Solar To Hydrogen Hybrid Cycles

From 2013-06-01 to 2016-11-30, closed project | SOL2HY2 Website

Project details

| Total cost: | EUR 3 727 404,20 |
| Topic(s): | SP1-JTI-FCH.2012.2.5 - Thermo-electrical-chemical processes with solar heat sources |
| EU contribution: | EUR 1 991 115 |
| Coordinated in: | Italy |

| Funding scheme: | JTI-CP-FCH - Joint Technology Initiatives - Collaborative Project (FCH) |

Objective

The FCH JU strategy has identified hydrogen production by water decomposition pathways powered by renewables such as solar energy to be a major component for sustainable and carbon-free hydrogen supply. Solar-powered thermo-chemical cycles are capable to directly transfer concentrated sunlight into chemical energy by a series of chemical and electrochemical reactions, and of these cycles, hybrid-sulphur (HyS) cycle was identified as the most promising one. The challenges in HyS remain mostly in dealing with materials (electrolyser, concentrator, acid decomposer/cracker and plant components) and with the whole process flowsheet optimization, tailored to specific solar input and plant site location. With recent technology level at large-scale hydrogen production concepts hydrogen costs are unlikely to go below 3.0-3.5 €/kg. For smaller scale plant, the costs of hydrogen might be substantially higher.

The present proposal focuses on applied, bottle-necks solving, materials research and development and demonstration of the relevant-scale key components of the solar-powered, CO2-free hybrid water splitting cycles, complemented by their advanced modeling and process simulation including conditions and site-specific technical-economical assessment optimization, quantification and benchmarking. For the short-term integration of solar-power sources with new Outotec Open Cycle will be performed. Simplified structure, extra revenues from acid sales and highly efficient co-use of the existing plants may drop hydrogen costs by about 50-75% vs. traditional process designs. Besides providing key materials and process solutions, for the first time the whole production chain and flowsheet will be connected with multi-objective design and optimization algorithms ultimately leading to hydrogen plants and technology "green concepts" commercialization.

The consortium consists of key materials suppliers and process development SME and industry, RTD performers and a university.

Related information

| Report Summaries | Final Report Summary - SOL2HY2 (Solar To Hydrogen Hybrid Cycles) |
**Coordinator**

ENGINSOFT SPA  
VIA DELLA STAZIONE 27  
38100 TRENTO  
Italy  
**EU contribution:** EUR 368 260

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

**Administrative contact:** Carla Baldasso  
Tel.: +39 049 7705311  
Fax: +39 0461 979217

**Contact the organisation**

**Participants**

AALTO KORKEAKOULUSAATIO SR  
OTAKAARI 1  
02150 ESPOO  
Finland  
**EU contribution:** EUR 376 607

**Activity type:** Higher or Secondary Education Establishments

**Administrative contact:** Michael Gasik  
Tel.: +358 50 5609511  
Fax: +358 9 47022799

**Contact the organisation**

DEUTSCHES ZENTRUM FUER LUFT - UND RAUMFAHRT EV  
Linder Hoehe  
51147 KOELN  
Germany  
**EU contribution:** EUR 527 450

**Activity type:** Research Organisations

**Administrative contact:** Georg Boehm  
Tel.: +49 2203 601 2972  
Fax: +49 2203 601 4141

**Contact the organisation**
AGENZIA NAZIONALE PER LE NUOVE TECNOLOGIE, L'ENERGIA E LO SVILUPPO ECONOMICO
SOSTENIBILE
LUNGOTEVERE GRANDE AMMIRAGLIO THAON DI REVEL 76
00196 ROMA
Italy
See on map
Activity type: Research Organisations
Administrative contact: Alberto Giaconia
Tel.: +390630486542
Fax: +390630486779
Contact the organisation

OUTOTEC (FINLAND) OY
RAUHALANPUISTO 9
02230 ESPOO
Finland
See on map
Activity type: Private for-profit entities (excluding Higher or Secondary Education Establishments)
Administrative contact: Helja Peltola
Tel.: +358205293080
Contact the organisation

Erbicol SA
Viale Pereda 22
6828 Balerna
Switzerland
Activity type: Private for-profit entities (excluding Higher or Secondary Education Establishments)
Administrative contact: Sandro Gianella
Tel.: +41 91 6976365
Fax: +41 91 6976369
Contact the organisation

OY WOIKOSKI AB
PL 1
45371 VALKEALA
Finland
See on map
Activity type: Private for-profit entities (excluding Higher or Secondary Education Establishments)
Administrative contact: Kalevi Korjala
Tel.: +358 400 156 848
Fax: +358 15 7700 720
Contact the organisation