



European Commission

## Innovation Fund Programme



### Overview of ongoing projects in Denmark

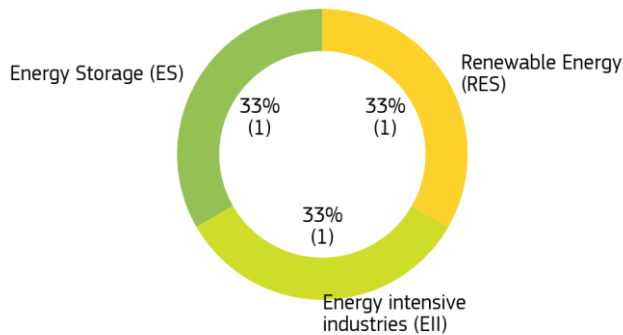
Funded by the revenue of the EU Emissions Trading System, the Innovation Fund's goal is to help businesses investing in innovative low-carbon technologies with significant GHG emissions reduction potential.

The Innovation Fund currently supports **3 projects** located in Denmark, which will contribute to the decarbonisation of European industries with a total expected GHG emission reduction of **7.7 Mt CO<sub>2</sub> equivalent in the first 10 years of operation**.

The total **Innovation Fund grant in Denmark is of EUR 128.3 million**, out of the **total relevant costs of EUR 282.5 million**, as defined in Art 5 of the Delegated Regulation 2019/856 on the Innovation Fund<sup>1</sup>.

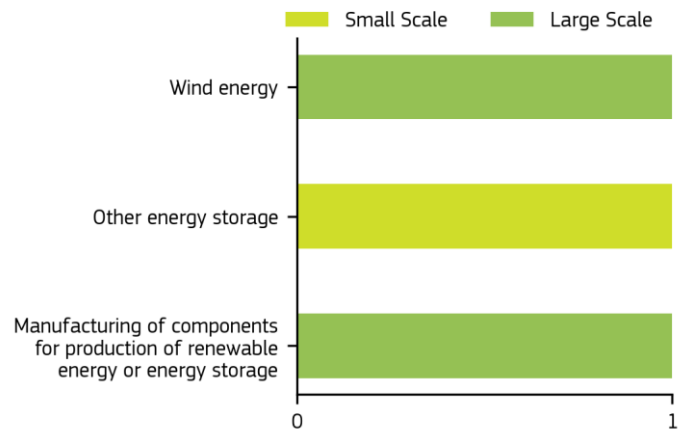
#### Projects per category

Number of projects and percentage of the total



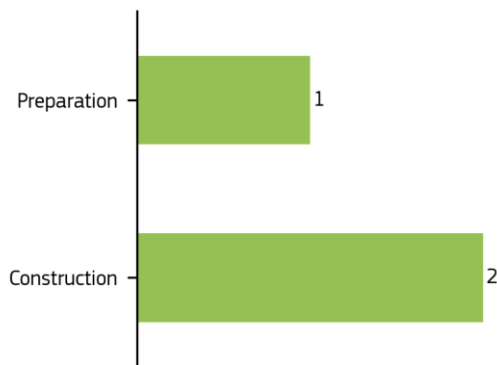
#### Projects per sector

Number of Small and Large-Scale projects



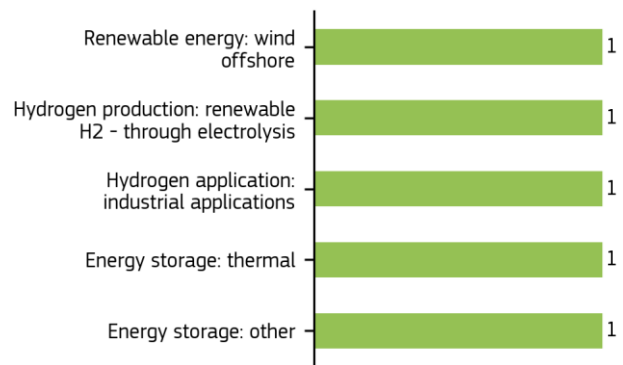
#### Projects per phase<sup>2</sup>

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 Denmark

| Acronym            | Title  | Sector   | Start date | Project phase | Beneficiaries              | Innovation Fund grant (EUR million) | Expected GHG emission avoidance (t CO2eq) |
|--------------------|--|--|------------|---------------|----------------------------|-------------------------------------|---|
| <b>Large Scale</b> |  |  |            |               |                            | <b>124.0</b>                        | <b>7,635,424</b>                          |
| HIPPOW             | Highly Innovative Prototype of the most Powerful Offshore Wind turbine generator | Wind energy  | 01/04/2023 | Construction  | SGRE-DK                    | 30.0                                | 55,424                                    |
| TopSOEC            | Topsoe SOEC Stack Module Factory   | Manufacturing of components for production of renewable energy or energy storage | 01/03/2023 | Construction  | TOPSOE AS                  | 94.0                                | 7,580,000                                 |
| <b>Small Scale</b> |  |  |            |               |                            | <b>4.3</b>                          | <b>37,073</b>                             |
| RockStore          | RockStore: accessible and cost-effective thermal energy storage                  | Other energy storage   | 01/01/2024 | Preparation   | HELIAC   FD   ARTHA Energi | 4.3                                 | 37,073                                    |

## Project overview

| Acronym   | Title  | Description   |
|-----------|--|---|
| HIPPOW    | Highly Innovative Prototype of the most Powerful Offshore Wind turbine generator | <p>The HIPPOW project will deliver the installation, operation, and testing of the world's most powerful offshore wind turbine prototype. The project will validate several new technological developments and obtain the necessary certifications, before starting full-scale production of Siemens Gamesa's next offshore wind turbine model. The prototype will be installed at the Wind Turbine Test Field of Østerild, Denmark, and will produce clean electricity with a 99.93% relative greenhouse gas (GHG) emission avoidance compared to the reference scenario.</p> <p>The innovative technologies are related to the nominal power, bearings, electrical system, installation of blades and tower, cooling system, and maintenance strategy, among others. The prototype will be the first of a kind due to its size and power rating, as well as the disruptive innovations implemented both in the product and in the installation process. These innovations go beyond the current state of the art by offering more efficient, reliable, and cost-effective solutions. The innovations will mainly contribute to the reduction of GHG emissions by producing renewable energy and circularity. The prototype will supply enough green energy to power around 7 000 average Danish households every year, reducing greenhouse gas emissions by 55 424 tonnes of CO2 equivalent (tCO2e) during the whole project duration.</p> <p>The HIPPOW project will contribute to the European Green Deal for a cleaner and more competitive Europe and the Circular Economy Action Plan in Europe. The future product will have a high impact on the decarbonisation of Europe and will reduce its dependency on fossil fuels, in line with REPowerEU Plan and the European ambitious targets of renewable energy capacity installation for the coming years.</p> <p>The project's ability to expand and adapt to different regions and markets is a strong indicator of its potential for scalability. Furthermore, the project's focus on sustainability and environmental impact is crucial in today's society, where businesses and industries must take responsibility for their impact on the planet. Full scale production of Siemens Gamesa's next generation offshore wind turbine, with manufacturing plants located in different countries of the EU, will allow the creation of new jobs, contributing to the economic growth of Europe and ultimately benefiting the wider economy.</p>   |
| RockStore | RockStore: accessible and cost-effective thermal energy storage                  | <p>Rockstore: Accessible and cost-effective thermal energy storage</p> <p>This project demonstrates the commercialisation of 'Rockstore', a granite-based thermal energy storage solution with the ability to store thermal energy at around 300°C. This demonstration will show that bridging the supply and demand gaps in renewable energy production and consumption provides a substantial emission avoidance. It will also demonstrate a 100% relative Greenhouse Gas (GHG) avoidance compared to the reference scenario. The key innovation of Rockstore is the provision of heat storage in the ideal range between: Cold storage solutions (&lt;100°C) which are too cold for combined heat and power production, and superhot air storage solutions (&gt;500°C), which are too hot for conventional Combined Heat and Power (CHP) equipment. This sweet spot between the two will make it commercially available to district heating plants connected to an electricity grid with a high intermittent renewable energy mix, which is applicable to many Danish and European cities.</p> <p>Rockstore possesses the capability to deliver electricity rapidly and can offer power backup for several hours by using granite rocks in large steel tanks to store heat up to 330°C. Rockstore tanks are charged and discharged by using an eco-friendly oil that interfaces with the user's heat systems through a standard heat exchanger. The system allows for an increase in capacity, displaying the ability to store and release thermal and electrical energy at a lower cost compared to existing technologies, thus facilitating greater integration of renewable energy sources.</p> <p>Rockstore's ability to charge with excess electricity and deliver heat and stored power independently from wind and solar production, particularly during periods of high energy demand, will aid European Union member states in meeting their 2050 and 2030 targets outlined in the European Climate Law. Additionally, this technology contributes to the objectives of the European Green Deal by helping ensure affordable and consistent energy prices. By enabling a higher energy security in an electricity grid with a high mixture of renewables, the EU will be less reliant on imports of natural gas, which is a target stated in the REPowerEU initiative.</p> <p>RockStore will produce heat to an existing 3rd party district heating grid, proving that renewable electrified heat production can be obtained at a low, stable price. The project also aims to displace total energy production of the system to 15.5 GWh thermal and storing heat exceeding 100°C, without putting stress on the electrical grid during peak periods in the demand curve, and paving the way for future projects.</p> |
| TopSOEC   | Topsoe SOEC Stack Module Factory   | <p>The project aims to construct a 500 megawatt (MW) Solid Oxide Electrolysis Cell (SOEC) stack module manufacturing facility in Herning, Denmark. This initiative will enable Topsoe to deliver the highly efficient SOEC electrolyser technology. This technology is essential for producing the renewable fuels and chemicals that are needed in hard-to-abate sectors, where direct electrification is not currently feasible. With a 100% relative greenhouse gas emission avoidance compared to the reference scenario, the project will support the swift decarbonisation of carbon-heavy industries and, by extension, contribute to the European Union's efforts to reach its climate neutrality target by 2050.</p> <p>Production will begin in 2024 with an initial annual electrolyser stack module manufacturing capacity of 500MW, and by 2031 the facility's production is projected to grow to 1.4 gigawatt (GW) annually. There is further potential to expand this capacity to 5GW annually. The defining innovative feature of the technology is its efficiency, leading to estimated electricity savings of 20-30% compared to current production methods. These electricity savings are therefore driving down the levelized cost of hydrogen production (LCoH), making</p>  |

| Acronym | Title | Description  |
|---------|-------|--|
|         |       | <p>green hydrogen and its derivatives competitive alternatives to fossil fuels. Overall, the project plans to reduce greenhouse gas emissions by approximately 7.6 million tonnes of CO2 equivalent over the first ten years of operation.</p> <p>The project is particularly beneficial for hard-to-abate sectors, such as steel manufacturing and fertilizer production, which have prevalent high operational temperatures and technologies which produce waste heat. This is because the waste heat from these processes can be channelled back into the electrolysis, enhancing energy efficiency, minimising costs, and ultimately producing more green hydrogen per total power input. Furthermore, the environmental footprint of the technology is notably smaller than alternative electrolysis technologies as it avoids the need for noble metals, providing a further competitive advantage.</p> <p>The manufacturing facility will also create 200 direct job opportunities. Additionally, the facility will indirectly create numerous additional job opportunities spanning from supply chain operations, building and maintenance, infrastructure, logistics, and more. This manufacturing facility will also further add to Herring's growing reputation as a centre for climate-focused businesses and contribute to the growing local economy.</p> |