



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

ENERGY

EXPANDING FUEL-CELL APPLICATIONS FOR GREENER INDUSTRIES



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Clean, circular energy

The concept of a circular economy has gained significant prominence, becoming more widespread and pervasive over the last 10 years. Taking into account the whole product life cycle, the circular economy offers an alternative model that promotes reuse, repair, refurbishment and recycling, recuperating rare raw materials and transforming waste into a resource. The FCH JU is also supporting projects in line with the circular economy as fuel cell technologies enable the production of clean energy from fuels resulting from waste treatment.

Fuel cells at the core of energy transition

The DEMOSOFC project is bringing into operation the largest biogas-fed fuel cell plant in Europe. The waste-water treatment process generates sludge, normally treated as a waste. Thanks to the biological anaerobic digestion, sludge is turned into biogas comprising methane and carbon dioxide. In Italy, a 174 kWe system¹ consisting of three modular solid oxide fuel cells recovers the biogas produced by Turin's waste-water treatment and uses it to generate zero-emission energy.

Most waste water in Europe and beyond is treated in facilities with a technical biogas potential below 500kWe. Fuel cells offer much higher power conversion efficiencies and are also cleaner than conventional technologies as they do not rely on combustion. This project also exemplifies the increasing range of fuel-cell applications, and their attractiveness within the service and small industry sectors.

¹ 2 of the 3 modules adding to a total of circa 100 kWe already installed and running.

Fuel cell hydrogen technology can play an important role in greening the service and industry sectors in support of a circular economy. FCH JU projects are developing innovative solutions for waste-to-energy conversion and to help the transition to a carbon neutral future.

The focus now is on scaling up the technology, improving performance and reducing costs, along with applying these solutions to meet circular economy goals through system-wide innovation.



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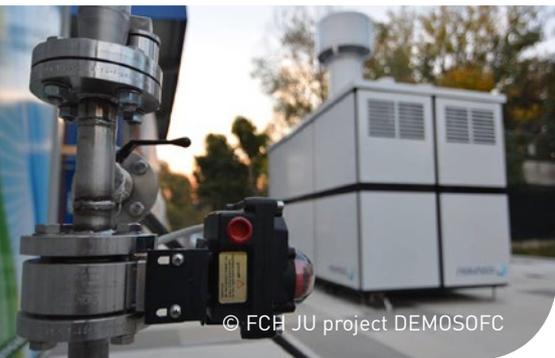


FCH TECHNOLOGY, THE NEXT LEVEL

By scaling up fuel-cell technology, the aim is to improve performance and reduce costs to meet the needs of different applications. The FCH JU is also supporting research activities for cutting the costs associated with conditioning the biogas product.

MANY APPLICATIONS, MUCH POTENTIAL

Supporting a first-of-its kind installation, the FCH JU is showcasing the benefits of fuel cells in reducing pollution and carbon emissions. **The goal?** To increase interest and scale up the technology while cutting costs. **Key results?** The fuel-cell plant generates zero-emission energy as it is CO₂ neutral and emits no contaminants into the air. The replication potential for this type of installations is significant: it is estimated that 90 % of the waste-water treatment plants in Europe could use the same technology. In addition, this and other FCH projects have led to the development of the next generation of the technology, which will be demonstrated in the later stages of DEMOSOFC.



KEY ACHIEVEMENTS

FIRST-OF-ITS KIND INSTALLATION
largest biogas-fed fuel-cell plant in Europe

ZERO CARBON EMISSIONS AND CONTAMINANTS
released from electrical and thermal power generated by DEMOSOFC's SOFC plant

>50 % NET ELECTRICAL EFFICIENCY

85 % COMBINED HEAT AND POWER EFFICIENCY
exceeding power efficiencies achievable with conventional CHP technologies of the same size

>7 000 HOURS OF OPERATION
reaching availabilities of up to 91 %

EUR 4.5 MILLION OF EU FUNDING FOR THE FUEL CELL
with additional regional funds providing the biogas clean-up unit

IMPACT

MORE THAN 26 800

Waste-water treatment sites in Europe (90 % of the total) could use the waste-to-energy technology being developed in the DEMOSOFC project

20 GWe MARKET POTENTIAL BY 2030 OF FUEL CELLS OF 5 TO 100 KWe
equivalent to EUR 1 200 million European production value

NEXT GENERATION OF THE FUEL-CELL TECHNOLOGY AVAILABLE
achieving better performances and lower costs



www.fch.europa.eu/page/fch-ju-projects
<http://www.demosofc.eu/>



FUEL CELLS AND HYDROGEN
JOINT UNDERTAKING

A partnership dedicated to clean energy and transport in Europe