



European Commission

Innovation Fund Programme



Overview of ongoing projects in Spain

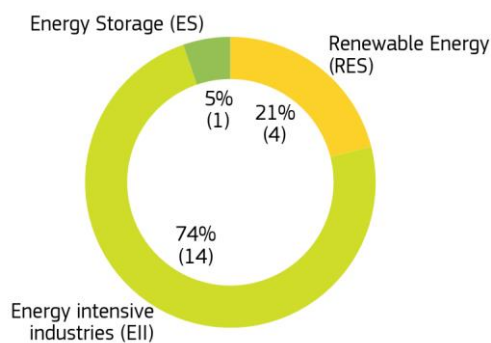
Funded by the revenue of the EU Emissions Trading System, the Innovation Fund's goal is to help businesses investing in innovative low-carbon technologies with significant GHG emissions reduction potential.

The Innovation Fund currently supports **19 projects** located in Spain, which will contribute to the decarbonisation of European industries with a total expected GHG emission reduction of **30.6 Mt CO₂ equivalent in the first 10 years of operation**.

The total **Innovation Fund grant in Spain is of EUR 724.8 million**, out of the **total relevant costs of EUR 1.3 billion**, as defined in Art 5 of the Delegated Regulation 2019/856 on the Innovation Fund¹.

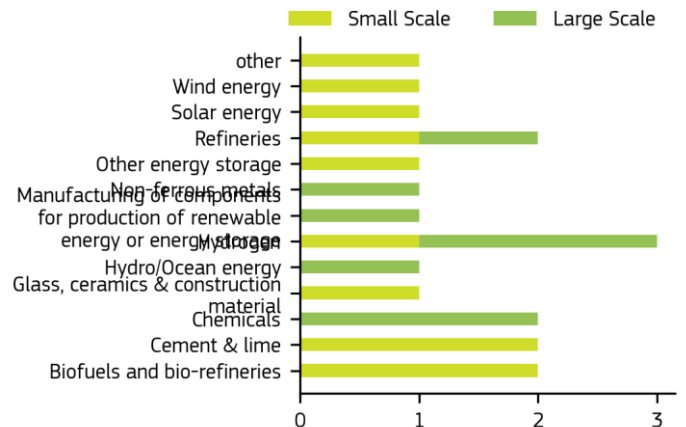
Projects per category

Number of projects and percentage of the total



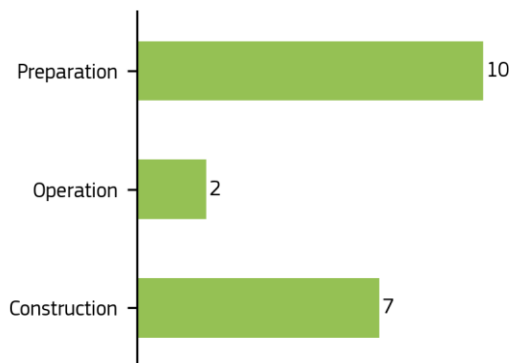
Projects per sector

Number of Small and Large-Scale projects



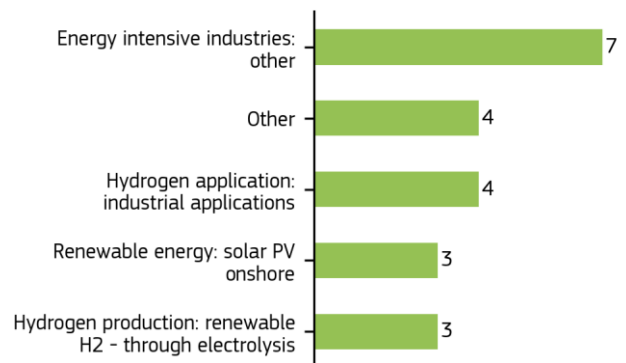
Projects per phase²

Number of projects



Top 5 technology pathways³

Number of projects



¹ OJ L 140, 28.5.2019, p. 9.

² Preparation means the period before financial close is reached; construction means the period between financial close and entry into operation; operation means that the construction is finished and the project has already started production.

³ Projects may employ several technological pathways, only the top 5 per country are kept in the graph.

List of ongoing Innovation Fund projects in Spain

Acronym	Title	Sector	Start date	Project phase	Beneficiaries	Innovation Fund grant (EUR million)	Expected GHG emission avoidance (t CO2eq)
Large Scale						684.7	29,276,509
ASTURIAS H2 VALLEY	ASTURIAS H2 VALLEY	Hydrogen	01/01/2024	Preparation	ABOÑO EDPR PT PO EDPE EDPR	18.1	1,329,786
BBRT	BASF Battery Recycling Tarragona	Non-ferrous metals	01/01/2024	Preparation	BASF Corp BASF SA BASF SE BSW BBMR Spain BASF ESPANOLA BASF Oy	100.0	2,257,326
ECOPLANTA	Reduction of CO2 emissions in methanol production from municipal non-recyclable waste	Chemicals	01/11/2021	Construction	Ecoplanta	106.4	3,444,269
GREEN MEIGA	Green Methanol in Galicia	Chemicals	01/10/2023	Preparation	FORESA IBERCLIEN	122.9	2,901,078
HOPE	High-efficient Onshore PV module production in Europe	Manufacturing of components for production of renewable energy or energy storage	01/01/2024	Preparation	MBI	200.0	17,080,051
SEAWORTHY	Sustainable dispatchable Energy enabled by wAve-Wind OffshoRe plaTforms with onboard Hydrogen	Hydro/Ocean energy	01/01/2024	Preparation	FPP FPP C	26.0	25,557
T-HYNET	TARRAGONA NETWORK HYDROGEN	Hydrogen	01/04/2023	Construction	THYNET RIT	62.5	1,378,161
TRISKELION	Green Methanol manufacturing from CO2	Refineries	01/01/2024	Preparation	Forestal	48.8	860,282
Small Scale						40.1	1,323,425
AGGREGACO2	Fabrication of CO2 negative AGGREGAtes based on disruptive accelerated carbonation processes fuelled by carbon capture in refineries	Glass, ceramics & construction material	01/04/2021	Construction	OCO INT REPSOL REPSOL PETROLEO PETRONOR OCO TECH ALBA	3.2	28,364
CIRQLAR	Low temperature heat recovery for industrial use by heat pumps	other	01/04/2023	Construction	REPSOL RANK RP	2.2	59,497
CLYNGAS	Substitution of petroleum coke in the cement industry by synthesis gas (syngas) generated from gasification of stabilised RDF	Cement & lime	01/08/2023	Preparation	CEMEX	4.4	406,960
CO2-FrAMed	CO2-Free Agriculture for the Mediterranean region	Solar energy	01/01/2022	Construction	AGR RAA QPV ISF ISF UPM ADG FENACORE Cingral	4.4	17,702
ERACLITUS	Expanding the Range of Clinker Substitutes. Designing a Sustainable Future for Cement Sector	Cement & lime	01/07/2024	Preparation	CRUZ	4.5	413,396
GREENMOTRIL	Development and operation of a GREEN energy community in the port of MOTRIL	Other energy storage	01/01/2022	Preparation	APM CUERVA SIEMENS	4.3	29,152
HYVALUE	Novel upcycling production process based on an innovative circular business model for urban waste streams valorisation for the generation of high quality H2.	Hydrogen	01/11/2021	Construction	TUBSG TUBINN NOVARGI TBX SA ECOLOGY	4.5	138,760
LuGaZ	Local manUre and agri-food waste treatment for bioGAs and biofertilizers production from Zero waste and circular	Biofuels and bio-refineries	01/06/2024	Preparation	Leche Río AGROAMB NORVENTO Medrar MIO	4.5	51,604

Acronym	Title	Sector	Start date	Project phase	Beneficiaries	Innovation Fund grant (EUR million)	Expected GHG emission avoidance (t CO2eq)
	economy perspective						
SKFOAAS	SKF RECONDOIL AS A SERVICE	Refineries	01/04/2021	Operation	RECONDOIL SKF	1.6	40
SustainSea	Reducing maritime transport CO2 emissions using wind	Wind energy	01/07/2023	Construction	bound4blue	4.1	46,789
W4W	Waga 4 World	Biofuels and bio-refineries	01/01/2022	Operation	SOFIWAGA ESPAÑA WAGA ENERGY SA	2.5	131,161

Project overview

Acronym	Title	Description
AGGREGACO2	Fabrication of CO2 negative AGGREGates based on disruptive accelerated carbonation processes fuelled by carbon capture in refineries	<p>AGGREGACO2 project targets the aggregates industry for a revolution through the successful commercial deployment of a sustainable aggregate as a solid alternative of conventional aggregates not fully environment-friendly. The AGGREGACO2 proposes a FOAK innovation through the introduction of CO2 captured of refinery processes in an Accelerated Carbonation Technology (ACT), that revalorise Air Pollution Control residues (APCr), which are hazardous residue nowadays stored after treatment, for the fabrication of carbon negative aggregates. The AGGREGACO2 project will demonstrate the industrial feasibility and cost-effectiveness of the first carbon negative aggregate that can compete face-to-face in the market while reduce drastically the GHG emissions emitted by refineries, the carbon footprint of the fuels and APCr in landfills.</p> <p>ALBA and OCO INT together with the Repsol Group, will become the first companies in the world in introducing industrial ACT processes perfectly connected with refinery plants, paving the way towards the transformation of the traditional oil & gas plants in places where fabricate derivative sustainable products with high added- value. This joint research produced attractive and promising results at high TRL-levels that make the AGGREGACO2 industrial concept profitable at mass fabrication level. A perfect symbiosis scenario is achievable because the ACT process can be 100% fuelled using the CO2 captured in a refinery as resource. Therefore, the main objective of the project is to design, implement and validate the first commercial production plant of carbon negative aggregates (in EU) with a capacity of 56,000 Tn/years, with adequate stability (>7,000 h) and capable to revalorise 22,000 Tn APCr/year and use 2,200 Tn CO2 captured. This project will avoid 2,836.44 TonCO2eq/year (i.e. 28,364 TonCO2eq considering 10 years of project operation) and, besides that, REPSOL will produce around 400 Ton/year of low carbon hydrogen.</p>
ASTURIAS H2 VALLEY	ASTURIAS H2 VALLEY	<p>The Asturias H2 Valley project consists of a first-of-a-kind Power-to-Hydrogen Hub to produce and supply renewable hydrogen, with the overall objective to decarbonise the economy of the region of Asturias, Spain. The project aims to develop a renewable hydrogen plant with 150 megawatts (MW) of electrolysis capacity by repurposing the site of Aboño's existing coal power plant, aiming to achieve 99.98% relative greenhouse gas emission avoidance compared to the reference scenario.</p> <p>The project will demonstrate the viability of a fully integrated hydrogen production and distribution process, optimised on the availability of renewable energy (wind and solar) and on demand from off-takers from multiple sectors. A project of this scale has not been demonstrated before. In the process of the gradual phasing-out of the coal power plant, the hydrogen plant will repurpose the existing installations and infrastructure to 1) lower the initial investment costs, 2) reduce the environmental impact (as it is not necessary to install new electricity supply infrastructures, process and cooling water supply systems or effluents treatment plant and network, among others) and 3) reduce administrative processing and permitting times. The project will not only increase circularity, but also provide an industrial-size technical demonstration for projects at other sites in transition to emulate. Moreover, the project will avoid consuming around 650 gigawatt hours (GWh) of fossil fuels every year, the equivalent of the annual emissions of more than 45 000 Spanish households. Overall, the project plans to avoid absolute greenhouse gas emissions of 1.3 million tonnes of CO2 equivalent over the first ten years of operation.</p> <p>Through many of its planned activities, the project will strongly contribute to several EU and national climate related strategies and goals, such as the European Green Deal, EU Hydrogen Strategy, Circular Economy Action Plan, and REPowerEU, while following the Just Transition principles. Achieving 150MW of electrolysis will also directly contribute to the European goals of deploying electrolysis capacity to produce renewable hydrogen.</p> <p>With a strong alignment with the Just Transition principles, it is estimated that the project will generate 55 direct jobs during its implementation, each with high added value, thus contributing to the maintenance of employment and the reconversion of currently declining industries in the region. In addition, in the construction phase more than 400 direct jobs are expected to be generated. The project will benefit the off-takers by reducing their consumption of fossil fuels. It will also contribute to a positive trade balance by reducing imports of coal and natural gas, and will strengthen the position of the region in the fast-growing hydrogen market, through the participation of local companies across its value chain.</p>
BBRT	BASF Battery Recycling Tarragona	<p>BBRT aims to install and operate a plant for the recycling of black mass from end-of-life batteries and battery manufacturing production scrap. The plant will have the capacity to process recycling feedstock equivalent to roughly 120 000 tonnes of end-of-life batteries per year, and will recover nickel, cobalt, lithium, copper, and manganese at high yields. The project will thus be able to provide the EU battery industry with locally and sustainably produced raw materials. Compared to primary metals extracted via mining, BBRT will be able to reduce greenhouse gas (GHG) emissions of the produced metals by 58%.</p> <p>Electric vehicle batteries require several raw materials such as lithium, nickel, cobalt, manganese and graphite. Extracting these materials has a significant carbon footprint. BBRT's specific objective is a first-of-its-kind commercial battery recycling process on an industrial scale, producing secondary raw materials that can be fed back into the circular battery material loop and re-used for battery production. The technological process is comprised of two steps: the pyrolysis step as pre-treatment and the hydrometallurgical refining step for metal extraction. Using this process, the plant can recover valuable metal salts with a special focus on lithium to be used as battery-grade raw materials for producing new batteries. BBRT expects to save 2.4 million tonnes of GHG emissions during its first ten years of operation compared to metal production from mining. This reduction equals the emissions caused by the yearly electricity consumption of 3.5 million European households.</p> <p>Batteries are the heart of every electric vehicle. BBRT aims to produce them in the most sustainable way, establish a competitive battery recycling industry in Europe and contribute to reducing the dependency of the battery industry on imports of raw materials like nickel, cobalt, and lithium. Its production process will fulfil the upcoming EU Battery Regulation requirements regarding recycling efficiencies and enable the fulfillment of the recycled content requirements for lithium-ion batteries.</p> <p>BBRT will be implemented at BASF's site in Tarragona, Spain, in one of the largest chemical complexes in southern Europe. The investments in Tarragona will support establishing a battery value chain in Spain and bring around 200 direct new jobs to the area. It will lay the foundations for further expanding the capacity for battery recycling in Europe and</p>

Acronym	Title	Description
CIRQLAR	Low temperature heat recovery for industrial use by heat pumps	<p>advancing the technology to cope with the increasing volumes of batteries to be recycled in the future.</p> <p>The CIRQLAR project will enable the recovery of low-temperature waste heat at around 100°C and its upgrading to 150°C by using heat pumps. Newly developed concepts and technologies will be integrated in a unique waste heat recovery solution, that will abate 100% of greenhouse gas (GHG) emissions during its first ten years of operation, compared to the reference scenario. This new unit will be integrated in the real production environment of A Coruña Refinery in Spain and will be the first step in an ambitious plan to replicate the concept in other refineries and other intensive-energy industries.</p> <p>The CIRQLAR project will be the first of its kind in Europe and will be used to pave the way for other similar facilities. The project will produce up to 4 megawatt (MW) of usable heat in the form of steam, through the recovery of 3 MW of low-temperature waste heat from a symbiotic production ecosystem. The project will reduce the energy consumption of the processing unit by 24%, increasing its energy efficiency and flexibility, while also reducing the GHG emissions associated with heat production. The system will use industrial heat pumps and the available waste heat to electrify the process. The electrification will reduce natural gas combustion and therefore abate 0.059 million tonnes of CO2 equivalent of GHG emissions.</p> <p>CIRQLAR will overcome the main barriers to uptake that have been faced by low-temperature heat recovery technology, such as the optimisation of the thermodynamic cycle, the reliability of the machines working in severe conditions, and its integration into an energy network. This will be driven by the technologies' main advantages: emission reduction potential compared to existing options, efficiency of heat recovery and the expanded operability and flexibility of the system.</p> <p>CIRQLAR is a first-of-a-kind technological concept that combines a set of innovative strategies and key integrated enabling technologies. These innovations and technologies will be developed and deployed at industrial scale, to exploit the Heat Circularity concept, in a cost-efficient and technologically viable manner. The development of each technological component will advance the current state-of-the-art, increasing the energy efficiency in the project site, whilst also allowing CIRQLAR to contribute to the fight against climate change.</p> <p>The project will exploit a concept that could potentially apply to any energy-intensive industry. This will allow key industrial sectors to offer their products and services in a more efficient and sustainable way to consumers whilst reducing their external energy cost dependence. CIRQLAR will reinforce the EU industry value chain of waste heat recovery and heat pumps, providing a cost-competitive technology to the market. It will deliver more sustainable processes with lower emissions, which will respond to today's environmental challenges, while also reducing consumption and dependence on natural gas throughout the EU.</p>
CLYNGAS	Substitution of petroleum coke in the cement industry by synthesis gas (syngas) generated from gasification of stabilised RDF	<p>CLYNGAS aims to produce high-added-value synthesis gas (syngas) by means of a gasification process. The gasification uses a combination of waste residues from other industrial processes as a feedstock. The proposed technology will expand the opportunities to use refuse-derived fuel in the cement sector. It will increase fossil fuels substitution, achieving a relative greenhouse gas (GHG) emission avoidance of 8%, whilst ensuring a stable process and high-quality production in CEMEX's cement plant in Alicante (Spain). This project is a relevant part of the CEMEX "Future in Action" strategy and roadmap to achieve net carbon neutrality by 2050. CLYNGAS is a first-of-a-kind project, with replicability in the cement sector at the global scale.</p> <p>The proposed technology allows the cement industry to use waste and by-products from other industrial processes to replace fossil fuels and natural raw materials. This constitutes a critical component in the transition of the cement industry towards a low-carbon economy. One of the key elements in CEMEX's roadmap for carbon neutrality is the substantial substitution of fossil fuels with refuse-derived fuel (RDF) with high biomass content. However, certain characteristics of these fuels such as humidity, calorific value, and composition can often limit their use. The CLYNGAS project provides an innovative and reliable solution to direct RDF burning. The proposed technology transforms RDF into syngas, which is then fed into the main burner of a clinker kiln. This ensures a stable production, which maintains the strict process quality requirements.</p> <p>As a result of this process, a significant reduction in absolute GHG emissions is achieved, estimated at 406 960 tonnes CO2 equivalent over the first ten years of the project's lifetime. In addition, CLYNGAS contributes to the circular economy by reusing waste that contains energy potential, and avoiding its disposal in landfills. The integration of CLYNGAS in the Alicante cement plant takes advantage of existing infrastructure, thus minimising the use of new natural resources in the gasifier construction process.</p> <p>The project contributes to climate objectives at the global, European (EU Green Deal and EU Policies and Regulations), national (Energy Transition Regulations, Strategic Agendas and Roadmap), regional (Regulations of the Valencian Community on Climate Change, Strategic Agenda and Integrated Plans) and local (Waste Management Plan of the Province of Alicante) levels.</p>
CO2-FrAMed	CO2-Free Agriculture for the Mediterranean region	<p>The CO2-FrAMed project will build approximately 12 stand-alone large-power photovoltaic irrigation systems (PVI) that do not require back-up batteries and significantly reduce risks related to the integrity of the water distribution infrastructure. This solution is a suitable alternative to conventional electric and diesel-based pumping systems. It brings environmental benefits in terms of CO2 emission reduction and economic benefits in terms of lower costs for farmers. Overall, the project will reduce reference emissions by 100% and farmers will benefit from zero-carbon irrigation at a competitive price.</p> <p>Innovation in the technology and in the way to finance it The project's innovative elements are threefold: a new technology, an advanced monitoring system and an innovative financing model.</p> <p>(1) The PVI technology was developed within Horizon 2020 to solve the intermittency problem of photovoltaic power sources. Intermittency can cause overvoltage and water hammers, which can seriously damage the irrigation infrastructure and dramatically reduce its lifetime. The PVI technology allows for the integration of the hydraulic components, the PV generators, and the frequency converters and it guarantees that the pressure remains always within optimal operational values. Such a solution avoids the need to use expensive backup batteries.</p>

Acronym	Title	Description
		<p>(2) The advanced monitoring and automated analysis of key system parameters is a breakthrough in the farming sector, also enabling fault detection, diagnosis and reporting for high performance of the large-power PVI systems.</p> <p>(3) The innovative business model proposed for the project builds on the work of the H2020 ResFarm project, which developed a framework to ease the access of on-farm renewable energy sources to capital market funding. The business model of CO2-FrAMed is based on the commercialization of PV electricity through a pool of power purchase agreements (PPAs) totaling 7.35 MW capacity. The model also enables the reduction of financing costs of the PVI projects, by showing that they qualify as collateral for high-quality financial instruments (green bonds).</p> <p>Multiple technical, environmental and economic benefits for the farmers The project will deploy zero-carbon irrigation systems, avoiding 17 700 tCO2e during the first 10 years of operation, which corresponds to 100% of the reference emission, while also tackling many of the technical, economic, and administrative challenges faced by farmers. The project aims to demonstrate that PVIs are well suited for medium-large irrigation applications. They can replace conventional electric (grid connected or using batteries as back-up) and diesel-based pumping systems and can work as stand-alone installations without the need for batteries or a connection to the grid. Introduction of advanced monitoring and analysis features will ensure optimal performance, minimise operational expenses, and reduce the cost of the electricity paid by the farmers. The project will also have a positive impact on circular economy by reducing the consumption of water in the farming sector by up to 30% without increasing GHG emissions. The pooled PPA approach significantly reduces financial and transaction costs for the PVI installations and prevents Operations & Maintenance costs and burdens from falling on farmers. In addition, the project will have a significant impact on agricultural activities in the region, contributing to a substantial increase in agricultural production.</p> <p>High scale-up potential in the irrigation sector worldwide The potential for expanding the project on site and transferring the technology to other sites with similar conditions is very high. The availability of a cost-effective 100% renewable and independent energy solution for irrigation systems opens sizeable opportunities worldwide, particularly in locations lacking a reliable electric grid. The introduction of concepts and practices from the securitization industry into the ori</p>
ECOPLANTA	Reduction of CO2 emissions in methanol production from municipal non-recyclable waste	<p>The ECOPLANTA project will revolutionise municipal solid waste (MSW) management by using non-recyclable materials rejected by sorting centers to produce circular chemicals and advanced biofuels. The project will deliver a first-of-a-kind commercial plant for the European market, using waste that would otherwise end up in landfill. Located in a petrochemical complex in El Morell, near the port of Tarragona in Spain, the production site will produce 237 kt/y of methanol, and thereby recover 70% of the carbon present in the non-recyclable materials. The methanol produced will displace fossil-based chemicals and fuels. Based on the IF methodology, the project will achieve 3.4 Mt CO2eq of GHG emissions reductions over the first ten years of operation.</p>
ERACLITUS	Expanding the Range of Clinker Substitutes. Designing a Sustainable Future for Cement Sector	<p>The ERACLITUS project pioneers sustainable cement production by introducing two new Supplementary Cementitious Materials (SCMs). These materials align with four fundamental pillars: achieving a zero-carbon dioxide (CO2) footprint, leveraging traditional SCM benefits, employing sustainable technologies, and emphasising the strategic importance of new low-carbon SCMs. The project aims to dramatically reduce the carbon footprint up to 55% relative greenhouse gas (GHG) emission reduction, with the innovative materials enabling the production of new cement with only 20% clinker.</p> <p>The innovation showcased in both new SCM products extends beyond the current state-of-the-art by transforming cement production. The SCMs represent a paradigm shift, utilising a unique blend of technological operations in SCM production. This approach goes beyond traditional methods and contributes to the circular economy by incorporating industrial, mining, and agroforestry waste as raw materials. Biomass as the sole fuel in the production process further aligns with sustainability goals. The disruptive technology not only focuses on emission reduction but also aims to influence European cement regulations to embrace eco-friendly cement types.</p> <p>The ERACLITUS project contributes significantly to key policy areas by championing a zero CO2 footprint in cement manufacturing. Its strategic emphasis on sustainable technologies aligns with broader European sustainability goals. Beyond emission reduction, the project seeks to influence European cement regulations and foster a regulatory environment conducive to cutting-edge and eco-friendly cement production.</p> <p>The implementation of the new materials not only revolutionises cement production but can also positively impact the local and regional economy, job creation, business clusters, and value chains. The scalable nature of the technology indicates potential efficiency gains and cost reductions, thus contributing to the resilience of the EU economy. The technology's licensable design across Europe emphasises the project's commitment to widespread adoption and amplification of its positive impact, both environmentally and economically.</p>
GREEN MEIGA	Green Methanol in Galicia	<p>GREEN MEIGA, located in Begonte, Galicia (Spain), aims to deploy innovative and integrated technological approaches, clustered in a unique integrated plant. The proposed approach will achieve three key outcomes: enhanced production performance, improved operational flexibility, and competitive production costs. GREEN MEIGA plans to reach 157% relative greenhouse gas (GHG) emissions avoidance compared to the reference scenario.</p> <p>The GREEN MEIGA project will develop novel concepts and technologies. They will be clustered in a unique integrated system and business case that will allow the production of 100 000 tonnes per year (t/y) of e-methanol and will avoid 2.9 million tonnes of CO2 equivalent during the first ten years of operation. The project will integrate (i) an innovative hybridised H2 production system including an alkaline Proton Exchange Membrane (PEM), a Solid Oxide Electrolyser Cell (SOEC) and Co-SOEC systems, (ii) an integrated self-sustainable e-methanol production system, and (iii) an advanced CO2-capture system integrating enzyme-based and direct air capture technologies.</p> <p>The cost-efficient production of e-methanol is essential for the chemical sector's decarbonisation pathway, contributing to the European goal of reaching climate neutrality by 2050.</p>

Acronym	Title	Description
		<p>The project will also contribute to the goals of the REPowerEU Plan of reducing fossil fuel consumption in industry and transport. As methanol is an important feedstock in the chemical industry, the on-site production of e-methanol can reduce GHG emissions, stimulate local economies and reduce the EU's current fossil fuel dependency (cost efficiency ratio, lower than today's carbon price).</p> <p>GREEN MEIGA will design a strategic plan to deploy the project concept in the future and mobilise investments in e-methanol production. The selected location is a representative scenario, being the first milestone of an ambitious scalability plan to replicate the concept in additional sites. The project will contribute to the development and decarbonisation of the value chain, both in the wood industry and in the energy sector in Galicia. GREEN MEIGA provides solidity and sustainability to the economic model and social and territorial cohesion, as it will contribute to the creation of green jobs in Galicia, planning to create up to 426 jobs during the operation stage and around 6 000 jobs during the construction stage.</p>
GREENMOTRIL	Development and operation of a GREEN energy community in the port of MOTRIL	<p>In line with the EU solid framework for prosperous climate neutral economy and the recent publication of the EU Green Deal where a clear commitment is placed to drastically reduce the greenhouse gas emissions (GHG) associated to the waterborne transport, GREENMOTRIL aims to become a pioneering project in the decarbonization roadmap of European ports. To this end, GREENMOTRIL aims to demonstrate the technical, environmental and economic benefits of implementing a smart self-managed energy community entirely powered by RES in the port of Motril. This approach will allow this port to become the first seaport in Europe able to work completely off-grid thanks to deployment of a 2,5 MW PV plant, a storage system of 4 MWh with grid-forming capacities and frequency supply, an innovative microgrid management system, a communication system based on edge multi-protocol concentrators and a robust cybersecurity framework.</p> <p>This approach will ensure the participation of the end users in the community management providing flexibility services through demand response schemes. This will allow a high replication potential of GREENMOTRIL concept and solutions not only in the European seaport sector (counting with 340 commercial ports) but also in other energy communities. GREENMOTRIL will enable the yearly integration of 6,300 MWh of renewable energy in the port, achieving a GHG reduction of 29,2 ktonCO₂ over ten years of operation associated to the daily activity of the industries located in the port and the ships connected to the OPS. Moreover, GREENMOTRIL is closely aligned with the Sustainable Development Goals (SDG) initiative, particularly, SDGs 3, 7, 8, 9, 13, 14 and 17.</p> <p>The project will be coordinated by CUERVA, a DSO very active on the generation, operation and commercialization of renewable energy with large experience in R&D European projects, APM the owner of port facilities and SIEMENS, a worldwide reference company in the digitalization and automatization of micro-grids</p>
HOPE	High-efficient Onshore PV module production in Europe	<p>The objective of the HOPE project is to establish an additional 3.5 gigawatt (GW) annual production capacity of high-performance Photovoltaic (PV) cells and modules in Europe, to strengthen European supply chains and energy independence. A cell and a module manufacturing facility will be set up in Germany, while an additional module manufacturing facility will be established in Spain. HOPE will introduce the next generation heterojunction technology (HJT), HJT 2.0; with this innovation, enabling the production of longer-lasting, higher-efficient, cutting-edge PV modules. HJT 2.0 modules also have a significant cost advantage for investors and operators. HOPE will supply the modules to build hundreds of new PV power parks in Europe. This project will reduce greenhouse gas (GHG) emissions by 99.9% compared to the reference scenario.</p> <p>In the HOPE project, the HJT 2.0 technology will be introduced to drive HJT-cell based modules to maximum efficiency, leveraging significant advantages in the efficiency of solar cells. With the HOPE project, Meyer Burger will implement a set of major innovations based on a revolutionary production concept, comprising cell and module manufacturing, materials, and smart factory design. HJT 2.0 is based on proprietary technologies and will overcome prevailing but outdated technologies like "passivated emitter and rear cell" (PERC) in the PV market. An absolute greenhouse gas (GHG) emission avoidance of 17 million tonnes CO₂ equivalent is expected. This has been calculated based on the proportional contribution that modules have in a PV power park, alongside other components such as inverters and installations. The total energy generated by the modules is equivalent to twice of the annual electricity consumption of the city Berlin. Additionally, the PV modules will be produced with low emissions, significantly reducing the overall carbon footprint of the PV industry.</p> <p>HOPE will contribute to strengthening European strategic sovereignty in the PV value chain. The innovations in the product and process design will contribute to increased resource efficiency in Europe, and the associated new renewable energy generation capacity will be indispensable for the European Green Deal.</p> <p>Nearly 1,400 new jobs will be directly generated by the project. Additionally, the job-multiplier of PV-based electricity generation is the largest among renewable technologies, with 2,200 indirect jobs that can be attributed to the project (e.g. at suppliers or linked to installing and operating the power parks). The regional economies will benefit both from local sourcing as well as from the availability of locally produced PV components.</p>
HYVALUE	Novel upcycling production process based on an innovative circular business model for urban waste streams valorisation for the generation of high quality H ₂ .	<p>HYVALUE is a small-scale innovative project to produce 1,600 ton per year of hydrogen ready to be used by carbon intensive industries and the mobility sector. The material inlet for HYVALUE will be 12,000 ton per year of discarded Municipality Solid Waste (MSW), otherwise destined to landfill. HYVALUE allocates two simultaneous approaches for GHG emissions reduction; one is hydrogen production and the second one is MSW landfill reduction. The project integrates well known process units in an innovative, product-oriented design, to make hydrogen production material, energy and financially more efficient. This technical solution represents a big step forward to end the current linear economy model, paving the way for the circular economy framework. Hydrogen applications extend further than industrial and domestic energy (heat) source (injected in the natural gas network), as its can be extended to vehicles and logistics services such as vessels, cargo-trains, and airplanes in the medium term, with the benefits of the higher fuel efficiency of the hydrogen fuel cells. This HYVALUE installation will be located in Vitoria, where the increase in clean hydrogen market availability will benefit the local industries (the metal sector especially) and contribute to their transition to a low carbon operation mode, create new green jobs, and boost hydrogen related R&D at international level. Cost competitive hydrogen availability will help the local institutions in promoting hydrogen use in high value-added applications such as movility and, additionally, facilitate the achievement of EU policies and objectives related to decarbonisation and landfill reduction through waste valorization. The project will be coordinated by TUBACEX and NOVARGI which will use its proprietary technology for the design and construction of the installation. A cost efficiency ratio of 32,06 has been estimated and a 36% Return of Investment for the HYVALUE project.</p>
LuGaZ	Local manUre and agri-food waste treatment for bioGAs and biofertilizers	<p>LuGaZ aims to create a sustainable zero-waste facility that manages organic and non-hazardous wastes generated primarily in the dairy sector value chain, and to create the opportunity for other agri-food industries in the area to manage their residues. The project proposes an ambitious facility that combines a biogas plant with an innovative low scale upgrading system, a liquid treatment of digestate for water recovery at low cost, and a solid treatment for fertiliser production across industrial symbiosis.</p>

Acronym	Title	Description
	production from Zero waste and circular economy perspective	<p>Nearly 55,000 tonnes/year of residues will be collected in the facility to generate biogas containing methane which will be captured, cleaned, upgraded, and injected into the natural gas grid. The digestate will be separated into a solid fraction to generate a stabilised organic fertiliser for the primary sector to compensate for the manure sent to the LuGaZ plant, and a liquid fraction which will be treated to recover reusable water in industrial applications. The relative greenhouse gas (GHG) emissions avoidance due to LuGaZ operations during the first 10 years amount to around 85%.</p> <p>LuGaZ goes beyond the commercial and technological state-of-the-art, bringing to the table a first-of-a-kind combination of waste treatment technologies for the agri-food production value chain:</p> <ul style="list-style-type: none"> · OPTBLENDER: A specialised software for the online control of anaerobic digestion that ensures the stability and quality of the digestate produced through co-digestion mixtures optimisation. · NIDUP: An upgrading system specifically designed for small-scale applications and is highly competitive due to its low operational costs, capability of coping with high hydrogen sulphite (H₂S) concentrations, and potential to minimise reagents/consumable's needs. · DEPURGAN/AQUATEC: A low-cost solution for liquid treatment based on an electrocoagulation all-in-one solution. <p>LuGaZ contributes to achieving European climate neutrality by 2050 by producing high-quality biomethane to be directly injected into the natural gas grid. LuGaZ combines waste management with renewable energy production, which, with biogas and the reduction of Methane emissions from open manure storage and landfills, helps make treatment affordable and energy efficient. It is also possible to obtain an added value product (fertiliser) and preserve natural resources through water recovery. LuGaZ has a potential to scale-up by increasing the size of individual integrating technologies (higher volumes of agri-food waste streams to be treated), replicating the Zero residue plant in new areas at Galician and Spanish level and applying this throughout in Europe.</p> <p>LuGaZ's innovative integrated scheme will play an essential role in the dynamisation of the primary sector by creating employment in rural areas, while actively participating in creating an innovative regional model of circular economy based on waste to energy principles. Additionally, it offers a practical waste treatment solution for rural areas, reducing transport costs and carbon footprint.</p>
SEAWORTHY	Sustainable dispatchable Energy enabled by wAve-Wind OffshoRe platfoms with onboard Hydrogen	<p>SEAWORTHY is a commercial-scale demonstration of a first-of-a-kind technology that is capable of supplying clean dispatchable offshore power from wind, waves and hydrogen (H₂). The project will pave the way for the commercial roll-out of this technology, which will revolutionise the offshore Power-to-X market by providing clean and cost-effective dispatchable power to offshore, off-grid and coastal weak-grid applications (e.g. islands), which currently rely on fossil fuels.</p> <p>This demonstrator technology, P-Demo, integrates a 4.3 megawatt (MW) Wind Turbine Generator (WTG), a 0.8 MW Wave Energy Converter (WEC) system and a H₂ system consisting of a 1 MW electrolyser, 48 MWh of energy storage and a 1.2 MW fuel cell. P-Demo will be the world's first wind-wave-H₂ unit and it will be deployed in PLOCAN's test site in Spain. It will deliver 11.05 Gigawatt hours (GWh) per year of renewable electricity to the grid, avoiding a total of 25 557 tonnes of CO₂ equivalent during its first 10 years of operation, with a 100% relative greenhouse gas (GHG) emission avoidance.</p> <p>These key innovative features of the project allow for a maximised uptake of wind and wave resources, increasing power quality, output capacity per unit and output consistency over time. At the same time, the project integrates H₂ production systems, including electrolysers, a higher energy storage capacity (up to 300 MWh) and fuel cells, for the provision of truly dispatchable renewable power.</p> <p>These features in turn minimise the total investment per megawatt, through shared infrastructure (mooring, platform, and grid infrastructure) for the three technologies in a single unit, as well as manufacturing materials and techniques from the shipbuilding value chain that enable scaled series production and economies of scale.</p> <p>In terms of policy priorities, the technology contributes directly to the EU Strategy on Offshore Renewable Energy, as well as to the longer term climate neutrality objectives. Moreover, REPowerEU recognizes that energy storage plays a key role to end external dependence on fossil fuels by ensuring security of supply and supporting renewables integration.</p> <p>Furthermore, the technological design allows a variety of manufacturing and assembly options, easing the use of different facility types and a distributed European supply chain. From a social perspective, this provides opportunities for a high degree of local content and job creation, even in geographical areas lacking a strong marine industry and where a suitable value chain can scale gradually.</p>
SKFOAAS	SKF RECONDOIL AS A SERVICE	<p>The current project proposes to install and operate the first-of-a-kind Stand-alone DST processing plant in the facilities of SKF located in Tudela (Navarra, Spain).</p> <p>The proposed solution aims at closing the loop in the use of industrial oils, allowing to use the same oil in the same application several times after a certified purification process. A win for both industry and the environment. The only issue standing in the way of this process is technology, as current solutions till now had not reached a level where the same oil could be re-used within the same system after a quick and efficient remanufacturing process.</p> <p>This project proposes a processing plant based on the patented SKF Double Separation Technology (DST), which allows purifying waste oil to more than 99% and, therefore, returning oil to an incredibly high-grade for usage and reducing the need to change oil frequently.</p> <p>This project will be a flagship DST that will count with a treatment capacity between 1,000 and 6,000 m³/year depending on the viscosity of the oils treated. The process will be semi-automatic and will require the execution of a 2.7M² CAPEX.</p> <p>The project implementation will face 3 phases: Financial close and preparation (April 21), Construction / installations works and commissioning (2021), Operation and Monitoring (2022-2031). In the last phase, the plant expects to treat up to 20million litres of used oil, avoiding 15.292,52 tCO₂e within 10 years of operation.</p>

Acronym	Title	Description
		<p>Thus, it is worth to mention that this innovation and targets are aligned with the EU's industrial strategy to introduce circularity in new areas and sector to reduce consumption of raw materials, waste generation and GHG emissions. In particular, by keeping more oil within the cycle, this technology really does offer something new to the world: the possibility of a future where oil demand decreases to a trickle and instead real and high-perpetual usage of oil in industry practices.</p>
SustainSea	Reducing maritime transport CO2 emissions using wind	<p>The SustainSea project will deploy bound4blue's innovative rigid wind sail system in maritime transport. The system will use wind energy to reduce fuel use and GHG emissions in the sector. Within the project, the wind propulsion system developed by Bound 4 Blue will be integrated into five large cargo vessels operating, mainly, in EU waters. In accordance with the REPowerEU and EUGreenDeal, this will have a significant impact on reducing dependence on fossil fuels and external suppliers, whilst also creating positive environmental impact by reducing relative greenhouse gas (GHG) emissions by 91% compared to the reference scenario.</p> <p>Pollution derived from maritime shipping activities has profound implications for air and water quality and marine biodiversity. Therefore, there is a clear need for new disruptive technologies to address these issues. The main objective of this project is to carry out five large-scale installations of eSAIL[®] systems in different ship types. This will reduce GHG emissions by 14 037 tonnes CO₂ equivalent for the first three years of operation, increasing to 46 789 tonnes CO₂ equivalent over the first ten years. The main challenges are around: (i) scaling up the technology to larger sizes, while remaining fully functional; and, (ii) adapting the technology to cover the main market segments in the European shipping industry.</p> <p>Over recent years, both the IMO (International Maritime Organization) and the EU developed a new regulatory framework on maritime pollution. These regulations are forcing ship owners and charterers to use less polluting fuels and move to emission saving technologies, with the global goal of reaching a high degree of decarbonisation of the shipping industry by 2050. This project is focused on energy efficiency of the European shipping industry, being fully aligned with the latest IMO regulations (such as the Sulphur Cap, EEDI/EEI or the CII (Carbon Intensity Indicator)) and with EU policies (such as FuelEU and the general framework of the EUGreenDeal). The inclusion of maritime transport in the EU Emission Trading System further strengthens the importance of moving towards CO₂ abating processes and technologies in this sector.</p> <p>In addition to generating employment for local suppliers, this project will support the EU regional economy, as it has the potential to generate a new value chain in the wind energy sector. As an example, the main suppliers for the structural parts of the sails are wind energy systems manufacturing companies from Spain.</p> <p>This project will position bound4blue as a global leader of wind-assisted propulsion, which will result in the increased competitiveness of this sector in the EU, generating impacts in future job creation and enhance the European value chain.</p>
T-HYNET	TARRAGONA NETWORK HYDROGEN	<p>The T-HYNET project's main objective is to deploy a first-of-a-kind European large scale, 150 megawatt (MW) capacity, alkaline electrolyser at "REPSOL Petróleo" site in the Tarragona's industrial area. The plant is planned to operate continuously and is expected to produce 2.7 tonnes of renewable hydrogen per hour. The plant will generate renewable hydrogen and oxygen to be used by local off-takers. It is planned that this project will achieve a99.99% relative GHG emissions when compared with the reference scenario.</p> <p>The T-Hynet project will integrate four key innovative elements: (i) A 150MW electrolyser producing hydrogen from renewable sources. This will represent a breakthrough in alkaline technology in terms of larger stacks and modules, as well as higher operating pressure and efficiency; (ii) Digital tools directed to electrolyser performance optimisation and monitoring; (iii) Oxygen integration leading to its complete reuse for local industrial applications; and (iv) Increased water use efficiency (minimizing water discharge and maximizing water recovery). It is expected that the project will have absolute greenhouse gas emissions avoidance of almost 1.4 million tonnes of CO₂ equivalent over the first ten years of operation.</p> <p>The project will contribute to the European Hydrogen Strategy, supporting the deployment of domestic hydrogen production in the European Union. It will also contribute to the objectives of the REPowerEU strategy, particularly by helping reduce fossil fuel consumption in industry and transport. The project will include technological developments in the electrolysis plant and digital tools to ensure a smart management of the electrolyser. This will reduce the cost of renewable hydrogen production, increasing the competitiveness of the product and boosting its use and implementation in the entire value chain.</p> <p>The deployment of the electrolyser will enhance renewable hydrogen industrial production, presenting a cleaner, cost-effective alternative to fossil fuels for local off-takers. The location of the project is also highly relevant for supporting the uptake of a hydrogen ecosystem in the challenging industrialisation roadmap for Spain and Europe.</p> <p>The project is expected to have a positive socio-economic impact in the region. The economic benefits will impact technology providers, manufacturers of hydrogen production plants and their components; commercial industries in areas of maintenance and operation, mobility end users, and research centres, etc. It is expected to create more than 900 direct jobs and more than 1 100 indirect and induced jobs during the construction stages. By engaging with local stakeholders and off-takers, the project will develop a synergistic industrial network that will create a baseline for a deep decarbonisation transformation. This will kick-start an ambitious scalability plan to be implemented in Tarragona and beyond.</p>
TRISKELION	Green Methanol manufacturing from CO ₂	<p>TRISKELION: Green Methanol manufacturing from CO₂</p> <p>The TRISKELION project will build an innovative e-Methanol production plant in Mugardos (Galicia, Spain). This renewable product will be synthesised in an innovative single reactor from CO₂ (captured from the flue gas of a combined heat and power plant), and renewable hydrogen (produced from electrolyses). The relative greenhouse gas (GHG) emission avoidance is estimated to around 137%compared to the reference scenario.</p> <p>The innovation of the project comes from the combination of different technologies with different degrees of technological maturity. The proposed capacity is significantly larger than any demonstration project in Europe, and will increase the System Readiness Level (SRL) and Technology Readiness Levels (TRL) of the plant, enabling it to reach a commercial level</p>

Acronym	Title	Description
		<p>that allows its replication in different sectors.</p> <p>The system has been designed to produce 40 000 tonnes per year of e-Methanol. It will also recover 59 643 tonnes per year of liquefied green oxygen from the electrolyzers, that will be later purified and liquified to ensure it is valuable. Electricity from renewable sources, through Power Purchased Agreements (PPAs), will be supplied to the entire system ensuring renewable and continuous power source during the 8 000 hours/year of operation. The excess water stream generated in the e-Methanol distillation will be reused directly in the electrolyser, minimising the total water quantity required. The project will avoid approximately 860 282 tonnes of CO2 equivalent of absolute GHG emissions during the first ten years of operation.</p> <p>This project will develop solutions and products (e-Methanol and renewable oxygen) to be deployed in the market, integrating different technologies and systems, and avoiding the use of fossil-based raw materials by using secure (in time) and stable (in quality) renewable energy sources. In addition, the project will maximise energy integration throughout various process units.</p> <p>TRISKELION will contribute to the European objectives set down in the REPowerEU communication, particularly by producing a synthetic fuel, e-Methanol, that will reduce fossil fuel consumption in industry and transport. The project will also have relevant regional socioeconomic impacts, creating 35 direct jobs and 70 indirect jobs, with a potential for scalability and replicability of the technology.</p>
W4W	Waga 4 World	<p>Over 10 million Nm³/h of methane is lost in landfills worldwide. This is a major waste of renewable energy and a significant source of GHG emissions.</p> <p>WAGA ENERGY has developed the WAGABOX unit, a breakthrough technology enabling recovery of landfill gas as grid-compliant biomethane. Since 2017, the company has been deploying this solution in France through a build, own, operate and maintain business model: WAGA ENERGY purchases landfill gas from landfill operators and sells compliant biomethane to energy utilities, thanks to a feed-in tariff.</p> <p>The WAGABOX solution has a double impact in terms of fighting climate change: it incentivises landfill operators to recover their gas, which contributes to significantly reduce fugitive methane emissions; and it produces clean, local renewable gas that can substitute common fossil natural gas. Ten WAGABOX units are operational in France. They supply around 35,000 households, avoiding 45,000 tons of eqCO₂ emissions per year.</p> <p>By recovering a waste management by-product, the WAGABOX unit solution provides the most cost-competitive biomethane in France (since the feed-in tariff for landfill gas upgrading is 40% lower than for anaerobic digestion plants). Existing units purify 600 Nm³/h and produce biomethane for an average price of 75€/MWh.</p> <p>However, to deploy this innovation worldwide, WAGA ENERGY must sell biomethane on a merchant basis, as most countries do not offer public incentives for biomethane. A target selling price of 42-48€/MWh must be achieved to be able to sign long-term purchase agreements with energy utilities or traders. Consequently, a next-generation WAGABOX unit adapted to local regulations with higher capacity, higher performance, and lower manufacturing and operating costs is mandatory to sustain worldwide deployment.</p> <p>The W4W project aims to complete the development of this specific next-generation of WAGABOX unit and move it from TRL7 to TRL8 before starting a broad international roll-out of the solution.</p>