

Restore our Ocean and Waters

A synergy info pack by CORDIS

EDITORIAL

The health of Europe's ocean and waters is vital to its economic, social and ecological well-being. The EU boasts 68 000 km of coastline – more than Russia and the United States combined – and the area of water under EU jurisdiction is greater than its land area.

However, marine and freshwater ecosystems are rapidly degrading, and climate change will increase the frequency and severity of droughts, flooding and extreme weather, threatening the safety and livelihood of millions of Europeans.

Protecting the health of our ocean and water system is fundamental to securing the health, well-being and prosperity of Europe's citizens and of European society. The Mission Restore our Ocean and Waters by 2030 (Mission Ocean and Waters) is designed to deliver on the EU's quantified and measurable targets for protecting and restoring ecosystems and biodiversity, for preventing and eliminating pollution, and for making the sustainable blue economy climate-neutral and circular, thus supporting the goals of the European Green Deal.

In the development and piloting phase (2021-2025), the Mission will roll out 'lighthouses' as Mission sites and hubs in major European sea and river basins. The lighthouses will act as hubs for the development, demonstration and deployment of solutions on the ground and as a framework for cooperation at a basin level. In the deployment and upscaling phase (2026-2030), the solutions piloted in the first phase will be developed, replicated and scaled up, enabling broad implementation and participation in the Mission across the EU and its bordering basins.

This Synergy Info Pack showcases 34 research projects funded through the complementary programmes of Horizon 2020 (including SME Instrument), LIFE and EMFF. The groundbreaking work of these researchers is supporting the development of the technical, social, governance innovation and business models needed to secure the restoration of aquatic ecosystems and the development of a sustainable, resilient and climate-neutral blue economy.

Among them are projects that foster a digital ocean and water knowledge system that builds on existing European infrastructures and services including Copernicus, EMODnet, Destination Earth, and European Research Infrastructure Consortia (ERICs). This will be enhanced by future research funded through the next Work Programmes to achieve the objectives of the Mission Ocean and Waters.

By powering a digital blue transition, these projects are enabling the Mission to deliver on Europe fit for the Digital Age. They will also promote a participatory governance, which is a central feature of this Mission with co-design and co-implementation of solutions with citizens and stakeholders at its heart.

To reverse the degradation of Europe's ocean and waters, the interrelated drivers of the hydrosphere's exploitation, such as pollution and climate change, as well as knowledge gaps and lack of citizen engagement, need to be addressed. Through research and innovation applied in a systemic manner, across the entire water system, the Mission will find the solutions to accelerate the transitions to restore our ocean and waters.

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OBJECTIVE #1

Protect and restore marine and freshwater ecosystems and biodiversity

Life on Earth depends on a healthy hydrosphere – the single connected system of the ocean, seas, coastal and inland waters – to maintain a rich biodiversity and functioning ecosystems that provide oxygen, drinking water and food. However, marine and freshwater ecosystems have been substantially degraded by human activity and continue to decline despite ambitious legislation.

The Mission Ocean and Waters aims to protect, in line with the EU Biodiversity Strategy, a minimum of 30 % of the EU's sea area, one third of which will be under strict protection measures. It also aims to restore at least 25 000 km of free-flowing rivers, as well as degraded seabed habitats and coastal ecosystems.

To this end, the Mission Ocean and Waters is launching two large-scale restoration lighthouses, one in the Danube River basin and another on the Atlantic and Arctic coast. Projects like **FutureMARES** and **iAtlantic** demonstrate that restoration of coastal and marine habitat-forming species is possible at basin scale through the reduction of pressures (from fishing, pollution, extraction, barriers such as dams and weirs, and other human activities), ecosystem-based management, and effective nature-based restoration solutions to measure the impact of climate change.

Sea level rise will increase the frequency and severity of extreme sea level events and floods and will increasingly threaten Europe's communities and affect large sections of Europe's population. It is also likely to negatively affect coastal biodiversity, through salinisation of natural areas and groundwater, ecosystem destruction and increased pollution. Projects such as **PROTECT** and **LOPHELIA** are deepening our understanding of the impacts of climate change on the marine environment, and support the development of nature-based solutions to boost coastal resilience through restored and resilient coastal ecosystems, such as oyster reefs, kelp forests, wetlands and salt marshes within the area of cities and communities.

The Mission will also launch an EU-wide 'Blue Parks' platform to promote conservation, protection and active restoration of sea areas. Projects like **ODYSSEA** will benefit from this platform as it will provide scientific basis and underpinning for the expansion of networks of marine protected areas, aid mapping of EU marine biodiversity, and assess coherence of these networks. The Mission will also provide technical assistance to local and regional protection and restoration initiatives. Projects such as **MaCoBioS**, **AFRIMED** and **ROC-POP-LIFE** show how the active and passive restoration and effective management of marine ecosystems through innovative approaches can be achieved.

#1

ODYSSEA

An observation system for the entire Mediterranean

Our ability to restore and protect our marine biodiversity and ecosystems depends on solid data. The ODYSSEA project has developed a platform that integrates a range of observation and forecasting systems from across the Mediterranean basin, providing primary data and on-demand data services (including weather forecasts, and reports on fish stocks, seagrass cover and fishing activity) through a single public portal. The platform combines information

from public databases with data provided by Earth observation facilities to, develop coastal observatories and deploy novel *in situ* sensors such as microplastic detectors, increasing the temporal and geographic coverage of observational data.

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ODYSSEA

📍 OPERATING A NETWORK OF INTEGRATED OBSERVATORY SYSTEMS IN THE MEDITERRANEAN SEA

€ Horizon 2020

⚙️ DEMOCRITUS UNIVERSITY OF THRACE – Greece

📅 1 June 2017 to 30 November 2021

🌐 odysseaplatform.eu



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#1

FutureMARES

Nature-based solutions for marine conservation

Marine environments and coastal ecosystems such as estuaries and fjords support a huge portion of the world's biodiversity. They also provide essential climate-regulating processes and make key contributions to global food security, in addition to other valuable economic and well-being services and resources. The FutureMARES project investigates socially and economically viable nature-based solutions for climate change adaptation and mitigation in marine and coastal ecosystems, covering five broad regions across the globe (North Sea, Baltic Sea, Mediterranean Sea,

North-East Atlantic and South Pacific). Solutions will include the restoration of coastal and marine habitat-forming species that can buffer coastal habitats from climate change effects, support biodiversity and improve seawater quality, as well as sustaining tourism and cultural activities. Ultimately, the project aims to develop these solutions to protect future biodiversity and ecosystem services in a future climate.

FutureMARES

📍 CLIMATE CHANGE AND FUTURE MARINE ECOSYSTEM SERVICES AND BIODIVERSITY

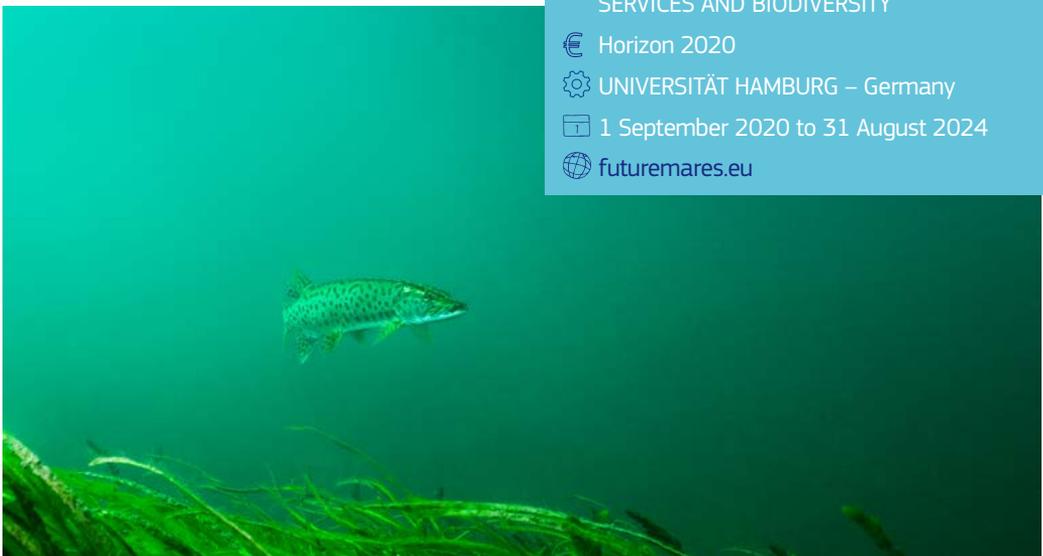
€ Horizon 2020

⚙️ UNIVERSITÄT HAMBURG – Germany

📅 1 September 2020 to 31 August 2024

🌐 futuremares.eu

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#1

MaCoBioS

Evidence-based guidance for marine policy formulation

Biodiversity provides us with a range of ecosystem services upon which we depend, such as food, fresh water, pollination and protection against floods. Knowledge of interrelations between climate change, biodiversity and ecosystem services is key to preserving ecosystems and fully integrating environmental requirements into policymaking. The MaCoBioS project investigates the impact of climate change on the most important marine

coastal ecosystems, such as seagrass beds and kelp forests, establishing a framework to assess vulnerabilities that will inform EU environmental protection strategies and to ensure an efficient and integrated approach for their conservation.

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MaCoBioS

📁 MARINE COASTAL ECOSYSTEMS BIODIVERSITY AND SERVICES IN A CHANGING WORLD

€ Horizon 2020

⚙️ UNIVERSITY OF PORTSMOUTH HIGHER EDUCATION CORPORATION – United Kingdom

📅 1 June 2020 to 31 May 2024

🌐 macobios.eu



© Citrus Deliciosa, Shutterstock

#1

AFRIMED

Protecting and restoring Mediterranean algal forests

Macroalgal forest ecosystems play a key role in supporting complex food webs, and are integral to the delivery of a multitude of goods and services. However, massive losses of macroalgal forests all over the Mediterranean basin are cause for great concern. The AFRIMED project seeks to bring about a step change in this situation, by developing, implementing and promoting a protocol to effectively restore macroalgal forests in the Mediterranean Sea in

order to maximise the delivery of conservation, societal and economic benefits. A combination of spatial analyses, laboratory and field studies, stakeholders' awareness-raising activities and pilot restoration projects will ensure the project's objectives are achieved.

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AFRIMED

- ALGAL FOREST RESTORATION IN THE MEDITERRANEAN SEA
- European Maritime and Fisheries Fund
- UNIVERSITÀ POLITECNICA DELLE MARCHE – Italy
- 1 January 2019 to 31 December 2022
- afrimed-project.eu



© Damsea, Shutterstock

#1

WESE

Wave Energy in southern Europe

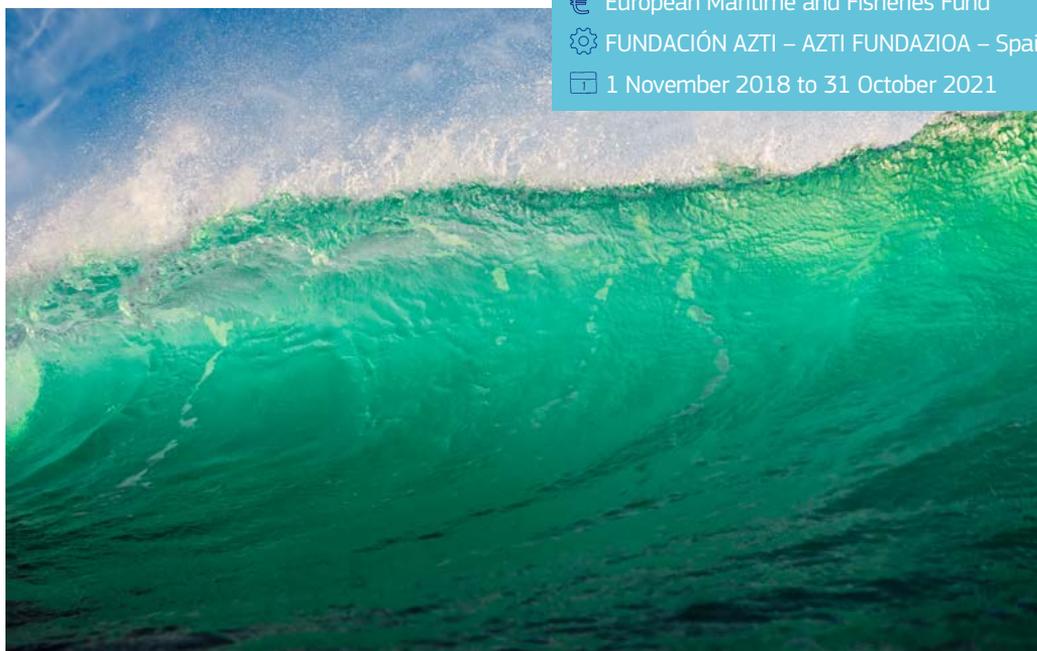
The Atlantic Sea offers plenty of renewable energy resources such as offshore wind, wave and tidal power. The benefits of using those resources are significant, from reducing greenhouse gas emissions to stimulating and diversifying the economies of coastal communities. The main objective of the WESE project is to contribute to the existing knowledge of the environmental impacts of wave energy to better protect biodiversity and ecosystems. This knowledge

will better inform decision makers and managers of the environmental risks of wave energy projects and reduce uncertainty around their implementation across Europe. It will also allow for a better maritime spatial planning approach to this nascent industry.

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WESE

- 📍 WAVE ENERGY IN SOUTHERN EUROPE
- 🇪🇺 European Maritime and Fisheries Fund
- ⚙️ FUNDACIÓN AZTI – AZTI FUNDAZIOA – Spain
- 📅 1 November 2018 to 31 October 2021



© Wonderful Nature, Shutterstock

#1

iAtlantic

Measuring the impact of climate change on the Atlantic

iAtlantic assesses the health of deep and open-ocean Atlantic habitats and species. It scales and standardises measurements so that ecosystem status can be assessed. It will help design ecologically coherent networks of marine protected areas to conserve habitats and ecosystems threatened by human activities. It will predict where and when synergistic effects of global change and multiple stressors occur, and what implications these will have for society, the economy and ocean health. Over 30 expeditions by partners from 17 nations spanning the EU, Argentina, Brazil, South Africa, Canada, the United States and

the United Kingdom will study those ecosystems most at risk of change. The close cooperation between these nations is integral to iAtlantic's work plan and vision to implement the Belém Statement on Atlantic Ocean Research and Innovation Cooperation. The iAtlantic fellowship programme will build human and technical capacities through hands-on work at sea, technology transfer, analytical techniques and data interpretation training, and a mentoring programme.

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iAtlantic

📁 INTEGRATED ASSESSMENT OF ATLANTIC MARINE ECOSYSTEMS IN SPACE AND TIME

€ Horizon 2020

⚙️ UNIVERSITY OF EDINBURGH – United Kingdom

📅 1 June 2019 to 31 May 2023

🌐 iatlantic.eu



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#1

PROTECT

A closer look at the interactions between atmosphere, ocean and ice sheets

Rising sea levels are a serious global threat with potentially catastrophic consequences for coastal regions. Policymakers are increasingly concerned about the contribution of thawing land ice. The PROTECT project will offer a new approach in modelling the interactions between atmosphere, ocean and ice sheets, significantly improving our understanding of ice sheet processes. PROTECT

will also improve the strength of the resulting sea level rise projections, envision the future social impact of this phenomenon, and train the next generation of sea level scientists.

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PROTECT

📁 PROJECTING SEA-LEVEL RISE: FROM ICE SHEETS TO LOCAL IMPLICATIONS

🇪🇺 Horizon 2020

⚙️ CENTRE NATIONAL DE LA RECHERCHE SCIENTIFIQUE
CNRS – France

📅 1 September 2020 to 31 August 2024

🌐 protect-sl.eu

© Anne Chapuis, IGE-CNRS

#1

ColiSense Online

Cheap, online and rapid monitoring of E. coli in water

Access to safe water is critical. Around 2 billion people lack access to clean drinking water, and contaminated supplies result in almost half a million deaths annually. The ColiSense Online project has developed a fast, cheap and accurate cloud-based analyser that can quantify the

presence of *E. coli* in drinking water. The test, which takes 60 minutes and costs just EUR 1 per analysis, can be applied anywhere, from waterworks to distilleries, either on-site or remotely.

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ColiSense Online

- 📍 ONLINE AND AUTOMATED E. COLI MONITORING FOR 100% SAFE DRINKING WATER
- € Horizon 2020
- ⚙️ BNOVATE TECHNOLOGIES SA – Switzerland
- 📅 1 July 2019 to 31 December 2021
- 🌐 bnovate.com/sme-instrument

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#1

ROC-POP-LIFE

Replanting Europe's algae forests

Cystoseira brown algae are key reef species protected by the Habitats Directive. But in past decades, these species have declined in the Mediterranean due to human activity. In some places, those pressures have been relieved, but limited dispersal capabilities hamper species' natural restoration. The ROC-POP-LIFE project aimed to accelerate the restoration of the reefs' habitat in the Cinque Terre and Miramare protected areas. To achieve this aim, *Cystoseira*

specimens taken from Italy and Slovenia have been reproduced in the laboratory and carefully planted in the target areas, encouraging recolonisation without damaging donor sites, speeding up the habitat restoration.

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ROC-POP-LIFE

 PROMOTING BIODIVERSITY ENHANCEMENT BY RESTORATION OF CYSTOSEIRA POPULATIONS

 LIFE programme

 UNIVERSITÀ DEGLI STUDI DI TRIESTE – Italy

 1 October 2017 to 31 December 2021

 rocpoplif.eu

© Damsea, Shutterstock

#1

INTEMARES

A nationwide network of marine reserves

INTEMARES is one of the largest projects for the conservation of the marine environment in Europe. It is the first initiative at a national level that integrates various funds, policies and actors for the management of a whole network of protected spaces. INTEMARES seeks to implement the Priority Action Framework for Natura 2000

across the marine network, bringing together various stakeholders to bolster critical knowledge of management practices, improve the monitoring of habitat types and species, and guarantee the conservation of Spain's marine species and habitats with a sustainable socio-economic development.

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INTEMARES

INTEGRATED, INNOVATIVE AND PARTICIPATORY MANAGEMENT FOR N2000 NETWORK IN THE MARINE ENVIRONMENT

LIFE programme

FUNDACIÓN BIODIVERSIDAD – Spain

1 January 2017 to 31 December 2024

intemares.es

© lunamarina, Shutterstock

#1

LOPHELIA

A steel foundation to restore Sweden's reefs

The cold-water coral *Lophelia* is a major habitat-building species, and its reefs offer rich feeding grounds for commercially important fish species. But around 40 % of the reef areas in Scandinavia have been damaged by bottom trawling, and the slow-growing *Lophelia* needs centuries to recover. Artificial substrates may

help: the LOPHELIA project will develop a cost-effective method to restore *Lophelia pertusa* reefs by finding the optimal design of artificial reef structures, assessing the use of calcium carbonate-rich metallurgical slag, a by-product of the steelmaking industry.

16



LOPHELIA

 METHOD DEVELOPMENT FOR COLD-WATER CORAL REEF HABITAT RESTORATION WITH IMPLEMENTATION IN KOSTERFJORD-VÄDERÖFJORD, SWEDEN

 LIFE programme

 COUNTY ADMINISTRATIVE BOARD OF VÄSTRA GÖTALAND – Sweden

 1 September 2019 to 31 December 2025

 lifelophelia.se

© Pavel Nesvadba, Shutterstock

OBJECTIVE #2

Prevent and eliminate pollution

Pollution-free waters are critical for the health of both citizens and the planet. For the citizens of Europe and the world, the health of the ocean and waters will shape their very real conditions of life. The Mission Ocean and Waters, in line with the EU Zero Pollution Action Plan for Air, Water and Soil, aims to reduce plastic litter at sea by at least 50 %, cut microplastics released into the environment by 30 %, and halve agricultural nutrient losses as well as the use and the risk of chemical pesticides.

To significantly reduce pollution, the Mission is launching a lighthouse in the Mediterranean Sea to connect and structure existing activities, disseminate and upscale solutions and mobilise relevant actors. The Mission will implement a portfolio of research and innovation aimed at tackling water pollution following the zero pollution hierarchy of: prevention, minimisation, elimination and remediation.

Its initial focus is on plastic pollution. Projects such as **NetTag** and **AQUA-LIT** are exploring ways to reduce the contribution of aquatic industries to plastic pollution, while **MAELSTROM** and **CLAIM** are among those finding economically viable ways to recover and recycle marine plastic debris, such as circular product design for fishing gear.

Other types of pollution targeted by the Mission include agricultural run-off, industrial waste and pharmaceutical residues. The **LIFE MARINAPLAN PLUS** project demonstrated a novel way to clear navigation routes without mobilising pollutants, while the **LIFE-PIAQUO** project aims to reduce marine noise, another major pressure on aquatic life, by 10 %.

By 2030, all Member States, regions and stakeholders across the Mediterranean and the whole of Europe will be able to access breakthrough innovations that prevent, minimise, remediate and monitor pollution in the ocean and waters.

#2

OCEANETS

A circular economy solution for derelict fishing gear

Around 640 000 tons of fishing equipment are lost or abandoned in oceans annually, and can remain in oceans for up to 600 years. Derelict fishing gear, such as nets or traps and pots, is one of the main types of debris impacting the marine environment today. The objective of the OCEANETS project was to guarantee the viability of a circular economy model of certain fishing gear. OCEANETS has addressed this

issue by developing an ICT tool for fishing fleets to prevent fishing gear loss, and set up recycling processes to produce high-quality fabrics from lost or discarded fishing gear.

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OCEANETS

TECHNOLOGICAL APPROACHES FOR CIRCULAR ECONOMY SOLUTIONS IN TERMS OF PREVENTION, RECOVER, RE-USE AND RECYCLE OF FISHING GEARS TO OBTAIN ADDED-VALUE PRODUCTS IN THE TEXTILE INDUSTRY

European Maritime and Fisheries Fund

AIMPLAS – ASOCIACIÓN DE INVESTIGACIÓN DE MATERIALES PLÁSTICOS Y CONEXAS – Spain

1 January 2019 to 30 June 2021

oceanets.eu

© Roman023_photography, Shutterstock

#2



NetTag

Tagging fishing gear to promote waste-free fisheries

NetTag has developed new technological devices for location and recovery of fishing gear and raising awareness about the urgent need to combat marine litter among the fisheries industry, as well as other stakeholders and social groups such as schools. NetTag worked closely with fishers in the north-west Iberian Peninsula to identify the most commonly lost gear and understand concerns and approaches towards marine litter. Based on this, the environmental impacts caused by marine litter – in particular by abandoned, lost and discarded fishing gear – were

evaluated. In parallel, the project developed low-cost miniature acoustic tags and transceivers, and an automated short-range recovery system. The feasibility, acceptance and socio-economic benefits of these devices were also assessed in cooperation with the fishers, and a collaborative on-board best practices handbook produced.

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NetTag

- TAGGING FISHING GEARS AND ENHANCING ON BOARD BEST-PRACTICES TO PROMOTE WASTE FREE FISHERIES
- European Maritime and Fisheries Fund
- CIIMAR – CENTRO INTERDISCIPLINAR DE INVESTIGAÇÃO MARINHA E AMBIENTAL – Portugal
- 1 January 2019 to 30 June 2021
- nettag.ciimar.up.pt



© VladSY, Shutterstock

#2

AQUA-LIT

A toolbox for reducing litter from the aquaculture industry

Aquaculture is the fastest growing food-production sector worldwide, with an expansion rate of 8 %. It is crucial to better understand how these activities are littering the ocean. The AQUA-LIT project is providing the aquaculture sector with a toolbox that can showcase actions, case studies and, best practices to prevent ocean

littering and recycle marine waste. Furthermore, AQUA-LIT assessed the current policies and gave recommendations on EU policies for better decision-making in the aquaculture sector.

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AQUA-LIT

PREVENTIVE MEASURES FOR AVERTING THE DISCARDING OF LITTER IN THE MARINE ENVIRONMENT FROM THE AQUACULTURE INDUSTRY

European Maritime and Fisheries Fund

GEONARDO ENVIRONMENTAL TECHNOLOGIES LTD – Hungary

1 January 2019 to 31 December 2020

aqua-lit.eu



© Evannovostro, Shutterstock

#2

LIFE MARINAPLAN PLUS

Clearing a path for maritime traffic

Over time, harbours and inlets become silted and unsuitable for commercial traffic. The use of dredging equipment is the most common solution, but has a high environmental impact on marine flora and fauna, and contributes to the mobilisation of pollutants. The LIFE MARINAPLAN PLUS project aimed to scale up an innovative and environmentally sustainable solution that

uses ‘ejectors’: submerged, static water jets that direct sediment away from navigation routes. The project tested a demonstration plant in Cervia, Italy, and developed a management plan for seabed maintenance.

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LIFE MARINAPLAN PLUS

RELIABLE AND INNOVATIVE TECHNOLOGY FOR THE REALIZATION OF A SUSTAINABLE MARINE AND COASTAL SEABED MANAGEMENT PLAN

LIFE programme

TREVI S.P.A. – Italy

1 October 2016 to 31 December 2020

lifemarinaplanplus.eu

© Obatala-photography, Shutterstock



#2



CLAIM

Innovative technologies to clean marine plastics litter



The CLAIM project developed five innovative technologies to prevent plastic litter entering the seas at two main source points, wastewater treatment plants and river mouths, and to monitor the presence of plastic debris. The proposed solutions include an automated pre-filtering system and a photocatalytic nanocoating device for removing microplastics in wastewater treatment plants, a small-scale waste-to-energy apparatus (pyroliser) for ships and ports, and

a floating boom system (CLEAN TRASH) for collecting visible floating debris at river mouths. Additionally, CLAIM developed innovative modelling tools to assess the marine plastic pollution, including a filtering system that collects microplastics that can be installed on ships of opportunity or FerryBoxes.

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CLAIM

CLEANING LITTER BY DEVELOPING AND APPLYING INNOVATIVE METHODS IN EUROPEAN SEAS

€ Horizon 2020

⚙️ HELLENIC CENTRE FOR MARINE RESEARCH – Greece

📅 1 November 2017 to 30 April 2022

🌐 claim-h2020project.eu

© IMG75, Shutterstock

#2

GoJelly

Jellyfish mucus to mop up microplastics

Coastal environments are under growing pressure from two distinct problems: microplastic pollution and swarms of jellyfish. The GoJelly project aimed to address both by developing a novel microplastics filter based on the particle-binding properties of jellyfish mucus, plus new uses for jellyfish biomass. Tests demonstrated an operational filter that can remove micro- and nanoplastics from the wastewater treatment

plants and support a market for harvesting jellyfish slime. The by-products of jellyfish biomass also offer a novel, valuable resource for application to a variety of products across the food and feed, cosmetics and nutraceutical industries, as well as agrobiological fertiliser for organic farming.

23

GoJelly

📍 A GELATINOUS SOLUTION TO PLASTIC POLLUTION

€ Horizon 2020

⚙️ SYDDANSK UNIVERSITET – Denmark

📅 1 January 2018 to 31 December 2021

🌐 gojelly.eu



© Vojce, Shutterstock

#2

MAELSTROM

New solutions for the recovery of marine plastics and litter

The recovery of plastic materials from the ocean is an arduous and costly task. The MAELSTROM project brings two innovative and complementary technologies for the sustainable removal of marine litter in European riverine and coastal ecosystems: an underwater cable robot and a bubble barrier. The project brings together key stakeholders to set out a reliable and sound approach for the assessment of marine debris distribution and evaluates the effectiveness of marine litter removal devices along with their

impact on local ecosystems. The action strives to provide sustainable recycling treatment solutions for the recovered litter and to enhance social awareness and involvement in the fight against marine litter pollution.

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MAELSTROM

SMART TECHNOLOGY FOR MARINE LITTER SUSTAINABLE REMOVAL AND MANAGEMENT

Horizon 2020

CONSIGLIO NAZIONALE DELLE RICERCHE – Italy

1 January 2021 to 31 December 2024

maelstrom-h2020.eu



© Rich Carey, Shutterstock

#2

BLUENET

Creating new life for discarded fishing gear

BLUENET's objective was to recycle abandoned, lost or discarded fishing and aquaculture (F&A) gear from the sea and use these as raw materials to manufacture new gear, with the ambition to set up a self-sustainable recycling programme for end-of-life gear in the region. BLUENET brought to shore over 4 tons of marine litter which contributed to reduced marine litter of about 10 % in the region. It provided alternative and sustainable designs for F&A gear, producing prototypes which were tested at sea with a technical performance

comparable to those available on the market. BLUENET established a first 'fishing for litter' initiative in the Basque Country. It involved 24 vessels, 150 fishers and three ports. As a result of the project, a regional management plan for marine litter will be produced in cooperation with the regional government authorities.

25

BLUENET

📄 CREATING NEW LIFE FOR DISCARDED FISHING AND AQUACULTURE GEARS TO PREVENT MARINE LITTER GENERATION

€ European Maritime and Fisheries Fund

⚙️ FUNDACIÓN AZTI – AZTI FUNDAZIOA – Spain

📅 1 January 2019 to 30 June 2021



© Chris Lawrence Travel, Shutterstock

#2



ToxMate

The first multispecies biomonitoring station



Urbanisation and industrial and agricultural development are associated with an increase in wastewater pollution worldwide. Wastewater contains a wide range of chemical and biological pollutants that are harmful to public health and must be treated accordingly before being released into the environment. But existing water quality tests are not fully suitable for continuous monitoring. ToxMate offers an instrument developed for automated, real-time, online and

on-site monitoring of wastewater toxicity. It is based on rapid observation and analysis of the locomotor activity of several different species of aquatic invertebrates, using infrared light and precision cameras.

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ToxMate

CONTINUOUS REAL-TIME MONITORING OF WATER TOXICITY

Horizon 2020

VIEWPOINT – France

1 January 2020 to 30 June 2022



© Jade ThatCatwalk, Shutterstock

#2

LIFE-PIAQUO

Underwater noise impact reduction of the maritime traffic and real-time adaptation to ecosystems

Since 1960, noise levels in the ocean have doubled every decade, mainly due to increased shipping. This noise can drive animals out of important feeding waters or breeding areas, impact their ability to hunt, and frustrate communication. The LIFE-PIAQUO project aims to develop and test different tools to reduce underwater noise pollution and protect marine biodiversity.

Optimised propellers, noise monitoring systems on ships and static buoys, and maritime traffic adaptations will all be investigated, to reduce ambient noise by 10 dB.

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LIFE-PIAQUO

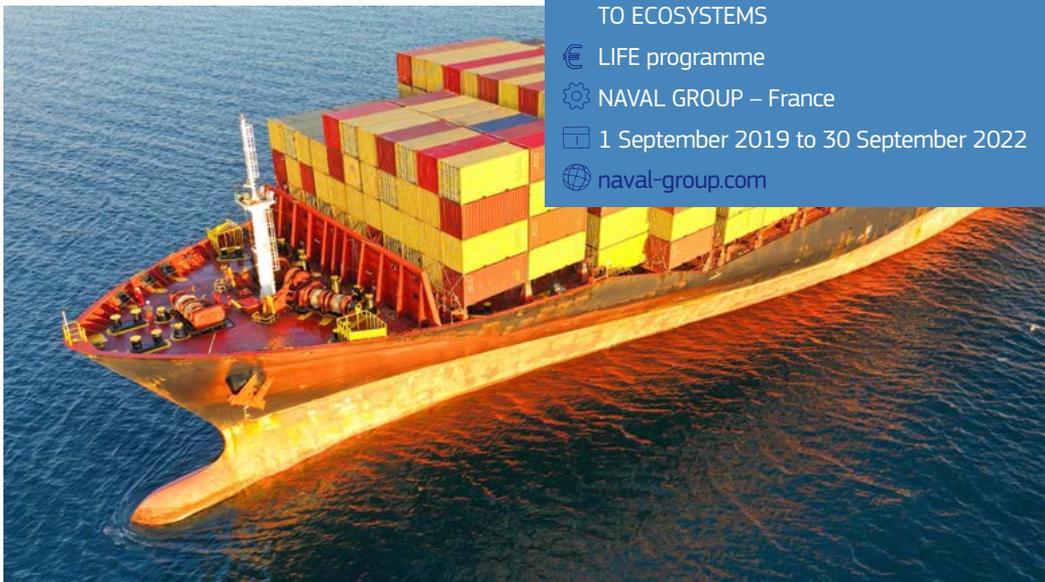
📁 UNDERWATER NOISE IMPACT REDUCTION OF THE MARITIME TRAFFIC AND REAL-TIME ADAPTATION TO ECOSYSTEMS

€ LIFE programme

⚙️ NAVAL GROUP – France

📅 1 September 2019 to 30 September 2022

🌐 naval-group.com



© Aerial-motion, Shutterstock

#2

LIFE SouPLess

Sustainable systems to catch plastics in rivers across Europe

The LIFE SouPLess project aims to demonstrate novel systems for removing microplastic pollution from rivers, the chief source of marine plastic. LIFE SouPLess will develop an innovative software tool that will analyse flow characteristics, river morphology, weather conditions and more to calculate the optimal location for recovering plastic. Removal techniques include Catchy, a system that uses wind and water currents to guide

floating litter and waste down to 1 m below the surface into a collection cage. Catchy has already collected more than 460 kg of floating waste from the Nieuwe Maas River in the Netherlands during an 11-month pilot.

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LIFE SouPLess

📍 SUSTAINABLE RIVERINE PLASTIC REMOVAL AND MANAGEMENT

€ LIFE programme

⚙️ ALLSEAS ENGINEERING B.V. – Netherlands

📅 1 July 2018 to 31 December 2022

🌐 allseas.com/life-souplless



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OBJECTIVE #3

Make the sustainable blue economy carbon-neutral and circular

Healthy waters are also of great economic importance. By 2030, the ocean alone is estimated to generate EUR 2.5 trillion of goods and services annually, whereas water-related services provided by nature are valued at around EUR 24 trillion per year. Through Horizon Europe, the Mission Ocean and Waters will fund innovation actions for technical solutions, actively working towards net zero maritime emissions, zero-carbon and low-impact aquaculture, and the circular, low-carbon multipurpose use of marine and water space.

An emission reduction lighthouse in the Baltic and North Sea is paving the way towards a productive and sustainable use of water space. Projects including **LEAPWind**, **SATHScale** and **LIFE NOVIOCEAN** are helping to develop, assess and de-risk technological solutions for clean ocean and wind energy and their connection to infrastructure.

Important contributions are also being made in other emerging sectors, with technological innovations from **FleetUSV** and **Aspiring wingsails** helping to drastically lower emissions associated with shipping and realise the objectives of the Zero Emission Waterborne Transport partnership. By 2030, the Mission will have delivered the deployment of zero-carbon, zero-pollution, zero-noise marine technologies and solutions to support the transition of fleets to zero-emission status.

The Mission also fosters development of a sustainable blue economy, building on collaborative networks and support tools developed by projects including **Blue-Cloud**, **Black Sea CONNECT** and **BANOS CSA**.

The Mission Ocean and Waters aims to secure from the lighthouse partners basin-scale emissions reduction targets at least as ambitious as the targets set in the Fit for 55 package under the European Green Deal by 2025. It will also promote battery, hydrogen or ammonia-driven ferries calling at ports of three different countries, a digital platform to enable sharing data, best practices and solutions among industry and policymakers, and a Blue Forum to coordinate a dialogue between stakeholders in fisheries, aquaculture, shipping, tourism and renewable energy.

By 2030, It will also deliver cost-effective solutions for setting up fully circular, zero-pollution offshore clean energy facilities as well as solutions for toxin-free aquaculture and algae production compatible with vulnerable marine ecosystems, applied solutions for multi-use of water space, and applied solutions for marine and freshwater carbon sinks that sequester carbon emissions, such as the sea meadows examined by the **SEA FOREST LIFE** project.

BANOS CSA

Towards a Baltic and North Sea research and innovation programme

Nature does not follow human borders. BANOS CSA's approach is based on a notion that the most efficient way to support the Mission objectives by new knowledge and know-how is a commonly implemented cross-border research and innovation (R&I) programme at a sea basin scale. To overcome R&I fragmentation and to identify the knowledge and innovation needs of the greener future of the region, the major R&I funders of 10 EU Member States

and two associated countries developed a joint R&I programme underpinned by a joint Baltic Sea–North Sea marine and maritime strategic research and innovation agenda (BANOS SRIA). The States surrounding the two 'sister seas' share a political and financial commitment to support sustainable blue growth and deliver healthy seas there.



BANOS CSA

-  TOWARDS THE JOINT BALTIC SEA AND THE NORTH SEA RESEARCH AND INNOVATION PROGRAMME
-  Horizon 2020
-  BALTIC ORGANISATIONS' NETWORK FOR FUNDING SCIENCE ETEY – Finland
-  1 November 2018 to 31 October 2021
-  banoscsa.org/banos_csa

#3



SOCLIMPACT

Helping islands fight the rising tide of climate change

Islands are particularly vulnerable to climate change, but the coarse spatial resolution of available projections makes it difficult to provide them with accurate predictions of these impacts. An innovative online platform developed by the SOCLIMPACT project helped deliver well-informed and effective mitigation and adaptation pathways

for 12 EU islands, offering tailored networking opportunities, information and support tools. The resource, a key outcome of the project, will help businesses, policymakers and citizens to identify climate-related challenges and take action.



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SOCLIMPACT

📍 DOWNSCALING CLIMATE IMPACTS AND DECARBONISATION PATHWAYS IN EU ISLANDS, AND ENHANCING SOCIOECONOMIC AND NON-MARKET EVALUATION OF CLIMATE CHANGE FOR EUROPE, FOR 2050 AND BEYOND

€ Horizon 2020

⚙️ UNIVERSIDAD DE LAS PALMAS DE GRAN CANARIA – Spain

📅 1 December 2017 to 31 March 2021

🌐 soclimpact.net

SEA FOREST LIFE

Subsea meadows as carbon sinks of the Mediterranean

The aquatic *Posidonia* meadows habitat is disappearing four times faster than terrestrial forests. Inventories show the prairies around Italy store up to 830 tonnes of carbon per hectare, a total of some 236 million tonnes of carbon per year. The main objective of the SEA FOREST LIFE project is to quantify the carbon deposits of *Posidonia oceanica* meadows and to increase their capacity by reducing erosion and subsequently consolidating habitats. This will be done through a better understanding of the meadows and the practices needed for their defence and local

actions to reduce impacts. After having identified the standards for the evaluation of carbon storage in the seagrass meadows habitat, the project aims also to develop a blue carbon market, creating a national platform for the purchase and certification of carbon credits.

SEA FOREST LIFE

📁 POSIDONIA MEADOWS AS CARBON SINKS OF THE MEDITERRANEAN

€ LIFE programme

⚙️ D.R.E.A.M. ITALIA SOC. COOPERATIVA AGRICOLO FORESTALE – Italy

📅 1 September 2018 to 31 December 2023

🌐 seaforestlife.eu/en



#3



Blue-Cloud

Ocean sustainability research goes to the Blue Cloud

As the Future of Seas and Oceans Flagship Initiative of the EU Horizon 2020 programme, Blue-Cloud is a European Open Science Cloud for the marine domain, serving the blue economy, marine environment and marine knowledge agendas. Blue-Cloud is deploying a digital platform with an unprecedented wealth of multidisciplinary data repositories, analytical tools, and computing facilities to explore and demonstrate the potential of cloud-based Open Science, and address ocean sustainability and the objectives of the UN Ocean Decade and G7 Future of the Oceans. A Blue-Cloud data discovery and access service is being developed as an overarching service to facilitate the sharing of multidisciplinary

data sets with human and machine users. A Virtual Research Environment will orchestrate the computing and analytical services using the federated Blue-Cloud data resources in addition to external data resources. Five virtual labs co-designed with top-level marine researchers will unlock the potential of Blue-Cloud innovation.

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Blue-Cloud

🔍 PILOTING INNOVATIVE SERVICES FOR MARINE RESEARCH & THE BLUE ECONOMY

€ Horizon 2020

⚙️ TRUST-IT SRL – Italy

📅 1 October 2019 to 30 September 2022

🌐 blue-cloud.org



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#3

Black Sea CONNECT

Research and innovation to boost blue economy in the Black Sea

Restoring and maintaining the resilience and health of the unique Black Sea ecosystem, while enabling the development of a sustainable blue economy, is vital. The Black Sea CONNECT project will support the development of the blue economy in the region towards the implementation of the Burgas Vision Paper. Its overall objective is to coordinate the development of the strategic research and innovation agenda

and its implementation plan at both national and regional level, drawing from the input of academia, funding agencies, industry, policy and society.

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Black Sea CONNECT

COORDINATION OF MARINE AND MARITIME RESEARCH AND INNOVATION IN THE BLACK SEA

Horizon 2020

MIDDLE EAST TECHNICAL UNIVERSITY – Turkey

1 October 2019 to 30 September 2022

connect2blacksea.org



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#3

FleetUSV

Charting a course to bring ocean research drones to market

Marine data is required for all important decision-making in the commercial ocean sector. But large, manned research vessels are expensive, carbon-intensive and difficult to source. Alternative solutions are urgently

needed. Employing uncrewed surface vessels (USVs), XOCEAN provides turnkey data collection services to surveyors, companies and agencies. From mapping the seabed to environmental monitoring, their platform offers a safe, economic and carbon-neutral solution for collecting ocean data. The objective of the FleetUSV project is to bring to market XOCEAN's high-performing, low-cost USV for the commercial ocean data collection sector.

FleetUSV

📍 FUTURE OF THE OCEAN DATA COLLECTION MARKET: COMMERCIALISATION OF THE NOVEL LOW-COST, EFFICIENT, HIGH-PERFORMING AUTONOMOUS UNMANNED SURFACE VESSEL

🇪🇺 European Maritime and Fisheries Fund

⚙️ XOCEAN LIMITED – Ireland

📅 1 September 2020 to 31 August 2022

🌐 xocean.com/technology-3



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Aspiring wingsails

Aspiring wingsails for the fishing and maritime transport sectors

The fishing and maritime transport sectors are facing tighter restrictions on emissions and higher fuel costs, fostering a demand for solutions that can reduce fuel use. The Aspiring wingsails project will demonstrate the use of a rigid wingsail – based on the aerodynamic principles of an airplane wing. The project will make accurate measurements of the fuel saving efficiency of this wingsail installed on a Galician fishing vessel, quantifying its potential to increase the

competitiveness of the European fishing and maritime transport industries and reduce pollutant emissions from maritime transport.

Aspiring wingsails

-  ASPIRING WINGSAILS FOR THE FISHING AND MARITIME TRANSPORT SECTORS
-  European Maritime and Fisheries Fund
-  BOUND 4 BLUE SL – Spain
-  1 November 2019 to 31 October 2021
-  aspiringwingsails.eu



#3

SATHScale

A competitive floating solution for offshore wind turbines

Wind energy is the renewable energy technology expected to provide the largest contribution to the renewable energy targets for 2020 and beyond, by reducing greenhouse gas emissions from maritime economic activities. SATH is a unique platform concept for floating offshore wind power generation with reduced levelised cost of energy. The SATHScale project aims to address the challenge of bringing to market

SATH technology through scaling up the prototype to industrial readiness, exploiting real-world data generated by an open-sea 2 MW demonstrator deployed at the Biscay Marine Energy Platform in Spain.

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SATHScale

ENGINEERING AND UPSCALING OF NEW FLOATING RENEWABLE WIND ENERGY PLATFORM

European Maritime and Fisheries Fund

SAITEC – Spain

1 November 2020 to 31 October 2023

sathscale.eu

#3

LEAPWind

Novel thermoplastic materials for wind turbine blades

The harsh conditions of the open sea can result in the rapid deterioration of the leading edge of wind turbines blades. LEAPWind aimed to commercialise a novel component that tackles offshore wind turbine blade erosion using advanced composite materials and innovative manufacturing processes that can eliminate the current need for blade maintenance every 5 years. The project has contributed to de-risking technology by performing physical testing of a full-scale prototype on an

existing wind turbine in Portugal. This technology has the potential to increase the productivity of wind turbines and reduce maintenance and repair costs.

LEAPWind

LEADING EDGE ADVANCED PROTECTION USING NOVEL THERMOPLASTIC MATERIALS AND PROCESSES FOR OFFSHORE WIND TURBINE BLADES

European Maritime and Fisheries Fund

EIRECOMPOSITES TEORANTA – Ireland

1 January 2019 to 31 December 2020

eirecomposites.com/renewableenergy/leapwind



© Peter Adams Photography, Shutterstock

#3

GREENing the BLUE

Fuel savings take off with wingsails

Fuel represents up to 60 % of the operational costs of maritime vessels, and this is accentuated by the introduction of mandates for new, cleaner fuels, such as marine gasoil, which can be double the price of traditional fuels like heavy fuel oil. The dramatic rise in fuel-related operational costs presents an acute need for new technologies. Alternative propulsion technologies for vessels can offer greater fuel efficiency and reduce the

associated pollution from maritime transport, supporting EU goals for emission reduction. GREENing the BLUE presents the full-scale demonstration of a patented tilting wingsail, which reduces fuel use and pollutant emissions in maritime transport through wind energy co-propulsion.

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GREENing the BLUE

- ◇ BOUND4BLUE WINGSAIL DEMONSTRATION PROJECT
- € European Maritime and Fisheries Fund
- ⚙️ BOUND 4 BLUE SL – Spain
- 📅 1 January 2019 to 31 December 2021
- 🌐 greeningtheblue.eu/project



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#3

AquapHOx

A sensor to measure the health of our oceans

Ocean acidification is a significant consequence of rising CO₂ emissions, with serious impacts on the ecosystem and our climate. Researchers are in urgent need of tools to monitor these changes. AquapHOx is a new optical sensor technology that enables large-scale, stable, accurate measurements of pH and further parameters under deep-sea conditions. The project has introduced two versions of AquapHOx to the

market, aimed at marine research and at the aquaculture market, where precise water quality measurements are critical to guarantee safe and environmentally sustainable farming conditions.

40

AquapHOx

📍 THE FIRST HIGH-PERFORMANCE, ALL-IN-ONE OPTICAL SENSOR TECHNOLOGY TO MONITOR THE HEALTH OF OUR OCEANS

🇪🇺 Horizon 2020

⚙️ PYRO SCIENCE GMBH – Germany

📅 1 November 2018 to 31 January 2021

🌐 pyroscience.com



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#3

LIFE NOVIOCEAN

Launching a novel wave power technology

Close-to-shore wave energy has a huge potential to produce renewable electricity and thus drastically cut Europe's emissions linked to power production. This project will demonstrate NoviOcean, a new, highly innovative concept for wave energy that is much more cost-efficient

than existing wave energy converters. The overall objective of LIFE NOVIOCEAN is to construct a pilot unit to validate the wave energy converters and systems on an industrially relevant scale, and monitor its performance during a demonstration phase.

LIFE NOVIOCEAN

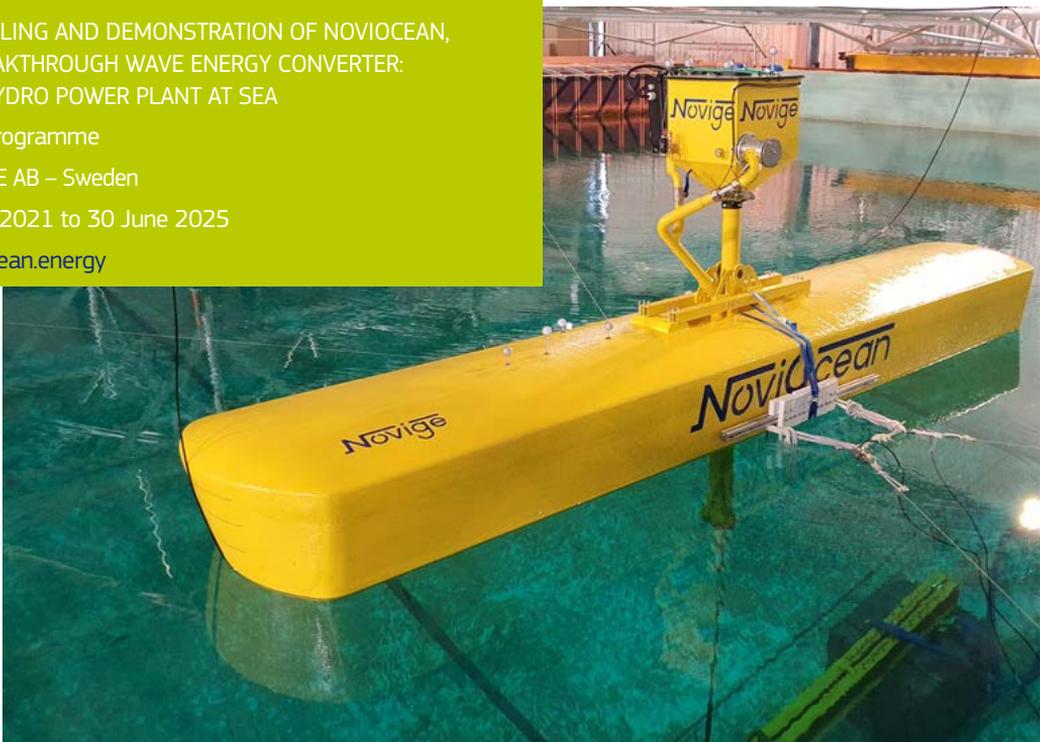
📁 UPSCALING AND DEMONSTRATION OF NOVIOCEAN, A BREAKTHROUGH WAVE ENERGY CONVERTER: THE HYDRO POWER PLANT AT SEA

€ LIFE programme

⚙️ NOVIGE AB – Sweden

📅 1 July 2021 to 30 June 2025

🌐 noviocean.energy



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EU Missions are new broad mobilisation initiatives
rooted in the Horizon Europe research and
innovation programme.

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