European Institute for Energy Research by EDF and KIT

RUBY

Robust and reliable general management tool for performance and durability improvement of fuel cell stationary units

Key Facts

Funding Agency
EU FCH JU

Project Call
FCH-02-8-2019

Duration
01/2020 – 12/2023

Coordinator
Università degli studi di Salerno (UNISA)

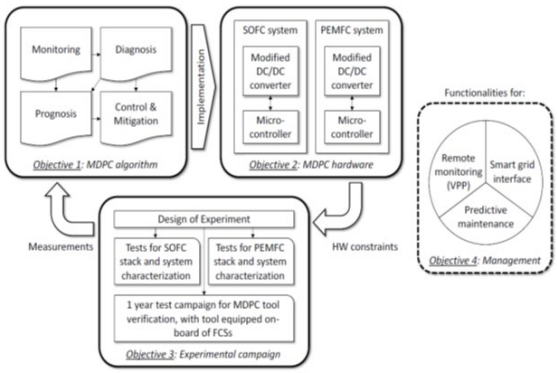
Partners

- Commissariat à l'Énergie Atomique et aux Énergies Alternatives (CEA)
- SolidPower S.p.A.
- Ballard Power Systems Europe AS
- Bitron S.p.A.
- Institut Jozef Stefan (IJS)
- VTT Technical Research Centre of Finland
- Communauté d'Universités et d'Établissements Université Bourgogne – Franche – Comte (UBFC)
- École Politechnique Fédérale de Lausanne (EPFL)
- Fondazione Bruno Kessler (FBK)

Website
https://www.rubyproject.eu/

Project Objectives

The RUBY project aims at developing, integrating, engineering and testing a comprehensive and generalized Monitoring, Diagnostic, Prognostic and Control (MDPC) tool capable of improving efficiency, reliability and durability of Solid Oxide Fuel Cell (SOFC) and Polymer Electrolyte Fuel Cell (PEMFC) systems for stationary applications. The tool relies on advanced techniques and dedicated hardware and will be embedded in the Fuel Cell Systems (FCSs) for on-line validation in relevant operational environment. The RUBY tool will reach at the end of the project a Technology Readiness Level (TRL) equal to TRL 7.



EIFER's Contribution

- EIFER is leading the test on PEMFC stacks and systems: to design and tune all the functionalities considered in the MDPC tool, experimental characterization of stacks and FCSs will be carried out. Both nominal and faulty operations will be addressed.
- EIFER will address for PEMFC faults related to Balance of Plant (BOP) through a signal-based algorithm which uses FTA and Failure Mode and Effect Analysis (FMEA) techniques to identify the failing components. EIFER will use a two-step hybrid diagnosis algorithm. The first step is a signal-based approach, followed by the identification of the intensity level, which is done by another signal based approach or an Adaptive Neural Fuzzy Interference System (ANFIS).
- EIFER will improve and validate its multi model approach for prognosis.

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FUEL CELLS AND HYDROGEN JOINT UNDERTAKING

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