

Solid Oxide Fuel Cells and their benefits

Solid Oxide Fuel Cells are particularly well suited for energy generation purposes in stationary applications: ideal applications range from single and multi-family homes to residential and public buildings, as well small and medium enterprises.

In general, SOFC technology is the ideal solution for structures with a constant and significant base load of energy, hence also Data Centres are increasingly adopting it.

Some advantages:

- Very high electrical efficiency
- Manufacturing with low cost materials
- Fuel-flexible: can be operated with a wide range of fuels
- High operation temperatures allow use of the heat for cogeneration
- Low emission technology (potentially zero-emission with hydrogen)

SOFC is an emerging energy technology, that is becoming competitive and is on the verge of making the step to mass production: SOFC technology owes its current success to its variety of possible applications and advantages, as well as the still high margin for cost reduction.

Large players from different fields are increasingly recognising the high-potential of the SOFC technology. Below we mention some:

- Bosch Thermotechnology signed a deal with SOLIDpower, the SOSLeM project coordinator, for the commercialisation of their SOFC-based BlueGEN m-CHP unit
- Microsoft launched a revolutionary project that aims at changing the energy supply of data centres, based on the SOFC technology of SOLIDpower, European SOFC manufacturer
- More than 1.000 BlueGEN units have been manufactured and sold by SOLIDpower, mainly in Europe

Presently, Europe has the global technology leadership in SOFC technology, securing scientific excellence and jobs in Europe. SOLIDpower currently employs around 240 people and manufactures the product with the highest electrical efficiency worldwide (BlueGEN).

SOLIDpower's Plant 3

Currently, SOLIDpower is building its Plant 3 which allows for a massive expansion of production capacity for SOFC

Plant 3 in figures:

- Plant 3 phase 1 production capacity: 25 MW/y
- Plant 3 potential overall production capacity: 50 MW/y
- Plant 3 operation to start between 2018/2019
- Ca. 7.000 m² area
- Ca. 20 million € investment
- 80 new employees – green jobs created by 2020
- Industry 4.0 manufacturing plant

Funding Programme:



Horizon 2020 Framework Programme
of the European Union

Fuel Cells and Hydrogen Joint
Undertaking

H2020-JTI-FCH-2015-1 (RIA)

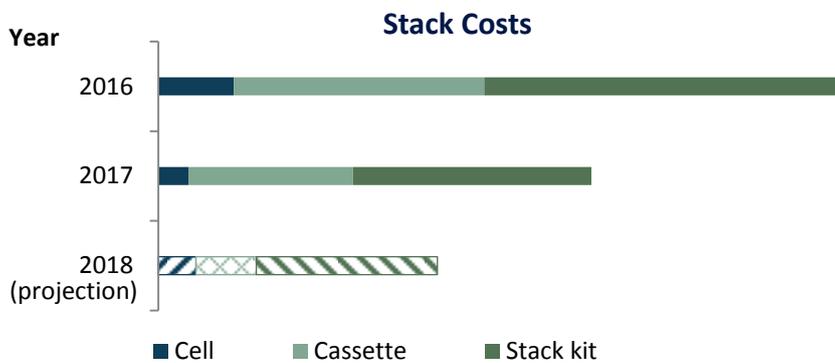
Project Duration:
01/04/2016 – 31/03/2019

Project Budget:
2.85 million euro

Project Website:
www.soslem.eu

SOSLeM Solid Oxide Stack Lean Manufacturing

A key factor contributing to the new Plant 3 was a significant cost reduction and optimisation of production processes which were researched and developed as part of the SOSLeM project, funded by the Fuel Cells and Hydrogen Joint Undertaking and the Horizon 2020 Framework Programme of the European Union. Since the start of the project in 2016 it has led to a current cost reduction of over one third and is projected to be reduced to 40 % of initial costs in 2018.



Key suppliers of SOLIDpower participating in the project

Many of SOLIDpower's key suppliers are collaborating to reduce the costs of SOFC technologies and benefit further as a network:

- Collaboration between Greenlight Innovation Corp. and AVL List GmbH; both leading manufacturers of test equipment for fuel cells and batteries, with 15 years of fuel cell monitoring expertise based on patented technologies.
- Innovative End-of-Line Testing Methodologies for SOFC and PEM; Pseudo-Random-Binary-Signal (PRBS) Excitation, Periodic broadband excitation, Intermodulation Analysis, Total Harmonic Distortion Analysis / THDA, Fast-EIS (multi-frequency impedance spectroscopy).
- Athena SpA are already using their initial SOSLeM results on their shop floor in Italy and will benefit from being a key supplier to SOLIDpower.
- HTceramix SA are exploiting their results as being a part of SOLIDpower. SOSLeM results have already been used and integrated in an updated product design of SOLIDpower.



High-End FC-Stack End-of-Line Testing:
AVL X-ION™ with Excellent Background Noise



Greenlight GI Perturbation Unit

Project Coordinator:



Marco Alberani,
SOLIDpower SpA, IT
marco.alberani@solidpower.com

Project Participants:



AVL List GmbH, AT



Athena SpA, IT#



ÉCOLE POLYTECHNIQUE
FÉDÉRALE DE LAUSANNE

EPFL Ecole Polytechnique Fédérale de
Lausanne, CH



Greenlight Innovation GmbH, DE



HTceramix SA, CH