM system which can be used for detailed, three-dimensional hydrological and geological mapping of the subsoil layers. Product innovation, a system called FloaTEM reveals water quality and hydro-geological features beneath lakes, rivers, fjords or the sea. So far, 10 new climate change adaptation solutions have been demonstrated.
Technological transfer and eco-innovation for the environmental and marine management in the port areas of the Macaronesia	The project is establishing a network to monitor the general marine environment, water and air quality in the ports of Madeira, the Azores, the Canary Islands and Cape Verde. The aim is to promote marine and maritime research, sustainable development and innovation in the Macaronesian region. Innovative technology has been developed and implemented and a data portal for real-time visualization and display updated. Regional ocean monitoring initiatives have been linked to international ones, and technology transfer and specialized training has been provided – from the Canary Islands to the rest of the Macaronesian archipelagos and Western Africa through Cape Verde. Presents product and organizational innovation.
MarRisk	MarRisk with product and organizational innovation supports smart and sustainable growth of coastal areas through analyzing the risks associated with climate change and their potential evolution. Applications, services, analysis, monitoring and surveillance developed as part of the project will ensure a coordinated response across borders.
ARIEL	Focusing on promotion of small-scale fisheries and aquaculture transnational networking in Adriatic-Ionian microregion, the project ARIEL aims to test pilot innovative solutions defined jointly by the enterprises and the research institutions. Innovation brokering events will facilitate R&D transfer into concrete and feasible actions for small-scale fishery and aquaculture actors,

	<p>accompanying their aggregation and cooperation process. The uptake and adoption of open innovation in small-scale fishery and aquaculture will be also fostered by the setting up of the ARIEL platform helping networking and partnering around innovative ideas and solutions during and beyond project life, favoring a permanent knowledge sharing and transnational dialogue among actors. Presents as such organizational innovation.</p>
MyCoast	<p>Project MyCoast spurs innovation with the development of pilot tools and instruments applied to specific coastal risks: extreme events and flood risks, maritime security and harbor, search and oil spill, marine renewable energy and offshore aquaculture and coastal pollution. As such combines product and organizational innovation.</p>
SUPAIR	<p>The transnational development and implementation (3 EU and 2 IPA countries) of methodology and actions insisting on a broad range of fields, with an innovative territory-based approach, involving port authorities, technical partners, stakeholders, and institutional actors guarantee quality, durability and transferability. Includes organizational innovation.</p>
ENVISUM	<p>The project ENVISUM addressed sustainability issues with organizational eco-innovation by joint collaboration of research institutions, cities and companies from seven countries, which collaborated to develop alternative, sustainable solutions that don't impose unbearable adjustment costs on the shipping industry. At the same time, they looked at reducing the industry's impact on the environment and people's health. ENVISUM helped promote the maritime industry as innovative and willing to uphold the environmental standards set by the International Maritime Organization. In addition, the research will help the shipping industry invest in the field of eco-innovation.</p>
BLASTIC	<p>BLASTIC project monitored and mapped sources and pathways of marine litter in four areas to demonstrate how plastic waste finds its way from urban areas into the Baltic Sea. BLASTIC drew up a checklist for mapping sources, flows and pathways of marine litter and formulated a methodology for monitoring its distribution in rivers and coastal waters in and around the Baltic. Mapping and monitoring exercises were carried out in 42 municipalities in the four participating countries, using the tools developed under the project, to compile guidelines and identify sources and pathways to be prioritized. The exercises led to the development of local marine litter prevention and reduction plans in pilot areas, with a focus on plastic waste from cities. As well good example of process and organizational eco-innovation.</p>
CleanAtlantic	<p>Project that builds on the existing knowledge and emphasizes collaboration developed a CleanAtlantic Knowledge Tool. This online database will provide access to resources relevant to</p>

	<p>any topic related to marine litter that had been delivered by EU and national research projects and expert organizations. A mix of product and organizational eco-innovation.</p>
Circular Ocean	<p>Circular Ocean, where local enterprises in remote northern coastal economies create smart new industries from plastic marine waste to revive economies and keep the environment clean. The EU-funded Circular Ocean project has stepped in with support to develop smart 'green' industries from old plastic fishing nets and ropes. This represents 10% of marine waste and is a potential resource for many industries and can be incorporated into products such as clothing and skateboards. The project helps local social enterprises and SMEs put the litter to profitable use. This creates a circular local economy in the plastics –waste from one business is used in another for a self-sustaining overall economy. Circular Ocean cleans up the environment, breathes fresh life into remote economies and makes more sustainable use of materials communities already import.</p>
Blue Circular Economy	<p>Blue Circular Economy project helps SMEs find ways to transform otherwise unwanted and polluting materials into a range of clean, sustainable items such as trainers, clothing, sunglasses and building materials. Blue Circular Economy (BCE) is a transnational project that supports the transformation of discarded fishing gear and marine plastic waste into recycled products. The project covers some of the most distant oceans and seas around Norway, Greenland, Ireland, and the United Kingdom.</p>
MadCrow	<p>MadCrow project with product eco-innovation has developed technology for the acquisition, integration and dissemination of marine ecosystem data, which is based on a citizen scientist concept in which boat owners allow project infrastructure to be fitted to their vessels to monitor physical, chemical and biological parameters of the sea, such as temperature, salinity, acidity and oxygen levels. MadCrow's application of the citizen scientist approach enhances environmental consciousness, particularly among young people, thereby contributing to increasing participation in, and reducing the cost of, monitoring and protection activities. As such addresses as well marketing eco-innovation.</p>
ACT4LITTER	<p>ACT4LITTER project aims at reviewing the most promising proposed measures to effectively tackle the issue of Marine Litter and select those that could be implemented in MPAs, considering particularly the ecosystem services. The selection of measures will result in the development of MPA-specific action plans for implementation in a future project. Those plans will be complemented by a realistic and operational governance plan at transnational level. MPA stakeholders and key experts on marine litter value chain will be involved through the process to validate the outputs together. The action plans</p>

	will have a strong focus on preventive measures, using circular economy and sustainable consumption and production approaches.
AtlantOS (Optimizing and Enhancing the Integrated Atlantic Ocean Observing System)	AtlantOS promote innovation, documentation and exploitation of innovative observing systems and so contributes to important product eco-innovation . The objective of AtlantOS is to achieve a transition from a loosely coordinated set of existing ocean observing activities to a sustainable, efficient, and fit-for-purpose Integrated Atlantic Ocean Observing System (IAOOS), by defining requirements and systems design, improving the readiness of observing networks and data systems, and engaging stakeholders around the Atlantic. AtlantOS will fill existing in-situ observing system gaps and will ensure that data are readily accessible and useable.
JERICO-NEXT (Joint European Research Infrastructure network for Coastal Observatory – Novel European eXpertise for coastal observaTories)	JERICO-NEXT (33 organizations from 15 countries) emphasizes that the complexity of the coastal ocean cannot be well understood if interconnection between physics, biogeochemistry and biology is not guaranteed. As an important organizational eco-innovation , the project is based on a set of technological and methodological innovations. One main innovation potential is to provide a simple access to a large set of validated crucial information to understand the global change in coastal areas.
Autonomous Unmanned Aerial Systems for Marine and Coastal Monitoring	A product eco-innovation is seen through increased use of autonomous unmanned aerial vehicle systems (UAS) instead of manned aircraft, buoys, ships or satellite-based remote sensing. UAS offers potential advantages such as high endurance, reduced cost, increased flexibility and availability, rapid deployment, higher accuracy or resolution, and reduced risk for humans and negative impact on the environment.
Boosting scientific excellence and innovation capacity in biorefineries based on marine resources	Organizational eco-innovation is seen in the network enhancement, which will enforce cluster dynamics in close interaction with industrial partners to contribute to regional, national and EU Blue Growth strategies, especially to marine biotechnology industry. The implementation of brokerage with stakeholders and market-oriented projects will dismantle trade barriers, increase the ways of communication among partners and promote knowledge enhancements and its conversion in business.
Nutrients and regenerated water recycling in wastewater treatment plants through twin-layer microalgae culture for biofertilizers production	The project aimed to address the environmental problem of wastewater produced by small- and medium-size urban areas with the development and implementation of two product eco-innovations . First, to develop and demonstrate a wastewater treatment plant using a Twin-Layer (TL) system: an advanced nutrient removal technology based on cultivation of microalgae in biofilm. Second, the project planned to address the shortage of phosphorus by developing and testing biofertilizers derived from the remaining microalgae. As such, the project includes also the elements of circular economy .

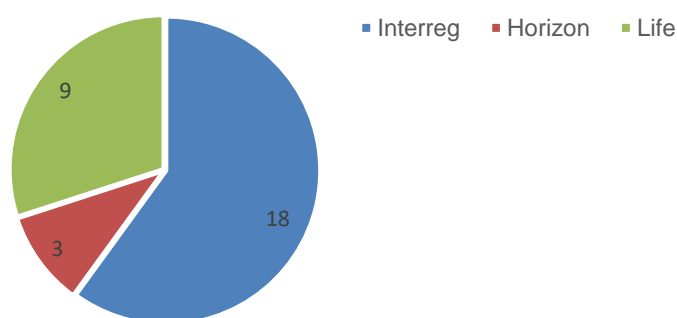
Notes: Interreg projects (cross-border and transnational); Horizon projects; Life projects; **Bold are eco-innovation or circular economy elements**

Out of 27 Interreg projects, 14 projects demonstrate elements of general innovation, eco-innovation or circular economy. In more details **7 with general innovation elements, while other 7 projects have elements of eco-innovation or circular economy.** Among general innovation elements we can observe technological innovation, innovation brokering events and other innovative solutions, methodology and tools, while among projects that engage eco-innovation and elements of circular economy we can identify alternative, sustainable solutions, development of local marine litter prevention and reduction plans, online database, support to develop smart 'green' industries from old plastic fishing nets and ropes, transformation of discarded fishing gear and marine plastic waste into recycled products technology for the acquisition, integration and dissemination of marine ecosystem data and action plans that have a strong focus on preventive measures, using circular economy and sustainable consumption and production approaches. There are in majority product, process and organizational innovations and eco-innovations with elements of circular economy and as well elements of marketing innovation.

Half of the identified **Horizon projects** include at least one type of eco-innovation. Example of **product eco-innovation** is seen in innovation observing system (AtlantOS) and in the use of autonomous unmanned aerial vehicle systems (UAS). The contribution of the other two Horizon projects among others is stressed through **organizational eco-innovation**, where scientific excellence boosts the cooperation among different stakeholders, all with the aim of more sustainable development of the coastal and maritime zones. In addition, identified **Life project**, which deals with nutrients and regenerated water recycling in wastewater treatment plants, incorporates not only the elements of **eco-innovation**, but also **circular economy elements**.

4.3 Protection and enhancement of natural habitats and terrestrial ecosystems

Regarding the flagship **protection and enhancement of natural habitats and terrestrial ecosystems** we have identified **18 Interreg projects**, **3 Horizon projects** and **9 Life projects**.

Figure 8: Number of projects regarding the operational program

We have identified elements of innovation in 3 Interreg projects, as follows: S2IGI project, ALICE and INTEGRATE, while no elements of eco-innovation were found among Horizon and Life projects.

Table 3: Projects that include elements of innovation, eco-innovation or circular economy

Project title	Innovation elements / Eco-innovation or circular economy elements
S2IGI project	Is aimed at reducing the environmental and economic damage caused by forest fires by developing a software system to support tactical and strategic interventions for fire prevention and management and post-fire recovery operations. It combines innovative data processing, images provided by new satellite technologies and accurate forecasts from meteorological models. Presents a product innovation.
ALICE	ALICE engages innovation by developing new methods for habitat mapping and monitoring of conservation status using remote sensing and ecological modelling tools, and by development of innovative participatory approaches for decision support to realistically inform future socioeconomic and environmental policy. As such presents process and organizational innovation.
INTEGRATE	Project INTEGRATE fosters a quintuple helix cooperation to promote the industrial transition, finding sustainable ways to address an imbalance of resources towards Integrated Multi-Trophic Aquaculture (IMTA) in the Atlantic Area. The project aims to develop effective tools to increase competitiveness while removing the barriers to sectoral green growth and improving the quality and public image of the aquatic products. The INTEGRATE project aims to strengthen transnational and collaborative networking among research, business-industry groups and civil society on eco-efficient aquaculture techniques through a territorially based cooperation approach. Presents organizational innovation with elements of marketing innovation.

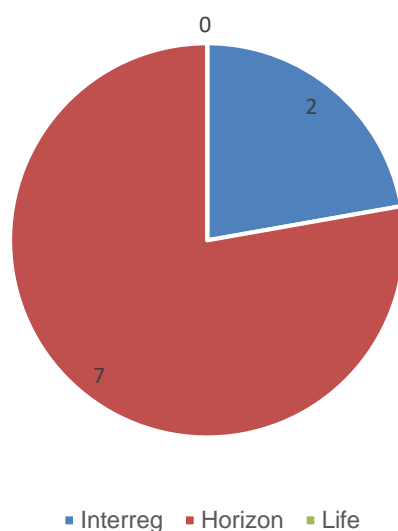
Notes: Interreg projects (cross-border and transnational); Horizon projects; Life projects; **Bold are eco-innovation or circular economy elements**

In conclusion, we can see that only **3 Interreg project demonstrate elements of general innovation (product, process, organizational and marketing)**, which are shown as innovative data processing, collaborative networking, development of effective tools and innovative participatory approaches. However, we cannot observe elements of eco-innovation or circular economy, but we can conclude that indirectly they affect sustainability.

4.4 Transnational contingency plan in the event of accidents at sea

Regarding the flagship **transnational contingency plan in the event of accidents at sea** we have identified **2 Interreg projects**, **7 Horizon projects** and **zero Life projects**.

Figure 9: Number of projects regarding the operational program



We have identified elements of innovation in **one Interreg project out of two** that have been identified through our research. The identified project is **@BluePortS**. Among the **Horizon projects**, we found eco-innovation elements in all **7 identified projects**, while no Life project was directly or indirectly linked to a transnational contingency plan in case of accidents at sea.

Table 4: Projects that include elements of innovation, eco-innovation or circular economy

Project title	Innovation elements / Eco-innovation or circular economy elements
@BluePortS	The project emphasizes product, process, and organizational innovation: in techniques, to reduce operation time, in financial instruments to facilitate investment and adjust service costs and in user friendly booking services.
Integrated oil spill response actions and environmental effects	The project includes several product and process eco-innovations , as follows: 1) to improve the observation and predictions of oil spreading in the sea using novel on-line sensors on-board vessels, fixed structures or gliders, and smart data transfer into operational awareness systems; 2) to examine the true environmental impacts and benefits of a suite of marine oil spill response methods (mechanical collection in water and below ice, in situ burning, use of chemical dispersants, bioremediation, electro-kinetics, and combinations of these) in cold climate and ice-infested areas; 3) to assess the impacts on biota of naturally and chemically dispersed oil, in situ burning residues and non-collected oil using biomarker methods and to develop specific methods for the rapid detection of the effects of oil pollution; 4) to develop a strategic Net Environmental Benefit Analysis tool (sNEBA) for oil spill response strategy decision making.
Safe maritime operations under extreme conditions: the Arctic case	SEDNA will develop an innovative and integrated risk-based approach to safe Arctic navigation, ship design and operation, to enable European maritime interests to confidently fully embrace the Arctic's significant and growing shipping opportunities, while safeguarding its natural environment. With inclusion of product and process eco-innovation , SEDMA directly prevents accidents and sea and safeguard its natural environment.
Evolift - Getting people out of harms way	As an example of product eco-innovation , the project offers a pioneering remote-controlled marine solution that can provide unmanned loading and offloading of cargo or buoys on in-shore and off-shore boats and oil rigs.
Guided Data-Driven Safety at Sea	Safewave is a software-based solution that provides operators real-time information and predictions of potential hazards ahead and so through process eco-innovation helps to prevent accidents at sea.
EfficienSea 2 - Efficient, Safe and Sustainable Traffic at Sea	The consortium will support EU policies and marine traffic management with an inclusion of eco-innovation through services to improve navigational safety and efficiency; improve Arctic navigation and emergency response; and improve environmental monitoring & enforcement.
Micro AIS Shore Station - MASS	A product eco-innovation is seen in Automatic Identification System (AIS), a VHF based system which is designated to enhance the safety of life and goods at sea by also assuring navigational and environmental improvements.

Mechanistic Microscale Approach to the Microbial Degradation of Oil-Droplets in Subsea Crude Oil Releases	The project proposes a new level of prediction of crude oil dispersion as well as develops more efficient bioremediation techniques to combat oil spills in marine environments and so with the help of process eco-innovation contributes to more sustainable environment.
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Notes: Interreg projects (cross-border and transnational); Horizon projects; Life projects; **Bold are eco-innovation or circular economy elements**

In conclusion, we can see that **only one Interreg project demonstrates elements of general innovation (process and organizational)** and even though that there are no direct elements of eco-innovation or circular economy, this project indirectly affects sustainability and environmental protection.

Among **7 Horizon projects**, all identified projects include aspects of **eco-innovation**, that either directly or indirectly prevent accidents or their consequences at sea and so safeguard natural environment. Two projects “Integrated oil spill response actions and environmental effects” and “Mechanistic microscale approach to the microbial degradation of oil-droplets in subsea crude oil releases” with the inclusion of **product** and **process eco-innovations** propose approaches, how to observe, predict, manage and minimize oil spills. The rest of identified Horizon projects are more indirectly related with the transnational contingency plans in the events of accidents at sea, specifically with the inclusion of product (i.e. AIS shore station; project Evolift) or process (i.e. Safewave) eco-innovation, which help to prevent accidents at sea and so safeguard its natural environment.

5. Proposals to stimulate eco-innovation and circular economy

Validated and documented instruments and approaches to stimulate eco-innovations and business practices leading to circular economy are relatively new areas of research, policy, and business, even though theoretical concepts dealing with measures to maintain and sustain environmental quality are around for decades. Up to now, most of businesses as well as users treated green practices more as a nice-to-have and a PR marketing tool to increase sales, and just a small share of enthusiasts perceived the environmental threats seriously and with needed urgency to proactively approach them. No need to mention the problems of the specific topics of TSG3 - The marine environment & Transnational terrestrial habitats and biodiversity, which are somehow even more hidden from the wider public, as well as more sensitive to tackle. Slowly, this perception is changing among all stakeholders, as a result of pull and push activities on different levels, and coming from different stakeholders, as well as the intensification of environmental threats society is facing.

Based on the work performed in this study, referring to the analyses of best practices and the identification of projects and programs, including eco-innovations on specific flagships of TSG3, as well as previous research and knowledge from the field, we might draw two general conclusions relevant for crafting the proposals of instruments and approaches to stimulate eco-innovations and circular economy. First, the “nature” of the eco-innovation is very complex and interconnected, since to a classical definition of innovation and various measures governments and stakeholders have implemented across the globe to stimulate innovation, it adds another dimension “of the environment”, which is much more intangible, acts on longer terms and pertains at the same time to “all” and “nobody” in specific. This means that we need first to shift consumer values and user behavior and increase the awareness of the topic in a wider sense. Therefore, proposing sets of specific instruments and approaches to stimulate their adoption is even more difficult, since they should be innovative and targeted, while stimulating incremental changes, using pull and push measures.

Second, number of policy instruments that are already in use at the EU-level (presented in brief below) might represent some basis to upgrade, and even they do not directly tackle the specific topics of TSG3, they indirectly influence the adoption of eco-innovations and circular economy business practices in specific flagships of TSG3. Likewise, the projects that we reviewed in majority indirectly address eco-innovations or circular economy elements. Similarly, most of the measures and actions presented later on, will have effects on a wider set of topics and flagships in the area of EUSAIR, then the core two topics of the TSG3, namely The marine environment & Transnational terrestrial habitats and biodiversity.

Third, in analyzed projects there are very little projects of marketing innovation, related to environmental issues and good practices of circular economy. Unfortunately, those are usually less tangible than others, but are those that most directly affect user values and behavior. Specifically, Eco-Innovation Observatory – Biannual Report 2018 (O’Brien et. Al, 2018) presents a number of policy instruments that are already in use at the EU-level and are being adapted to the needs of the circular economy, and some others that are being developed to steer the transition toward it. **One of the study findings implies the that synergies and overlaps between instruments must be**

strengthened to help streamline administrative procedures (e.g., by using the same basic metrics and criteria for product evaluation) **and facilitate greater uptake of good practices across product groups, sectors and Member States.**

Among the most effective, widely spread and unique **EU policy instruments** in that “they aim to address the environmental impact along the whole life cycle, including the increasing number of impacts of European consumption that happens in countries outside the EU where products and materials are often produced and from which they are imported to the EU” (EC 2017a) were identified: **the EU Ecolabel, green public procurement, and the Environmental Management and Audit Scheme (EMAS)**, relevant mostly for products and business models. Besides, they also identified three other instruments that are focused more explicitly on the circular economy: namely **Extended Producer Responsibility (EPR), Eco-design for material efficiency and the pilot Product Environmental Footprint**. If not directly, these policy instruments are relative also for TSG3 – Environmental quality, but the next step in their use for stimulating the transition toward a more sustainable EU, and specifically EUSAIR region would be to upgrade and start using certain measures on the regional level and start benchmarking among them.

As different documents related to policy implications (Eco-Innovation Observatory – Biannual Report 2018; O’Brien et al. 2018) have already proposed, **the involvement of consumers is also key**. Citizens play a role as participants (e.g., in take-back schemes), as key drivers for more sustainable products (e.g. by purchasing products with eco-labels) and as active eco-innovators through user-led changes. When citizens will start co-creating specific environmental actions, they will become much more engaged and will start promoting themselves the importance of such activities and behavior, which will make a strong push toward changes in consumer values. From the reviewed projects, we can observe that some have engaged citizens into their actions, innovative approaches to achieve their goals.

Only a few projects that have been reviewed have focused as well in part on awareness raising. To develop further and operationalize such approaches, **we would suggest concentrating first on awareness rising and promotion activities** (e.g., information campaigns) **to change user mindset and values, thus influencing their (consumer/user) behavior and lifestyles toward higher levels of sustainability** that requires new and adapted policy instruments and strong policy frameworks to support these changes. Building on available research findings (Hojnik et al. 2019), which indicate that **female consumers express greater environmental concern, consciousness of eco-products, and perceived environmental responsibility than male consumers**, we should start with awareness rising and promotion activities targeting those groups that are more sensitive to environmental issues, to build a snowball effect in changes of consumer values.

5.1 Micro - stakeholder level

A concrete proposal of coordinated actions to stimulate the adoption of eco-innovations and circular economy actions would be setting up regional **“ECO-INNOVATION-LIVING-LABS”**, that could operate on different levels.

First, such entity could act as “think-tank” and consultation body for the transfer of program documents into implementation strategy for smaller regions, areas or cities, representing a link from macro to micro. On the other hand, with the future gained experience it might act also as consultation body for future policy documents, since would be led by researchers specialized in eco-innovation and circular economy, as well as practitioners, entrepreneurs, consultants and other stakeholders from the area.

Second, on the business level, companies could find a personal guide and advice that would complement the EU-level digital **repository of business practices about eco-innovation**, with their description and contacts, but presented in a systematic way that entrepreneurs could identify and find inspiration as relevant as possible for them to implement in their business. The uniqueness of such entity would be also in the part of the “LIVING” site of the Eco-innovation-laboratory, that would **showcase how selected eco-innovations really work in practice** but exposing to companies that this might have **also positive economic effects** of their operation (while reducing costs of materials, operations, energy etc.). Its presentation should be done with video clips of the eco-innovations of circular economy business practices, including interviews of innovators or entrepreneurs explaining their experience, and potential contact of them.

Additionally, specific educational **seminars and workshops about eco-innovation implementation, as well as academies** should be developed and offered free of charge to entrepreneurs and their employees, potentially in coordination with professionals from the academia and with academic institutions (see point below referring to academia). So far different examples of such academies exist (e.g. <https://www.circularbusiness.academy>), some also with support of state agencies – SPIRIT¹ (<https://www.podjetniski-portal.si/programi/trajnostna-poslovna-strateska-transformacija/>), but they might be somehow more focused on specific topics of TSG3 (The marine environment & Transnational terrestrial habitats) and designed for a broader audience of stakeholders and organizations/institutions (e.g. NGO, municipalities...), and not just for profit businesses.

Third, the academia would be an extremely important stakeholder in such entity for support and implementation of eco-innovations and circular economy business practices in both the educational and research aspects. Concretely, academic institutions should try to develop and propose **interdisciplinary educational study programs on post-gradual levels, focused on management of sustainable development** (e.g. https://www.fm-kp.si/izobrazevanje/programi_2_stopnje/upravljanje_trajnostnega_razvoja, so far only in Slovene), where future leaders will be educated with critical knowledge from environmental sciences, combined with management skills to lead different public and private entities. In medium to long term such measure is beneficial also because students will establish personal networks of their peers that in few years will become professionals or leaders in different organization, which will address one of the main problems and obstacles of coordinated actions of stakeholders to implement eco-innovations and circular economy business practices.

On the undergraduate level of study, measures such as **eco-innovation challenges as competitions for the best ideas of eco-innovation** (either as a product, service, process,

¹ SPIRIT Slovenia - Public Agency for Entrepreneurship, Internationalization, Foreign Investments and Technology

business mode, ...), and complemented by supported schemes (such as advice, mentoring, incubation, seed capital) for their implementation and establishment of potential startup companies. In addition, some **summer school educational programs** covering different environmental topics and complemented with scholarship for students coming from EUSAIR territory could be offered. In relation to the research activities of academic institutions, **basic research activities regarding different phenomena related to eco innovation and circular economy** might be performed, including the **monitoring of trends, publishing research articles or various expert analyses**.

Forth, **kindergartens, primary education and secondary schools** are also extremely important in shaping and defining values of future users and consumers. In our review of projects, basically no actions were identified, that would be addressed toward them. This would concern especially marketing type of eco-innovations, or good practices of circular economy that would engage the abovementioned target groups. Concrete examples of proposals would be “challenges” for best practices related to circular economy, adapted to different levels of schooling and education, such as, “Show me how you...save water...recycle...reuse...repair”, present me your idea “How you would best...organize collection of waste in your city, school...”events for planting new trees, thematic drawings...”Nature/water/seas/rivers as a classrooms” etc. This might lead also to some international competitions, networks, or certifications of “young best practices”, schools etc. Examples of such already exist: Foundation for Environmental Education (FEE) ² (<https://www.fee.global/>) . In Slovenia is present under the brand Eko Šola (Eco-School).

Fifth, since **users** are most (easily) influenced by the (self)experience or by insights, resulting from the relation “see & believe”, especially when they become engaged, we would propose that such entity would act also as a “LIVING LAB”, where **eco-innovation and circular economy would be showcased, demonstrating their direct and positive effect on the environment** (while also the scenario if we remain passive and continue with the status quo with established practices), their operation and **how can citizens participate in such activities**. The selection of eco-innovations should be done in the way, that they might be open for co-creations and user engagement. They should be targeted toward increasing awareness and change in consumer values. This might come to the level of **coordinated “movements” and supported with intense PR activities on social media**, like “ #me too for...our planet...clean ocean...nature preservation”. Similarly, we should approach the activities of awareness rising related to concerns for the environments with help of “**influencers**”, that would target especially younger people, which are usually more connected and are still developing the identities and personalities.

The “eco-innovation-living-lab” would be best positioned within the academic institution. With such positioning, it might influence, perform and coordinate educational and research activities on one hand and be the facilitator in the regional stakeholder networks outside the academic institutions. With a specific “consultation body” composed of main stakeholders specified above, it might most easily harmonize different interest and coordinate the activities and functions specified above. At the same time would be economically viable, since some operation costs of its operation would be already covered from other ongoing activities and finally, would capitalize on the accumulated

² Foundation for Environmental Education (FEE) is the world's largest environmental education organization, active in over 100 countries around the world. Through our five groundbreaking programs, we empower people to take meaningful and purposeful action to help create a more sustainable world.

knowledge and networks about innovation and circular economy. Additionally, a spillover effect might be expected that could be gained by transferring such knowledge into study programmers for educating future generations of entrepreneurs and citizens.

A measure that would **vertically connect different stakeholders and contribute to overcome identified barriers** could be the **creation of local networks of stakeholders and partners** to introduce eco-innovation and circular economy practices in order to explore the possibilities of coordinated activities. The initiative for establishing such networks might come from different sources. The analysis of good practices has shown that one of the fundamental obstacles is the complexity of introducing good practices in the circular economy due to the diversity of stakeholders. Local stakeholder networks would be in support of SMEs, as the bearers of their activities, who could, through the acquired knowledge and exchange of information between the actors in the network, advance faster in their efforts. Examples of such Slovenian local networks are CER – Sustainable business network (<http://cer-slo.si/dogodki.html>)³ or SRIPS – Strategic partnership for circular economy (<https://srip-circular-economy.eu/>)⁴, where government might act as supporter, giving them some more strategic position.

5.2 Government - national level

Governments should develop and propose more public tenders for adoption of eco-innovation and circular economy to include different kind of organizations. So far already some public calls exist (<https://www.podjetniski-portal.si/programi/trajnostni-razvoj/javni-razpis>)⁵, but are mostly dedicated to SMEs and for more “tangible elements”, with short term direct effects. As already mentioned above, we should start with actions that influence general public awareness about environmental concerns and the change in consumer values, which is mostly not in (direct and short term) interest of SMEs. Therefore, such public calls should be oriented more toward non for-profit organizations, such as NGO, and social enterprises, with different kind of missions, **with the aim to influence the public awareness about environmental concerns, and the change in consumer values.** This is especially relevant for TSG3 topics of The marine environment & Transnational terrestrial habitats and biodiversity. **Such proposal builds also on our findings** from the analyses of the financed projects, where relatively low number of projects propose marketing eco-innovations. They do include some parts and try to engage citizens and raise awareness, establish transnational cooperation and networking, but there is still space for improvement.

³ CER is the first and largest partnership for a sustainable economy in Slovenia, which strives to achieve a climate-neutral economy as soon as possible. CER is a platform for the promotion of green transition and the use of green technologies in all sectors. It is based on the belief that the challenges of climate change and globalization require new solutions, new partnerships and new ways of working together.

⁴ SRIP - The Strategic Research and Innovation Partnership – Networks for the transition into circular economy is a connection of Slovenian business subjects, educational and research institutions (RDI), non-governmental organisations and other interested parties, in collaboration with the state, aiming to establish new value chains according to the economic principles of closed material flows.

⁵ The purpose of the public tender is to support small and medium-sized enterprises that want to integrate sustainable aspects of business into business / corporate strategies and business models, and thus achieve higher added value and competitive advantage in positioning end products and services on the market and improve integration into global value chains.

5.3 Regional level

On regional level, above national governments, **initiatives of thematic clusters**, such as those presented in the ADRION project (e.g., Coastal and marine environmental management⁶) should be **further developed and elaborated**. Further elaboration that would complement the work performed, would be **the focus on specific innovation elements related to eco-innovation and business practices about circular economy**. In such case the thematic cluster coordinator could **build on the work performed in this study and use the identified projects and developed framework**.

The regions can improve the institutional framework (innovation ecosystems) for stimulating eco-innovation on regional level, which needs coordinated actions of different local governments and their policies. This could be done in collaboration with other regional and local actors from business and research, which is sometimes easier to achieve and start with, than on the governmental and policy level.

On the other hand, regions can only focus on addressing those of the barriers to introducing eco-innovations which are **within their remits and means but have overall general and important impact on local implementation of eco-innovation and circular economy business practice**. These include tackling behavioral lock-ins through communication and awareness raising.

In the introduction of this section related to proposals for stimulation of eco-innovation, different EU policy instruments have been shortly introduced, such as eco-innovation index that benchmark countries among different elements of eco-innovation. The next step would be to measure the **regional eco-innovation performance** since this would drive the regions ambitions while benchmarking them against other regions and increase their performance.

The problem that should be tackled on the regional level is still the **data fragmentation** about the forthcoming trends, implemented good practices of eco-innovation and circular economy that too many times remain hidden, and their promotional impact is not exploited. Such best practices could be better segmented in terms of relevance for specific stakeholders, industries etc., leading to a regional, systematic repository. Similarly, the monitoring and evaluation of financed projects related to TSG3 – Environmental quality on specific flagships, using the framework that was developed and used within this study also for newly funded and future projects might be continued.

Given that **relatively few projects with elements of eco-innovation and circular economy have been identified among the completed and analyzed projects**, further study of key obstacles of implementation of eco-innovation should be strengthened. Despite the fact that this is to some extent already in progress and there is some accumulated knowledge, it is **necessary to lower the study of obstacles related to implementation of good practices and eco-innovation to the operative-local level and specifics of the local environments**, as it has been shown that a lot of barriers in implementation are related to the local environment. However, measures to eliminate them could be better targeted and adapted to the local context and environment.

⁶<https://www.adrioninterreg.eu/index.php/2020/03/04/adrion-thematic-cluster-on-coastal-and-marine-environment-management/>

In this chapter several proposals of measures have been presented as potential to stimulate eco-innovation and circular economy business practices in general, as well as some more specifically of TSG3 and its specific topics of The marine environment & Transnational terrestrial habitats and biodiversity, since their impact and implementation has mostly spillover effects to other pillars and topics. They are segmented along the level of implementation and specific stakeholder groups that might be included in its implementation. **However, there is not a one-size fits-all solution over the wide scope of challenges associated to their faster and wider implementation, but the approach should be incremental, systematic, coordinated and inclusive, to engage all relevant stakeholders, if we want it will be effective.**

Summary of main proposals:

- Start with awareness rising and promotion activities to change user mindset and values, thus influencing consumer/user behavior and lifestyles toward higher levels of sustainability, focus on marketing innovation in circular economy (little has been found about marketing innovations in review of projects) in the funding of program calls
- Setting up regional “ECO-INNOVATION-LIVING-LABS”, that could operate on different levels. Potential activities related to such entity, composed of different stakeholders, and meaningfully integrated in the university environment are presented below:
 - Establish a “Think-tank” and consultation body for the transfer of program documents into implementation strategy for smaller regions, areas or cities, representing a link from macro to micro
 - Develop a digital repository of business practices about circular economy and implemented eco-innovations, with their descriptions and contacts, with better segmented in terms of relevance for specific stakeholders, industries etc., leading to a regional, systematic repository
 - Showcase how selected eco-innovations really work in practice, but exposing to companies that this might have also positive economic effects of their operation, demonstrating how can users be engaged in them and co-create them; involvement of consumers is a key
 - Propose educational seminars, workshops and academies about eco-innovation implementation for different target groups in collaboration with academics and professionals
 - Organize local, regional and potentially international challenges as competitions for the best ideas/practices eco-innovation and circular economy (on different levels of education; primary, secondary, university level) to increase awareness and influence consumer values (Show me how you...save water...recycle...reuse...repair”, present me your idea “How you would best...organize collection of waste in your city, school...”events for planting new trees, thematic drawings...”Nature as a classroom” etc)
 - Marketing and PR activities, with focus on social media, influencers, building communities and “movements” (e.g., “#me too for...our planet...clean ocean...nature preservation”.
- Develop interdisciplinary educational study programs on post-gradual levels, focused on management of sustainable development, summer business schools, inclusion of professionals as guest speakers into undergraduate study programs
- Create local networks of stakeholders and partners to introduce eco-innovation and circular economy practices in order to explore the possibilities of coordinated activity, vertically connect different stakeholders, and contribute to overcome identified barriers

- Develop and propose more public tenders for adoption of eco-innovation and circular economy to include different kind of organizations of thematic clusters with focus on specific innovation elements related to eco-innovation and business practices about circular economy (build on identified projects with eco-innovations and circular economy business practices)
- Measure the regional eco-innovation performance to drive regions' ambitions while benchmarking them against other regions and increase their performance (upgrade of eco-innovation index relative for country benchmark)
- Further study of key obstacles of implementation of eco-innovation, since relatively few projects with elements of eco-innovation and circular economy have been identified among the completed and analyzed projects
- Continue monitoring, research, data collection, analyses, identification of trends and best practices of circular economy and eco innovation, as well as funded projects, potentially with the framework developed and used in this study

5.4 Classification of proposals based on resources needed and time frame for start or implementation of identified activities

In this paragraph, the measures to stimulate eco-innovation and circular economy will be presented in a simplified version and classified according to the time and resources needed for their start or implementation, as well as the stakeholders that would need to cooperate in the implementation of the presented activities. The readers should consider that the classification and estimation of needed resources proposed below is based on the estimation of the innovation expert team, is not supported with feasibility analyses and is meant only as a starting point for further discussions.

The Table 5 below summarizes and presents in a simplified version the identified proposal to stimulate eco-innovations and circular economy business practices. The proposals are numbered, while the specific measure of eco-innovation-living-lab has a second order number, which means it would perform several activities, which for clarity of presentations have been presented separately. The combination of numbers and colors in the table, determining a specific proposal will be used in the next Figure 10 to position them against the resources needed for their start or implementation and the timing in which they could start being implemented.

Table 5: Summary of main measures to stimulate eco-innovations and circular economy business practices

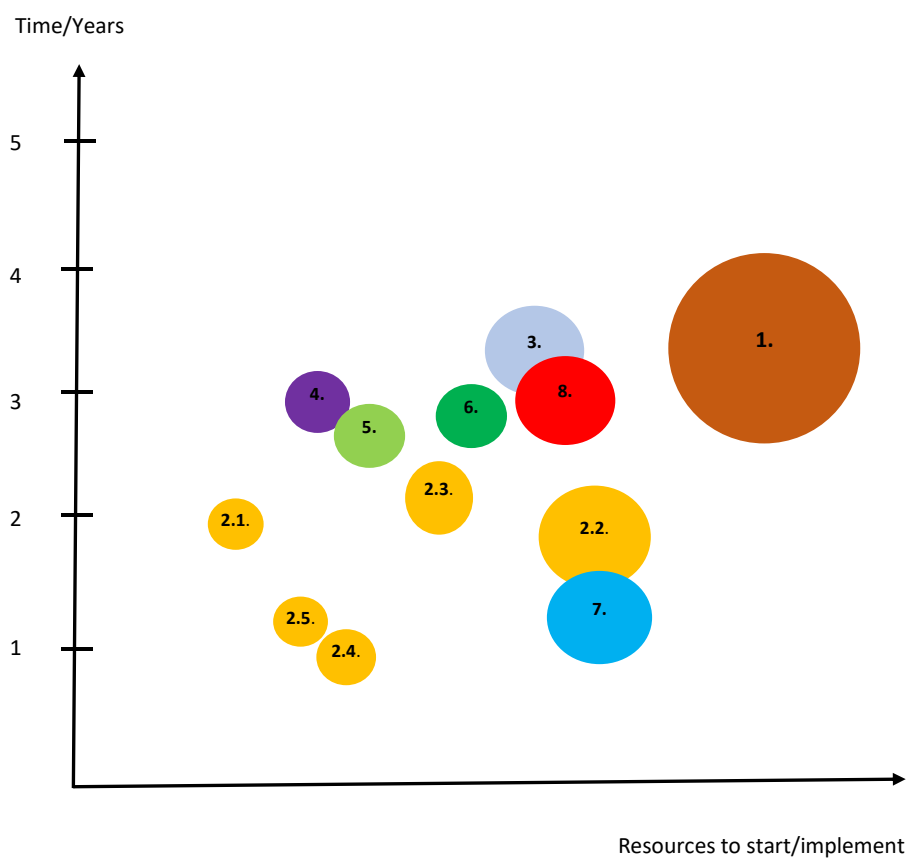
Color/Number	Measure/proposal	Stakeholders involved
1.	Program calls directed toward marketing innovation in circular economy – awareness rising and promotion activities	Managing authorities, ministries
2.1.	Eco-innovation-living-lab: consultation body	Experts, faculties, municipalities
2.2.	Eco-innovation-living-lab: digital repository of business practices about circular economy and eco-innovations	Marketing agency, IT company, faculties, enterprises
2.3.	Eco-innovation-living-lab: demonstration of operation & effects of eco-innovations and circular economy business practices to wider public and businesses	Businesses, students, wider public, influencers
2.4.	Eco-innovation-living-lab: seminars, academies, workshops	Faculties, experts
2.5.	Eco-innovation-living-lab: challenges as competitions for the best ideas/practices eco-innovation and circular economy	Faculties, schools, kindergartens
3.	Local networks of stakeholders and partners to introduce eco-innovation and circular economy practices	Ministries, experts, governments, NGOs, businesses, others
4.	Thematic clusters with focus on specific innovation elements related to eco-innovation & circular economy	Ministries, experts, governments, NGOs, businesses, finished project consortiums
5.	Benchmark of regions eco-innovation performance	Regions, ministries, experts
6.	Study of key local obstacles for implementation of eco-innovation and circular economy business practices	Experts
7.	Continuation of monitoring, research, data collection, analyses, identification of trends and best practices of eco-innovation and circular economy	Experts
8.	Formal educational programs (masters), summer schools, guest lectures	Faculties, experts

Source: Own categorization

Figure 10 places the identified measure against two axes, namely the approximate time in years, demonstrating when the measures could be implemented or just the estimation of the timing, when they could start to be implemented. This could not be generalized, because some proposals could be started relatively fast, but will have more iterations and might be continued for years. Such example is the establishment of a digital database is a one-time activity, but the constant update of the database is the ongoing activity. Similarly, is for seminars, education activities, awareness rising activities...while for proposing specific calls dedicated to marketing innovation related to circular economy, it needs a lot of time and coordination for their preparation, while there will be published maybe one or two calls dedicated to them. The second axes demonstrate the resources needed, where the similar logic might be applied. The resources presented in the chart are presented and estimated to start the identified proposal with some limited number of iterations. The size of the circle demonstrated the relative amount of resources compared to other identified proposals.

As we see from the Figure 10 awareness rising activities co-organized by eco-innovation-living –lab and other stakeholders might be started relatively fast and with reasonable resources, demonstrating some concrete and tangible results related to the promotion of eco-innovation and circular economy business practices.

Figure 10: Classification of proposals based on resources needed and time frame for their start or implementation



Source: Own categorization

6. Literature

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7. Appendix

Projects are divided into 4 categories based on the four flagships.

7.1 3MPS – Monitoring and management of marine protected marine species

	Title	Operational program	Fund	Program period	budget	topic	website	Eco-innovation or circular economy elements
1	MPA-ADAPT	Interreg TN - Mediterranean	European Regional Development Fund	2014-2020 Project duration 01/2016 - 04/2019	Total Investment 1 904 257 EUR EU Investment 1 618 580 EUR	The EU-funded MPA-ADAPT project is helping Marine Protected Areas (MPAs) in the Mediterranean Sea develop ways to enhance the resilience of biodiversity, safeguard ecosystems and buffer coastal communities against the effects of climate change. Although still a work in progress, the project has already successfully raised awareness about the importance of effective MPA management in preparing the region. Specifically, by creating understanding of the risks of climate change to biodiversity and coastal communities, the project has helped MPAs improve their planning and responsiveness.	https://ec.europa.eu/regional_policy/en/projects/croatia/mpa-adapt-preparing-the-mediterranean-region-for-the-impacts-of-climate-change	/
2	Collaborative Oceanography and	Interreg V-A - United	European Regional	2014-2020	Total Investment	Monitoring and understanding complex and sensitive marine environments require the	https://ec.europa.eu/regional_policy/en/projects/lr	Innovative approach

	Monitoring for Protected Areas of Species (Compass)	Kingdom-Ireland (Ireland-Northern Ireland-Scotland)	Development Fund	Project duration 01/2017 - 03/2022	7 726 441 EUR EU Investment 5 632 299 EUR	collection of long-term data sets – a process both challenging and expensive. Although new technologies help researchers access such data, leveraging the full potential of these technologies requires an informed and innovative approach, which is where Compass comes in. Specifically, by bringing in the expertise and experience of scientists from across the region, the project is building cross-border capacity for the effective monitoring and management of Marine Protected Areas (MPAs). Researchers are developing long-term monitoring strategies for highly mobile protected species, including marine mammals and salmon. Last but not least, it is providing the infrastructure needed for baseline oceanographic and ambient noise monitoring.	eland/northern-ireland-scotland-ireland-combine-resources-to-better-protect-marine-habitats	
3	Protection and rehabilitation of the coastal areas - Phase II”	Large Infrastructure Programme - ERDF/CF	European Regional Development Fund	2014-2020 Project duration 01/2019 - 12/2023	Total Investment 841 118 736 EUR EU Investment 602 743 199 EUR	This is the second phase of a project to protect and rehabilitate a 30.5 km stretch of Romania’s Black Sea coast. It involves artificial sanding of beaches, building, extension and replacement of coastal structures such as breakwaters for beach stabilisation and support walls, rehabilitation of sluices, cliff consolidation, and dredging. To preserve biodiversity, construction of artificial reefs and introduction of bio-structures and repopulation with marine species are planned. Equipment will be purchased for monitoring purposes.	https://ec.europa.eu/regional_policy/en/projects/Romania/protecting-romania-coastline-from-erosion	/

						The Edighiol and Periboina sluices, which control water flow between the Black Sea and Lake Sinoe, are to be restored. Measures will be taken to protect the bases of electricity pylons and erect new coastal protection structures. In Constanta, existing structures that no longer fulfil their initial protective purpose will be demolished and new coastal revetments built to protect a historic area of the city.		
4	MEDSEALITTER (Developing Mediterranean-specific protocols to protect biodiversity from litter impact at basin and local MPAs scales)	INTERREG Mediterranean	European Regional Development Fund, IPA	2014- 2020 Project duration: 2016- 2019	Total Investment 2 402 741 EUR EU Investment 2 042 330 EUR	The project aims at networking representative MPAs, scientific organizations and environmental NGOs for developing, testing and applying efficient, easy to apply and cost-effective protocols to monitor and manage litter impact on biodiversity. Overall, the project aims at accomplishing and validating within the Mediterranean basin systematic protocols for monitoring one of the major polluters present in marine waters (marine litter) and its potential effect on key biodiversity species. The project endeavors to capitalize the potential of networking Marine Protected Areas, research organizations and NGOs for gathering information on a wide and local scale, coordinating measures across different international MPAs.	https://medsealitter.intereg-med.eu/	Innovative approach
5	A Trans-Atlantic Assessment and deep-water ecosystem-based Spatial	Horizon 2020	RIA – research and innovation action	Project duration 05/2016- 10/2020	Overall budget 9 167 816,86 EUR	ATLAS creates a dynamic new partnership between multinational industries, SMEs, governments and academia to assess the Atlantic's deep-sea ecosystems and Marine Genetic Resources to create the integrated	https://cordis.europa.eu/project/id/678760	Eco-innovation

	management plan for Europe				EU contribution 9100316,86 EUR	and adaptive planning products needed for sustainable Blue Growth. ATLAS will gather diverse new information on sensitive Atlantic ecosystems (incl. VMEs and EBSAs) to produce a step-change in our understanding of their connectivity, functioning and responses to future changes in human use and ocean climate.		
6	Deep-sea Sponge Grounds Ecosystems of the North Atlantic: an integrated approach towards their preservation and sustainable exploitation	Horizon 2020	RIA – research and innovation action	Project duration 3/2016 – 12/2020	Overall budget 10 275 365,25 EUR EU contribution 9994302,75 EUR	The objective of SponGES is to develop an integrated ecosystem-based approach to preserve and sustainably use vulnerable sponge ecosystems of the North Atlantic. The SponGES consortium, an international and interdisciplinary collaboration of research institutions, environmental non-governmental and intergovernmental organizations, will focus on one of the most diverse, ecologically and biologically important and vulnerable marine ecosystems of the deep-sea - sponge grounds – that to date have received very little research and conservation attention.	https://cordis.europa.eu/project/id/679849	/
7	Co-creating a decision support framework to ensure sustainable fish production in Europe under climate change	Horizon 2020	RIA – research and innovation action	Project duration 4/2016 – 3/2020	Overall budget 5 195 216 EUR EU contribution 5000000 EUR	The overall goal of ClimeFish is to help ensure that the increase in seafood production comes in areas and for species where there is a potential for sustainable growth, given the expected developments in climate, thus contributing to robust employment and sustainable development of rural and coastal communities. The underlying biological models are based on single species distribution and production, as well as multispecies interactions. Forecasting models	https://cordis.europa.eu/project/id/677039	Eco-innovation

						will provide production scenarios that will serve as input to socio-economic analysis where risks and opportunities are identified, and early warning methodologies are developed.		
8	Climate change and European aquatic RESources	Horizon 2020	RIA – research and innovation action	Project duration 03/2016-2/2020	Overall budget 5 586 851,25 EUR EU contribution 5 586 851,25 EUR	CERES advances a cause-and-effect understanding of how future climate change will influence Europe's most important fish and shellfish populations, their habitats, and the economic activities dependent on these species. CERES will involve and closely cooperate with industry and policy stakeholders to define policy, environment, social, technological, law and environmental climate change scenarios to be tested.	https://cordis.europa.eu/project/id/678193	/
9	Open Ocean Fish farms	Horizon 2020	SME-2 - SME instrument phase 2	Project duration 08/2015-11/2018	Overall budget 3 354 000 EUR EU contribution 2 347 800 EUR	Gili Ocean Technologies aims to become the leading off-shore (Open Ocean) aquaculture company. This will be achieved through the operation of fish farms as well as through the delivery of turn-key projects for other fish farmers based on our extensive off-shore fish farming expertise and advanced technologies. The OCEANFISH system is a flexible submerged system of cages. The original technology was developed with the Technion, Israel's leading technological university. OCEANFISH is an excellent example of how humans can take better advantage of oceans in a highly sustainable manner and at the	https://cordis.europa.eu/project/id/683610	Eco innovation

						same time solve significant ecological challenges.		
10	AQUAculture infrastructures for EXCELlence in European fish research towards 2020	Horizon 2020	RIA – research and inovation action	Project duration 10/2015-12/2020	Overall budget 9 756 279 EUR EU contribution 9 756 279 EUR	AQUAEXCEL2020 will be a key vehicle in the improvement of aquaculture research practices to the benefit of industry through finalized research and innovation, and of excellent science through the development of highly innovative methods and approaches such as Virtual Laboratories, standardized experimental fish lines and nano-sensors. It will also benefit to society through the development of methods for sustainable aquaculture, such as the use of cleaner fish to control parasites or Integrated Multitrophic Aquaculture, and also through a better management of animal experiments for research according to the 3 R's. Reduction, Refinement and Replacement. As a whole, AQUAEXCEL2020 will provide a world-class platform for all types of fish culture research, from biology to technology, in all types of rearing systems, with all major EU fish species, including the most promising new species.	https://cordis.europa.eu/project/id/652831	Eco innovation
11	Novel marine biomolecules against biofilm. Application to medical devices.	Horizon 2020	RIA – research and inovation action	Project duration 4/2015-12/2019	Overall budget 7 651 315 EUR EU contribution 7 651 315 EUR	Microalgae are a source of secondary metabolites useful as new bioactive compounds. Activity of these compounds against bacterial pathogens and biofilm formation has not been determined yet. Biofilm formation is especially important in infections and tissue inflammation related to implants and catheters. These problems	https://cordis.europa.eu/project/id/634588	/

						finally cause a release of the implant, which must be removed and replaced by a new one, entailing an increase in antibiotic consumption, together with a health costs of about 50,000-90,000 € per infection episode. This project also addresses the biosynthesis of the targeted bioactive compounds in sustainable microalgae co-cultures, diminishing cultivation costs by mimicking natural aquatic ecosystems.		
12	Tools And Strategies to access to original bioactive compounds from Cultivation of MARine invertebrates and associated symbionts	Horizon 2020	RIA – research and innovation action	Project duration 4/2015 - 9/2019	Overall budget 6 758 452,50 EU contribution 6 755 950,25 EUR	TASCAMAR project aspires to develop new tools and strategies in order to overcome existing bottlenecks in the biodiscovery and industrial exploitation of novel marine derived biomolecules (secondary metabolites and enzymes) with applications in the pharmaceuticals, nutraceuticals, cosmeceuticals and fine chemicals industries. Exploitation of neglected and underutilized marine invertebrates and symbionts from mesophotic zone will be combined with innovative approaches for the cultivation and extraction of marine organisms from lab to pilot-scale, using the unique prototypes Platotex™ and Zippertex™, both reaching the Technology Readiness Level 7. Thus, marine dedicated cultivation and extraction equipment will be built and validated. These unique improvements will ensure sustainable supply of biomass and promote the production of high added value bioactive marine compounds.	https://cordis.europa.eu/project/id/634674	Eco innovation

13	Rapid evolution and geographic ranges: predicting marine species persistence and distribution in a changing ocean	Horizon 2020	RIA – research and innovation action	Project duration 9/2015 - 8/2018	Overall budget 250 160,40 EUR EU contribution 250 160,40 EUR	In marine ectotherms, the breadth of physiological tolerance largely determines species' geographical distribution and extinction risk. Understanding the mechanisms underlying environmental tolerance windows and their relation to life history and demography is thus required for predicting taxa sensitivity to global changes more accurately. Specifically, it is imperative to acquire a firm understanding of both plastic and adaptive responses as rescue mechanisms to prevent species extinction, comparing the effects and costs of these mechanisms among closely related species with different biogeography. I propose to compare the capacity for trans-generational plasticity and rapid adaptation to ocean warming and acidification, in geographically widespread and restricted species as a test for biodiversity evolution under global change.	https://cordis.europa.eu/project/id/659359	/
14	Platform for wildlife monitoring integrating Copernicus and ARGOS data	Horizon 2020	RIA – research and innovation action	Project duration 1/2016 -12/2018	Overall budget 2 665 325 EUR EU contribution 2 665 325 EUR	EO4wildlife main objective is to bring large number of multidisciplinary scientists such as biologists, ecologists and ornithologists around the world to collaborate closely together while using European Sentinel Copernicus Earth Observation more heavily and efficiently. EO4wildlife will design, implement and validate various scenarios based on real operational use case requirements in the field of wildlife migrations, habitats and behaviour. These include: (1) Management tools for	https://cordis.europa.eu/project/id/687275	Eco innovation

						regulatory authorities to achieve real-time advanced decision-making on the protection of protect seabird species; (2) Enhancing scientific knowledge of pelagic fish migrations routes, reproduction and feeding behaviours for better species management; and (3) Setting up tools to assist marine protected areas and management.		
15	Knowledge, Assessment, and Management for AQUatic Biodiversity and Ecosystem Services aCROSS EU policies	Horizon 2020	RIA – research and innovation action	Project duration 6/2015 -11/2018	Overall budget 6 913 116,25 EUR EU contribution 6 343 613,75 EUR	AQUACROSS aims to support EU efforts to enhance the resilience and stop the loss of biodiversity of aquatic ecosystems as well as to ensure the ongoing and future provision of aquatic ecosystem services. It focuses on advancing the knowledge base and application of the ecosystem-based management concept for aquatic ecosystems by developing cost effective measures and integrated management practices.	https://cordis.europa.eu/project/id/642317	/
16	Vulnerable trait-combinations in corals and fishes and their management	Horizon 2020	MSCA-IF-EF-RI - RI – Reintegration panel	Project duration 9/2017 - 8/2019	Overall budget 195 454,80 EUR EU contribution 195 454,80 EUR	Cross-taxon interdependencies govern many key ecosystem services, e.g. pollination, agricultural production and coral reef fisheries. Many of these services are deteriorating; this is especially pressing for coral reefs. Human and climate stress drives declines of global coral reef assets, but the characteristics of the most vulnerable species groups are poorly understood. By evaluating the responses of coral and fish communities and their functional types under stress, this project will link this knowledge to potential management objectives and identify actions specific to functional types, where	https://cordis.europa.eu/project/id/747102	/

						vulnerable organisms are stringently protected and others can still be used.		
17	A Holistic Opto-Acoustic System for Monitoring Marine Biodiversities	Horizon 2020	IA - Innovation action	Project duration 11/2017-12/2020	Overall budget 1 602 460 EUR EU contribution 1 399 960 EUR	We present the SYMBIOSIS project to provide a mature, cost effective autonomous optco-acoustic prototype for the characterization, classification, and biomass evaluation of six target pelagic fish that are important to the fishery industry and that reflect on the health of the environment. The processing will be made in a real-time fashion onsite, and the results will be sent to a shore station. The system will be completely autonomous and will withstand three month deployment without recharging. We will demonstrate the capabilities of the system and its readiness to a TRL6 stage over three sea and ocean mooring sites.	https://cordis.europa.eu/project/id/773753	Eco-innovation
18	SPatial variability and Implications of the Timing of Fish Responses to the Environment	Horizon 2020	MSCA-IF-EF-ST - Standard EF	Project duration 11/2017-12/2020	Overall budget 1 602 460 EUR EU contribution 1 399 960 EUR	Prediction of fish production is hindered by the lack of high-resolved data, and the complexity of the bio-physical systems affecting fish survival. A key factor determining the survival of larval fish is the relationship between predator recruitment and prey-predator overlap (match-mismatch hypothesis, MMH). MMH thus offers a mechanistic explanation for the fluctuations in fish recruitment, i.e. the number of fish entering the fishery. However, little is known about how MMH mechanistically explains population and ecosystem dynamics across species and regions. Therefore, the main goal of SPITFIRE is to quantify the ability of an	https://cordis.europa.eu/project/id/794301	/

						improved MMH to globally explain fish dynamics, by acknowledging the roles of zooplankton (animal-like drifters, not just phytoplankton, plant-like drifters), space and mismatch.		
19	WHALE protection from Strike by Active cetaceans detection and alarm issue to ships and FErries in pelagos sanctuary	Life	LIFE13 NAT/IT/001061	Project duration 10/2014 - 3/2020	Overall budget 1 847 167 EUR EU contribution 923 214 EUR	The Pelagos Sanctuary for Mediterranean Marine Mammals is a special marine protected area in the north-western Mediterranean Sea. It is located between Liguria, France and Sardinia and covers an area of around 90 000 km ² . The sanctuary is the most important breeding and feeding site for cetacean populations living in the Mediterranean Sea and thus crucial for their well-being. The project will develop an interference avoidance system aimed at detecting and tracking sperm whales; identifying threats to them; and preventing collisions and other risks by issuing warning messages in real time to ships in the area. A protocol for reducing the disturbance and impact risks will be drafted in cooperation with the local coast guard and agreed by all stakeholders involved.	https://webgate.ec.europa.eu/life/publicWebsite/project/details/4075	/
20	Fundacin oceana	Life	LIFE16 NGO/ES/2000 26	Project duration 1/2017 -12/2017	Overall budget 4 200 002 EUR EU contribution 700 000 EUR	Fundación Oceana focuses on improving the health of European oceans and seas through activities in the areas of scientific research, law, advocacy, at-sea expeditions and media/communications. It aims to effect policy changes that address the most urgent problems confronting the marine	https://webgate.ec.europa.eu/life/publicWebsite/project/details/4593	/

						environment, especially in the areas of fisheries management and habitat protection. To this end, Fundación Oceana will focus on promoting responsible fishing and protecting key ocean habitats and species, while encouraging greater consumption of wild-caught sustainable seafood. It will work towards a broader long-term objective: the improved health of our seas and oceans so that they are less susceptible to the effects of climate change. It will advocate protecting key marine habitats so that they can continue to serve as carbon sinks, as well as restoring ocean ecosystem resilience by creating Marine Protected Areas (MPAs) and promoting more sustainable fisheries.		
21	Mediterranean monk seal conservation in Madeira and development of a conservation status surveillance system	Life	LIFE13 NAT/ES/000974	Project duration 6/2014 -12/2019	Overall budget 1 143 364 EUR EU contribution 670 808 EUR	The Mediterranean monk seal (<i>Monachus monachus</i>) is a critically endangered species. With less than 600 individuals throughout its distribution range, it is considered one of the most endangered mammals in the world. The project LIFE Madeira Monk Seal aims to resolve known threats to the monk seal and improve its long-term conservation in the Madeira region. It specifically seeks to address conflict between the habitat needs of the seal and human activities in coastal areas. The project plans to draft and have formally adopted a new Monk Seal Regional Conservation Plan in the Madeira archipelago.	https://webgate.ec.europa.eu/life/publicWebsite/project/details/4034	/

Notes: Interreg projects (cross-border and transnational); Horizon projects; Life projects;

7.2 ICZM&MSP – sustainable development of the coastal and maritime zones

	Title	Operational program	Fund	Program period	budget	topic	website	Eco-innovation or circular economy elements
1	MELTEMI	Interreg TN - Balkan-Mediterranean	European Regional Development Fund	2014-2020 Project duration 09/2017 - 09/2020	Total Investment 1 214 936 EUR EU Investment 1 032 695 EUR	Schoolchildren, local communities and government policymakers are among those engaged in a project which is finding new ways to solve the problem of marine litter on the beaches and in the seas around Albania, Greece, Cyprus and Bulgaria. The Marine Litter Transnational Legislation Enhancement and Improvement project (MELTEMI) is working to boost legal frameworks and increase the capacity of public bodies and wider society to deal with this growing problem.	https://ec.europa.eu/regional_policy/en/projects/Bulgaria/-meltemi-tackling-marine-litter-in-the-balkan-mediterranean-area	/
2	The AdriaMORE	Interreg V-A - Italy-Croatia	European Regional Development Fund	2014-2020 Project duration 01/2018 - 09/2019	Total Investment 1 150 500 EUR EU Investment 977 500 EUR	The AdriaMORE project upgraded an existing platform for the monitoring and management of hydrometeorological risks such as storms or floods along the Adriatic coastline. Components to refine the system's coverage for stretches in Italy and Croatia were added. Project activities included software development, installation of a wind profiler and acquisition of a firefighting vessel.	https://ec.europa.eu/regional_policy/en/projects/Croatia/adriamore-protecting-the-italian-and-croatian-shores-of-the-adriatic	It contributed both software and hardware components to the existing decision support system.
3	EnviSuM – environmental impact of low emission shipping: measurements and modelling strategies	Interreg TN - Baltic Sea	European Regional Development Fund	2014-2020 Project duration	Total Investment 3 222 539 EUR EU Investment 2 883 325 EUR	Research institutions, cities and companies from seven countries – Sweden, Estonia, Finland, Norway, Poland, Germany and Denmark – collaborated to develop alternative, sustainable solutions that don't impose unbearable adjustment costs on the	https://ec.europa.eu/regional_policy/en/projects/Denmark/envisum-ensuring-a-cleaner-baltic-sea-shipping-industry	The research will help the shipping industry invest in the field of eco-innovation.

				01/2016 - 04/2019		shipping industry. At the same time they looked at reducing the industry's impact on the environment and people's health. From this research, a set of tested and analysed best practices on air quality measurements was compiled. The parties involved shared and improved it, benefitting all Baltic Sea region countries in their efforts to make shipping cleaner.		
4	TOPSOIL	Interreg TN - North Sea	European Regional Development Fund	2014-2020 Project duration 01/2015 - 02/2020	Total Investment 7 342 220 EUR EU Investment 3 671 110 EUR	A new method of mapping subsoil structures has been invented which reveals how the soil and groundwater beneath our feet responds to rising temperatures. This is enabling experts in The Netherlands, Belgium, Denmark, Germany and the UK to better assess how local areas will respond to climate change.	https://ec.europa.eu/regional_policy/en/projects/Denmark/subsoil-mapping-in-the-north-sea-region-to-predict-climate-change-impacts	The testing, development and deployment of different investigation methods has been carried out to map topsoil layers and its properties in 16 pilot areas. This includes an electromagnetic tTEM system which can be used for detailed, three-dimensional hydrological and geological mapping of the subsoil layers. A system called FloaTEM reveals

								water quality and hydro-geological features beneath lakes, rivers, fjords or the sea. So far, 10 new climate change adaptation solutions have been demonstrated.
5	BLASTIC – plastic waste pathways into the Baltic Sea	Interreg V-A - Finland-Estonia-Latvia-Sweden (Central Baltic)	European Regional Development Fund	2014-2020 Project duration 01/2016 - 12/2018	Total Investment 1 016 555 EUR EU Investment 784 522 EUR	BLASTIC drew up a checklist for mapping sources, flows and pathways of marine litter and formulated a methodology for monitoring its distribution in rivers and coastal waters in and around the Baltic. Mapping and monitoring exercises were carried out in 42 municipalities in the four participating countries, using the tools developed under the project, to compile guidelines and identify sources and pathways to be prioritised. The exercises led to the development of local marine litter prevention and reduction plans in pilot areas, with a focus on plastic waste from cities.	https://ec.europa.eu/regional_policy/en/projects/Finland/blastic-tackling-plastic-litter-in-the-baltic-sea	It contributed to work under the European Strategy for Plastics in a Circular Economy, which addresses issues including recycling, biodegradability and hazardous substances in litter.
6	Protection and sustainable development of the Sète lido in Marseillan'	Languedoc-Roussillon - ERDF/ESF/YE I	European Regional Development Fund	2014-2020 Project duration	Total Investment 52 700 000 EUR EU Investment	In France, the Sète lido in Marseillan, located in the Occitanie region, is a stretch of sand by the Mediterranean. It is over 12 km long and is a key natural space between the sea and the lagoon. In the face of coastal erosion and loss of the shoreline, an important protection and development project has allowed	https://ec.europa.eu/regional_policy/en/projects/France/protection-and-sustainable-development-of-the-sete-lido-in-marseillan-france	/

				05/2016 - 01/2020	18 000 000 EUR	measures to be taken both on land and at sea, to safeguard this space. The Sète area has a large seaboard with over 20 km of coastline, including that of the Sète lido in Marseillan. Sandy lidos are exceptionally beautiful landscapes, forming rare dune ecosystems with great biodiversity, including flora and fauna only found in coastal spaces.		
7	CleanAtlantic: Tackling marine litter in the Atlantic Area	Interreg TN - Atlantic Area	European Regional Development Fund	Program ming period 2014-2020 Project duration 09/2017 - 08/2020	Total Investment 3 249 241 EUR EU Investment 2 436 930 EUR	Marine litter is defined as any solid material, such as plastic, wood, glass, or rubber, that has been deliberately discarded or unintentionally lost on beaches or at sea. It includes material transported into the marine environment from land by rivers, drainage, sewerage systems, or winds. According to the OSPAR Commission, the amount of litter in many areas of the North-East Atlantic has reached unacceptable levels. In-line with the EU's Marine Strategy Framework Directive (MSFD), the commission is developing innovative ways to reduce marine litter, to the point where it no longer causes harm to the coastal and marine environment. However, as the Atlantic is bordered by a number of countries and territories, a coordinated effort is required.	https://ec.europa.eu/regional_policy/en/projects/France/turning-the-tide-on-marine-litter-in-the-atlantic-ocean	The project is developing a CleanAtlantic Knowledge Tool. This online database will provide access to resources relevant to any topic related to marine litter that had been delivered by EU and national research projects and expert organisations.

8	Circular Ocean	Interreg V-A - Germany-The Netherlands	European Regional Development Fund	2014-2020 Project duration 01/2015 - 09/2018	Total Investment 1 472 185 EUR EU Investment 921 176 EUR	Local enterprises in remote northern coastal economies create smart new industries from plastic marine waste to revive economies and keep the environment clean. The EU-funded Circular Ocean project has stepped in with support to develop smart 'green' industries from old plastic fishing nets and ropes. This represents 10% of marine waste and is a potential resource for many industries, and can be incorporated into products such as clothing and skateboards. Funded with EUR 921 176 from the European Regional Development Fund, the project helps local social enterprises and SMEs put the litter to profitable use.	https://ec.europa.eu/regional_policy/en/projects/Greenland/wealth-from-waste-in-northern-and-artic-marine-regions	This creates a circular local economy in the plastics –waste from one business is used in another for a self-sustaining overall economy. Circular Ocean cleans up the environment, breathes fresh life into remote economies and makes more sustainable use of materials communities already import.
9	Blue Circular Economy	Interreg TN - Northern Periphery and Arctic	European Regional Development Fund	2014-2020 Project duration	Total Investment 1 690 661 EUR EU Investment 1 012 529 EUR	An initiative based in the Northern Periphery and Arctic regions of Europe is cleaning up the environment while helping local SMEs turn waste into new opportunities. Blue Circular Economy (BCE) is a transnational project that supports the transformation of discarded fishing gear and marine plastic	https://ec.europa.eu/regional_policy/en/projects/Ireland/blue-circular-economy-turning-waste-fishing-gear-into-business	By taking a circular approach, the project helps SMEs find ways to transform otherwise unwanted and

				01/2018 - 09/2021		waste into recycled products. The project covers some of the most distant oceans and seas around Norway, Greenland, Ireland, and the United Kingdom.	opportunities-in-the-far-north	polluting materials into a range of clean, sustainable items such as trainers, clothing, sunglasses and building materials. Eco-innovation: waste becomes a business opportunity.
10	The Blue flag of the Litorale Domitio, II. phase	Campania - ERDF	European Regional Development Fund	2014-2020 Project duration 06/2016 - 05/2020	Total Investment 80 000 000 EUR EU Investment 53 375 347 EUR	The new facilities help restore the attractiveness of the Domium coastline to the tourism industry by eliminating the release of waste water into channels and ditches that flow directly to the sea. Between 2014 and 2020, EU funding is helping the Campania region upgrade its sewage and water networks. Work will see more than 3 000 000 residents benefit from improved waste water treatment infrastructure, while ensuring that 100 % of the urban population has access to clean drinking water.	https://ec.europa.eu/regional_policy/en/projects/Italy/waste-water-treatment-scheme-for-litorale-domitio-coastline-in-campania-italy	/
11	MadCrow	Friuli-Venezia Giulia - ERDF	European Regional Development Fund	2014-2020 Project duration	Total Investment 1 461 941 EUR EU Investment 549 380 EUR	Launched in the Italian region of Friuli-Venezia Giulia, the Marine Data Crowdsourcing (MadCrow) project has developed technology for the acquisition, integration and dissemination of marine ecosystem data. MadCrow is based on a	https://ec.europa.eu/regional_policy/en/projects/Italy/crowd-technology-for-gathering-information-on-marine-	MadCrow's application of the citizen scientist approach enhances environmental

				01/2017 - 05/2019		citizen scientist concept in which boat owners allow project infrastructure to be fitted to their vessels to monitor physical, chemical and biological parameters of the sea, such as temperature, salinity, acidity and oxygen levels.	ecosystems-developed-in-italy	consciousness, particularly among young people, thereby contributing to increasing participation in, and reducing the cost of, monitoring and protection activities. At the same time, it equips citizens to play a greater part in formulating and evaluating environmental policy.
12	Logistics and ports – integrated port system of Naples, phase 2	Campania - ERDF	European Regional Development Fund	2014-2020 Project duration 07/2014 - 09/2021	Total Investment 148 212 027 EUR EU Investment 110 904 743 EUR	The work aims to improve a number of structures, to make operations safer and more efficient. Environmental issues are being given priority, with plans to clean the port area's seabed, introduce clean energy to the site and increase the amount of freight moved by rail. The changes should help to reduce how much air pollution the port generates.	https://ec.europa.eu/regional_policy/en/projects/Italy/wide-ranging-restoration-of-port-of-naples-to-improve-operations-safety-and-environment	/
13	Collection of waste water and waste water treatment on the island of Krk	Competitiveness and Cohesion - ERDF/CF	European Regional Development Fund	2014-2020 Project duration	Total Investment 85 304 258 EUR	The project is overseeing improvements to 38.7 km of Krk's drinking-water supply network. As regards its waste-water collection and treatment systems, gravity sewers – which use energy produced by a difference in	https://ec.europa.eu/regional_policy/en/projects/Croatia/croatian-island-of-krk-taps-into-	/

				04/2017 - 12/2020	EU Investment 48 570 876 EUR	elevation to move water – 79.56 km in length, and pressure sewers – which use pumps for the same purpose, 6.35 km in length, are being installed. Repairs will be carried out on around 3 km of the sewer network, and coastal water collectors will be renovated, while a total of 26 new pumping stations are under construction.	upgraded-water-supply-system	
14	Technological transfer and eco-innovation for the environmental and marine management in the port areas of the Macaronesia	Interreg V-A - Spain-Portugal (Madeira-Açores-Canarias (MAC))	European Regional Development Fund	2014-2020 Project duration 01/2017 - 12/2019	Total Investment 1 360 713 EUR EU Investment 1 156 606 EUR	The project focuses on coastal areas. Harbours are of particular interest as they are key to identifying and engaging with maritime sector end users. A coastal monitoring network has been consolidated and business opportunities fostered in the context of Blue Growth, which is a long-term strategy to support sustainable growth in the marine and maritime sector. Innovative technology has been developed and implemented and a data portal for real-time visualisation and display updated. Regional ocean monitoring initiatives have been linked to international ones, and technology transfer and specialised training has been provided – from the Canary Islands to the rest of the Macaronesian archipelagos and Western Africa through Cape Verde.	https://ec.europa.eu/regional_policy/en/projects/Portugal/promoting-maritime-research-protection-and-innovation-in-macaronesia	Innovative technology has been developed and implemented and a data portal for real-time visualisation and display updated.
15	Heraklia desalination plant	North Aegean - ERDF/ESF	European Regional Development Fund	2014-2020 Project duration	Total Investment 554 112 EUR EU Investment 277 056 EUR	Iraklia has an annual water supply need of approximately 20 000 m3. As it lacked a water treatment centre, ships had been used to transport water to the island. This was inefficient, vulnerable to bad weather, and a huge burden on the state's budget.	https://ec.europa.eu/regional_policy/en/projects/Greece/new-desalination-plant-provides-quality-	/

				03/2018 - 10/2019		The desalination plant has solved the problem. With a daily capacity of 300 m3 of drinking water, it covers the needs of the island's 141 permanent residents and 1 260 visitors.	water-to-iraklia-island-greece	
16	MarRisk	Interreg V-A - Spain-Portugal (POCTEP)	European Regional Development Fund	2014-2020	Total investment 2 957 049 EUR EU investment 2 217 787 EUR	A coastal risk surveillance system that offers general and specific services for marine communities is a pioneering approach. The project strategy of adaptation, awareness and generation of opportunities involves society as a whole.	https://ec.europa.eu/regional_policy/en/projects/Portugal/spain-portugal-help-coastal-communities-build-resilience-to-climate-change-threats	MarRisk supports smart and sustainable growth of coastal areas through analysing the risks associated with climate change and their potential evolution. Applications, services, analysis, monitoring and surveillance developed as part of the project will ensure a coordinated response across borders.
17	ARIEL - Promoting small scale fisheries and aquaculture transnational networking in	2014 - 2020 INTERREG VB Adriatic - Ionian	ERDF, IPA/IPA II	2014-2020 Project start	Total budget/expense: EUR 1 249 234.46	ARIEL project is jointly promoted and developed by 9 scientific and institutional partners of 4 Countries (Italy, Croatia, Greece and Montenegro) and focuses on small-scale fishery and aquaculture which are two key	https://keep.eu/projects/19138/Promoting-small-scale-fishes-EN/	Based on this result, the project will test pilot innovative solutions defined

	Adriatic-Ionian macroregion			<p>date: 2018-01-01</p> <p>Project end date: 2020-12-31</p>	<p>European Union funding: EUR 1 061 849.29</p>	<p>drivers for blue and sustainable growth of Adriatic and Ionian communities. Despite their relevance, those sector faces the same challenges of maritime spatial planning, environmental and socio-economic sustainability, better conditions for innovation uptake and for scientific knowledge dissemination, more effective cooperation between entrepreneurs, academia and policy makers. In this context, ARIEL transnational approach will catalyze joint efforts to tackle this complex ecological, economic and societal challenge supporting the development of a transnational “critical mass” and the provision of common skills, tools and methods accompanying small-scale fishery and aquaculture innovation process and networking in the Adriatic and Ionian Sea basin.</p> <p>ARIEL overall objective is, in fact, to promote technological and non-technological solutions for innovation up take of small-scale fishery and aquaculture in Adriatic-Ionian basin, acting as knowledge network and performing a set of transferable activities to better understand threats and solutions for a more successful and sustainable management of policies and practices.</p>		<p>jointly by the enterprises and the research institutions. Innovation brokering events will facilitate R&D transfer into concrete and feasible actions for small-scale fishery and aquaculture actors, accompanying their aggregation and cooperation process. The uptake and adoption of open innovation in small-scale fishery and aquaculture will be also fostered by the setting up of the ARIEL platform helping networking and partnering around innovative ideas and solutions</p>
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								during and beyond project life, favoring a permanent knowledge sharing and transnational dialogue among actors.
18	HarmoNIA – Harmonization and Networking for contaminant assessment in the Ionian and Adriatic Seas	2014 - 2020 INTERREG VB Adriatic - Ionian	ERDF, IPA/IPA II	2014-2020 Project start date: 2018-02-01 Project end date: 2020-06-30	Total budget/expense: EUR 1 290 978.60 European Union funding: EUR 1 097 331.81	In the framework of enhancing the capacity to tackle environmental vulnerability and safeguard ecosystem services at transnational scale, the objective of HarmoNIA is twofold: to share best practices to support the harmonized implementation of marine environmental directives in the ADRION region to strengthen the network of data infrastructures, and to facilitate access and re-use of marine data among countries bordering the Adriatic – Ionian Seas. Building on the EU initiative EMODnet for the management and supply of fragmented marine data, HarmoNIA will strengthen the existing transnational network of data infrastructures to facilitate access and re-use of marine data among countries bordering the Adriatic – Ionian Seas. The project will improve the coherence, among most countries bordering the Adriatic and Ionian Seas, all Contracting Parties of the Barcelona Convention, of protocols for monitoring and	https://keep.eu/projects/19141/Harmonization-and-Networking-EN/	/

						for assessment of contaminants in the marine environment and will facilitate data and information exchange within the region.		
19	MyCOAST - Cooperation for restoring cockle shellfisheries & its ecosystem-services in the Atlantic Area	2014 - 2020 INTERREG VB Atlantic Area	ERDF	2014-2020 Project start date: 2017-11-15 Project end date: 2020-07-15	Total budget/expense: EUR 2 998 954.28 European Union funding: EUR 2 249 215.71	The European Union has funded large scale initiatives to protect, secure and develop the potential of marine and coastal environments. The aim of MYCOAST is to enhance the capability of risk management systems in the Atlantic region by improving co-operation between, observational and forecasting systems, and end users. This project aims to build a coordinated Atlantic Coastal Operational Observatory in the Atlantic Area joining capabilities from all the five countries and from existing cross-border cooperation activities, all targeted towards the improvement of coastal monitoring and forecasting tools to support threat and emergency response. The technical networking and specific synergies will strengthen the use and the dissemination of downstream applications of the Copernicus Marine and Environmental Monitoring Service (CMEMS) in order to address the common challenge of resilience of the coastal to risk. The proposed data management tools will promote information sharing and interoperability between coastal observatories and the common European information sharing systems. To ensure effective implementation, the risk management tools will be developed and validated jointly with the	https://keep.eu/projects/19328/Cooperation-for-restoring-c-EN/	Development of pilot tools and instruments applied to specific coastal risks: extreme events and flood risks, maritime security and harbour, search and oil spill, marine renewable energy and offshore aquaculture and coastal pollution. 8 pilot demonstration and case studies for the implementation in national and regional prevention and management systems in the 5 countries along the Atlantic coast.

						key actors involved in managing and preventing coastal risks like flooding and coastal erosion, those in managing water quality issues, and those responsible for managing maritime safety and response to pollution incidents. Finally MYCOAST will improve the awareness of these risks in the Atlantic Area, and identify and promote opportunities for the private sector.		
20	SUPAIR - SUsustainable Ports in the Adriatic-Ionian Region	2014 - 2020 INTERREG VB Adriatic - Ionian	ERDF, IPA/IPA II	2014-2020 Project start date: 2018-01-01 Project end date: 2020-06-30	Total budget/expenditure: EUR 1 448 707.43 European Union funding: EUR 1 231 401.32	Ports are core nodes for multimodal transport in the Adriatic-Ionian basin and strategic key drivers for economic growth: reducing negative environmental impacts is essential for a sustainable development of the area. SUPAIR responds to a major challenge (EUSAIR strategy, pillar 2, topic 1), in that it tackles reduction of emissions from shipping and on-shore port operations with an integrated approach, enhancing port authorities' capacity to plan and implement low-carbon and multimodal transport and mobility solutions and further empowering the main political, technical, trade stakeholders and partners in related decision-making.	https://keep.eu/projects/19193/Sustainable-Ports-in-the-Ad-EN/	SUPAIR firstly establishes a TRANSNATIONAL NETWORK of port authorities, technical organizations, relevant actors to jointly elaborate the project's durable and transferable methodology; then develops operational ACTION PLANS complete with technical and feasibility studies in the 7 partner ports; ultimately implements dedicated actions

								<p>and produces a TRANSNATIONAL STRATEGY for port-based low-carbon transport systems to increase the network, disseminate, enhance and widen scope, methodology and results. The transnational development and implementation (3 EU and 2 IPA countries) of methodology and actions insisting on a broad range of fields, with an innovative territory-based approach, involving port authorities, technical partners, stakeholders and institutional actors guarantee quality,</p>
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								<p>durability and transferability. SUPAIR's impacts are short-term (7 operational plans developed) and mid- to long-term plans implemented and financed, new actions undertaken following the established methodology by an enhanced and widened network of ports. Benefits for the involved territories embrace enhanced technical capacity for ports, increased empowerment of relevant local organizations and institutions, improved environmental</p>
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								quality and attractiveness, increased investments in low-carbon and environment-friendly port transport and mobility solutions.
21	AMARE	INTERREG Mediterranean	European Regional Development Fund, IPA	2014-2020 Duration: 36 months, end in January 2020	Total budget/expense: 2.7 M EUR European Union funding: 2.3 M EUR	In the Mediterranean Sea, the intensive use of maritime space calls for integrated management to avoid cumulative impacts and user conflicts. Maritime Spatial Planning (MSP) - the harmonization of human activities in marine areas - is advocated as a powerful approach to reach these goals. However, most Mediterranean countries have not yet gone through this process. The objectives of this project are 1- to develop shared methodologies and geospatial tools for multiple stressors assessment, coordinated environmental monitoring, multi criteria analyses and stakeholders' engagements; 2- to translate these guidelines into concrete pilot actions and coordinated strategies in selected Marine Protected Areas (MPAs) to solve hot spots of conflicts affecting marine biodiversity and the services it provides. Transnational cooperation and regulations, development of coordinated best practices to deal with present and future drivers of changes in biodiversity and	https://amare.interreg-med.eu/	/

						ecosystem services, coordinated monitoring, data access to share information and concrete stakeholder and users' involvement are the expected results.		
22	FishMPABlue2 - Fisheries and Marine Protected Areas, A Partnership for Sustainability in the Mediterranean	Interreg Mediterranean	European Regional Development Fund	2014-2020 Duration: December 2016 - November 2019	Budget: 3.500.000 EUR	<p>The FishMPABlue2 project is the follow-up of the FishMPABlue project (July 2014-June 2015) funded by Interreg MED Programme. FishMPABlue carried out an analysis of the management of small scale fishery (SSF) within and around a set of Mediterranean MPAs, and developed a "regional-based governance toolkit" to strengthen MPA management capacity of SS.</p> <p>The FishMPABlue2 Project aims to test this toolkit to demonstrate its effectiveness on the field in 11 Pilot MPAs located in 6 Med countries (Spain, France, Italy, Slovenia, Croatia and Greece), to assess and quantify its effectiveness in achieving expected results in terms of MPA ecological effectiveness, benefits delivered to small scale fisheries and social acceptance of management measures by stakeholders.</p>	https://maritime-spatial-planning.test.ec.europa.eu/projects/fishmpablue2-fisheries-and-marine-protected-areas-partnership-sustainability	/
23	POSBEMED	INTERREG Mediterranean	European Regional Development Fund	Duration: November 2016 - April 2018	Total project budget: 596 750 EUR ERDF contribution: 507 238 EUR	POSBEMED will look at the management, conflicts and opportunities of the Mediterranean coast, particularly in coastal protected and Natura 2000 areas where interdependence between seagrass meadows, dunes and beaches occurs, with a view to provide a Mediterranean strategy and governance model for enhancing management effectiveness of these areas	https://posbemed.interreg-med.eu/about-posbemed/	/

						and beyond. By integrating the results of several past projects and examining management practices, stakeholders' perception and expectations, guidelines with innovative management tools will be produced to enhance local administrations and coastal managers' capacity across the Mediterranean. The results will assist in improving protection measures and enhancing management effectiveness on these connected habitats, while promoting local blue growth and nature-based solutions on the use and sustainable management of the seagrass banquettes.		
24	ACT4LITTER – joint measures to preserve natural ecosystems from marine litter in Mediterranean Marine Protected Areas	INTERREG Mediterranean	European Regional Development Fund	Project duration: February 2017 – July 2018	Project budget: 599,496 EUR	ACT4LITTER aims at reviewing the most promising proposed measures to effectively tackle the issue of Marine Litter and select those that could be implemented in MPAs, considering particularly the ecosystem services. The selection of measures will result in the development of MPA-specific action plans for implementation in a future project. Those plans will be complemented by a realistic and operational governance plan at transnational level. MPA stakeholders and key experts on marine litter value chain will be involved through the process to validate the outputs together.	https://act4litter.interreg-med.eu/	The action plans will have a strong focus on preventive measures, using circular economy and sustainable consumption and production approaches.
25	PHAROS4MPAS - blue economy and marine conservation:	INTERREG Mediterranean	European Regional Development Fund	Project duration: 1. 2. 2018 –	Project budget: 1.2 M EUR	The PHAROS4MPAs project explores how Mediterranean MPAs are affected by maritime activities and provides a set of practical recommendations for MPA managers, MSP	https://pharos4mpas.interreg-med.eu/	/

	safeguarding Mediterranean MPAs to achieve good environmental status			31. 1. 2020		authorities and businesses on how the environmental impacts of 7 sectors can be prevented or minimized.		
26	ML-REPAIR - REducing and Preventing, an integrated Approach to Marine Litter Management in the Adriatic Sea	2014 - 2020 INTERREG V-A Italy - Croatia	ERDF	2014-2020 Project start date: 2019-01-01 Project end date: 2019-09-30	Total budget/expense: EUR 1 007 093.20 European Union funding: EUR 856 029.20	The ML-REPAIR project, capitalizing the results of the Adriatic IPA CBC DeFishGear project, is aimed at strengthening joint governance on marine litter management and developing of solutions among different entities for reducing and preventing marine pollution. The main project activities are focused on testing new educational tools for raising awareness of tourists in the coastal areas and for supporting the strategies for monitoring the marine litter in participative approach of the fishermen community.	https://keep.eu/projects/23073/REducing-and-Preventing-an-EN/	/
27	WATERCHAIN - Pilot watersheds as a practical tool to reduce the harmful inflows into the Baltic Sea.	2014 - 2020 INTERREG V-A Finland - Estonia - Latvia - Sweden (Central Baltic)	ERDF	2014-2020 Project start date: 2015-10-01 Project end date: 2018-09-30	Total budget/expense: EUR 2 574 249.94 European Union funding: EUR 2 029 057.45	A common multidisciplinary approach across the Central Baltic region, based on wide scientific and practical knowledge is needed to promote the cleaner future of the Baltic Sea. Reducing nutrients and hazardous substances inflows to the Baltic Sea is a complex task that requires tailor made strategies implemented at grass root level actions. WATERCHAIN supports several levels of actions, project helps to reduce inflows of nutrients and hazardous substances to the Baltic Sea from all types of land-based sources with commitment of the project partners as well as beneficiaries, the	https://keep.eu/projects/18675/Pilot-watersheds-as-a-pract-EN/	/

						<p>local people and visitors from all Central Baltic countries.</p> <p>The main actions are carried out in the pilot watersheds in each partner country with the practical actions targeted to sustainable impact. The sustainable use of common resources is based both on prevention of nutrients and hazardous substances inflow, as well as on water treatment of these harmful substances already entered the water bodies, as pointed out in Regional Water Management plans, HELCOM Baltic Sea Action Plan, as well as EU Strategy for the Baltic Sea Region. During the project period, one to two sources of nutrients or hazardous substances recognized by river basin water management plans will be identified and activities to reduce the substances in each pilot watershed will be initiated. By year 2023, in pilot watersheds flowing into the Baltic Sea the pollution loads of nutrients and hazardous substances from targeted sources are reduced.</p>		
28	Marine Ecosystem Restoration in Changing European Seas	Horizon 2020	RIA – research and innovation action	Project duration 06/2016-11/2020	Overall budget 6 651 117,80 EUR EU contribution 6 651 117,80 EUR	<p>The project MERCES is focused on the restoration of different degraded marine habitats, with the aim of: 1) assessing the potential of different technologies and approaches; 2) quantifying the returns in terms of ecosystems services and their socio-economic impacts; 3) defining the legal-policy and governance frameworks needed to optimize the effectiveness of the different</p>	https://cordis.europa.eu/project/id/689518	/

						restoration approaches. Specific aims include: a) improving existing, and developing new, restoration actions of degraded marine habitats; b) increasing the adaptation of EU degraded marine habitats to global change; c) enhancing marine ecosystem resilience and services; d) conducting cost-benefit analyses for marine restoration measures; e) creating new industrial targets and opportunities.		
29	Optimizing and Enhancing the Integrated Atlantic Ocean Observing System	Horizon 2020	RIA – research and innovation action	Project duration 04/2015-9/2019	Overall budget 20652921 EUR EU contribution 20652921 EUR	The overarching objective of AtlantOS is to achieve a transition from a loosely-coordinated set of existing ocean observing activities to a sustainable, efficient, and fit-for-purpose Integrated Atlantic Ocean Observing System (IAOOS), by defining requirements and systems design, improving the readiness of observing networks and data systems, and engaging stakeholders around the Atlantic; and leaving a legacy and strengthened contribution to the Global Ocean Observing System (GOOS) and the Global Earth Observation System of Systems (GEOSS). AtlantOS will fill existing in-situ observing system gaps and will ensure that data are readily accessible and useable. AtlantOS will promote innovation, documentation and exploitation of innovative observing systems.	https://cordis.europa.eu/project/id/633211	Eco innovation
30	Joint European Research Infrastructure network for Coastal Observatory –	Horizon 2020	RIA – research and innovation action	Project duration 09/2015-9/2019	Overall budget 9 998 876,47 EUR EU contribution	JERICO-NEXT (33 organizations from 15 countries) emphasizes that the complexity of the coastal ocean cannot be well understood if interconnection between physics, biogeochemistry and biology is not	https://cordis.europa.eu/project/id/654410	Eco innovation

	Novel European expertise for coastal observatories				9 998 876,47 EUR	<p>guaranteed. Such an integration requires new technological developments allowing continuous monitoring of a larger set of parameters.</p> <p>In the continuity of JERICO(FP7), the objective of JERICO-NEXT consists in strengthening and enlarging a solid and transparent European network in providing operational services for the timely, continuous and sustainable delivery of high quality environmental data and information products related to marine environment in European coastal seas. JERICO-NEXT is based of a set of technological and methodological innovations. One main innovation potential is to provide a simple access to a large set of validated crucial information to understand the global change in coastal areas.</p>		
31	Sea Change	Horizon 2020	CSA - Coordination and support action	Project duration 03/2015-2/2018	<p>Overall budget 3 494 8769 EUR</p> <p>EU contribution 3 494 8769 EUR</p>	The overarching goals of the Sea Change project are to bring about a fundamental "Sea Change" in the way European citizens view their relationship with the sea, by empowering them – as 'Ocean Literate' citizens - to take direct and sustainable action towards healthy seas and ocean, healthy communities and ultimately - a healthy planet.	https://cordis.europa.eu/project/id/652644	/
32	Nonlinearity of Key Economic and Environmental Variables in Coastal/Marine	Horizon 2020	RIA – research and innovation action	Project duration 1/2018 -	<p>Overall budget 195 454,80 EUR</p> <p>EU contribution</p>	Traditional approaches of natural resource management that focus on a single species or sector is widely seen as insufficient/ineffective in protecting coastal/marine systems from human pressures. As a result, ecosystem-	https://cordis.europa.eu/project/id/798028	/

	Ecosystem-Based Management (EBM)			8/2020	195 454,80 EUR	based management (EBM) has been proposed as a benefit optimization and decision-making strategy that combines often conflicting human development and ecosystem conservation goals. This study would contribute to the building of foundation for mainstreaming natural capital into decisions for numerous marine coastal social-ecological systems in Europe and worldwide by providing evidence based, quantitative basis to make informative decisions in optimizing the economic development and sustainability goals.		
33	Systematic Characterisation and Archiving of megafauna on a regional scale in a Deep-sea area threatened by mining	Horizon 2020	MSCA-IF-EF-ST - Standard EF	Project duration 3/2018 - 3/2020	Overall budget 183 454,80 EUR EU contribution 183 454,80 EUR	The Clarion-Clipperton Zone (CCZ) in the tropical eastern Pacific Ocean contains vast reserves of polymetallic nodules on the abyssal seafloor, a future source of deep-sea minerals already targeted for exploitation. There is an almost complete absence of open biodiversity data on the large animals (megafauna) of this 6 million km ² area, and it is a pressing conservation priority to establish baseline data to enable future sustainable management of the region. In particular, a regional-level assessment that cuts across contracted areas is urgently needed to [1] establish the baseline quantitative ecology of the region, [2] assess species richness and ranges and thus, [3] enable the successful management of this globally important marine area in the context of a global 'blue growth' agenda.	https://cordis.europa.eu/project/id/747946	/

34	Autonomous Unmanned Aerial Systems for Marine and Coastal Monitoring	Horizon 2020	MSCA-ITN-ETN - European Training Networks	Project duration 1/2015 - 12/2018	Overall budget 3 851 102,88 EUR EU contribution 3 851 102,88 EUR	European countries have vast coasts and economic zones that go far into the Atlantic and Arctic oceans and are challenging to monitor and manage. The need to protect and manage the vulnerable natural environment and marine resources in a sustainable manner is an important policy that is manifested in European legislation such as the European Strategy for Marine and Maritime Research. Moreover, the drive towards activities in more remote locations and harsher environment demands new approaches and technologies. A key technology is the increased use of autonomous unmanned aerial vehicle systems (UAS) instead of manned aircraft, buoys, ships or satellite-based remote sensing. UAS offers potential advantages such as high endurance, reduced cost, increased flexibility and availability, rapid deployment, higher accuracy or resolution, and reduced risk for humans and negative impact on the environment.	https://cordis.europa.eu/project/id/642153	Eco innovation
35	Boosting scientific excellence and innovation capacity in biorefineries based on marine resources	Horizon 2020	CSA - Coordination and support action	Project duration 1/2016 - 3/2019	Overall budget 996 687,50 EUR EU contribution 996 687,50 EUR	The exploitation of the ocean unraveled a huge diversity of organisms producing innovative compounds used as pharmaceuticals, nutraceuticals, cosmeceuticals and antifoulings. The aim of BLUEandGREEN is to strength the performance of CIIMAR - Interdisciplinary Centre of Marine and Environmental Research, from the low performing Member	https://cordis.europa.eu/project/id/692419	Eco innovation

						<p>State Portugal, in the emergent area of marine biotechnology.</p> <p>The network enhancement will enforce cluster dynamics in close interaction with industrial partners to contribute to regional, national and EU Blue Growth strategies, especially to marine biotechnology industry. The implementation of brokerage with stakeholders and market-oriented projects will dismantle trade barriers, increase the ways of communication among partners and promote knowledge enhancements and its conversion in business.</p>		
36	Nutrients and regenerated water recycling in wwtps through twin-layer microalgae culture for biofertilizers production	Life	LIFE13 ENV/ES/000800	Project duration 7/2014 - 6/2017	Overall budget 1 097 092 EUR EU contribution 548 546 EUR	The LIFE + TL-BIOFER project aimed to address the environmental problem of wastewater produced by small- and medium-size urban areas. To meet this aim, the project planned to implement two actions. First, to develop and demonstrate a wastewater treatment plant using a Twin-Layer (TL) system: an advanced nutrient removal technology based on cultivation of microalgae in biofilm. Second, the project planned to address the shortage of phosphorus by developing and testing biofertilisers derived from the remaining microalgae.	https://webgate.ec.europa.eu/life/publicWebsite/project/details/3984	Eco innovation, circular economy elements
37	Preservation, restoration and valuation of coastal habitats of european interest of the Aiguillon Bay	Life	LIFE14 NAT/FR/000669	Project duration 1/2016 -12/2020	Overall budget 2 317 727 EUR EU contribution 1 390 636 EUR	The protection and conservation of coastal habitats is a major issue across Europe. The Marais Poitevin was formed as a result of the filling of Picton's gulf with sediments from the ocean. The marsh is the meeting point of the marine environment, the inner wetland and	https://webgate.ec.europa.eu/life/publicWebsite/project/details/4329	/

						<p>the migration routes, which explains the extraordinary biodiversity it hosts.</p> <p>The LIFE Barge project will adopt an integrated approach to strengthen the intrinsic natural value of Aiguillon Bay while valuing the coastal habitats as an efficient ways of protecting the territory.</p>		
38	Mediterranean Information Office for Environment, Culture and Sustainable Development	Life	LIFE17 NGO/GR/1000 16	Project duration 1/2018 -12/2018	Overall budget 1 120 000 EUR EU contribution 672 000 EUR	<p>The Mediterranean Information Office for Environment, Culture and Sustainable Development (MIO-ECSDE) is a federation of 127 NGOs focused on the environment and development of the Mediterranean area. MIO-ECSDE is a technical and political platform expressing views and proposals for intervention. It works with governments, international organisations and socio-economic partners to promote environmental protection and sustainable development.</p> <p>The overall strategy of MIO-ECSDE in the EU is to address the major environmental and climate challenges of the region, providing support for its 54 member NGOs in 12 Member States. It has identified these main challenges as protecting Europe's natural capital, safeguarding citizens from health risks, promoting a resource-efficient, climate-resilient economy and combating climate change. Specifically, MIO-ECSDE's work programme aims to improve the management of Natura 2000 sites, especially coastal and marine protected sites, addressing the threat of invasive alien species (IAS) to biodiversity.</p>	https://webgate.ec.europa.eu/life/publicWebsite/project/details/4835	/

Notes: Interreg projects (cross-border and transnational); Horizon projects; Life projects;

7.3 PET HAB ECO – protection and enhancement of natural habitats and terrestrial ecosystems

	Title	Operational program	Fund	Program period	budget	topic	website	Eco-innovation or circular economy elements
1	PREVENT	IPA CBC Bulgaria - Turkey	European Regional Development Fund	2014-2020 Project duration 03/2017 - 06/2018	Total Investment 581 484 EUR EU Investment 494 261 EUR	With the support of EU-funding, the cross-border region of Dimitrovgrad, Bulgaria, and Uzunkopru, Turkey, implemented a coordinated, technology-based forest fire monitoring and prevention system. PREVENT installed an early detection system for preventing floods on the region's key rivers, along with air pollution and other environmental effects caused by climate change. Located in Uzunkopru, the Flood Prevention Information System uses specialised software to deliver real-time water monitoring data. PREVENT not only helps mitigate the risk of natural disasters, it also has a positive impact on local environmental policy – playing a key role in protecting and preserving the cross-border region's rich biological landscape.	https://ec.europa.eu/regional_policy/en/projects/Bulgaria/bulgaria-turkey-cross-border-region-teams-up-to-prevent-forest-fires	/
2	eOUTLAND	Interreg V-A - Greece-Bulgaria	European Regional Development Fund	2014-2020 Project duration	Total Investment 1 207 831 EUR EU Investment	The Interreg eOUTLAND project has helped enhance protection of NATURA 2000 and other protected areas in the cross-border regions of Central Macedonia, in Northern Greece, and South Central, in Bulgaria,	https://ec.europa.eu/regional_policy/en/projects/Bulgaria/greece-bulgaria-cross-border-	/

				01/2017 - 06/2020	1 026 648 EUR	against natural disasters, such as floods and wildfires. This was achieved by expanding the capacity, competence, and support structures of existing civil protection volunteer groups through specialised training, staffing, equipment, knowledge, and cross-border networking.	cooperation-enhances-nature-protection	
3	Protection of the English oak in the cross-border area	Interreg V-A - Hungary-Croatia	European Regional Development Fund	2014-2020 Project duration 09/2017 - 04/2019	Total Investment 638 644 EUR EU Investment 542 847 EUR	The project brought together environmental experts from Croatia and Hungary to prevent the loss of habitat of the English oak and other native trees. Work included collecting data and analysing conditions in the local forests and putting in place measures to stop the spread of invasive species.	https://ec.europa.eu/regional_policy/en/projects/croatia/protecting-the-english-oak-in-the-hungary-croatia-cross-border-region	/
4	NATURAVITA – mine clearance, regeneration and protection of forest and forest land in protected areas and Natura 2000 sites in the Danube-Drava region	Competitiveness and Cohesion - ERDF/CF	Cohesion Fund	2014-2020 Project duration 06/2015 - 09/2023	Total Investment 49 577 107 EUR EU Investment 41 334 125 EUR	Implemented in the Kopački rit nature park and Mura Drava regional park – in eastern Croatia, in the basin of the Danube and Drava rivers – the Naturavita project is clearing more than 25 km ² of protected forest and Natura 2000 sites of landmines and unexploded ordinance left over from the 1991-95 Croatian Homeland War. Of this area, some 6 km ² is in Kopački rit and 19 km ² is in Mura Drava. The mine clearance should ensure safe access to the parks for visitors and conservationists, making it possible to implement environmental management plans.	https://ec.europa.eu/regional_policy/en/projects/croatia/landmines-cleared-from-protected-areas-in-croatia	/
5	safEarth	IPA CBC Croatia – Bosnia and	European Regional Development Fund	2014-2020	Total Investment 974 695 EUR	The safEarth project tackles the common challenge of landslides and flash floods in Croatia, Bosnia and Herzegovina and Montenegro by mapping those areas where	https://ec.europa.eu/regional_policy/en/projects/croatia/safearth-improving-risk-	/

		Herzegovina - Montenegro		Project duration 06/2017 - 11/2019	EU Investment 828 491 EUR	they are likely to occur, so that regional and local authorities can improve prevention systems and emergency preparedness. The maps can be used as a point of reference for decisions about infrastructure investments and to optimise spatial planning, to prevent loss of life and better protect biodiversity and nature.	prevention-from-landslides-and-flash-floods	
6	Environmental Risk Management and Information Service - Floods ERMIS-F	Interreg V-A - Greece-Cyprus	European Regional Development Fund	2014-2020 Project duration 01/2017 - 06/2020	Total Investment 1 159 248 EUR EU Investment 985 361 EUR	To help bridge the gap between scientific knowledge and public action regarding flooding, this Greece-Cyprus Interreg-funded project developed an online Environmental Risk Management Information Service. It provides the business, policy and scientific communities, and the general public, with tools such as risk maps, early warning systems, climate change projections, and social network facilities.	https://ec.europa.eu/regional_policy/en/projects/Cyprus/integrated-flood-services-and-climate-change-awareness-for-eastern-mediterranean-islands	/
7	PIVOTS' project ('Platforms for Innovation, Development and Optimisation in Environmental Technologies')	Centre - ERDF/ESF/YEI	European Regional Development Fund	2014-2020 Project duration 09/2015 - 06/2019	Total Investment 5 631 075 EUR EU Investment 1 663 973 EUR	The PIVOTS programme is a set of seven experimental and analytical platforms, mainly located in the French metropolis of Orléans, in Centre-Val de Loire region. They offer scientists and entrepreneurs laboratory and on-site facilities for experimentation, measurement and testing, for innovative projects in the domains of engineering and environmental metrology. The PIVOTS programme focuses on environmental quality monitoring. It aims to preserve natural resources (soils, subsoil, surface water, groundwater, air), at a time when they are	https://ec.europa.eu/regional_policy/en/projects/France/innovation-platforms-to-tackle-environmental-issues-in-centre-val-de-loire-region-france	/

						threatened by human activities that pollute and cause climate change.		
8	SeeWande: Life in Lake Constance – the past, present and future	Interreg V-A - Germany-Austria-Switzerland-Liechtenstein (Alpenrhein-Bodensee-Hochrhein)	European Regional Development Fund	2014-2020 Project duration 01/2018 - 06/2022	Total Investment 5 666 477 EUR EU Investment 2 248 708 EUR	The SeeWandel project is investigating complex interactions affecting the biodiversity, functioning and resources of Lake Constance, which borders Germany, Austria and Switzerland. It focuses on effects of nutrient decline, climate change, invasive and non-native species. Understanding how these affect the stability of the ecosystem will contribute to better water management and allow politicians to make informed decisions about the future of the lake.	https://ec.europa.eu/regional_policy/en/projects/Germany/lake-constance-ecosystem-threats-and-resource-use-investigated	/
9	Collaborative Action for the Natura Network (CANN)	Interreg V-A - United Kingdom-Ireland (Ireland-Northern Ireland-Scotland)	European Regional Development Fund	2014-2020 Project duration 01/2017 - 12/2021	Total Investment 9 406 312 EUR EU Investment 7 995 366 EUR	The EU-funded CANN project is a cross-border initiative that aims to improve the condition of protected habitats and support priority species in Northern Ireland and the border region of Ireland and Western Scotland. CANN project researchers have produced customised conservation action plans for a range of sites previously designated as Special Areas of Conservation (SACs). The goal of these plans is to help guide the habitats and species towards favourable conservation status. Out of the over 25 000 hectares of SAC land in the region, this project will develop 27 conservation action plans and conduct habitat improvement actions covering 3 650 hectares.	https://ec.europa.eu/regional_policy/en/projects/Ireland/protecting-habitats-and-species-of-northern-ireland-ireland-and-scotland	/

10	S2IGI – Integrated Satellite System for Management of Fires	Sardegna - ERDF	European Regional Development Fund	2014-2020 Project duration 01/2018 - 12/2020	Total Investment 1 459 956 EUR EU Investment 544 332 EUR	Implemented in Sardinia, the S2IGI project is aimed at reducing the environmental and economic damage caused by forest fires. It is doing so by developing a software system to support tactical and strategic interventions for fire prevention and management and post-fire recovery operations. It combines innovative data processing, images provided by new satellite technologies and accurate forecasts from meteorological models. New data is produced every 10 minutes.	https://ec.europa.eu/regional_policy/en/projects/italy/software-developed-in-italy-to-mitigate-damage-from-forest-fires	Developing a software system to support tactical and strategic interventions for fire prevention and management and post-fire recovery operations
11	VALCONMAC – Project for the recovery and conservation of resources Forestry in the MACARONESIA	Interreg V-A - Spain-Portugal (Madeira-Açores-Canarias (MAC))	European Regional Development Fund	2014-2020 Project duration 10/2016 - 10/2019	Total Investment 1 473 660 EUR EU Investment 1 252 611 EUR	The four archipelagos that form part of Macaronesia are located off the coast of Europe and Africa and belong to Portugal, Spain and Cape Verde. This project arose from the need to preserve the archipelagos' distinct forests, so that future generations can enjoy the cultural and natural heritage rooted in them. It is establishing a network of trails, compiling a catalogue of unique tree varieties, and promoting centres to manage and safeguard the forests. These centres will manage invasive alien species, educate people and improve knowledge on forest resources for sustainable use. They will promote programmes that foster the exchange of environmental information between the regions, to increase the resilience of these habitats to climate change.	https://ec.europa.eu/regional_policy/en/projects/Portugal/valconmac-preserving-and-protecting-macaronesias-unique-forest-habitats	/

12	Management of green zones / wetlands	Pays de la Loire - ERDF/ESF	European Regional Development Fund	2014-2020 Project duration 01/2014 - 06/2016	Total Investment 570 852 EUR EU Investment 227 264 EUR	<p>The project involves landscaping works to develop a green belt around the Fontaine creek, in Louverné, in the Pays de la Loire region. It aims to restore the natural functioning of the waterways and their overflow capacity by creating or restoring more than 2 hectares of wetlands.</p> <p>The project increases the biological and ecological value of the functioning of the waterways and surrounding areas by, in particular, improving living conditions for benthic macro fauna. The project also aims to raise the population's awareness about wetlands preservation.</p>	https://ec.europa.eu/regional_policy/en/projects/france/a-green-belt-to-promote-biodiversity-in-louverne-in-the-pays-de-la-loire-region-france	/
13	ALICE - Improving the management of Atlantic landscapes: accounting for biodiversity and ecosystem services	2014 - 2020 INTERREG VB Atlantic Area	European Regional Development Fund	2014-2020 Project start date: 2017-11-01 Project end date: 2020-10-31	Total budget/expenditure: EUR 2 976 034.16 European Union funding: EUR 2 232 025.62	<p>An integrative, landscape management approach incorporating socioeconomic and climate change scenarios is critical to ensure the delivery of benefits from investments in Blue and Green Infrastructures to meet the 2020 EU biodiversity targets and sustainable development in the Atlantic Region.</p> <p>The ALICE project will develop a comprehensive package of new methods, tools and procedures to identify economic and social barriers to the delivery of benefits from Blue and Green Infrastructures implementation and to improve the characterization of biodiversity and the valuation of Ecosystem Services across four Atlantic case studies (Portugal, Spain, France and UK-Ireland). ALICE will focus on</p>	https://keep.eu/projects/19287/Improving-the-management-of-EN/	Developing new methods for habitat mapping and monitoring of conservation status (sensu Habitats Directive) using remote sensing and ecological modelling tools; Development of innovative participatory

						<p>participative learning and modelling by engaging stakeholders and policy makers to identify best Blue and Green Infrastructures solutions.</p> <p>The key objectives of ALICE are:</p> <p>(i) develop a full-package of new methods, tools and procedures to assist with coastal and inland landscape management;</p> <p>(ii) targeting and stimulating BGI investment within the four case studies by quantifying the benefits for ES including biodiversity conservation,</p> <p>(iii) identify solutions for the economic and social barriers, which may limit investment in BGI in each of the four case studies,</p> <p>(iv) provide with stronger scientific and socioeconomic support for the effective implementation of future BGI and environmental policy.</p>		<p>approaches for decision support to realistically inform future socioeconomic and environmental policy</p>
14	WetMainAreas - Improving the conservation effectiveness of wetlands	the of	2014 - 2020 INTERREG VB Balkan- Mediterranea n	ERDF, IPA/IPA II	2014- 2020 Project start date: 2017-09- 01 Project end date: 2020-08- 31	Total budget/expense: EUR 1 159 383.93 European Union funding: EUR 985 476.34	The overall objective of the project is the protection, conservation and development of wetlands, as a shared asset of the Balkan Mediterranean (BalkanMed) territory. BalkanMed wetland ecosystems are biodiversity hotspots with significant natural and cultural values and with high potential for territorial development and cooperation, including ecosystem basis development, improvement of knowledge, know how exchange and capacity to take informed decisions with a positive impact on the whole territory. As such, the project serves directly	https://keep.eu/projects/18991/Improving-the-conservation--EN/ /

						to 2.1. SO “to take on the transnational challenge by promoting ecological connectivity and transnational ecosystems’ integration” and contributes significantly to the overall program’s objective for a more competitive and sustainable Balkan Mediterranean area.		
15	WETNET - Coordinated management and networking of Mediterranean wetlands	INTERREG Mediterranean	European Regional Development Fund	Finished in 2019, duration 30 months	Budget: 2.252 M EUR	The project addresses the issue of wetlands in Europe, which are vulnerable interconnected environments, hugely contributing to biodiversity. Their protection intertwines scientific-environmental aspects and governance concerns. The project aims at ensuring higher coordination between different levels of spatial planning and authorities in charge for wetland management, whilst limiting conflicts between conservation issues and economic activities. By defining common priorities for MED wetland conservation, WETNET builds a common territorial strategy for their integrated management. The project intends to increase the knowledge of Wetlands Contracts’ effectiveness, and strengthen existing transnational networks for sharing and disseminating information and good practices on wetland conservation.	https://wetnet.interreg-med.eu/	/
16	AlpES - Alpine Ecosystem Services – mapping, maintenance and management	2014 - 2020 INTERREG VB Alpine Space	ERDF	2014-2020 Project start	Total budget/expense: EUR 2 265 506.90	Ecosystems and their services go beyond national borders and need a transnational approach for their dynamic protection, sustainable use, management and risk prevention. As a basis for joint action, public	https://keep.eu/projects/18569/Alpine-Ecosystem-Services-m-EN/	/

				date: 2015-12-16 Project end date: 2018-12-15	European Union funding: EUR 1 829 885.86	authorities, policy makers, NGOs, researchers and economic actors – the AlpES target groups – need a common understanding of ecosystem services, comparable information on their status and support in using appropriate tools for integrating them in their fields of work. The AlpES project's overall objective is to introduce ecosystem services as a regional/transnational environmental governance framework and train and support the AlpES target groups in understanding, valuing and managing them.		
17	INTEGRATE - Integrate aquaculture: an eco-innovative solution to foster sustainability in the Atlantic Area	2014 - 2020 INTERREG VB Atlantic Area	ERDF	2014-2020 Project start date: 2017-06-01 Project end date: 2020-05-31	Total budget/expense: EUR 2 012 372.09 European Union funding: EUR 1 509 279.07	Circular economy principles make activities more sustainable and competitive. The INTEGRATE project will foster a quintuple helix cooperation to promote the industrial transition, finding sustainable ways to address an imbalance of resources towards Integrated Multi-Trophic Aquaculture (IMTA) in the Atlantic Area. The project will develop effective tools to increase competitiveness while removing the barriers to sectoral green growth and improving the quality and public image of the aquatic products. Though its development is encouraged by major policies (EU Blue Growth Strategy, Atlantic Action Plan, RIS3), there are many limits (socio-economic, administrative and legal) and challenges that need to be solved in order to benefit from its potential to increase competitiveness, productivity and profitability	https://keep.eu/projects/19303/Integrate-aquaculture-an-ec-EN/	Strengthen transnational and collaborative networking among research, business-industry groups and civil society on eco-efficient aquaculture techniques through a territorially based cooperation approach.

						<p>while minimizing environmental impacts related to waste production.</p> <p>The INTEGRATE project aims to strengthen transnational and collaborative networking among research, business-industry groups and civil society on eco-efficient aquaculture techniques through a territorially based cooperation approach. This will be achieved by embracing and communicating the principles and benefits of eco-innovation and eco-efficiency, in which the concept of IMTA is based. Furthermore, it will facilitate the consecution of strategic regional goals as the industry transitions to resource-efficient technologies (aquaculture is a sector highlighted in EU Blue Growth Strategy).</p>		
18	Risk-AquaSoil - Atlantic risk management plan in water and soil	2014 - 2020 INTERREG VB Atlantic Area	Co-financing sources: ERDF	2014-2020 Project start date: 2017-05-31 Project end date: 2019-11-28	Total budget/expense: EUR 1 849 359.36 European Union funding: EUR 1 387 019.52	<p>There are huge uncertainties in the way climate change will directly and indirectly affect agricultural and food systems. The RISKAQUASOIL project aims to develop a comprehensive management plan for risks in soil and in water to improve the resilience of the Atlantic rural areas. Through transnational cooperation, the project partners will combat the adverse effects of the climate change, especially on agricultural lands. In summary, the project will contribute to a better coordination for the detection, risk management and rehabilitation for rural territories (maritime and terrestrial areas), especially for agricultural purposes, mainly</p>	https://keep.eu/projects/19292/Atlantic-risk-management-pl-EN/	/

						associated to climate change and natural hazards but also to human pressure.		
19	ECOPOTENTIAL: improving future ecosystem benefits through earth observations	Horizon 2020	RIA – research and innovation action	Project duration 06/2015 - 10/2019	Total Investment 15 993 931,25 EUR EU Investment 14 874 340 EUR	ECOPOTENTIAL makes significant progress beyond the state-of-the-art and creates a unified framework for ecosystem studies and management of protected areas (PA). ECOPOTENTIAL focuses on internationally recognized PAs in Europe and beyond in a wide range of biogeographic regions, and it includes UNESCO, Natura2000 and LTER sites and Large Marine Ecosystems. Best use of Earth Observation (EO) and monitoring data is enabled by new EO open-access ecosystem data services (ECOPERNICUS).	https://cordis.europa.eu/project/id/641762	/
20	The history of wolves, and their contribution to adaptation and phenotypic diversity in dogs	Horizon 2020	MSCA-IF-EF-ST - Standard EF	Project duration 09/2016 - 8/2018	Total Investment 200 194,80 EUR EU Investment 200 194,80 EUR	The resurgence of the gray wolf in Europe and its re-emergence in northern Europe, including Denmark, makes this an ideal time to study the wolf populations and their relationships to dogs. The evolutionary relationship between wolves and dogs is an area of active research. There are several key questions about dog domestication that remain unanswered, such as whether the dogs were domesticated once or several times, and the location of the domestication event(s). The ability to answer these questions has been hampered by multiple factors such as unavailability of a large number of wolf samples, the poor elucidation of the relationship between the wolf subspecies and the lack of an appropriate wolf reference genome.	https://cordis.europa.eu/project/id/655732	/

21	Historic response of a wide-ranging carnivore to climate change	Horizon 2020	MSCA-IF-EF-ST - Standard EF	Project duration 6/2018 - 6/2020	Total Investment 173 857,20 EUR EU Investment 173 857,20 EUR	This proposed project investigates novel ways of predicting the effects of future climate change on the survival of animal species. We will focus on a case study of two genetically and morphologically distinct wolf populations living in Eurasia. One of these survived the climate changes that have occurred over the past 40,000 years, whereas the other did not. We will describe the details of this extinction and replacement event, and determine the genetic processes that led to this difference between the two populations. To achieve this, we will carry out next-generation sequencing of wolf ancient DNA samples, and take advantage of ancient samples already collected and sequenced from across Eurasia. Together, this dataset will constitute the largest ancient wolf genome dataset ever collected.	https://cordis.europa.eu/project/id/796877	/
22	The ecological services, social benefits and economic value of the Ecosystem Services in Natura 2000 sites in Crete	Life	LIFE13 INF/GR/000188	Project duration 7/2014 - 12/2018	Total Investment 1 085 171 EUR EU Investment 530 960 EUR	The main threats to the Natura 2000 network sites in Crete are the destruction of coastal habitats by the development of tourism, the degradation of mountain landscape and the loss of biodiversity due to intense agriculture, abandonment of traditional farming practices and the human-related mortality of certain species. The project aims to support conservation efforts targeting Natura 2000 sites in Crete by motivating the public to participate in relevant decision-making processes and by	https://webgate.ec.europa.eu/life/publicWebsite/project/details/4141	/

						highlighting the socio-economic damage that will result from biodiversity loss in Crete.		
23	Implement best practices for in-situ conservation of the species <i>Canis lupus</i> in the Eastern Carpathians	Life	LIFE13 NAT/RO/0002 05	Project duration 7/2014 - 2/2019	Total Investment 942 902 EUR EU Investment 707 175 EUR	The overall objective of the WOLFLIFE project was to maintain a viable wolf population in the Carpathian Mountains. The project's area covers the central and southern parts of the Eastern Carpathians, including 18 Natura 2000 network sites in which the wolf is protected. Data obtained during the project will form the basis for developing an effective action plan to maintain a viable wolf population, in line with EU policy regarding the conservation and sustainable management of large carnivores.	https://webgate.ec.europa.eu/life/publicWebsite/project/details/4040	/
24	Population level management and conservation of brown bears in northern Dinaric Mountains and the Alps	Life	LIFE13 NAT/SI/00055 0	Project duration 7/2014 - 6/2019	Total Investment 5 987 478 EUR EU Investment 4 149 202 EUR	Conflicts with humans are an ongoing threat to the conservation status of brown bear (<i>Ursus arctos</i>) populations, not only in the project area, but in Europe generally, and steps must be taken to improve coexistence. The LIFE DINALP BEAR project's main objective was to establish a more strategic population - level approach to the conservation, management and monitoring of brown bear populations in Slovenia, Croatia, Italy and Austria. Other key aims included decreasing human-bear conflicts and promoting better coexistence between bears and humans. The ultimate goal was to encourage the natural expansion of brown bear from the Dinaric Mountains into the Alps.	https://webgate.ec.europa.eu/life/publicWebsite/project/details/4031	/

25	Conservation of Brown Bear (<i>Ursus arctos</i>) population in Romania	Life	LIFE13 NAT/RO/0011 54	Project duration 10/2014 - 12/2020	Total Investment 1 567 512 EUR EU Investment 1 115 911 EUR	The Romanian Carpathians are the home to a stable population of brown bear (<i>Ursus arctos</i>), which represents around 35% of the total number of brown bears in Europe. However, brown bears in Romania face several threats, including habitat fragmentation due to new infrastructure. The LIFE FOR BEAR project aims to protect the entire bear population in the Romanian Carpathians. Although parts of the Apuseni Mountains in Western Romania are not included, the migration corridor between the Carpathian and the Apuseni Mountains is included in the project area. The project area encompasses about 30% of Romania's total land area.	https://webgate.ec.europa.eu/life/publicWebsite/project/details/4159	/
26	Italian emergency strategy for fighting illegal poisoning and minimize its impact on bear, wolf and other species	Life	LIFE13 NAT/IT/000311	Project duration 6/2014 - 11/2020	Total Investment 2 414 270 EUR EU Investment 1 265 077 EUR	The illegal use of poison is one of the main threats to two priority large carnivore species of the Habitats Directive ? the brown bear (<i>Ursus arctos</i>) and the wolf (<i>Canis lupus</i>) ? as well as to several scavenger raptor species.	https://webgate.ec.europa.eu/life/publicWebsite/project/details/4009	/
27	Consolidation of a bear population in a fragmented management territory: Central Pyrenees	Life	LIFE13 NAT/ES/00139 4	Project duration 7/2014 - 10/2019	Total Investment 2 435 639 EUR EU Investment 1 826 729 EUR	By 1990 native bears in the Central Pyrenees had become extinct. A reinforcement action with specimens of the same genetic strain from Slovenia was initiated in 1996. This project was funded and promoted by France, Spain and the EU, with support from the LIFE programme. However, the concerted actions were insufficient and the bear became extinct in the whole of the Pyrenees by 2004. Since	https://webgate.ec.europa.eu/life/publicWebsite/project/details/4126	/

						<p>then, many efforts have been made and the population of bears has reached about 30 specimens, almost 90% of which live totally or partially in Catalonia.</p> <p>The PIROSLIFE project aims to consolidate bear populations and strengthen their long-term conservation in the Pyrenees. It will develop measures to improve coordinated action between different administrative units in order to help support the co-existence of bear populations with human interests. It hopes to develop a management approach that can be an example to other territories.</p>		
28	Living in Natura 2000 and living with bears in two small and endangered subpopulations	Life	LIFE16 GIE/ES/00062 1	Project duration 7/2014 - 10/2019	Total Investment 2 435 639 EUR EU Investment 1 826 729 EUR	<p>The environmental problem addressed in the present proposal is the lack of awareness of the Natura 2000 Network among the general public as well as among the inhabitants of the network sites. This is especially relevant in the distribution of brown bears in the Eastern Cantabrian and Western Pyrenees region, the two smallest and most threatened subpopulations in Spain in order to guarantee the favourable conservation status of these populations as there has been less investment in conservation efforts to date.</p> <p>The overall objective of the LIFE NATURA 2000 + BEAR project is to improve information and awareness of the Natura 2000 network and of the brown bear population among the inhabitants of areas that are home to the two</p>	https://webgate.ec.europa.eu/life/publicWebsite/project/details/4660	/

						smallest and most endangered subpopulations of bears in Spain.		
29	Strategies to minimize the impact of free ranging dogs on wolf conservation in Italy	Life	LIFE13 NAT/IT/000728	Project duration 1/2015 - 9/2020	Total Investment 2 885 921 EUR EU Investment 2 089 118 EUR	<p>The widespread presence of stray dogs represents a threat to the grey wolf (<i>Canis lupus</i>) because of the increased possibility of genetic loss for the target species, predation of domestic animals (often attributed to wolves) and transmission of diseases that could weaken wolf populations. Moreover, the negative attitude towards wolves, considered responsible for sheep predations, has increased illegal killings.</p> <p>The LIFE MIRCO-lupo project's overall aim is to improve the conditions for wolf conservation by combating threats associated with the presence of stray dogs.</p>	https://webgate.ec.europa.eu/life/publicWebsite/project/details/4029	/
30	The wolf of Andalusia: changing attitudes	Life	LIFE15 GIE/ES/00096 2	Project duration 9/2016 - 6/2020	Total Investment 1 644 871 EUR EU Investment 921 352 EUR	<p>The Iberian wolf (<i>Canis lupus signatus</i>) is a subspecies of grey wolf found in north-west Spain and northern Portugal. Its prey includes both game species and livestock. This is a source of conflict with those who make a living from these animals. Minimising wolf-human conflicts is a necessary condition for the conservation of the Iberian wolf, which is categorised as "near threatened" by the IUCN.</p> <p>This project focuses on the Iberian wolf's southernmost distribution area: The central-eastern area of the Sierra Morena mountain range in Andalusia. The main objective of the LIFE SOUTHERN WOLVES project is to</p>	https://webgate.ec.europa.eu/life/publicWebsite/project/details/4526	/

						improve the coexistence of the Iberian wolf population with key economic activities in Andalusia, thereby improving its conservation status.		
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Notes: Interreg projects (cross-border and transnational); Horizon projects; Life projects;

7.4 ASOSCoP – transnational contingency plan in the event of accidents at sea

	Title	Operational program	Fund	Program period	budget	Topic	website	Eco-innovation or circular economy elements
1	SAFE SEA - Safe coast and sea in Latvia and Estonia	Interreg V-A - Estonia-Latvia	European Regional Development Fund	2014-2020 Project duration 05/2017 - 06/2019	Total Investment 547 815 EUR EU Investment 465 642 EUR	Baltic Sea region countries have a shared responsibility to protect the marine environment. In case of an emergency, like an oil spill, it is crucial that the countries' first responders have a coordinated cross-border response plan. Due to a lack of equipment and procedures, this was not the case in Latvia and Estonia. For this reason, the project is increasing capacity and strengthening coordination between Estonian and Latvian emergency services and other organisations. They include the State Fire and Rescue Service of Latvia, Estonian Rescue Board, Estonian Small Harbour Development Centre, coast guards, police and border guards, environmental agencies, local municipalities and volunteer organisations. By implementing a single set of procedures between these	https://ec.europa.eu/regional_policy/en/projects/estonia/safe-sea-estonia-latvia-combine-forces-for-a-safer-coast	/

						actors, the project aims to establish a more effective – and successful – response to emergencies.		
2	@BluePortS	2014 - 2020 INTERREG VB Atlantic Area	European Regional Development Fund	2014- 2020 Project start date: 2017-09- 01 Project end date: 2020-04- 29	Total budget/expense: EUR 2 959 900.00 European Union funding: EUR 2 219 925.00 Co-financing sources: ERDF	As pillar of MARPOL, the EU Port Reception Facility (PRF) directive obliges ports providing adequate PRF, ships delivering waste in the port and recommends a cost recovery system (CRS) as an incentives. IMO has also developed a PRF database, a user service. The IMO Ballast Water Management Convention (BWMC) entered into force on September 2017. Despite regulations, discharge at sea is still practiced. Port users complain about the variability, cost and lack of adequate port discharge facilities. BLUEPORTS aims to provide a practical support to the ESSF/EMSA, using the Atlantic Area as a physical platform and its maritime community as a resource to design, prototype, test and demonstrate the "ideal" PRF and services for oiled and ballast water (as first concern). The overall goal is to create awareness and motivation within the maritime community to stop discharge at sea by designing in consensus the "Blue Port Services" for 2020 and beyond. The project will create a cooperation framework and network for all parties by addressing users, providers and policy makers. The project emphasizes innovation: in techniques, to reduce operation time, in	https://keep.eu/projects/19356/Servicios-puertos-azules-At-EN/	A pilot innovative oil treatment process

						financial instruments to facilitate investment and adjust service costs and in user friendly booking services.		
3	Integrated oil spill response actions and environmental effects	Horizon 2020	RIA – research and innovation action	Project duration 03/2016 - 08/2019	Total Investment 5 513 252,50 EUR EU Investment 5 277 554 EUR	Objectives: 1) to improve the observation and predictions of oil spreading in the sea using novel on-line sensors on-board vessels, fixed structures or gliders, and smart data transfer into operational awareness systems; 2) to examine the true environmental impacts and benefits of a suite of marine oil spill response methods (mechanical collection in water and below ice, in situ burning, use of chemical dispersants, bioremediation, electro-kinetics, and combinations of these) in cold climate and ice-infested areas; 3) to assess the impacts on biota of naturally and chemically dispersed oil, in situ burning residues and non-collected oil using biomarker methods and to develop specific methods for the rapid detection of the effects of oil pollution; 4) to develop a strategic Net Environmental Benefit Analysis tool (sNEBA) for oil spill response strategy decision making.	https://cordis.europa.eu/project/id/679266	Eco innovation
4	Safe maritime operations under extreme conditions: the Arctic case	Horizon 2020	RIA – research and innovation action	Project duration 06/2017 - 11/2020	Total Investment 6 726 565 EUR EU Investment 6 498 752,50 EUR	Maritime traffic in the Arctic region is rapidly increasing. But there has been a huge increase in marine casualties in this region due to its extremely harsh environment and the severe safety challenges for ships' navigation teams. SEDNA will develop an innovative and integrated risk-based approach to safe Arctic	https://cordis.europa.eu/project/id/723526	Eco innovation

						navigation, ship design and operation, to enable European maritime interests to confidently fully embrace the Arctic's significant and growing shipping opportunities, while safeguarding its natural environment.		
5	Evolift - Getting people out of harms way	Horizon 2020	SME-1 - SME instrument phase 1	Project duration 12/2019 - 5/2020	Total Investment 71 429 EUR EU Investment 50 000 EUR	The offshore lifting decks in many marine activities such as in oil and fish farming industries are considered among the most dangerous sites for workers at sea. As a consequence, new technologies are required to eliminate risk from existing lifting operations. The EU-funded Evolift project offers a pioneering remote-controlled marine solution that can provide unmanned loading and offloading of cargo or buoys on in-shore and off-shore boats and oil rigs. The solution paves the ground for autonomous ships and rigs and opens the way for further development in subsea lifting operations without the support of remote-operated subsea vessels. The new technology permits loading operations in larger weather windows and heavier weather conditions than currently possible thus saving energy, lowering carbon emissions, increasing productivity and protecting human lives.	https://cordis.europa.eu/project/id/888465	Eco innovation
6	Guided Data-Driven Safety at Sea	Horizon 2020	SME-1 - SME instrument phase 1	Project duration 2/2019 - 5/2019	Total Investment 71 429 EUR EU Investment	Wave slamming impacts in high-speed boats has been recognized as a serious problem in maritime industry producing serious injuries and fatigue to operators and crew, and also mechanical and structural damages in	https://cordis.europa.eu/project/id/854448	Eco innovation

					50 000 EUR	vessels and on-board equipment. Some solutions exist in the market, such as shock absorbing seats, that mitigate the impact to some extent. However, they do not reduce the number of wave slamming accidents, as 96% of times its main cause is human errors. With 13 years of combined experience in the maritime industry we have developed Safewave, a software-based solution that provides operators real-time information and predictions of potential hazards ahead. Our device uses current and historical information of acceleration forces experienced from mechanical impacts, together with current and past sea-states and weather, engine and navigation data and analyse this information make intelligent data-driven predictions. Safewave does not mitigate the impact, but prevent it.		
7	EfficienSea 2 - Efficient, Safe and Sustainable Traffic at Sea	Horizon 2020	IA - Innovation action	Project duration 5/2015 - 4/2018	Total Investment 11 455 000,89 EUR EU Investment 9 795 318,16 EUR	The coincide of EU policies on safer and more efficient waterborne operations and in particular the e-maritime initiative with IMO's strategy for e-navigation opens a unique window of opportunity to influence the maritime sector and make substantial impact. Funding of EfficienSea 2 will enable the consortium to exploit this window of opportunity, supporting EU policies and marine traffic management through services to: 1. Improve navigational safety and efficiency	https://cordis.europa.eu/project/id/636329	Eco innovation

						<p>2. Improve Arctic navigation and emergency response</p> <p>3. Decrease administrative burdens</p> <p>4. Improve environmental monitoring & enforcement</p>		
8	Micro AIS Shore Station - MASS	Horizon 2020	SME-1 - SME instrument phase 1	Project duration 6/2017 - 11/2017	Total Investment 71 429 EUR EU Investment 50 000 EUR	<p>Automatic Identification System (AIS) is a VHF based system which is designated to enhance the safety of life and goods at sea by also assuring navigational and environmental improvements. The coverage of national AIS networks are limited because of many reasons (geography, weather conditions, insufficient number of stations etc.) and due to these limitations relevant authorities have difficulties to track and manage the marine traffic properly; causing safety and security weaknesses at sea which also means increased threats of accidents, illegal fishing, immigration & smuggling and water pollution.</p> <p>MASS is a cost-effective, compact-solar powered Micro AIS Shore Station; which is easy to set-up & maintain with lower power consumption rates thanks to its innovative AIS engine. MASS increases safety and security of coasts by enabling advanced monitoring of sea shores, inland waters & lakes and thus eliminating blind spots which are mainly out of the coverage of conventional AIS networks.</p>	https://cordis.europa.eu/project/id/775636	Eco innovation
9	Mechanistic Microscale Approach to the	Horizon 2020	MSCA-IF-GF - Global Fellowships	Project duration	Total Investment	In oligotrophic marine ecosystems, the natural or accidental release of crude oil marks the beginning of a season of feast for indigenous	https://cordis.europa.eu/project/id/741799	Eco innovation

	Microbial Degradation of Oil-Droplets in Subsea Crude Oil Releases			11/2017 - 1/2020	176 408,10 EUR EU Investment 176 408,10 EUR	microbial consortia that have developed appropriate adaptive machinery to access and assimilate hydrocarbons. Biodegradation and bioemulsification are among the key processes by which marine microbes strongly affect the transport and fate of crude oil in the sea. Unraveling of the coupled physical and biochemical interactions between microbes and oil droplets will be a major enabler for achieving a new level of prediction of crude oil dispersion as well as for developing more efficient bioremediation techniques to combat oil spills in marine environments. The proposed research project aims at an improved understanding of the fundamental microscale mechanisms that underpin oil biodegradation with a highly innovative focus at both the single-droplet and droplet-population levels. In particular, at the single-droplet level, our focus is on the droplet-microbe interactions and the dynamics of biofilm formation over the oily substrate. Ultimately, the developing interfaces between biofilms, oil and water will be tracked and quantitatively visualized.		
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Notes: Interreg projects (cross-border and transnational); Horizon projects; Life projects;