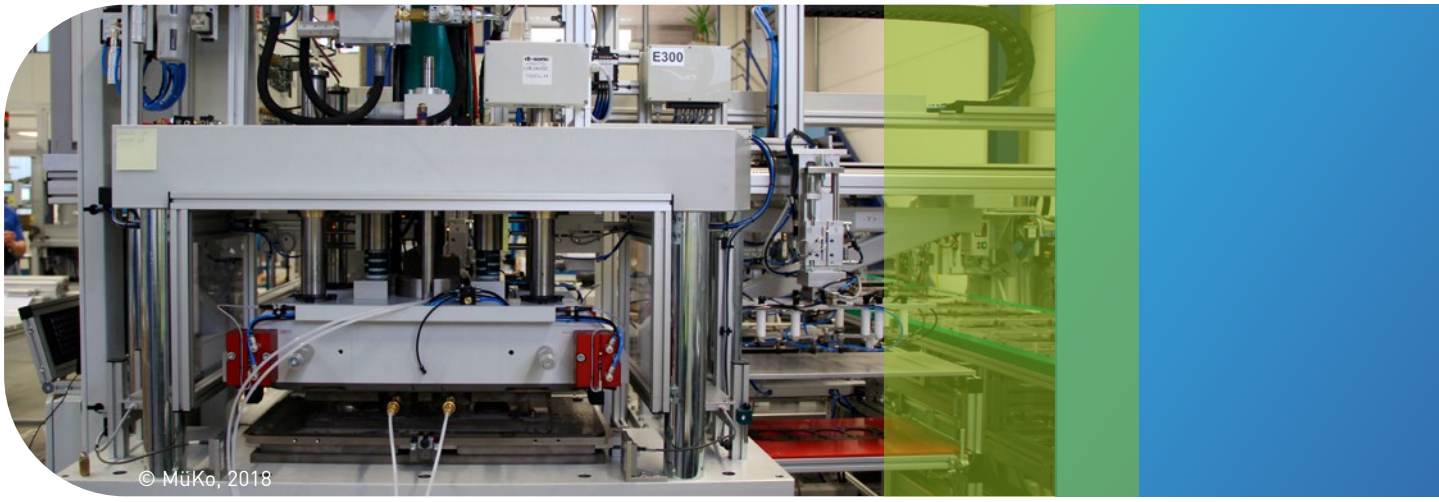
Making an impact on the clean energy transition

ENERGY

MID-SIZED SOFC SYSTEMS BREAK PRODUCTION-COST BARRIERS



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Innovation to demonstration

Solid-oxide fuel cells (SOFCs) enable households and businesses to produce low-carbon electricity and heat. FCH JU projects, such as ENE.FIELD and PACE, have helped the development of affordable mass-produced small 0.5-1.5 kW SOFCs. Larger systems of 50 kW or more must be researched and improved now to become competitive.

FCH JU projects are addressing this need. NELLHI developed components and stack properties to boost manufacturing rates and reduce the cell price of a high-performance 1 KW stack. qSOFC then enhanced manufacturing and automated quality control, making costs of EUR 1 100/kW possible for the production of 10 MW/year or more. Following on, INNO-SOFC integrated the NELLHI stack into a second-generation version of a system from earlier project DEMOSOFC to create a high-efficiency, long-lasting 50 kW system that can be mass-produced at below EUR 2 000/kW. Finally, ComSos is building on these projects, with European manufacturers, to demonstrate next-generation commercial-size systems and to test business models.

A commercial future

The projects contribute to a European supply chain for affordable, reliable mid-sized SOFC systems. European specialist supplier SMEs received 63 % of the available funding from INNO-SOFC and 87 % from ComSos. A machine-vision inspection system and interconnection and coated-steel materials production from qSOFC are already being commercialised. Meanwhile, INNO-SOFC results are being used in a system in a smart grid in Finland and have been **modelled** for other applications (see results tab). Overall, the innovations pave the way to better quality control and scaled-up manufacturing and production capacities, enabling competitive full-cell CHP systems. Third-generation systems are now being developed in projects CH2P and SWITCH.

A 60 kW (C60) hydrogen heating and power system developed from a range of FCH JU-funded projects costs less to build than existing models and has a fully European supply chain. Demonstrations of the systems in real applications are boosting manufacturing volumes and supporting the business case for their application.


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FCH JU Success Stories >

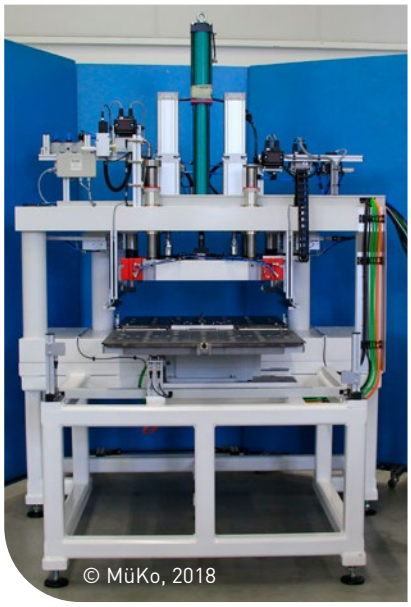
MID-SIZED SOFC SYSTEMS BREAK PRODUCTION-COST BARRIERS

AFFORDABLE MID-SIZED SOFC

SOFC heating and power systems of up to 60 kW (C60) are currently expensive to manufacture and buy, limiting access to the technology and related jobs in Europe.

GREENER ENERGY AND JOBS

FCH-JU-funded collaboration between European specialised companies and research institutions have improved components and assembly of mid-sized SOFC stacks and systems. **The goal?** To develop reliable technology that is cost-efficient and with fast manufacturing processes. **Key results?** Systems, components, materials and production technology have been improved and are ready for commercialisation or development to the next generation.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KEY ACHIEVEMENTS

qSOFC

50 MW/year
production volumes possible from advanced cell manufacturing

10-µm scale
of visual inspection for defects at 10 s/cell

NELLHI

74 %
stack electrical efficiency at 1-kW scale

650 ºC
operating temperature

INNO-SOFC

61.4 %
system electrical efficiency

60 kWe
second-generation SOFC system

ComSos

20 FUEL CELLS
to be deployed; with total installed capacity of 500 MW

3 EUROPEAN MANUFACTURERS
are joining forces

IMPACT

ENABLES FULL EUROPEAN SUPPLY CHAIN
for affordable, efficient, adaptable SOFC of up to 60 kW

qSOFC

HIGHLIGHTS POTENTIAL OF THE TECHNOLOGY
– project awarded the EU's Innovation Radar Prize 2019

REDUCES MANUFACTURING COSTS
through advanced interconnects, conditioning and inspection technology

NELLHI

CONFIRMS EUROPEAN LEADERSHIP
in SOFC technology, with first stack electrical efficiency of 74 %

INNO-SOFC

PROMOTES TAKE-UP OF LOW-EMISSION HEATING AND POWER
by enabling competitive systems that can be tailored to local needs

ComSos

EXPECTED TO DE-RISK SCALE-UP INVESTMENT
in a high-potential emerging market

FIND OUT MORE

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

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