Green Industrial Hydrogen via Reversible High-Temperature Electrolysis

Fact Sheet

Project Information

GrInHy

Grant agreement ID: 700300

Project website

DOI
10.3030/700300

Project closed

EC signature date
18 March 2016

Start date
1 March 2016

End date
28 February 2019

Funded under
SOCIETAL CHALLENGES - Secure, clean and efficient energy

Total cost
€ 4 498 150,00

EU contribution
€ 4 498 150,00

Coordinated by
SALZGITTER MANNESMANN FORSCHUNG GMBH
Germany

Objective

High-temperature electrolysis (HT electrolysis) is one of the most promising technologies to address the European Commission´s Roadmap to a competitive low-carbon economy in 2050. Because a significant share of the energy input is provided in the form of heat, HT electrolysis achieves higher electrical system efficiency compared to low temperature electrolysis technologies. Therefore, the main objectives of the GrInHy project focus on:

• Proof of reaching an overall electrical efficiency of at least 80 %LHV (ca. 95 %HHV);
• Scaling-up the SOEC unit to a DC power input (stack level) of 120 kWel;
• Reaching a lifetime of greater 10,000 h with a degradation rate below 1 %/1,000 h;
• Integration and operation for at least 7,000 h meeting the hydrogen quality standards of the steel industry;

Additional project objectives are:
• Elaboration of an Exploitation Roadmap for cost reducing measures;
• Development of dependable system cost data;
• Integration of a reversible operation mode (fuel cell mode);

The objectives are congruent with the call FCH-02.4-2015 and the Multi Annual Work Plan of the FCH JU.

The proof-of-concept will take place in the relevant environment of an integrated iron and steel works. Its existing infrastructure and metallurgical processes, which provide the necessary waste heat, increase the project´s cost-effectiveness and minimize the electrical power demand of auxiliaries. As a result, the electrical efficiency of 80 % will be achieved by operating the HT electrolyser close to the thermal-neutral operation point. The installation will consist of an optimized multi-stack module design with 6 stacks modules in parallel (total capacity: 120 kWel). The last project year is dedicated to the testing of 7,000 h and more. This will be achieved due to a high degree of existing knowledge at system level. Lifetime and degradation targets have already been fulfilled at cell level and will be verified by testing an enhanced stack.

Fields of science (EuroSciVoc)

natural sciences > computer and information sciences > **software**

natural sciences > chemical sciences > electrochemistry > **electrolysis**

engineering and technology > environmental engineering > energy and fuels > fossil energy > **natural gas**

engineering and technology > environmental engineering > energy and fuels > **fuel cells**

engineering and technology > environmental engineering > energy and fuels > renewable energy > **hydrogen energy**

Programme(s)

H2020-EU.3.3. - SOCIETAL CHALLENGES - Secure, clean and efficient energy MAIN PROGRAMME

H2020-EU.3.3.8.2. - Increase the energy efficiency of production of hydrogen mainly from water electrolysis and renewable sources while reducing operating and capital costs, so that the combined system of the hydrogen production and the conversion using the fuel cell system can compete with the alternatives for electricity production available on the market

Topic(s)

FCH-02.4-2015 - Proof-of-concept of HT electrolysers at a scale > 70 kW

Call for proposal

H2020-JTI-FCH-2015

See other projects for this call

Sub call

H2020-JTI-FCH-2015-1

Funding Scheme

FCH2-RIA - Research and Innovation action

Coordinator

SALZGITTER MANNESMANN FORSCHUNG GMBH

Net EU contribution

€ 425 217,50

Total cost

€ 425 217,50

Address

EISENHUTTENSTRASSE 99
38239 Salzgitter
Germany

Region

Niedersachsen > Braunschweig > Salzgitter, Kreisfreie Stadt

Activity type

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

Links

Contact the organisation
Participation in EU R&I programmes
HORIZON collaboration network

Participants (7)

SALZGITTER FLACHSTAHL GMBH

Germany

Net EU contribution

€ 303 987,50

Address

EISENHUTTENSTRASSE 99
38239 Salzgitter

Region

Niedersachsen > Braunschweig > Salzgitter, Kreisfreie Stadt

Activity type

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

Links

Contact the organisation
Participation in EU R&I programmes
HORIZON collaboration network

Total cost

€ 303 987,50

BOEING AEROSPACE SPAIN

Spain

Net EU contribution

€ 395 457,50

Address

AVENIDA SUR DEL AEROPUERTO DE BARAJAS 38 EDIF 4 PL 4 A
28042 Madrid

Region

Comunidad de Madrid > Comunidad de Madrid > Madrid

Activity type

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

Links

Contact the organisation
Participation in EU R&I programmes
HORIZON collaboration network

Total cost

€ 395 457,50

SUNFIRE GMBH

Germany

Net EU contribution

€ 2 008 125,00

Address

GASANSTALTSTRASSE 2
01237 Dresden

SME

Yes

Region

Sachsen > Dresden > Dresden, Kreisfreie Stadt

Activity type

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

Links

Contact the organisation Website
Participation in EU R&I programmes
HORIZON collaboration network

Total cost

€ 2 008 125,00

TEKNOLOGIAN TUTKIMUSKESKUS VTT OY

Finland

Net EU contribution

€ 394 772,50

Address

TEKNIIKANTIE 21
02150 Espoo

Region

Manner-Suomi > Helsinki-Uusimaa > Helsinki-Uusimaa

Activity type

Research Organisations

Links

Contact the organisation Website
Participation in EU R&I programmes
HORIZON collaboration network

Total cost

€ 394 772,50

EIFER EUROPAISCHES INSTITUT FUR ENERGIEFORSCHUNG EDF KIT EWIV

Germany

Net EU contribution

€ 411 082,50

Address

EMMY NOETHER STRASSE 11
76131 Karlsruhe

Region

Baden-Württemberg > Karlsruhe > Karlsruhe, Stadtkreis

Activity type

Research Organisations

Links

Contact the organisation Website
Participation in EU R&I programmes
HORIZON collaboration network

Total cost

€ 411 082,50

Ustav fyziky materialu, Akademie Ved Ceske republiky, v.v.i.

Czechia

Net EU contribution

€ 314 225,00

Address

Zizkova 22
61662 Brno

Region

Česko > Jihovýchod > Jihomoravský kraj

Activity type

Research Organisations

Links

Contact the organisation Website
Participation in EU R&I programmes
HORIZON collaboration network

Total cost

€ 314 225,00

POLITECNICO DI TORINO

Italy

Net EU contribution

€ 245 282,50

Address

CORSO DUCA DEGLI ABRUZZI 24
10129 Torino

Region

Nord-Ovest > Piemonte > Torino

Activity type

Higher or Secondary Education Establishments

Links

Contact the organisation Website
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HORIZON collaboration network

Total cost

€ 245 282,50

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