OUR VISION

VIRTUAL-FCS making the design process of hybrid fuel cell and battery systems easier, cheaper and quicker.

- Develop a **fully open source software-hardware** (cyber-physical) tool that can be adopted as a global standard for FC system design.
- Enable any system integrator, with limited fuel cell experience, to **rapidly design and optimize** a fuel cell battery hybrid powertrain for varied applications: stationary, backup, maritime, rail, heavy and light duty vehicles.
- Ensure **free access** to the platform for all interested parties, including academics, SMEs and industry, allowing them to continue to develop, use and customise the platform both during and beyond the end of the project.

Objectives

The VIRTUAL-FCS project will address 5 sub-objectives (SO):

SO 1: Accurately predict the lifetime, reliability and performance of systems to reduce cost.
SO 2: Better hybridization and control strategies for any fuel cell application.
SO 3: Enable software-model-hardware in the loop design of hybrid systems.
SO 4: Demonstrate and validate the approach with assistance of end users.
SO 5: Establish the ongoing development of the tool and its widespread adoption.

CONSORTIUM

Contact

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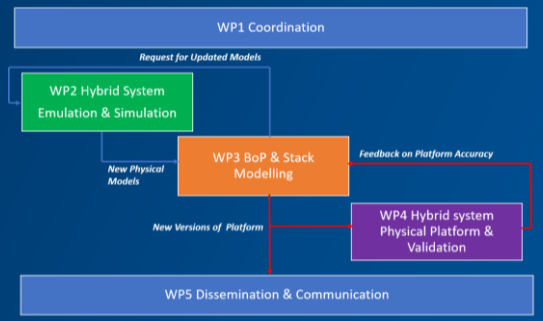
Topic: FCH-01-3-2019 - Cyber-physical platform for hybrid Fuel Cell Systems

VIRTUAL & physical platform for Fuel Cell System development

CONCEPT

Combined Software-Hardware platform: Virtual FCS will produce a toolkit combining software and hardware parts to design and optimize PEMFC battery hybrid systems.



MAIN PROJECT OUTPUTS

- An **Open-source platform,** offering benefits to both industry and academics and allowing them to contribute to its future development.
- **Design & optimization** of fuel cell hybrid power trains in close calibration with end users and system's integrators in **4 different transportation sectors,** some of which have limited knowledge in the area, thereby securing the widespread use of the software tools.
- The platform will integrate machine learning to process data from real PEMFC hybrid powertrains. This will improve the parameterization of the models and help identify critical aspects **lifetime and performance**.

IMPACT

- Significant reduction of development times for new fuel cell battery hybrid systems.
- A better understanding of hybridization strategies on the performance, reliability and durability including a benchmark of current methods.
- Validation using a complete propulsion system that is an optimized and versatile combination of real or emulated components (stack and balance of plant, battery pack, power electronics, electric engine…).
- A system and platform open and free to any users, in particular SMEs, of the value chain from component suppliers to original equipment manufacturers for different transport applications (land, air, water etc.).
- High-performance, real-time, emulators of the dynamic behaviour of real components and sub-systems.
- Exchange of best practicing and harmonizing models and algorithms to optimize hybrid fuel cell system architecture and power management strategies.
- Creation of links between software development, software implementation, experimental tools and FC industry along the entire supply chain
- Establishment of an EU based supply industry for hybrid FC system simulation and experimental tool environment (XiL platform) in order to boost the competitiveness of EU FC industry.

EVENTS

Code release A new public release every 3 months accompanied by full documentation so that it can be used (and developed) by the wider fuel cell community.

A Forum two-ways exchange between the consortium and the users, allowing exchanging best practicing and harmonizing models and algorithms to optimize hybrid fuel cell system architecture and power management.

Webinar Explanatory webinars and blog posts will be produced to accompany every release of new code. These will explain both the science/engineering behind the new features and details on how to practically implement and use the developed platform.

Training workshop a workshop where the focus will be on practical training on the use of the developed platform.

Student Exchange The project supports education of students and young scientists through periods of exchange within the consortium partners.