

**VOLUMETRIQ represented at the first edition of  
Electrospinning for ENergy conference  
Montpellier, June 2016**



The 2016 edition of the conference Electrospinning for ENergy (ELEN 2016) was oriented to the application of nanofibres issued from electrospinning in energy conversion and storage devices. The conference gave the opportunity for exchanges between researchers, students and engineers from academia and industry, on recent advances associated with electrospinning and its application in energy devices.

[www.elen2016.eu](http://www.elen2016.eu)



**Contact Us**  
Project Coordinator

**Dr Deborah Jones**  
ICGM - AIME  
Université Montpellier  
Pl. Eugène Bataillon  
34095 Montpellier France  
[deborah.jones@umontpellier.fr](mailto:deborah.jones@umontpellier.fr)

**Linked Projects**

- FCH-JU HyTEC
- FCH-JU IMPACT
- FCH-JU INSPIRE
- FCH-JU MAESTRO
- FCH-JU STAMPEM
- FCH-JU AutoStack Core

**Next conferences**

VOLUMETRIQ will make oral presentation at:

- **FCH-JU Programme Review Days**, 21-22 November 2016, Brussels, Belgium
- **FDCF 2017**, 31 January - 02 February 2017, Stuttgart, Germany
- **Polymers for Fuel Cells, Energy Storage, and Conversion**, 26-28 February 2017, Asilomar CA, USA

**More Information ...**

[contact@volumetriq.eu](mailto:contact@volumetriq.eu)/[www.volumetriq.eu](http://www.volumetriq.eu)

ANNUAL NEWSLETTER  
2016 / ISSUE #1

Volume Manufacturing of PEMFC Stacks for Transportation and In-Line Quality Assurance

<p><b>Context &amp; Objectives</b> VOLUMETRIQ is developing an EU-centric supply base for PEM fuel cell stacks ... <b>p2</b></p>	<p><b>Partnership</b> New leadership for the VOLUMETRIQ project ... <b>p2-3</b></p>	<p><b>Achievements</b> VOLUMETRIQ reinforced membrane has demonstrated improved performances ... <b>p3</b></p>	<p><b>News &amp; contact</b> VOLUMETRIQ participated in the conference ELEN2016 hold in Montpellier, June 2016 ... <b>p4</b></p>
--	---	--	--



*This project has received funding from the Fuel Cells and Hydrogen 2 Joint Undertaking under grant agreement No 671465. This Joint Undertaking receives support from the European Union's Horizon 2020 research and innovation programme.*

## Fuel cell vehicles to reduce fleet overall CO<sub>2</sub> emissions

**VOLUMETRIQ** is a Fuel Cells and Hydrogen Undertaking funded under the call FCH-01.2-2014 on **"Cell and stack components, stack and system manufacturing technologies and quality assurance"**.

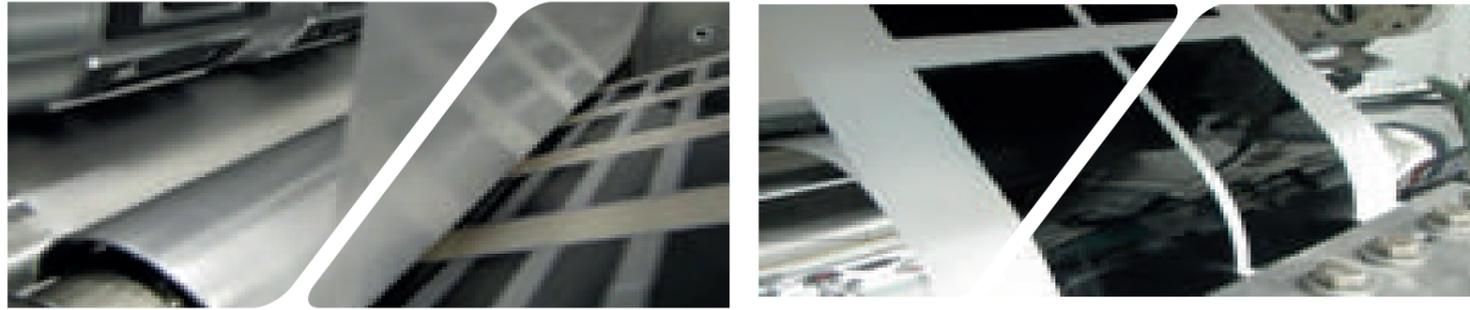
It will demonstrate validated volume capable manufacturing processes and quality control systems for an automotive fuel cell stack platform and for major constituent cell components. Stack components will be manufactured, involving improvement of existing methods and enhancement through manufacturing processes and tests to achieve robust volume yield and cost delivery.

- Establishing an integrated European supply chain for key fuel cell components
- Delivering manufacturing maturity to fuel cell components and stacks
- Embedding quality in automotive stack production

VOLUMETRIQ will also demonstrate operational OEM stack performance requirements for ElringKlinger's automotive PEM fuel cell platform, with production readiness.

The project will validate a **complete "at scale" stack production package** which will be overseen by the automotive OEMs BMW and Daimler





## Project Objectives

The principal aim of **VOLUMETRIQ**, a commercialisation focused project, is to develop an EU-centric supply base for automotive PEM fuel cell stacks and their key components with volume manufacturing capability and embedded quality control at its heart. The stack and components are based on automotive PEM fuel cell

technology which is presently TRL5 for component manufacturing approach and concepts. The project will deliver a TRL7 stack and component design, at TRL7 manufacturing maturity, a stack power of 90 kW, and demonstrated cost reduction, via an EU supply base that is consistent with the JU 2020 system targets for performance and cost.

## General Context

Current automotive PEM fuel cell stack manufacturing is very much oriented towards meeting the volume requirements of the day. Stacks are invariably hand-built using components which in some cases are selected based on bespoke quality requirements. As a result **manufacturing through-put is too slow and high in cost to meet the 2020 targets**. If PEM fuel cells are to make a significant impact on the modern auto-industry in the EU, **development of the manufacturing approach to all components must be made** to facilitate high volume capability throughout the supply chain – from sub-component through to stack assembly.

The focus of the work in **VOLUMETRIQ** thus:

- **solves technical problems** that are relevant and important to the industry
- **reduces costs** and advance market acceptability
- comprises patent protectable ideas
- scales technologies and processes into viable **commercial products**

As such, the project involves a **high level of innovation potential**.

In order to achieve this, the **key objectives** are to:

- develop the complementary volume manufacturing capability and in-process quality controls at component and sub-component level to **reduce scrap rate to target of <5%**.
- optimise existing component detail designs to **achieve automotive power density of 2,5 A/cm<sup>2</sup> at 0,6 V**
- **advance stack manufacturing technology level to TRL7**
- demonstrate capability to achieve **5000 hours** on representative automotive drive cycle
- demonstrate stack **cost reduction** model consistent with automotive target of 100 €/kW at 2020 assuming 50,000 units per annum

## New coordinator

In July 2016 **CNRS Montpellier (FR)** accepted the responsibility for project coordination. **ElringKlinger (DE)** in the reconfigured project has expanded to encompass the automotive stack manufacturing work, using its in-house automotive stack line.

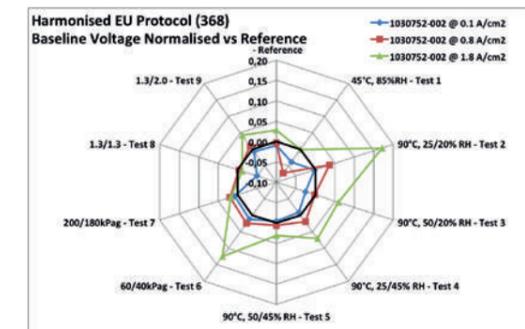


12M progress meeting,  
September 2016  
La Grande Motte, France

## Achievements and Outputs

In its first twelve months the project has:

- produced and supplied reinforcement and ionomer dispersion materials for baseline membrane and MEA development
- fabricated and tested the **VOLUMETRIQ** baseline MEA using materials representing the state-of-the-art at the beginning of the project. This material has demonstrated a beginning of life power density of 2.0 A/cm<sup>2</sup> at 0.60 V in single cell testing.
- developed and supplied new improved reinforcement and ionomer dispersion materials for first generation improved membranes and MEAs
- agreed and validated the test protocols that will be used to generate membrane, MEA and stack performance data
- introduced a new pilot level continuous membrane casting line to produce **VOLUMETRIQ** membranes by volume manufacturable processes.



MEA using electrospun reinforcement and low EW Aquivion ionomer demonstrates higher performance than the project reference MEA with conventional reinforcement

- completed cross-checking of test results between single cell hardware at 2 partners
- completed the generation of automotive fuel cell stack requirements
- communicated on **VOLUMETRIQ** through a press release, project web-site and brochure.

