



European Commission

## Innovation Fund Programme



### Overview of ongoing projects in Greece

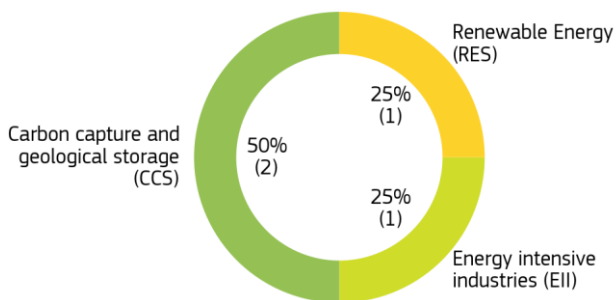
Funded by the revenue of the EU Emissions Trading System, the Innovation Fund's goal is to help businesses investing in innovative low-carbon technologies with significant GHG emissions reduction potential.

The Innovation Fund currently supports **4 projects** located in Greece, which will contribute to the decarbonisation of European industries with a total expected GHG emission reduction of **35.7 Mt CO<sub>2</sub> equivalent in the first 10 years of operation**.

The total **Innovation Fund grant in Greece is of EUR 489.5 million**, out of the **total relevant costs of EUR 823.5 million**, as defined in Art 5 of the Delegated Regulation 2019/856 on the Innovation Fund<sup>1</sup>.

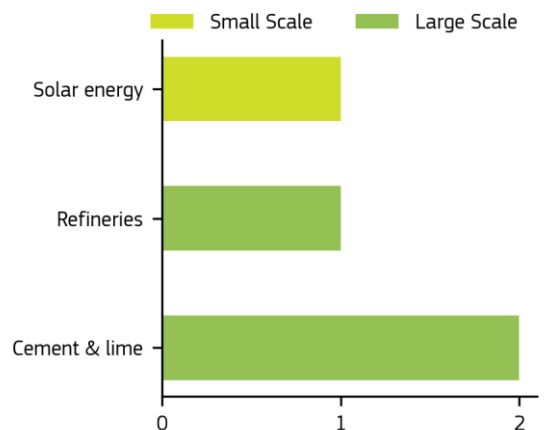
#### Projects per category

Number of projects and percentage of the total



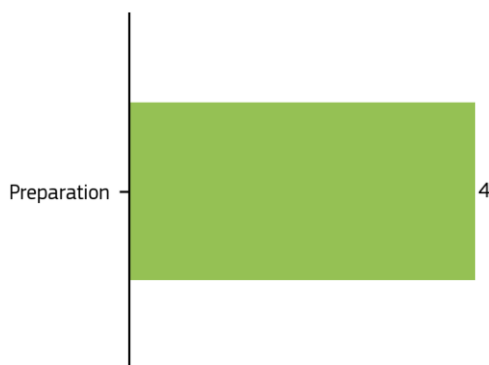
#### Projects per sector

Number of Small and Large-Scale projects



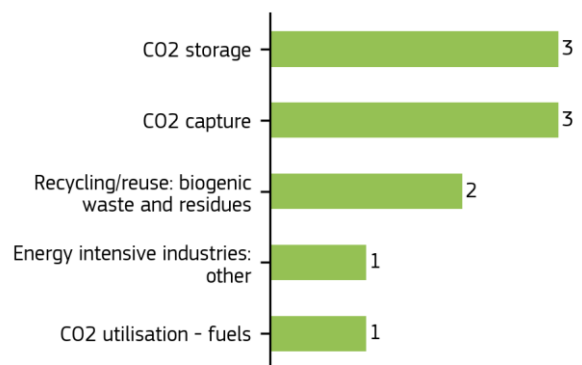
#### Projects per phase<sup>2</sup>

Number of projects



#### Top 5 technology pathways<sup>3</sup>

Number of projects



<sup>1</sup> OJ L 140, 28.5.2019, p. 9.

<sup>2</sup> 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.

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

## List of ongoing Innovation Fund projects in Greece

Acronym	Title	Sector	Start date	Project phase	Beneficiaries	Innovation Fund grant (EUR million)	Expected GHG emission avoidance (t CO2eq)
<b>Large Scale</b>						<b>485.1</b>	<b>35,696,046</b>
IFESTOS	IFESTOS – one of the largest carbon capture projects in Europe to enable the production of zero carbon cement & concrete and create decarbonization synergies with regional industries	Cement & lime	01/01/2024	Preparation	TITAN CEMENT COMPANY S.A.	234.0	20,227,227
IRIS	Innovative low caRbon hydrogen and methanol production by large Scale carbon capture	Refineries	01/01/2024	Preparation	MOTOR OIL	126.8	8,585,470
OLYMPUS	Ascending to the top of CO2 avoidance in the EU cement sector through the innovative OxyCalciner technology	Cement & lime	01/01/2024	Preparation	HERACLES GCC   HOLCIM TECH LTD	124.3	6,883,349
<b>Small Scale</b>						<b>4.5</b>	<b>21,482</b>
SUNBREWED	Solar eNergy for the BREWEry inDustry	Solar energy	01/07/2024	Preparation	HOCHTIEF PPP   AB   PROTARGET	4.5	21,482

## Project overview

Acronym	Title	Description
IFESTOS	IFESTOS – one of the largest carbon capture projects in Europe to enable the production of zero carbon cement & concrete and create decarbonization synergies with regional industries	<p>The IFESTOS project aims to set up one of Europe's largest carbon capture and storage (CCS) value chains. TITAN Cement Group will retrofit its existing cement kilns at the Kamari plant near Athens, Greece, with an innovative carbon capture configuration. First- and second-generation oxyfuel technology will be combined with cryogenic capture. This will result in capturing 98.5% of the plant's carbon dioxide (CO<sub>2</sub>) emissions that would otherwise be released during its cement production process, thus supplying the market with approximately 3 million tons per year of zero-carbon cement to serve the growing needs for green construction materials in the metropolitan area of Athens and beyond. Captured CO<sub>2</sub> will be liquified and transported to a permanent storage site in the Mediterranean.</p> <p>The project will apply a hybrid carbon capture configuration by combining first- and second-generation oxyfuel and post-combustion cryogenic capture technologies. Exhaust gases from the cement kilns will be enriched to more than 70% CO<sub>2</sub>, allowing for high capture efficiency. The project will be the first double-inlet post-combustion system, which will capture emissions from two kilns with different CO<sub>2</sub> content. This approach will enable the avoidance of more than 1.9 million tonnes of CO<sub>2</sub> annually which represents around 12% of the annual emissions of all Greek industrial installations (based on data from the 2022 Climate Action Progress Report) and will make IFESTOS one of the largest carbon capture facilities in Europe. This will kickstart the CCS value chain in Southern Europe and encourage the rest of the industry to apply similar models. IFESTOS will be powered by 100% clean energy and will significantly increase the use of alternative fuels at the Kamari cement plant, while capturing all related biogenic CO<sub>2</sub> emissions.</p> <p>By tackling greenhouse gas (GHG) emissions in a hard-to-abate sector, IFESTOS is contributing to the aim of EU carbon neutrality by 2050, in line with the European Green Deal. The project's scale, and the value chain that comes with it, will enhance the EU's sustainable growth in line with the Circular Economy Action Plan, while supporting Europe's competitiveness and strategic autonomy. In addition, in view of its demand for renewable energy, IFESTOS will create a viable business platform for large renewable energy projects, in line with RePowerEU guidelines.</p> <p>IFESTOS will be the steppingstone for a regional CCS cluster, acting as a key enabler for local CO<sub>2</sub> shipping and storage infrastructure. In addition, the project will boost the local economy with an estimated job creation of approximately 115 direct and 800 indirect full-time equivalent jobs.</p>
IRIS	Innovative low caRbon hydrogen and methanol production by large Scale carbon capture	<p>Sustainable hydrogen and e-methanol production through deep refinery decarbonization</p> <p>The IRIS project aims to reduce the carbon footprint of the Agioi Theodoroi refinery, by applying carbon capture technology on its Steam Methane Reformer (SMR). This will allow the refinery to become a large ultra-low-carbon hydrogen producer. The bulk of the captured carbon will be sequestered in an offshore storage facility in the North Aegean Sea, while a small amount will be utilised to produce 10 000 tonnes of e-methanol per year, which will be used as an energy carrier for both mobility and industrial applications. The implementation of the project will result in the avoidance of 89% of the relative greenhouse gas (GHG) emissions compared to the reference scenario.</p> <p>The IRIS project will incorporate a number of industrial processes on a scale not applied before at an independent refinery. Its main innovative aspect is the integration of advanced technologies, engagement of multiple stakeholders, and the formation of the basis for a first-of-its-kind South-eastern European model plant for carbon capture, use and storage (CCUS). The post-combustion capture technology that has been selected for IRIS will allow for both unperturbed hydrogen production and continuous high-pressure steam generation. The CO<sub>2</sub> fraction contained in the SMR flue gas will be captured at a rate of 95%.</p> <p>Besides its use within the refinery, the produced hydrogen will be used as fuel in transport applications. E-methanol will be directed to maritime applications as a low carbon substitute for marine fuels. As a result, the IRIS project as a whole will avoid 8.58 million tonnes of CO<sub>2</sub> equivalent absolute emissions over the first ten years of operation. In this way the environmental impact of the project will be maximized, achieving both explicit decarbonisation through emission reduction and implicit decarbonisation through low-carbon, EU Taxonomy compliant, fuel production.</p> <p>The project will contribute to the European goals to achieve climate neutrality by 2050. It will notably contribute to the Net-Zero Industry Act goal of achieving 50 Mt/y CO<sub>2</sub> storage capacity by 2030, as well as to the REPowerEU goal of reducing fossil fuel consumption in industry and transport. Furthermore, IRIS will promote the scalability of the CCUS chain to two more refinery units, that could further decrease the total refinery carbon footprint by another 25%. Through communication and dissemination activities, other regional refineries could also develop similar decarbonisation strategies or contribute towards creating a shared infrastructure hub, extending the impact of the project beyond its current boundaries. IRIS will also positively impact the regional economy, creating up to 2 000 job opportunities during construction and 21 permanent jobs during the project's operating lifetime.</p>
OLYMPUS	Ascending to the top of CO <sub>2</sub> avoidance in the EU cement sector through the innovative OxyCalciner technology	<p>The large-scale Carbon Capture and Storage (CCS) "OLYMPUS" project aims to transform the Milaki cement plant in Evia, Greece into a net-zero carbon cement plant, through the adoption of innovative technologies. Captured CO<sub>2</sub> will be liquefied and transported by sea to the Greek offshore sequestration facility of Prinos in the northern part of the Aegean Sea. The project is planned to achieve a 95% relative greenhouse gas (GHG) emission avoidance compared to the reference scenario.</p> <p>The Milaki plant will be retrofitted with state-of-the-art technologies, increasing energy and resource efficiency, as well as circularity, allowing for low incremental capturing costs of CO<sub>2</sub>. The technology is expected to reduce the complexity compared to a full oxyfuel approach and aims to optimise the cost efficiency of captured CO<sub>2</sub>. Further to the maximum</p>

Acronym	Title	Description
		<p>energy recuperation with the Waste Heat Recovery System (WHRs), the plant will cover its full electricity demand of 365 gigawatt hour (GWh)/year (for reference, similar to 220 000 EU average annual citizens consumption). This will be achieved via renewable energy with a &gt;90% penetration rate, whereas thermal energy demand will come from &gt;80% alternative (non-fossil) fuels. The project expects to have an absolute GHG emissions avoidance of 6.8 million tonnes CO<sub>2</sub> equivalent during the first ten years of operation. The project will contribute to the objectives of REPowerEU strategy, by helping to reduce fossil fuel consumption in industry and transport, and particularly to the objectives of the Net-Zero Industry Act (NZIA) of reaching 50 mega tonnes (Mt)/year CO<sub>2</sub> storage capacity by 2030. The project will also promote the production of green construction materials, sequestering more than 900 000 tonnes CO<sub>2</sub>/year. The project will contribute to both Greek and European climate-neutrality, by creating new markets for climate neutral and circular products, such as steel, cement and basic chemicals.</p> <p>The project will have positive socio-economic impacts at the regional level, expecting to create 1 000 jobs (400 direct and 600 indirect), including the collaboration with subcontractors and suppliers, thus contributing to the overall economic development of the area. OLYMPUS will also serve as a CCS knowledge hub, promoting knowledge sharing among policymakers, academia, professionals and other stakeholders. The creation of knowledge sharing networks, exchange of technology, expertise and best practices will also facilitate stakeholder learning, and contribute to the development of innovative solutions for decarbonising energy-intensive industries.</p>
SUNBREWED	Solar eNergy for the BREWEry inDustry	<p>The objective of the SUNBREWED project is to demonstrate the innovation, technical feasibility, commercial viability, and scalability of solar thermal technology in combination with an innovative energy contracting business model in the food and beverage industry. Implemented at a brewery, the SUNBREWED project will supply a sustainable carbon dioxide (CO<sub>2</sub>) free steam into the brewing process, replacing conventional fossil fuel-based energy, and achieving a relative greenhouse gas (GHG) emissions avoidance of 100% compared to the reference scenario.</p> <p>The project aims to install an industrial-scale concentrated solar thermal power plant with a thermal storage system at a brewery in Patras, Greece. This plant will operate under a Thermal Purchase Agreement (TPA). This approach, which combines an efficient renewable energy technology with a well-established business model, serves the industrial end-user's demand for reliable and affordable thermal energy, while simultaneously reducing carbon emissions from its operations.</p> <p>The key factors driving this project to supply solar heat to an industrial process are (1) the environmental concerns over carbon emissions and efforts to reduce air pollution, (2) high energy costs, (3) solar thermal technology being a product-market fit (unlike several other renewable alternatives), (4) policy enforcement support from governments to drive the adoption of renewable technologies for industries, and (5) the integrability of the SHIP (Solar Heat in Industrial Processes) systems with thermal storage systems, as well as with other renewable energy or fossil-fuel based systems. Through the use of these technologies this project aligns with the REPowerEU Plan as well as the European Climate goals by contributing to produce clean energy and combining diverse technologies to increase the energy supplies in the European territory.</p> <p>The project expects to boost the local economy of the area and strengthen local communities with the collaboration of local suppliers, contractors and subcontractors who are responsible for constructing, installing, and maintaining the solar plant. In total, 29 new jobs will be created during both, the construction phase and the operation of the project. The new SUNBREWED solar thermal plant also has a two-fold educational value and impact. First, it brings general awareness to the region, showing that large manufacturers are becoming more sustainable and can produce their products using new green technologies. Second, there is the potential for the new plant to collaborate with local and regional schools to offering organised visits for students to the plant facilities.</p>