

INN-BALANCE

INNOVATIVE COST IMPROVEMENTS FOR BALANCE OF PLANT COMPONENTS OF AUTOMOTIVE PEMFC SYSTEMS



Project ID	735969
PRD 2022 Panel	7 – Supply chain
Call topic	FCH-01-4-2016: Development of industrialization-ready PEMFC systems and system components
Project total costs	EUR 6 156 288.75
Clean H₂ max. contribution	EUR 4 994 538.75
Project period	1/1/2017 – 31/10/2021
Coordinator	Fundación Ayesa, Spain
Beneficiaries	China Euro Vehicle Technology Aktiebolag, Steinbeis 2i GmbH, Brose Fahrzeugteile GmbH & Co. Kommanditgesellschaft, Würzburg, Celeroton AG, PowerCell Sweden AB, Steinbeis Innovation gGmbH, Volvo Personvagnar AB, AVL List GmbH, Universitat Politècnica de Catalunya, Deutsches Zentrum für Luft- und Raumfahrt EV

<https://www.innbalance-fch-project.eu>

PROJECT AND OBJECTIVES

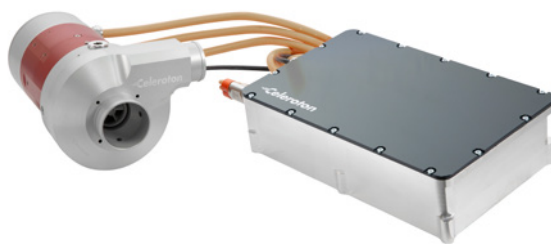
The aim of INN-BALANCE was to develop a novel and integrated development platform for developing advanced balance-of-plant components in current fuel-cell-based vehicles in order to improve their efficiency and reliability, reducing costs and presenting a stable supply chain to European car manufacturers and system integrators.

PROGRESS AND MAIN ACHIEVEMENTS

- INN-BALANCE has created an optimised ejector for the automotive fuel cell stack.
- The project has created a high-speed air compressor for the automotive fuel cell.
- It has created an antifreeze module for the automotive fuel cell.

FUTURE STEPS AND PLANS

The project has finished.



QUANTITATIVE TARGETS AND STATUS

Target source	Parameter	Unit	Target	Target achieved?
Project's own objectives	Power: air turbo compressor	kW	10–12	
	Thermal management system	°C	– 40	
	Fuel cell system's efficiency and lifetime	%	5 (efficiency), 10 (lifetime)	

LOWCOST-IC

LOW COST INTERCONNECTS WITH HIGHLY IMPROVED CONTACT STRENGTH FOR SOC APPLICATIONS



Project ID	826323
PRD 2022 Panel	7 – Supply chain
Call topic	FCH-02-6-2018: Cost-effective novel architectures of interconnects
Project total costs	EUR 2 335 997.50
Clean H ₂ max. contribution	EUR 2 335 997.50
Project period	1/1/2019 – 30/9/2022
Coordinator	Danmarks Tekniske Universitet, Denmark
Beneficiaries	Tecno Italia SRL, Sunfire GmbH, SOLIDpower SpA, Borit NV, Aperam Stainless France SA, Aktiebolaget Sandvik Materials Technology, AVL List GmbH, Chalmers tekniska högskola AB, Forschungszentrum Jülich GmbH
https://www.lowcost-ic.eu	

PROJECT AND OBJECTIVES

The overall objective of LOWCOST-IC is to contribute to the successful upscaling of the widespread commercialisation of solid oxide cell (SOC) technologies by:

- increasing the robustness of the lifetime of SOC stacks by developing novel high-robustness air electrode contact layers and testing new interconnect coatings in SOC stacks;
- minimising the interconnect development and production cost by introducing cheaper high-volume steel, applying state-of-the-art (SoA) large-scale roll-to-roll manufacturing

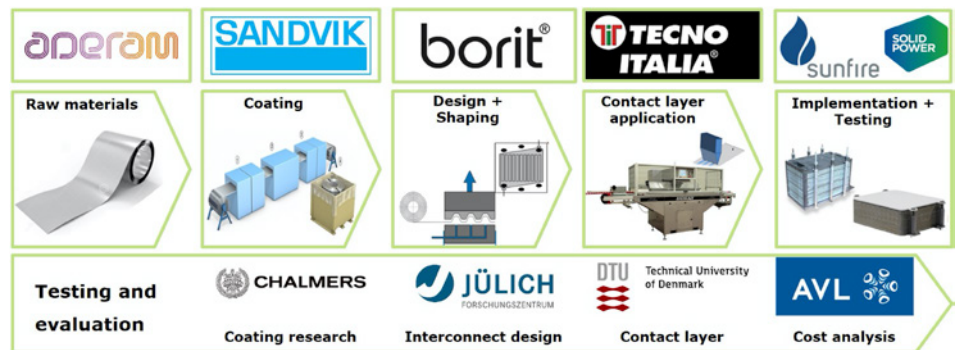
methods for SOC manufacturing, and developing a novel interconnect shape design route.

PROGRESS AND MAIN ACHIEVEMENTS

Robust contact layers were developed.

FUTURE STEPS AND PLANS

LOWCOST-IC will perform postmortem analysis of the contact layers tested in the stacks. Samples have been cut out from commercial stacks being tested with the new contact material. Postmortem analysis under a microscope will be undertaken shortly.



QUANTITATIVE TARGETS AND STATUS

Target source	Parameter	Unit	Target	Achieved to date by the project	Target achieved?	SoA result achieved to date (by others)	Year of SoA target
Project's own objectives	Fracture energy of contact layer	J/m ²	5.1	10	✓	1.7	2013
	Area-specific resistance of contact layer at 750 °C	mohm.cm ²	15	60	⚙️	15	2019
	Area-specific resistance of contact layer at 850 °C	mohm.cm ²	25	21	✓	N/A	N/A

MAMA-MEA

MASS MANUFACTURE OF MEAS USING HIGH SPEED DEPOSITION PROCESSES



Project ID	779591
PRD 2022 Panel	7 – Supply chain
Call topic	FCH-02-8-2017: Step-change in manufacturing of fuel cell stack components
Project total costs	EUR 3 189 816
Clean H ₂ max. contribution	EUR 3 189 816
Project period	1/1/2018 – 30/6/2021
Coordinator	Technische Universität Chemnitz, Germany
Beneficiaries	System SpA, Johnson Matthey Fuel Cells Limited, Inea Informatizacija Energetika Avtomatizacija DOO, Nedstack Fuel Cell Technology BV, Università degli Studi di Modena e Reggio Emilia, Fraunhofer-Gesellschaft zur Förderung der angewandten Forschung EV

<https://www.mama-mea.eu>

PROJECT AND OBJECTIVES

The task of MAMA-MEA was to develop an innovative additive layer deposition process integrating all main catalyst-coated membrane components (membrane, catalyst layers, sealing) using a single, continuous roll-to-roll manufacturing process for the proton-exchange membrane fuel cell industry. This will enable a more than 10-fold increase in the volume manufacturing rate compared with state-of-the-art processes, while also increasing key material utilisation, and reducing the quantity of materials and their costs. The project was successfully completed by 30 June 2021.

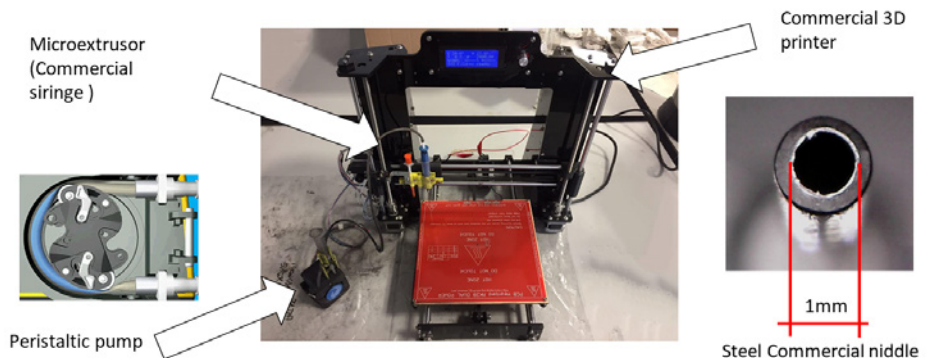
PROGRESS AND MAIN ACHIEVEMENTS

- MAMA-MEA completed the engineering design.
- The project evaluated deposition techniques.
- It performed experimental validation.

FUTURE STEPS AND PLANS

The project is finished. The target manufacturing speed was reached; however, additional process optimisation is required to increase the lifetime.

Printer set up



FISMAT 2019 Catania September 30 – October 4, 2019

QUANTITATIVE TARGETS AND STATUS

Target source	Parameter	Unit	Target	Target achieved?
AWP 2017	CAPEX	€/kW	55	⚙️
	Lifetime	hours	20 000	
	Degradation rate	%/1 000 h	< 1	✓
Project's own objectives	Production/web speed	lm/s	0.84	