



INNOVATION FUND

Driving clean innovative technologies towards the market

ZE PAK green H₂: 5 MW pilot green hydrogen production facility

The Innovation Fund is 100% funded by the EU Emissions Trading System



Project summary

ZE PAK (Coordinator), the largest private energy group in Poland, is undertaking active steps to become one of the leaders of the Renewable Energy Sources (RES) transformation in Poland.

The ZE PAK project aims to build a 5MW pilot water electrolysis system to produce green hydrogen for the public bus transport sector in Poland. The system is highly innovative as it contains a self-designed electrolyser stack that improves efficiency by 5% and reduces costs compared to a conventional technology. The hydrogen production capacity is expected to achieve 710 tonnes per annum (tpa) allowing to power ca. 84 buses, supporting the avoidance of 96% of greenhouse gas (GHG) emissions compared to a conventional technology.

COORDINATOR

ZE PAK

LOCATION

Konin Power Plant, Poland

SECTOR

Hydrogen

AMOUNT OF INNOVATION FUND GRANT

EUR 4 460 000

RELEVANT COSTS

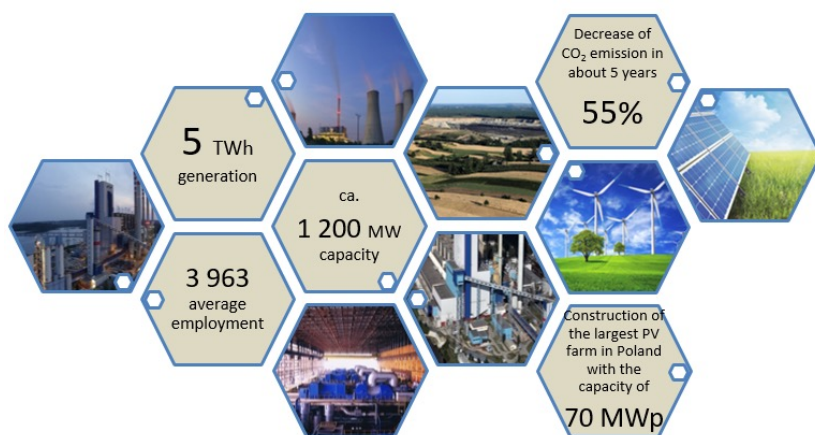
EUR 7 430 000

STARTING DATE

01 October 2021

PLANNED DATE OF ENTRY INTO OPERATION

01 January 2024



A self-designed electrolyser stack allowing energy efficiency and cost savings

The project introduces strong innovations relative to the state-of-the-art through the design, development and demonstration of a new Proton Exchange Membrane (PEM) electrolyser in a real environment to produce green Hydrogen for the public transport services in Poland.

The electrolysis system will consist of two 2.5 MW PEMs. The innovative solution will deploy advanced coating techniques for corrosion protection, enabling lower cost materials for bi-polar plates and an increased energy efficiency (5%), without impacting the electrolyser's long-term stability. The electrolysers will be powered by renewable sources, originating both from an on-site solar photovoltaic plant (60%) and from external suppliers (40%).

Decarbonising the transportation sector with a GHG competitive renewable fuel

The project will contribute to the development of a low-emission transportation market in Poland, by introducing new, innovative technologies in the sector of renewable fuels applications. As a first step, the project aims to refuel self-produced H₂ public buses sold to Polish Cities and commune services, substituting the use of traditional fossil fuel-powered buses.

In terms of GHG emissions per unit of produced hydrogen, the ZE PAK green H₂ project has a significantly lower level when compared to the EU ETS benchmark value, as well as the average value for the 10% most efficient installations of the same kind. The GHG emissions per unit of produced hydrogen account for 0.51 tCO₂e / tH₂ in the ZE PAK green H₂ project, while the EU ETS benchmark is 8.85 tCO₂ / tH₂ (representing 96% of avoidance). Overall, estimated net GHG emission avoidance from the project will be of 77 331 tCO₂e during its ten year long reporting period.

A hydrogen production solution with high scalability potential

The project has a high scalability potential at ZE PAK's project site, where it could be scaled from 5MW to 50MW in the period of 2024-2030, if future growth in hydrogen-powered bus sales is achieved. The project's technology could also be easily replicated at other sites. At the regional level, other cities in Poland have already shown interest in adopting the ZE PAK Green H₂ solution.

Additionally, the project's approach could be replicated in the short-term in already commercially viable sectors (e.g. forklift trucks sector) and in other sectors in the medium-term (e.g. railway and passenger cars sectors). In the longer-term there could be opportunities to exploit the technology for heavy-duty trucks, light vans and motorcycles, as well as the inland shipping sector).