



# NET-ZERO INDUSTRIES

MISSION



## Project Title

**World's Largest Manufacturing Plant for High-Temperature Electrolyzer Technology**

### Industry Partner

Topsoe A/S

### Industry Sector

Other Energy Intensive & Hard to Abate

### Technology Pathway (Primary)

Low-Carbon Hydrogen

### NIM Pillar

Technology Demonstration

### Source

IRENA (AFID)

### Description

Topsoe is a leading provider of technology solutions for the energy transition. Building on decades of exceptional R&D experience, Topsoe has been developing cutting-edge solid oxide electrolyzer cell (SOEC) technology, offering superior performance and reliability.

Indeed, Topsoe's high temperature technology can produce between 20% – 30% more hydrogen per unit of power input than conventional electrolyzer technologies. When coupled with technologies that produce waste heat – such as ammonia or steel production Topsoe's SOEC electrolyzers can realize the industry's lowest levelized hydrogen cost at megawatt or gigawatt scale. This makes it ideal for chemical or e-fuel production.

To bring this technology to market and contribute to decarbonizing heavy emitting sectors, Topsoe is building the world's largest SOEC manufacturing plant in Herring, Denmark. Topsoe expects the clean hydrogen produced by its Herring electrolyzers to reduce more than 40 million metric tons of CO<sub>2</sub>-equivalent emission over the first 10 years of operation versus conventional hydrogen produced with unabated fossil fuels.

Supported by a €94 million grant from the EU's Innovation Fund, one of the largest funding programs for innovative low-carbon technologies, Topsoe is set to operationalize its new SOEC manufacturing facility this year. The factory's initial capacity will be 500 megawatts (MW) of SOEC units, with the potential to expand to 5GW over time.

The Herring facility, spanning 23,000 square meters, will directly employ around 150-200 people and create additional job opportunities through its supply chain, construction, and maintenance. It is Topsoe's biggest investment to date.

Topsoe has also formed an alliance with ABB and Fluor to design a standardized concept for electrolyzer manufacturing facilities. This alliance will start with the construction of a new \$400 million SOEC facility in Virginia, USA, recently announced by Topsoe and pending final investment decision. The experience gained from the Herring facility will benefit the Virginia factory, along with the implementation of a standardized concept and new efficiencies.

### Innovations Employed

The SOEC manufacturing plant in Herring aims to bring to market an innovative electrolyzer technology, that offers 20-30% more efficiency than conventional conversion technologies, to enable low carbon and low cost hydrogen production.



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<b>Project Title</b>	<b>World's Largest Manufacturing Plant for High-Temperature Electrolyzer Technology</b>
	Topsoe's Solid Oxide Electrolysis Cells (SOEC) factory in Herning, Denmark, will begin operations in late 2024 with an initial capacity of 500MW per year. The factory will manufacture advanced, energy efficient Solid Oxide Electrolyzer Cells (SOEC) that are essential in the production of green hydrogen and its derivatives. With the option to expand to 5GW, this plant will play a significant role in supporting the ramp up of renewable hydrogen production going forward.
<b>Dimension of Novelty</b>	NR
<b>Innovation Collaboration</b>	Contact information - Asmara Klein - AKLN@topsoe.com
<b>Intellectual Properties</b>	NR
<b>IP Links</b>	Not found
<b>Timetable &amp; Progress</b>	Herning will be up and running in Q4 2024.
<b>Financing (Public/Private)</b>	
<b>Finance Links</b>	
<b>Project Phase TRL</b>	TRL 8-9
<b>Problems to be Solved and Risks to be Managed</b>	
<b>Preliminary or Final Results Achieved</b>	The summary will be published in "Open Book on Projects" at AFID and MI websites
<b>CO2 Emissions Reduction Potential - Implementation and Future Market</b>	NR
<b>Market Positioning</b>	NR
<b>Project Location</b>	Herning, Denmark
<b>Project &amp; Technology Links</b>	<a href="#">Topsoe A/S Herning SOEC Manufacturing Facility</a>
<b>Technology Links</b>	<a href="#">Press Release - Topsoe confirms final investment decision</a> <a href="#">Press Release - Topsoe awarded EUR 94 million from the EU's Innovation Fund to build SOEC factory</a> <a href="#">Topsoe's electrolyzer demonstration plant delivers strong results</a> <a href="#">General information about Topsoe's SOEC technology: SOEC high-temperature electrolysis</a>