SOSLeM
Solid Oxide Stack Lean Manufacturing

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Programme Review Days 2019

Brussels, 19-20 November 2019

PROJECT OVERVIEW

- Call year: 2015
- Call topic: FCH-02.6-2015 Development of cost effective manufacturing technologies for key components of fuel cell systems
- Project dates: 01.04.2016 – 31.03.2019
- % stage of implementation 01/11/2019: 100 %
- Total project budget: 2.85 million €
- FCH JU max. contribution: 1.99 million €
- Other financial contribution: 0.86 million € (CH)
- Partners: SOLIDpower, AVL, Athena, EPFL, Greenlight Innovation, HTceramix

PROJECT SUMMARY

SOSLeM aims at facilitating the market penetration of fuel cells by reducing the production costs of solid oxide fuel cell (SOFC) stacks

- Improvement of production process
- Novel manufacturing technologies
- Reduction of manufacturing costs by about 70%

In terms of industrial SOFC applications in Europe, SOLIDpower represents the State-of-the-Art

The stationary applications of Solid Oxide Cells address a large number of market areas, from Cogeneration of Heat and Power and Energy Storage, to Power-to-Gas or Power-to-Fuel applications

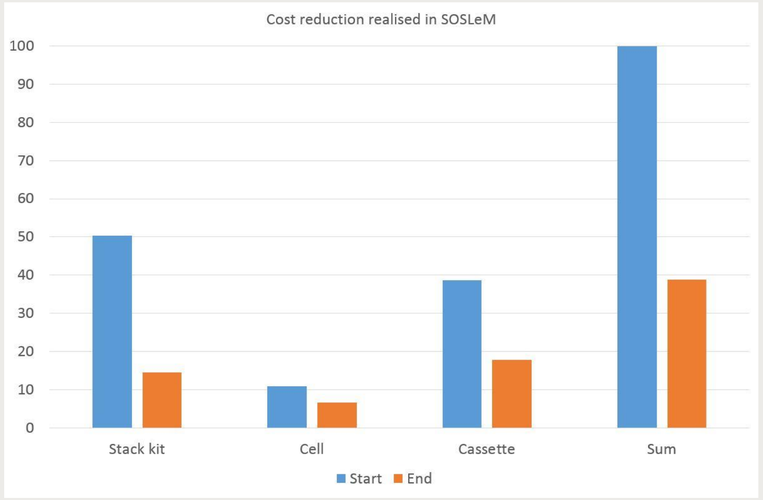
PROJECT PROGRESS/ACTIONS – SOFC stack cost reduction

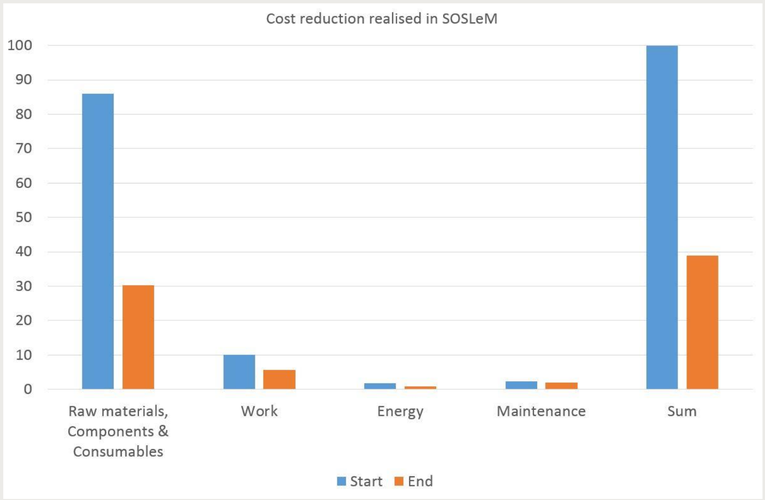
Achievement to-date

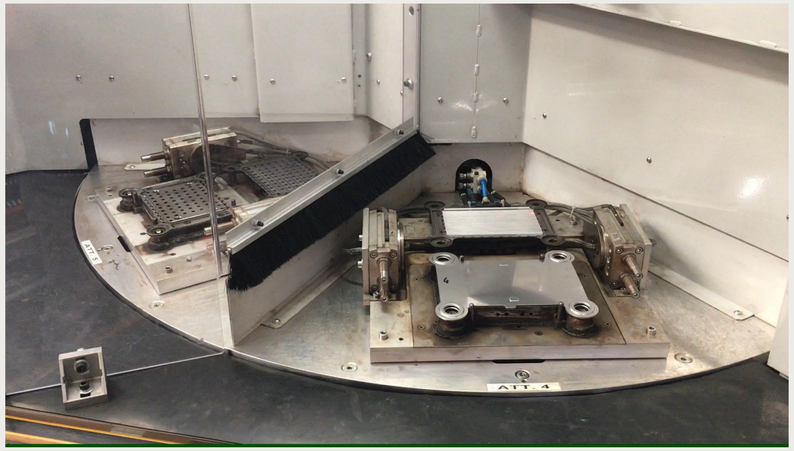
100%

38%

25% 50% 75%







Cost reduction realized by using cheaper materials (SP) and improved cassette manufacturing (Athena)

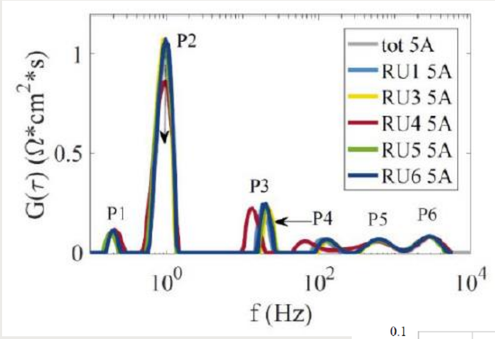
PROJECT PROGRESS/ACTIONS – Improved stack qualification

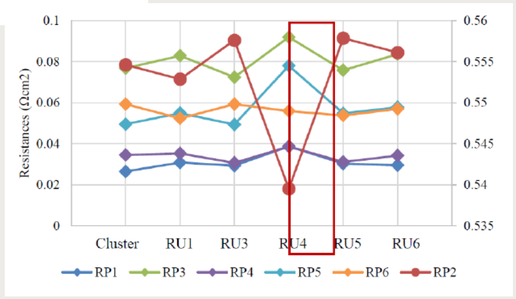
Achievement to-date

Stack qualification time

Advanced diagnosis

25% 50% 75%





Adoption of faster and cheaper stack qualification (Greenlight), and important steps made in development of advanced stack diagnosis (AVL, EPFL, HTc)

PROJECT PROGRESS/ACTIONS – Improve environmental friendliness

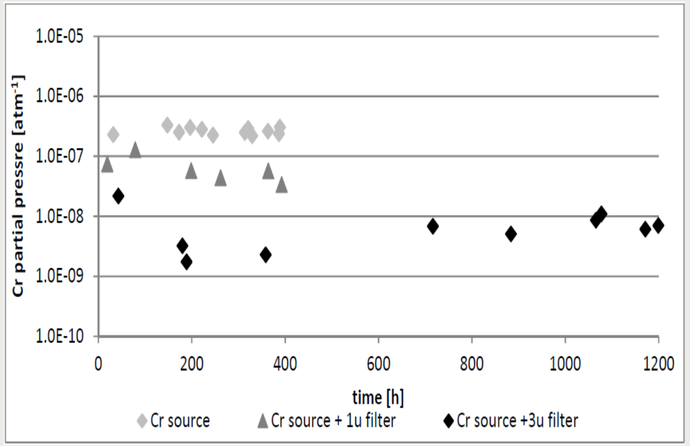
Achievement to-date

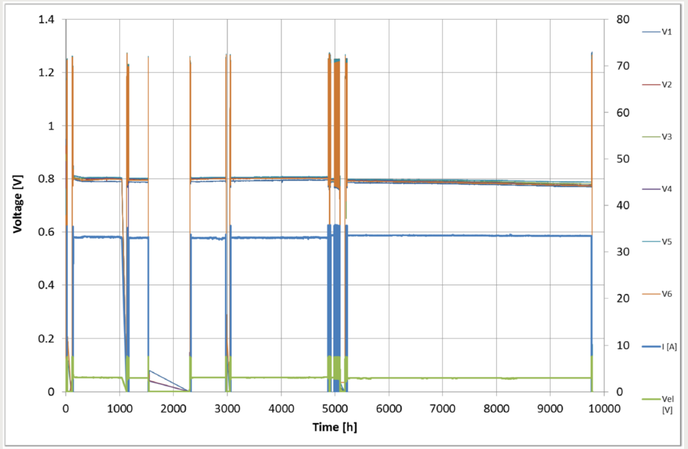
Ni disposal fixture

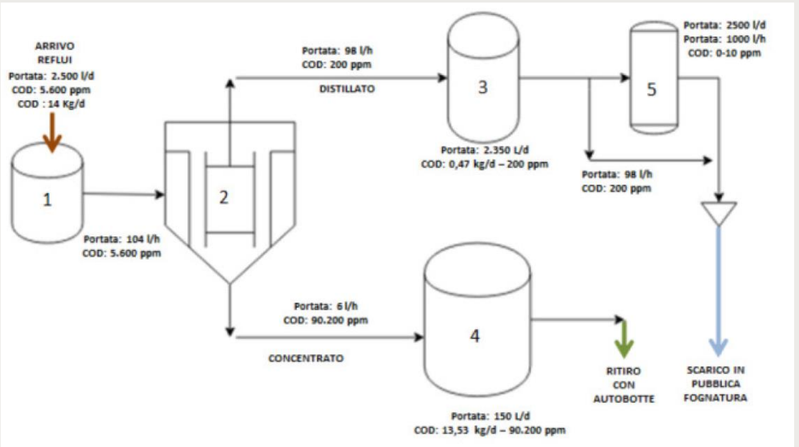
Protective coatings

Cr exhaust filter

25% 50% 75%







Fixture planned for new production plant (SP), successful implementation of new protective coatings (HTC, SP), and first steps made in development of Cr exhaust filter (EPFL)

Risks and Challenges

- Implementation of advanced diagnostics in stack qualification bench pending
  - delay in hardware development and validation
  - original goals overambitious → further efforts in follow-up projects (e.g. INSIGHT, RUBY)
- Implementation of Ni fixture not economic for pilot plant
  - Implementation in 50 MW plant (under construction)
- Cr exhaust filter not implemented. Problem collaterally reduced by other means
  - Solution functional but bulky
  - system design change option, now low priority given alternate solution

Communications Activities

- Dissemination material: project flyer, brochure, and 2 powerpoint presentations
- Project website: www.soslem.eu
- Integration of results from SOSLeM in regular master course on Fuel Cells and in module presented during Eurotech 2018. (EPFL)
- Journal articles: 3 manuscripts submitted
- Public thesis defenses by P. Caliandro and M. Bianco (EPFL)
- Poster presentations and oral presentations during European Fuel Cell Forum 2018, Corrosion and Science Symposium 2018.
- Presentations and booths during trade fairs (FC EXPO 2018, Hannover Fair 2018.
- Contributions planned for Plans to present during 11th International Symposium on Electrochemical Impedance Spectroscopy 2019, ModVal 2020, and EFCF 2020.

EXPLOITATION PLAN/EXPECTED IMPACT

Exploitation

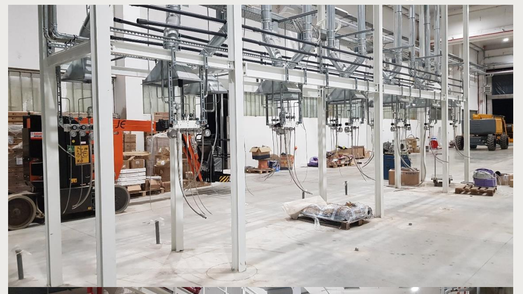
- Multiplicaton of results across European factories
- Prototyping and Demonstration in factory environment
- Patent application (2 submitted by AVL)
- Standardisation of quality control by stacks
- Introducing results into the product portfolio of industry partners
- Generation of new business cases

Impact

De-risking of factory investment

Reduction of investment cost for specific manufacturing tools

Construction of 50 MW SOC stack plant



FUEL CELLS AND HYDROGEN
JOINT UNDERTAKING

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