

SOSLeM

Solid Oxide Stack Lean Manufacturing

Background

Fuel cells convert the chemical energy stored in a fuel, e.g. hydrogen into electricity. They are one of the most effective technologies for energy conversion known so far and have the potential to significantly contribute to future decentralised electric power grids with a variety of technical advantages. In particular, stationary fuel cells will be able to reduce carbon dioxide emissions as well as dependencies on fossil fuels and may also help to compensate efficiently load variations in the power grid caused by fluctuating renewable energy generation, e.g. from solar or wind energy sources.

However, market penetration of fuel cells is currently hampered by comparably high production costs. SOSLeM is tackling this problem by improving production processes as well as developing and applying novel manufacturing technologies for fuel cell stacks.

Objectives

The SOSLeM project aims at reducing manufacturing costs for fuel cell stacks while at the same time making production more resource efficient and realising environmental benefits. Specifically, the project will:

- Develop new and optimised processes for the production of the fuel cell cassettes by lean manufacturing processes, improved sealing adhesion on cassettes, using anode contact layer laser welding and automation of the welding process.
- Improve stack preparation by advanced glass curing and stack conditioning and improved gas stations.
- Enable environmental benefits by on-site nickel removal from waste water.
- Reduce production time and costs and improve flexibility by large furnace arrangement, introduction of a multi-stack production station.

The improvements will sum up to a reduction of manufacturing costs of about 70%, leading to decreased capital costs of about 2.500 €/kW.

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:

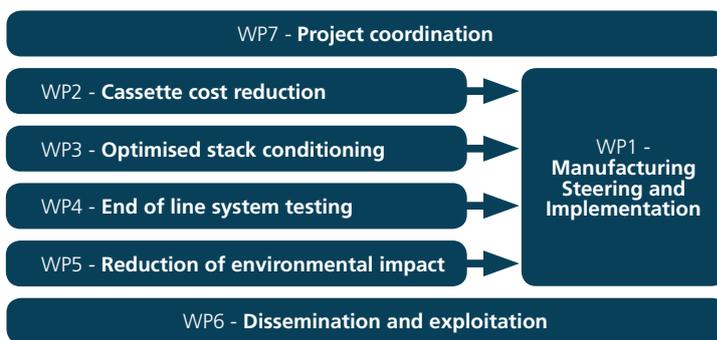
2.85 million euro

Project Website:

www.soslem.eu

Activities

Five technical work packages (WPs), one dissemination and exploitation WP and one project management WP have been set up to achieve the challenging targets.



The breakdown is based on the technical content of the work and the organizational conditions and requirements of this research and innovation project. The goal is to provide easy management through segmentation of work while optimizing the cooperation between partners in different activity blocks and supply chains. The project will be coordinated by SOLIDpower and the technical WPs are managed by leading edge industrial and research partners

Impact

The SOSLeM project will have significant impacts in the following main domains:

- **Performance and efficiency of the production line:** Fast feedback of a powerful end-of-line quality monitoring-tool enables to reduce the response time inside the manufacturing line to counteract against loss of quality or reliability. And less rejects increase performance and efficiency of the production line.
- **Production costs:** Fast recognition of defects reduces the amount of outage. And identification of the root cause of outage empowers the manufacturer to implement countermeasures.
- **After-sales costs:** For the SOFC technology it is crucial to increase the reliability of the stacks. Outage at customer sites provokes an image loss for this new technology in the public and causes extra maintenance costs.
- **Lifetime:** The lifetime of the ceramic and glass-based SOFC stacks depends heavily on the structural integrity of the brittle material in use. One goal is the detection of material defects at the end-of-line (sealing failure, poor contact due to assembly issues, improper gas distribution).

In summary, the impact of SOSLeM has quantum-leap potential for European manufacturing and market penetration of solid oxide fuel cells in the highly competitive global fuel cell markets.

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