



**Making an impact
on the clean
energy transition**

ENERGY

DEMANDING A SUPPLY



© Elcogen

Ready to roll

Power-to-gas and gas-to-power technologies play a key role in the energy transition. As the most efficient, flexible, durable and environmentally friendly of these technologies, solid oxide fuel cells (SOFC) and solid oxide electrolyser cells (SOEC) are valuable decarbonising tools for Europe. However, costly and time-intensive manufacturing processes are impeding their mass deployment and preventing them from reaching their full potential.

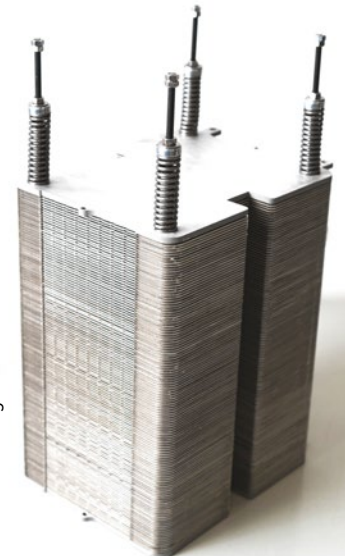
By 2017, the FCH JU-funded NELLHI project had developed a mass-producible, high-performance SOFC stack. More recently, projects like SOSLeM have increased performance and production speed, while the qSOFC project has reduced the cost of SOFC stacks by automating the manufacturing process.

Now, the HEATSTACK project is working to cut the cost of the two most expensive components – the stack and the heat exchanger – by 60 %.

The knock-on effect

The developments made in the solid oxide fuel cell industry has also led to the establishment of European companies as leaders in the sector of solid oxide electrolysis. Projects such as GrInHy are bringing the new technologies to the steel industry, while CH2P is using them in clean transport. Project breakthroughs have enabled manufacturers like SOLIDPOWER and Elcogen to expand production, further cutting costs. Leading manufacturer, Sunfire, plans to produce thousands of micro-CHP systems using new automated processes, while the REFLEX project uses new reversible solid oxide cell (rSOC) technology in a renewable energy storage solution. Looking more into the future, with the use of 3D printing, the Cell3Ditor project could enable the manufacture of SOFC stacks at unprecedented speed and scale.

Solid oxide technology presents one of the most promising routes to a low-carbon economy. By funding the development of increasingly marketable, cost-effective and efficient technologies, the FCH JU is nourishing a thriving supply chain for the European solid oxide industry.



© Elcogen



TOOL FOR CHANGE

Although solid oxide technology is a valuable tool for decarbonising Europe's industry, transport, heating and energy sectors, it has yet to reach mass deployment.

TAKING THE LEAD

The FCH JU is ensuring that Europe stays at the forefront of solid-oxide-based technologies by accelerating the development towards cost-effective mass production. **The goal?** To bring together leading technology providers in the supply chain with extensive industrial experts to advance the design and industrialisation of core manufacturing processes and exploit the results to open up new markets. **Key results?** European SOFC and SOEC manufacturers are expanding and upscaling.

IMPACT

Heatstack

1 000 MICRO-CHP SYSTEMS
to be produced using automated
production from 2020

qSOFC

1-2.5 GW
potential power from existing biogas
using SOFC

50 MW/YEAR EXPANSION
of Elcogen production facilities

**Succesfull projects qSOFC and
NELLHI contributed to Elcogen
signing 12 million loan from
European Investment Bank to expand
manufacturing facilities to 50MW/
year**

KEY ACHIEVEMENTS

Heatstack

INCREASE IN MANUFACTURING SPEED AND QUALITY
of the Cathode Air Pre Heaters

REDUCTION IN STACK MANUFACTURING COST
due to process improvements developed by Sunfire

qSOFC

RESEARCH & INNOVATION DAYS
disseminating qSOFC's optical-recognition system for quality control

500 €/kW STACK COST REDUCTION
potential at 2 000 MW/year production volume

200 €/kW CELL COST REDUCTION
potential at 2 000 MW/year production volume

SOSLeM

70 % REDUCTION IN MANUFACTURING COSTS
for fuel-cell cassettes

CAPITAL COST DECREASED TO 3 700 €/kW
The SOSLeM project was a key factor contributing to the new production plant currently under construction in Italy by SOLIDpower which will increase production capacity to 25MW/y initially and potentially up to 50MW/y, creating many new high quality employment opportunities.

FIND OUT
MORE



www.fch.europa.eu/page/fch-ju-projects

www.soslem.eu
www.heatstack.eu
www.qsofc.eu

www.demosofc.eu
<https://ch2p.eu/>



**FUEL CELLS AND HYDROGEN
JOINT UNDERTAKING**

A partnership dedicated to clean energy and transport in Europe



@fch_ju
@HEATSTACK_EU