Demonstration of 500kWe alkaline fuel cell system with heat capture POWER-UP

(325356)

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PROJECT OVERVIEW

- Call topic: SP1-JTI-FCH.2012.3.7
- Application area: Field demonstration of large-scale stationary power and CHP fuel cell systems
- Start and end date: 1 April 2013 – 30 June 2017
- Budget: €11,552,448; FCH JU contribution: €6,137,565; self-funded costs: €5,414,883
- Consortium overview:

- Project summary: world's first demonstration of AFC system; built in GB, installed in Germany; currently feeding electricity into local grid
- Stage of implementation: 60%

PROJECT TARGETS AND ACHIEVEMENTS

Programme objective/target	Project objective/target	Project achievements to-date	Expected final achievement
MAIP 2008-13			
>5 MW by 2015	240 kW by end 2015	40 kW in October 2015	240 kW by end 2015
3,000 €/kW Assuming supported deployment from 2013+	3,000 €/kW is the target cost (CapEx and OpEx), using demonstr. systems	The first system had a number of one-off high-cost items which will not be repeated	Target cost for the post-funding period will be significantly lower

PROJECT TARGETS AND ACHIEVEMENTS

Programme objective/target	Project objective/target	Project achievements to-date	Expected final achievement
AIP 2012: SPI-JTI-FCH-2012.3.7			
58% conversion efficiency (electr.)	58 – 59%	61% per tier	On track to achieve by the end of the project
15,000hrs Lifetime / duration of	15,000hrs	<15,000hrs	13,500hrs

PROJECT TARGETS AND ACHIEVEMENTS

Site works completed

Robot stacking cartridge

Assembly in Stade

KORE producing electricity

RISKS AND MITIGATION

Target	Proof of feasibility of integrated fuel cell units by demonstrating sufficient duration.
Bottle-necks and risks:	• Delay in achieving site readiness • Design and manufacturing delays • System and cartridge costs higher than original estimates • increase in fuel cell production volumes
Revision of targets:	Yes
Suggested nature of revision:	• A possible maximum of 13,500h (90%*) of target will now be achieved • (*largely determined by CHP capability in 2016)

SYNERGIES WITH OTHER PROJECTS AND INITIATIVES

	DESCRIPTION OF COMPLEMENTARITY AND JOINT ACTIVITIES
LASER-CELL	• Project LASER-CELL (278674); 01/11/2011 – 31/10/14 • completion enabled POWER-UP system to exploit the advances of project LASER-CELL • including: novel plate design, development of substrate material and the manufacturing process used to make the substrates
ALKAMMONIA	• Project ALKAMMONIA (325343); 01/05/2013 – 30/04/17 • CE-Certification in POWER-UP following experience gained from undertaking similar work in project ALKAMMONIA • 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 project

Safety, regulations, codes, standards

- Compliance with local laws, focus on HAZOPs and risk assessments, relevant TÜV Nord certification

General public awareness

- Opening event in January with politicians, local companies and residents

DISSEMINATION ACTIVITIES

- Wider external partnerships established, e.g. Special Advisory Board, industry, etc.
- Presentation at Hannover Messe and other high-profile events, press coverage, high interest from scientific community

Event presenting fuel cell science to high-school students

HANNOVER MESSE

13-17 April 2015

euro chlor 17.

Madrid, 1-3 April 2014

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
- 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)