Real operation pem fuel cells HEALTH-state monitoring and diagnosis based on dc-dc COnverter embedded Eis

Fact Sheet

Project Information

HEALTH-CODE
Grant agreement ID: 671486

Funded under
H2020-EU.3.3.8.1.

Project website

Overall budget
€ 2,358,736.25

Start date
1 September 2015

End date
31 December 2018

EU contribution
€ 2,358,736.25

Coordinated by
UNIVERSITA DEGLI STUDI DI SALERNO
Italy

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Objective
HEALTH-CODE aims at implementing an advanced monitoring and diagnostic tool for μ-CHP and backup PEM fuel cell systems equipped with different stacks. Such a tool is able to determine the FC current status (condition monitoring) to support stack failures detection and to infer on the residual useful lifetime. Five failure modes will be detected: i) change in fuel composition; ii) air starvation; iii) fuel starvation; iv) sulphur poisoning; v) flooding and de-hydration.

The main project objectives are: i) the enhancement of electrochemical impedance spectroscopy (EIS) based diagnosis; ii) the development of a monitoring and diagnostic tool for state-of-health assessment, fault detection and isolation as well as degradation level analysis for lifetime extrapolation; iii) the reduction of experimental campaign time and costs. Moreover, the improvement of power electronics for FC is also considered. These targets will be achieved through the implementation of several methodologies and techniques, well suited for industrial application.

Several algorithms will be developed relying on on-board EIS measurements of the fuel cell system impedance. Moreover, low-cost diagnostic concepts are also proposed for a straightforward implementation on FCS controllers.

The project exploits the outcomes of the previous FCH 1 JU funded project D-CODE, during which a proof of-concept validated in laboratory (TRL3-4) was developed. HEALTH-CODE will increase the TRL up to level 5.

The exploitation of the project outcomes will lead to low-cost and reliable monitoring and diagnostic approaches and related applications (e.g. power electronics). These results will have an impact on stationary FCS with a direct increase in electrical efficiency, availability and durability, leading to a reduction in maintenance and warranty costs, thus increasing the customers’ satisfaction. Therefore, HEALTH-CODE contributes to the enhancement of FC competitiveness towards a wider market deployment.

Field of science
/social sciences/economics and business/business and management/commerce
/natural sciences/chemical sciences/analytical chemistry/spectroscopy
/engineering and technology/environmental engineering/energy and fuels/fuel cell

Programme(s)

Topic(s)
Call for proposal
H2020-JTI-FCH-2014-1

Funding Scheme
FCH2-RIA - Research and Innovation action

Coordinator

UNIVERSITA DEGLI STUDI DI SALERNO
Address
Via Giovanni Paolo II 132
84084 Fisciano Sa
Italy
Activity type
Higher or Secondary Education Establishments
EU contribution
€ 483 117,53
Website
Contact the organisation

Participants (9)

AALBORG UNIVERSITET
Denmark
EU contribution
€ 214 437,50
Address
Fredrik Bajers Vej 7K
9220 Aalborg
Activity type
Higher or Secondary Education Establishments
Website
Contact the organisation

BALLARD POWER SYSTEMS EUROPE AS
Denmark
EU contribution
€ 387 375
Address
Majsmarken 1
9500 Hobro
Activity type
Private for-profit entities (excluding Higher or Secondary Education Establishments)
EIFER EUROPÄISCHES INSTITUT FUR ENERGIEFORSCHUNG EDF KIT EWIV
Germany
EU contribution
€ 279 250
Address
Emmy Noether Strasse 11
76131 Karlsruhe
Website
Contact the organisation

ELECTRO POWER SYSTEMS MANUFACTURINGSR
Italy
EU contribution
€ 129 136,55
Address
Piazza Del Tricolore 4
20129 Milano
Website
Contact the organisation

TORINO E-DISTRICT CONSORZIO
Italy
EU contribution
€ 92 162,71
Address
Via Nicola Fabrizi 136
10145 Torino To
Contact the organisation

UNIVERSITE DE FRANCHE-COMTE
France
EU contribution
€ 338 211,25
Address
1 Rue Claude Goudimel
25000 Besancon
Activity type
Higher or Secondary Education Establishments
AK GROUP

France

EU contribution
€ 138 750

Address
41B Rue Dupetit Thouars
49000 Angers

Activity type
Private for-profit entities (excluding Higher or Secondary Education Establishments)

Contact the organisation

BITRON SPA

Italy

EU contribution
€ 130 744,76

Address
Corso Principe Oddone 18
10122 Torino

Activity type
Private for-profit entities (excluding Higher or Secondary Education Establishments)

Website

ENGIE EPS ITALIA S.R.L.

Italy

EU contribution
€ 165 550,95

Address
Via Anton Francesco Grazzini 14
20158 Milano

Activity type
Private for-profit entities (excluding Higher or Secondary Education Establishments)

Contact the organisation