



# Hydrogen Europe: European Hydrogen & Fuel cell Project Database

## Project GENIUS

### GEneric diagNosis InstrUment for SOFC Systems

The state of health of any SOFC system is currently difficult to evaluate, which makes it difficult to respond to a fault or degradation with the appropriate counter measure, to ensure the required reliability level. Therefore, the GENIUS project aims to develop a "GENERIC" algorithm, based on a validated diagnostic "GENERIC" approach. This algorithm would only use process values (normal measurements and system control input parameters) and the approach would allow all SOFC developers to use and implement the algorithm in their respective systems according to their specific constraints. To guarantee the "GENERIC" character of the algorithm, stacks and systems from four different manufacturers will be tested using commonly defined test plan that will be based on the "Design Of Experiment" method. Three different types of models will be evaluated in parallel by four different academic institutions in order to define the optimal tool for fault detection and degradation identification. This will be done taking into account both "on board" diagnostic and "off-line" diagnostic requirements. The diagnosis would generate a set of indicators able to quantify either the drift or the difference of the actual status with respect to nominal or expected performance. A diagnostic hardware integrating the best algorithm will be developed and validated in two different SOFC systems. Finally, physical parameters and interactions will be correlated with degradation mechanisms. This correlation will allow the definition of either counter measures (in case of fault or degradation) or of a more optimal operation point. This will make it possible to reduce maintenance to yearly intervals. It may also help reach a target of tens of thousands hours for stack or system operation lifetime. Finally, it is important to mention that most of participants of the GENIUS project are members of the FCH Joint Undertaking Initiative.

## Project Information

**Type of project :** Research

**Timing :** 01/02/2010 > 31/01/2013

**Project Budget :** 3.861.447 €

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## Funding

European Union through FCH JU: [Grant agreement 245128 - CORDIS link](#)

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## Project partners

**Coordinator :**[EIFER - Europäisches Institut für Energieforschung](#)**Partners :**[University of Birmingham](#)[University of Salerno](#)[VTT - Technical Research Centre of Finland](#)

CERAMIC FUEL CELLS (EUROPE) LTD

EBZ Entwicklungs- und Vertriebsgesellschaft Brennstoffzelle mbH

UNIVERSITE DE TECHNOLOGIE DE BELFORT - MONTBELIARD

HEXIS AG

HTceramix SA

TOPSOE FUEL CELL A/S

WARTSILA FINLAND OY

INNO TSD

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**Sub project(s)****Sub project 1****Country:** Germany**Address:** EMMY NOETHER STRASSE 11 76131 KARLSRUHE**Sub project categories**

Research

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