# POWER-UP
## (325356)


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# PROJECT OVERVIEW

- Project title: POWER-UP – Demonstration of 500kWe alkaline fuel cell system with heat capture
- Call: SP1-JTI-FCH.2012.3.7: Field demonstration of large-scale stationary power and CHP fuel cell systems
- Start and end date: 1 April 2013 – 30 June 2017
- Total budget: €11,552,448; FCH JU contribution: €6,137,565; self-funded costs: €5,414,883
- Consortium


- Overall purpose of project: POWER-UP will be the world's first large scale demonstration of an alkaline fuel cell system. A 500 kWe alkaline fuel cell system will be built, then installed and operated at Air Products' industrial gas plant in Stade, Germany.
- Stage of implementation: 39% of project duration passed

# PROJECT TARGETS AND ACHIEVEMENTS

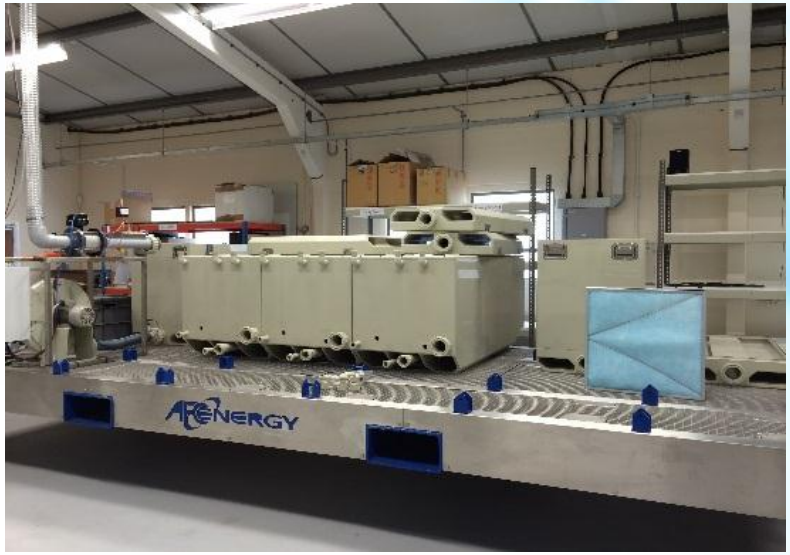
| Status before project | AIP target | Project Target | Current status/ achievements | Expected final achievement |
|---|---|---|---|---|
| Only R&D supply chain / sourcing strategy in place | Develop the potential for European businesses to realise 'product' supply chain opportunities | Almost all component parts of the AFC system are now sourced from within the EU | EU supply chain has already been initiated as a result of POWER-UP funding | Sophisticated and flexible almost wholly-European supply chain |
| Desired stringent control of 'scale-up' costs | Identification of barriers or risks to full implementation | Flexible, validated cost model tool | major risk analysis has already been undertaken | cost model shows that viable costs can be achieved |

# PROJECT TARGETS AND ACHIEVEMENTS

| Status before project | AIP target | Project Target | Current status/ achievements | Expected final achievement |
|---|---|---|---|---|
| Mainly UK-wide marketing and publicity | Public awareness: strong dissemination efforts; potential customers | Utilise European Hydrogen Association's network and presence at industry fairs | Eurochlor, posters & website, dissemination plan complete | established Strategic Advisory Board, scientific papers for publication |
| n/a | commitment towards the running of the system after project end | fuel cell system will continue to function in situ | n/a | system continues to be used to generate electricity |

# PROJECT TARGETS AND ACHIEVEMENTS


3D model of the KORE fuel cell module




Assembly of the first AFC KORE module for Stade

Stack assembly robot

# RISKS AND MITIGATION

| | |
|---|---|
| **Target** | Proof of feasibility of integrated fuel cell units by demonstrating sufficient duration. |
| **Bottlenecks and risks:** | • due to output from HAZOP it was necessary to relocate the fuel cell systems<br>• decision caused a delay to the installation of the first system of at least three months<br>• installation of the second system is not expected to be affected and durability targets are still on schedule to be met |
| **Revision of targets:** | No |
| **Suggested nature of revision:** | • Consortium expects to meet target and considerable progress has been achieved<br>• uncertainty has been addressed in the risk management programme, and appropriate tests have been undertaken |

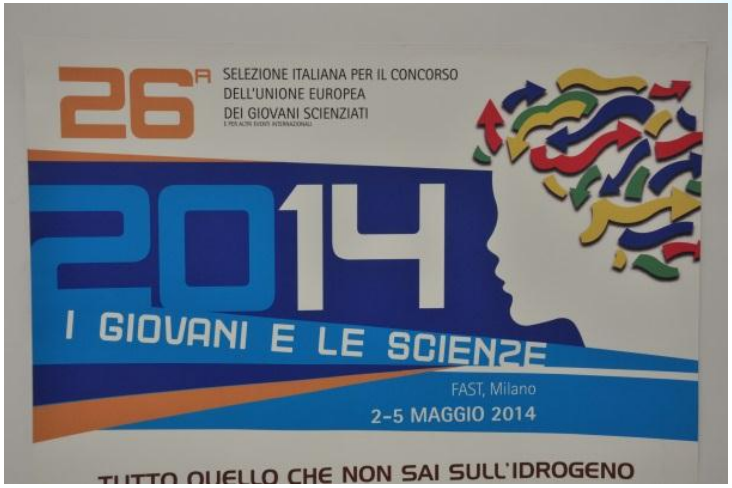
# SYNERGIES WITH OTHER PROJECTS AND INITIATIVES

| | DESCRIPTION OF COMPLEMENTARITY AND JOINT ACTIVITIES |
|---|---|
| LASER-CELL | • Project LASER-CELL (278674); 01/11/2011 – 31/10/14<br>• completion will enable the final phase of the POWER-UP system to exploit the advances of project LASER-CELL<br>• including: novel plate design, development of substrate material and the manufacturing process used to make the substrates |
| ALKAMMONIA | • Project ALKAMMONIA (325343); 01/05/2013 – 30/04/16<br>• CE-Certification in POWER-UP following experience gained from undertaking similar work in project ALKAMMONIA<br>• POWER-UP will benefit from ALKAMMONIA's cartridge stack design and adaption, as well as further development of the systems controller |

# HORIZONTAL ACTIVITIES

Training and education

- face-to-face interactions with the research community at events
- project partners host several Masters and PhD students over the duration of the projects
- students examine specific parts of the Life Cycle Analysis, the costs and the risks analysis of the materials and systems
- event in cooperation with ALKAMMONIA and POWER-UP presenting fuel cell science to high-school students taken place to explain employment opportunities in the industry



# DISSEMINATION ACTIVITIES

Madrid,
1-3 April 2014

13-17 April
2014

Hamburg,
20/21 May 2015

Stuttgart,
12-14 October
2015

# EXPLOITATION PLAN/EXPECTED IMPACT

- work in project POWER-UP will be the final step before market deployment
- partners will have demonstrated the ability of the POWER-UP system to deliver the technical performance and economic viability that commercial end-users demand
- estimate the cost vs volume relationship for AFC's fuel cell
- developed robots will be capable of assembling/disassembling stacks and serve as the basis for future automation systems to meet the increased demand for stacks
- initial anticipated market for AFC's fuel cells is within the chlor-alkali industry (where there exists a symbiosis with alkaline fuel cells due to hydrogen as a by-product)

# Project LASER-CELL workshop

Laser-cell

„Lab to manufacturing – an iterative process“:

12 Nov, 11:30am

FCH JU office, 4th floor

L‘atrium blanche, Avenue de la Toison d‘Or 56-60