SOFT-PACT

SOFT-PACT (278804)

Andrew Thomas
E.ON

General Overview

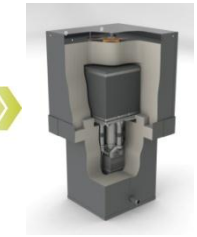
- Project full title: **Solid Oxide Fuel Cell micro-CHP Field Trials**
- Duration: **July 2011 – July 2014**
- Budget: **Total budget €10.3M and FCH contribution € 3.95M**
- Consortium description

  The consortium consists of a utility company (E.ON), a heating system manufacturer (Ideal), a fuel cell company (CFCL) and a software company (HOMA) specialising in microgeneration control systems and virtual power plants.

Project Goals:

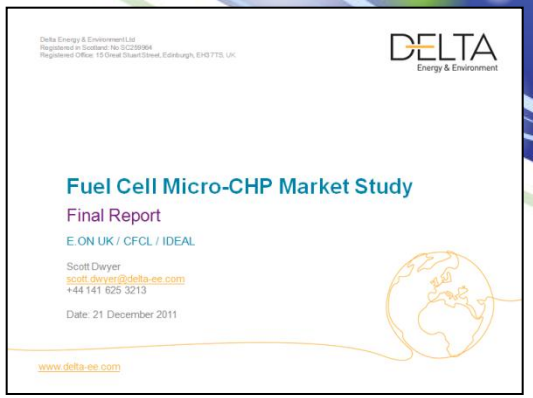
- ☛European demonstration of fuel cell microCHP systems
- ☛Trialling of modular and integrated Fuel Cell microCHP systems
- ☛Utilisation of Gennex: world's most electrically efficient fuel cell module (60%)
- ☛Determine EU Market Opportunity for domestic Fuel Cells
- ☛Deployment of 100 Fuel Cell microCHP systems – 3 System Configurations
- ☛Analysis of real world data from field units
- ☛Commercial configuration and component optimisation

GENNEX fuel cell module



BlueGEN

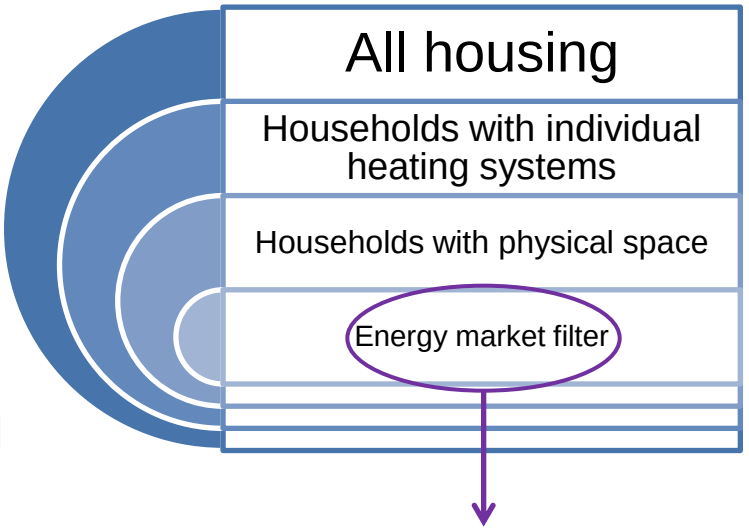
LOGIC +

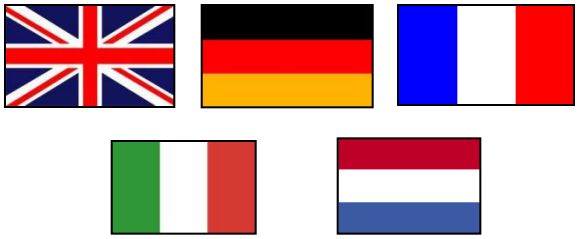


EU Market Opportunity for domestic Fuel Cells

The market study generated comprising of:

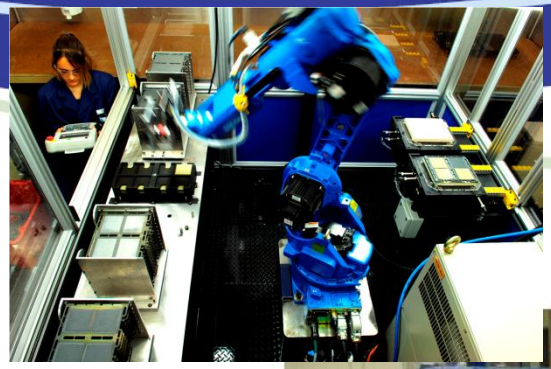
- **Technical market opportunity** – number of buildings with natural gas individual heating systems with space for the appliance utilising BRG Group's EU Heating System statistics.
- **Economic market potential** – given energy and heating market barriers, in how many of the above buildings does the fuel cell micro-CHP appliance offer a potentially attractive proposition utilising policy and regulation country expertises of Delta Energy & Environment consultancy

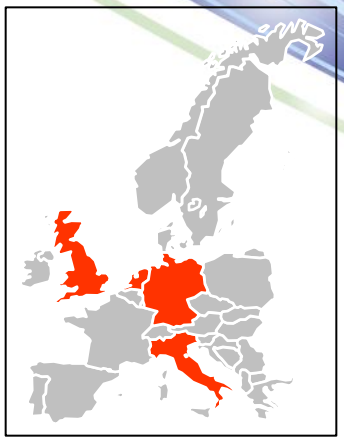




Building Manufacturing Capability

- Robotic Assembly of Stacks
- BlueGen Assembly in Germany
  - Flexible & Scalable 'manufacturing cell'
  - Production capacity from 1,000 systems p.a.
- Assembly & testing of Key Components
  - Water Treatment
  - Air Delivery
  - Power Management
- Final Testing
- Warehousing





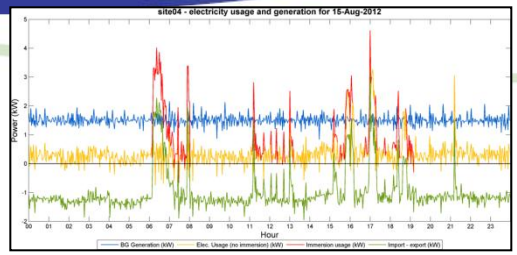
Deployment of 100 Fuel Cell microCHP systems

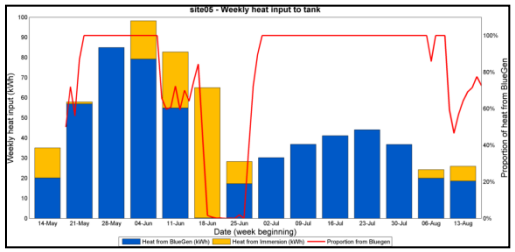
Phase 1 – 40 units in Germany and UK

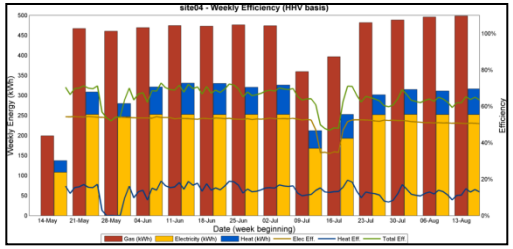
- 2 system configurations
  - BlueGen + Existing Boiler
  - BlueGen + E.ON Storage 160
- Analysis of real world data from field units

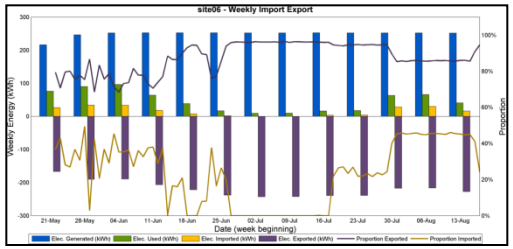
Garage installations

Different occupancy and usage patterns









Project Challenges

Domestic Installation Challenges

- Space constraints:
  - UK housing stock – no basements
  - Removal of the cylinders during change over to Condensing boilers in 1970-90s
  - Netherlands – too heavy for lofts
- Distance between system components:
  - Heavily insulated piping to avoid thermal losses during transfer to thermal storage
- Training for installation
  - staff vs family owned dealership
  - Maintaining quality & cost control
- Data transmission
  - Condition monitoring via property's internet connection

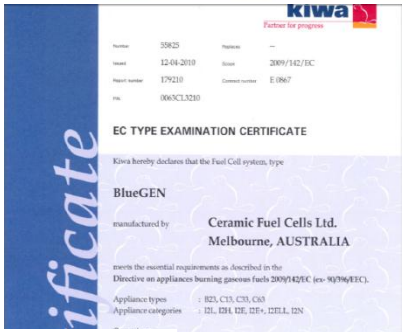
British Standards

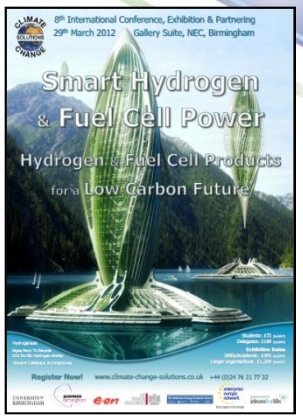
Training and Education

- Training of installation teams in UK and Germany to install BlueGen FC mCHP systems

Safety, Regulations, Codes and Standards

- Development and review of installation safety procedures and standards for systems
- Identification of issues:
  - UK Ofgem only supports Deemed for <30kWe generation, missing value of fuel cells
  - Recognition for Fuel Cell technology within building regulations





Dissemination & public awareness

Sponsorship of 8th International Hydrogen & Fuel Cell Conference:

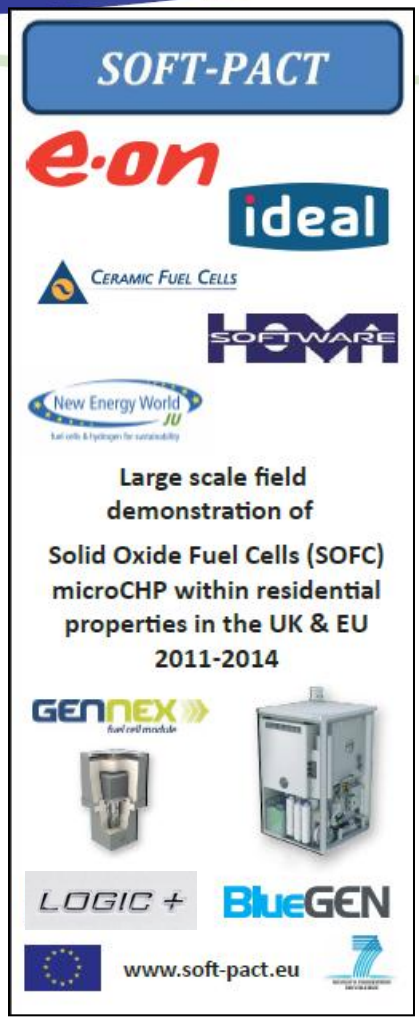
Speakers:

- Bert de Colvenaer, FCH JU – 2020 Vision in the European Union
- Jeremy Harrison, E.ON – Smart Houses with Fuel Cell CHP

Plus BlueGen information stand

Triallists engaged using to methods:

- Customers & Staff volunteers (UK)
- Members of the public selected from responses from 400,000 printed newspapers articles (DE)

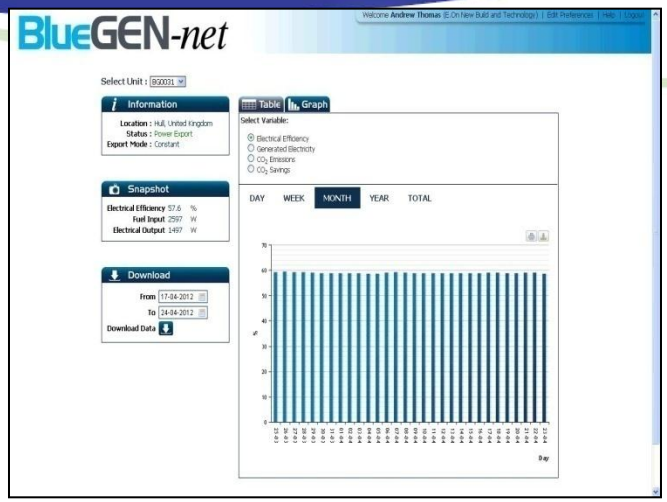


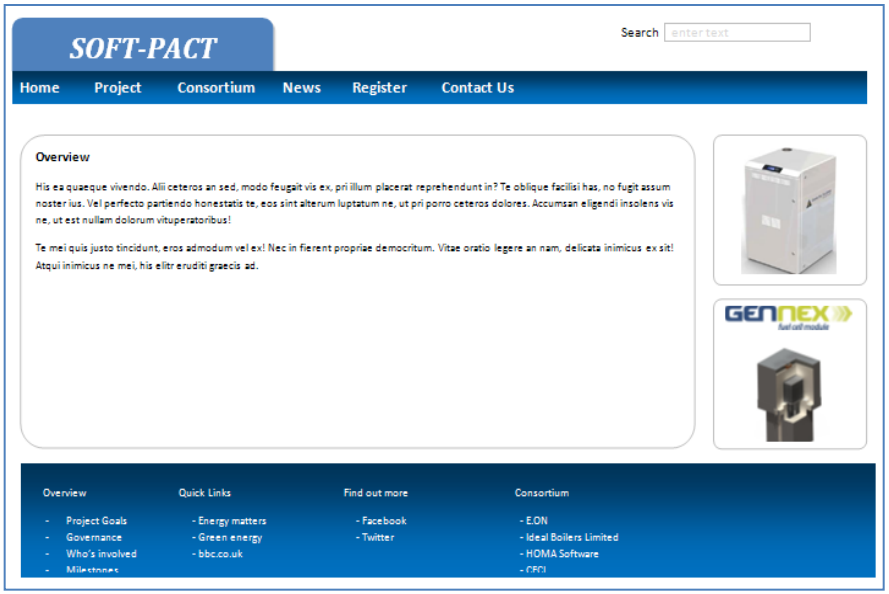
Dissemination & public awareness

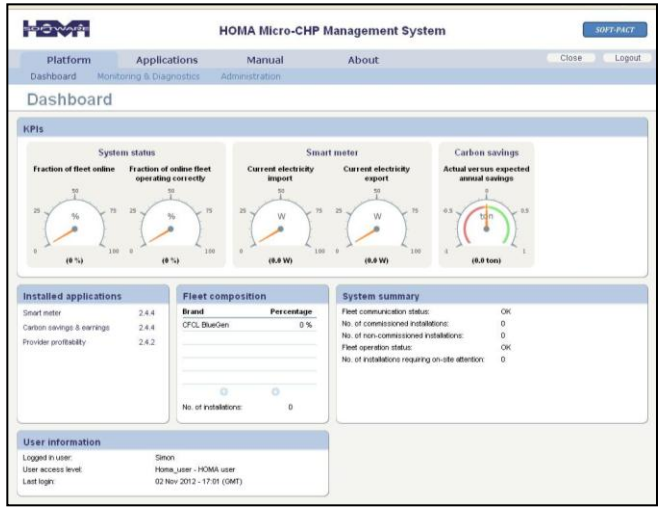
BlueGen.Net portal – Customer Experience

HOMA Software Portal – Fleet Management

SOFT-PACT website – now in production with enquiry capture forms







Technology Transfer / Collaborations

- *Fuel Cell technology transfer to mass manufacturer*
- *Collaborative design and development of integrated system*
- *Cost reduction and optimising of subcomponents:*
  - *Power Electronics*
  - *Water Treatment*
  - *Air Flow System*
  - *Flue System*
  - *Balance of Plant*
  - *Desulphurisation System*

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Alignement to MAIp/AIPs

Expected output AIP Topic: Field Demonstration of Stationary Fuel Cell Systems Call: SP1-JTI-FCH.2010.3.5	Objectives	Status at 50% of the project	Expected revised objectives
EU Market Opportunity Analysis Report , leading to outline requirements specification for integrated system	*Report and Specification*	Complete	-
Training and re-skilling of installation and maintenance engineers	-	BlueGen System Engineers Trained for UK and DE	Integrated FC Unit Engineers Trained by May 2013
Remote control and diagnostics of all the systems from a central point in real time	*Up to 100 units*	BlueGen installations 26 completed 14 scheduled	Up to 100 units by Jul/Aug 2013
Identify and quantify benefits to the homeowner	*Report*	Not Due	Report due at end of Project
Long term reliability and life data from the systems	*Field Trial Data*	Analysis of 26 systems underway – monthly reports on system available to Consortium members	Full Analysis Report and recommendations
Design, develop and deploy integrated fuel cell mCHP systems	-	Design 90 complete Prototypes build about to start	Deployed integrated Fuel Cell mCHP systems in multiple EU countries
Cross Cutting and Knowledge Dissemination	*Sponsorship & Case Studies*	UK conference sponsorship Hamburg press articles UK council engagement Website for Lead Generation	More engagement with house builders, designers and trade

Project Future Perspectives

- Requirements and design considerations are leading to a multiple product line supporting a range of thermal profiles and county specific requirements.
- These integrated Fuel Cell mCHP appliances will be tested residential properties in most promising countries highlighted by market study
- Consortium members have been performing customer research to identify the concerns and issues to be overcome with marketing literature.
- SOFT-PACT website will gather pre-sales enquiries to identify geographic deployment ‘hot spots’

General Future Perspectives

Possible contribution to the future FCH JU Programme

- Support for early market tooling and manufacturing
- Lobbying for EU, Government and Regional incentives
- Fuel Cell education
  - TV Infomercials,
  - Property makeovers,
  - Tech Magazines features
  - Information packs for property designers, builders

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Thank you

Andrew Thomas
on behalf of SOFT-PACT Consortium

Email: andrew.thomas@eon.com
Fuel Cell Programme Manager
Distributed Energy Division
E.ON New Build & Technology