

COMSOS

COMMERCIAL-SCALE SOFC SYSTEMS



Project ID	779481
PRR 2024	Pillar 4 – H ₂ end uses: stationary application
Call topic	FCH-02-11-2017: Validation and demonstration of commercial-scale fuel cell core systems within a power range of 10–100 kW for selected markets/applications
Project total cost	EUR 10 277 897.50
Clean H ₂ JU max. contribution	EUR 7 486 954.75
Project period	1.1.2018–31.8.2023
Coordinator	Teknologian tutkimuskeskus VTT Oy, Finland
Beneficiaries	Convion Oy, Energy Matters BV, Politecnico di Torino, Solidpower GmbH, SolydEra SA, SolydEra SpA, Sunfire GmbH

<https://www.comsos.eu/>

PROJECT AND GENERAL OBJECTIVES

The key objective of the Comsos project was to validate and demonstrate fuel-cell-based combined heat and power solutions in the medium-sized power ranges of 10–12 kW, 20–25 kW and 50–60 kW (referred to as mini fuel cell combined heat and power (mini-FC-CHP) solutions). The core of the project consortium consisted of three solid oxide fuel cell (SOFC) system manufacturers aligned with individual strategies along the value chain: Solidpower (SolydEra), Sunfire and Convion.

NON-QUANTITATIVE OBJECTIVES

The overall objectives of the Comsos project were as follows:

- demonstrate and validate a mini-FC-CHP solution;
- promote the worldwide leadership of the EU in the mini-FC-CHP market;
- leverage micro-CHP volumes and cost reductions in additional fuel cell applications;
- confirm the presence of investment opportunities for additional job creation for mini-FC-CHP solutions.

PROGRESS AND MAIN ACHIEVEMENTS

During the project, 321 kW_e of SOFC power was installed in customer sites when the requirement was 450 kW_e. Sunfire (150 kW_e) and Convion (120 kW_e) reached the installation target but SolydEra did not (51 kW_e). However, an additional 81 kW_e of SOFC power was constructed by SolydEra but not installed in customers' sites before the end of the project. These already-constructed units were planned to be installed in customer sites after the project. Total SOFC power constructed during the project was therefore around 400 kW_e. In addition, not all installed units achieved 9 000 demonstration hours, but at least one unit from each manufacturer could have

reached the 9 000-hour requirement if end users had run the systems all the time. However, for an unknown reason some end users shut down the systems every now and then. For these users, the 9 000-hour target was not always reached in practice, even if from the point of view of the system it was possible.

- All five Sunfire systems (150 kW) were installed at customers' sites.
- Both Convion systems (120 kW) were installed at a customer's site.
- The first three Solidpower (SolydEra) systems (51 kW) were installed at a customer's site.

Each unit type from the manufacturers fulfilled the performance and emission targets of the Comsos project: an electrical efficiency greater than 50 % and NO_x emissions lower than 40 mg/kWh.

FUTURE STEPS AND PLANS

The project has finished.



PROJECT TARGETS

Target source	Parameter	Unit	Target	Achieved to date by the project	Target achieved?
MAWP (2014–2020)	Electrical efficiency	%	> 50	> 50	✓
	NO _x emissions	mg/kWh	< 40	< 40	✓
	Durability	years of plant operation	10	2	⚙️
Project's own objectives	SME participation	%	25	50	✓