



European Commission

Innovation Fund Programme

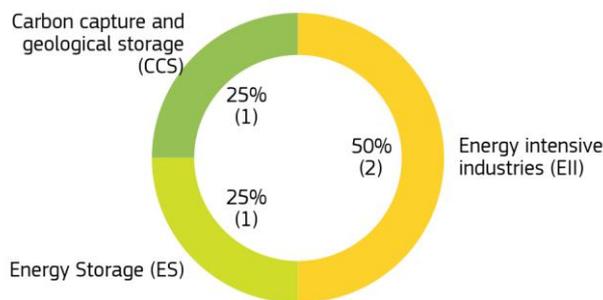
Overview of ongoing projects in Poland

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 Poland, which will contribute to the decarbonisation of European industries with a total expected GHG emission reduction of **44.8 Mt CO₂ equivalent in the first 10 years of operation**.

The total **Innovation Fund grant in Poland is of EUR 312.6 million**, out of the **total relevant costs of EUR 4.9 billion**, as defined in Art 5 of the Delegated Regulation 2019/856 on the Innovation Fund¹.

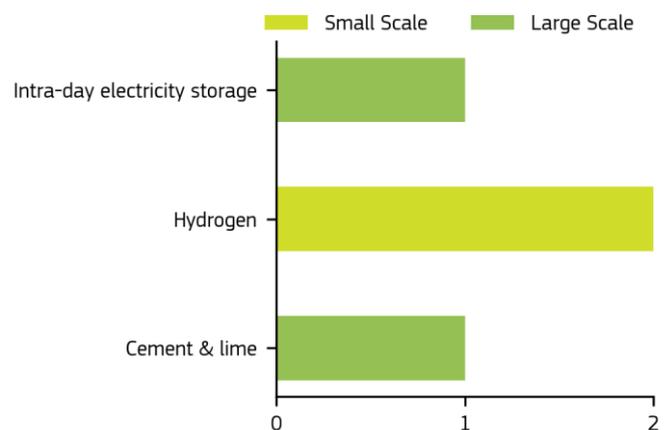
Projects per category

Number of projects and percentage of the total



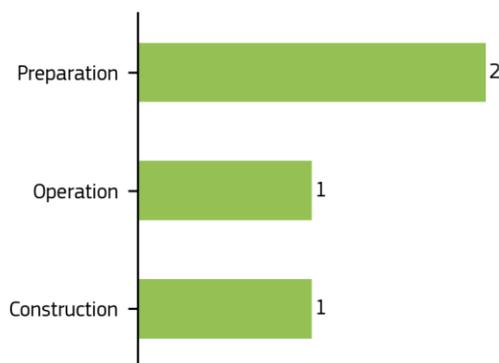
Projects per sector

Number of Small and Large-Scale projects



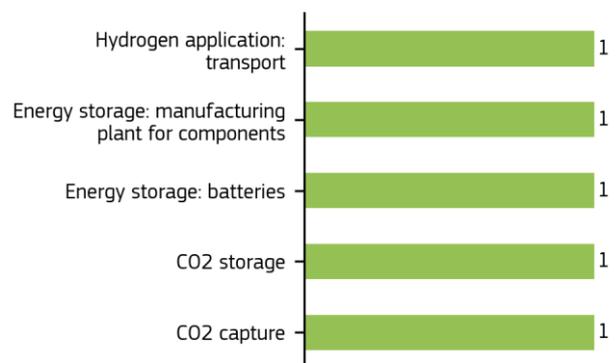
Projects per phase²

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 Poland

Acronym	Title	Sector	Start date	Project phase	Beneficiaries	Innovation Fund grant (EUR million)	Expected GHG emission avoidance (t CO2eq)
Large Scale						303.7	44,739,465
GO4ECOPLANET	KUJAWY GO4ECOPLANET	Cement & lime	01/04/2022	Preparation	Lafarge Cement	228.2	10,220,252
NorthSTOR PLUS	NorthSTOR+: Industrialising Green Optimised Li-ion Battery Systems for ESS	Intra-day electricity storage	01/04/2022	Construction	NV Systems AB NVS Poland	75.5	34,519,213
Small Scale						9.0	86,706
GreenH2	Small-scale green hydrogen production facility	Hydrogen	01/06/2023	Preparation	LOTOS Green H2	4.5	9,375
ZE PAK green H2	Investment in 5 MW green hydrogen production facility located in Konin, Poland	Hydrogen	01/10/2021	Operation	ZE PAK BiW EXION EXION	4.5	77,331

Project overview

Acronym	Title	Description
GO4ECOPLANET	KUJAWY GO4ECOPLANET	<p>The Go4ECOPlanet project aims to fully decarbonise cement production at the Lafarge (Holcim Group member) plant in Kujawy (Poland) and thus to contribute to decarbonising the construction industry. The project involves a world-unique technology for capturing and liquefying CO₂. The solution will capture 100% of the plant's CO₂ emissions, which will be transported to storage areas in the North Sea. The project is a key part of Holcim Group's decarbonisation roadmap to meet its Net Zero Pledge. Negative emissions linked to the fuel containing biogenic carbon (considered as carbon neutral) allows the project to obtain 105% relative greenhouse gas emissions avoidance compared to the reference scenario.</p>
GreenH2	Small-scale green hydrogen production facility	<p>The Green H2 project, plans to produce green hydrogen using a 1 megawatt (MW) electrolyser system, strategically located next to the refinery in Gdańsk, Poland. The project's objective is to build a modular and scalable hydrogen production system, that includes an electrolyser powered by solar panels along with energy management and residual heat recovery systems. The green hydrogen produced will be used by the nearby refinery. The system will also include a storage facility for compressed hydrogen, so that the hydrogen produced can also be used for other sectors. The project aims to achieve a 100% relative greenhouse gas (GHG) emission avoidance over its first ten years of operation.</p> <p>The Green H2 project plans to modernise and decarbonise the current method of industrial hydrogen production. Hydrogen is currently produced through steam reforming of methane, a fossil fuel. This project will replace the current technology with electrolysis, powered by renewable electricity. The pilot project will therefore be producing hydrogen without the need for fossil fuels. Moreover, the project involves not only the integration of the electrolyser, but also an energy management system, heat recovery and a dedicated renewable energy source, which will maximize the energy and cost efficiency of the green hydrogen production process.</p> <p>The main innovation of the project is an unprecedented integration of these subsystems and their application in a full-scale installation. The green hydrogen that is produced will be connected to a refinery in Gdańsk. However, the installation will enable the creation of dispersed hydrogen production points, which can be tailored for other locations and applications. This will allow the green hydrogen that is produced to be used in other locations and sectors of the economy.</p> <p>Globally, hydrogen is produced primarily through the high-emission methane steam reforming process, which has an emission intensity of approximately 8.85 kg of CO₂ equivalent per 1 kg of hydrogen. The Green H2 project replaces this technology with a zero-emission and energy efficient process, with the option to re-use the waste heat produced by the electrolysis. It will directly contribute to reducing the GHG emissions of the refinery industry and create the possibility of producing emission-free hydrogen for use in other sectors of the economy. Implementation of the project will directly result in the avoidance of approximately 9 375 tonnes CO₂ equivalent over a period of ten years.</p> <p>The Green H2 project has a modular design with the option to scale up, which allows the operation of a distributed hydrogen production systems and thus the supply of hydrogen to local consumers. Such independence not only allows the development of a dispersed network of installations, but also the dissemination of green hydrogen as a decarbonised alternative to conventional fuels.</p>
NorthSTOR PLUS	NorthSTOR+: Industrialising Green Optimised Li-ion Battery Systems for ESS	<p>Energy Stationary Storage (ESS) is essential to decarbonise the energy sector as it allows maximum penetration of intermittent renewable energy generation by balancing generation and supply and ensuring system stability. ESS will thereby contribute to the displacement of carbon-intensive fossil fuel generation sources in the European electricity system, contributing to climate mitigation. It is estimated that ca. 108 GW of stationary battery storage is required in 2030 to meet EU decarbonisation targets. The deployment of batteries for ESS in Europe is immature and will require significant investments in product development and industrialisation. The current state of the art for Lithium-ion battery grid ESS solutions is Asian-produced LFP or High Cobalt NMC battery cells. These systems are bulky, inflexible and perform poorly on sustainability criteria such as embedded carbon content. There are also safety issues that have caused notable fire incidents.</p> <p>The NorthSTOR+ project aims to validate the technology development of an innovative energy stationary storage system (ESS) and to industrialise the production of the solution at a mass-scale. The final product, the Voltainer, features Lithium-ion ESS based on a battery cell originally developed for the automotive sector, resulting in larger and more energy dense than products currently available on the market. The Voltainer will offer superior characteristics in terms of performance, safety, costs, flexibility, connectivity, traceability and life-cycle environmental impact compared to state-of-the-art products. The project will result in 100% relative greenhouse gas emission avoidance compared to the reference scenario.</p> <p>At full capacity (2029), c. approx. 6 GWh Voltainer unit/a will be delivered. The absolute CO₂ saving over the initial 10 years of operation is estimated at 34,519,213 tonnes. The estimated net benefit for the end-customer is a cost reduction of 16,9-18,8% per kWh. >90% of value of components and equipment will be sourced from European supply chain.</p>
ZE PAK green H2	Investment in 5 MW green hydrogen production facility located in Konin, Poland	<p>Green H2 Project of ZE PAK SA envisages construction of first green hydrogen production installation for transportation purposes in Poland. The installation is planned to be built up sequentially with the first phase targeted at 5MW power gradually increasing up to 50MW depending on the dynamics of the future growth of the market.</p> <p>The electrolysis system will consist of 2 electrolyzers powered with own renewable sources (60% of electric energy consumption) as well as market sourced PPAs with suppliers of renewable power (40%). The main innovative component introduced by ZE PAK SA is the construction of self-designed electrolyzer stack. The final prototype is planned to allow for -15% CAPEX savings and +5% energy efficiency increase in comparison to available technologies.</p> <p>The entire H2 production volume of the installation will be destined for use within the transportation sector, which is Company's main strategic direction in terms of H2 development. ZE PAK SA's primary target market in the short term constitutes of fueling self-produced H2 public buses. Additional revenue stream (15% of overall revenues) of the installation will consist of sales of oxygen, which is a byproduct of the electrolysis process.</p> <p>With net emission generation per annum equal to 364 tonnes of CO₂ and expected production volume at 710 tonnes of Hydrogen, the GHG emissions per unit of hydrogen are</p>

Acronym	Title	Description
		<p>calculated at the level of 0.51 tCO2 equivalent / t H2 - significantly below both the EU ETS benchmark value (8.85 tCO2 / tH2) as well as the average value for 10 % most efficient installations.</p> <p>Project works have started in 2020, all feasibility, preparatory, permitting and construction works are planned to be completed in 1Q 2024. The Entry into Operations is planned for 1st of June 2024. ZE PAK SA has already covered part of the costs of the Project (2.1 mEUR; not included in budget of application to IF) which reflects Company's strong commitment to successfully launching the Project.</p>