ene.field

”European- wide field trials for residential fuel cell micro CHP”

(303462)

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COGEN Europe

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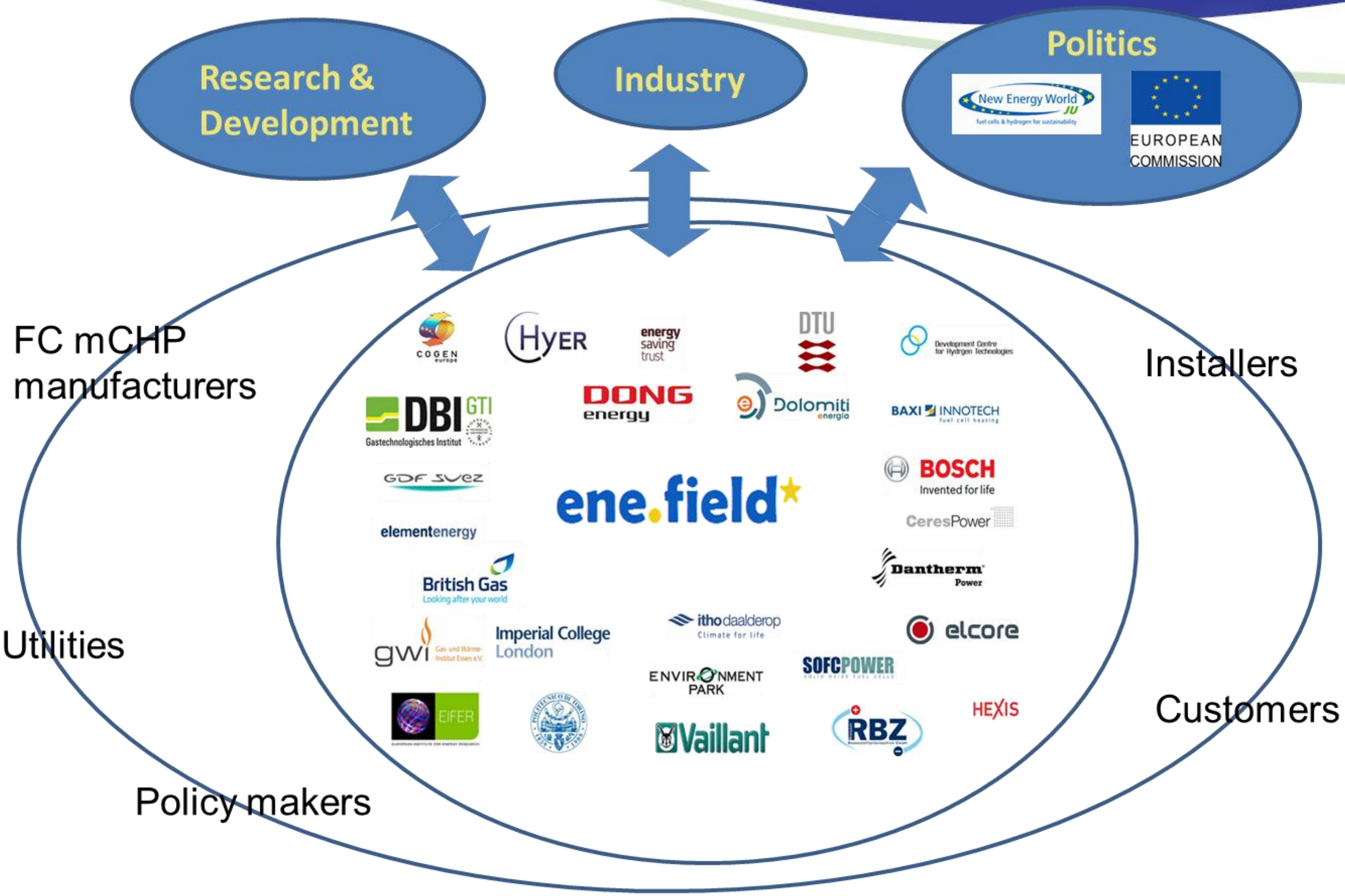
General Overview

- ene.field : European- wide demonstration of fuel cell micro CHP
- 5 years project
  - From Sept 2012- Sept 2017
- Budget
  - Project Cost: € 53 million
  - JU-FCH Project funding: € 26 million
- 26 partners including manufacturers, utilities, research institutes, universities
- It will deploy up to 1,000 Fuel Cell heating systems in 12 key European member states.
- ene.field is the largest European demonstration of the latest smart energy solution for private homes, fuel cell micro-CHP.

Countries where units are currently expected to be installed

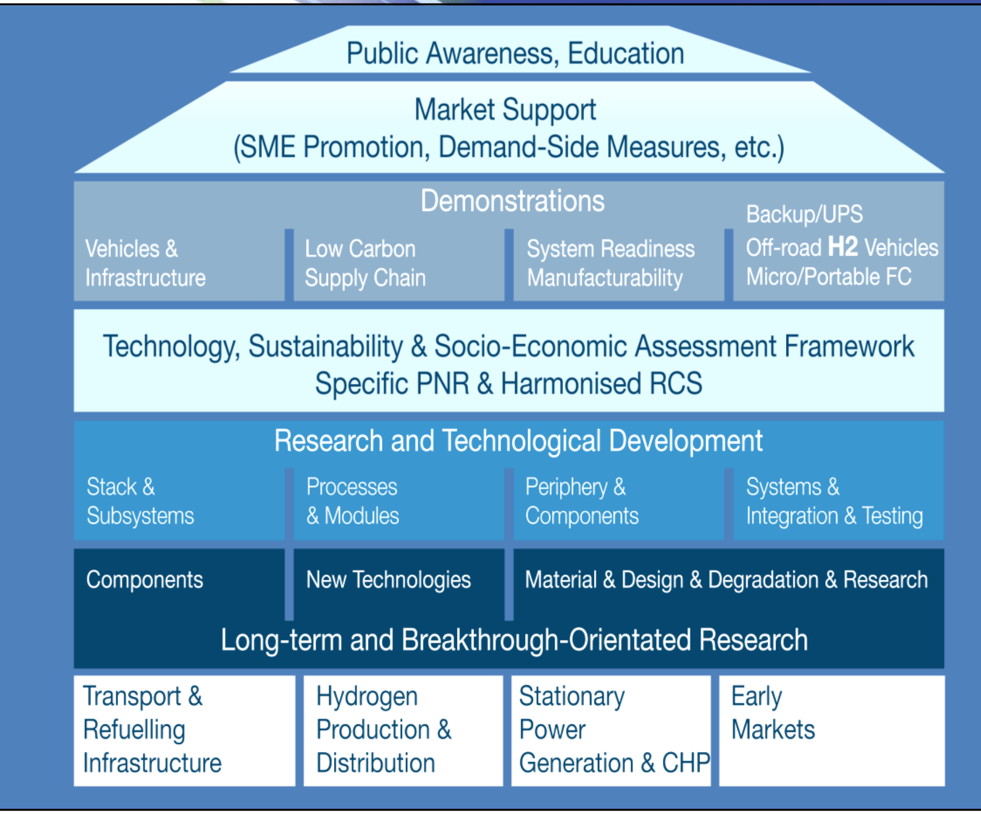
The ene.field consortium



A demonstration project

- **Real world learning -** demonstration of market potential, segmentation, cost and environmental benefits of micro FC-CHP
- **Developed market focused-product** specifications and harmonised codes and standards
- A **more mature supply chain**, readied for deployment of micro FC-CHP in 12 member states.
- **An evidence base on cost and environmental per**formance, that can be used to accelerate policy support from governments, and adoption by channels to market.

Multi-Annual Implementation Plan 2008-2013/2017



Adopted in May 2009 and <u>update targets in Nov 2011</u>

		Volume & cost		
Application Area	Market application	2010 baseline	2015 mid-term	2020 long-term
AA3 – Stationary	Micro-CHP (residential), natural gas based		1,000 units / 10,000 € per system (1kWe + household heat) Assuming supported deployment from 2013+	50,000 units / 5,000 € per system (1kWe + household heat) Anticipating commercial introduction beyond 2020
	Industrial/commercial, H2 based	1 MW / 4,500 €/kW	>5 MW / 3,000 €/kW Assuming supported deployment from 2013+	>50 MW / 1,500 €/kW Anticipating commercial introduction beyond 2018
	Industrial/commercial, natural gas based		>5 MW / 4,000 €/kW Assuming supported deployment from 2013+	>100 MW / 2,000 €/kW Anticipating commercial introduction beyond 2018

Technical Targets

State of the art technical targets and ene.field performance

	JTI Target	Current State of the Art**	ene.field expected performance
Technical targets for FC CHP	Efficiency minimum of 35% (electrical)	30%	The products will meet and exceed the targets with a range of 35–50% electrical efficiency
	Overall efficiency >85% (LHV)	70–85%	Up to 90%
	Lifetimes of 8-10 years	3 years	Up to 8 years
	Cost below 20,000 €/ unit (Assumed to refer to the capital cost of the system per kWe)	50.000 €/kW	13,000- 27,000 €/kW for the trial – excludes 300W outlier Potential for < 10 000 €/kW after the trial.
	Cost reduction to meet targets in the MAIP including a 2015 target cost of 4,000- 5,000 €kW for micro CHP.	Manufacture, hand made	Pre-serial to serial production

Year 1 Milestones

Milestone number	Milestone name	Month
M1.2	Installation of first unit	6
M2.1	Data collecting and reporting training	6
M3.3	Establishment of Regulations Codes and Standards (RCS) working group	1
M3.4	Establishment Utility working group	7
M4.1	Project dissemination plan	6
M6.1	Annual consortium meetings and 6 monthly core partner meetings	6

ene.field interacts/interfaces/coordinates with other institutions and projects

	Ene-farm	CALLUX and NIP	Ene.field
Timescales	2010-2015	2008-2015	2012-2017
Countries involved	Japan	Germany	UK, Germany, France, Netherlands, Denmark, Italy , Spain, Austria, Luxemburg, Belgium, Slovenia
Electrical efficiencies	30-35%	30-34%	> 35% by end of trial
System efficiencies	60-80%	80-95%	>85% (LHV)
No. units	>9,000 to date	800 + 1400	960
Unit capacity			0.3-5kW
Type	Integrated system consisting of fuel cell subsystem, peak heater and hot water storage tank. Designed to produce electricity and hot water	Integrated system with fuel cell and peak heater to produce electricity, tap water and supply heat to the home. Storage is a supplementary part of the system	Combination of integrated and separate systems. Storage is a supplementary part of the system.
Technology	PEM and SOFC	PEM and SOFC	HT SOFC, IT SOFC, HT PEM and LT PEM
Further information	Floor standing, outdoor installation.	Integration in various German heating systems. Floor standing, wall hung. Indoor installation.	Integration in various European heating systems. Floor standing, wall hung. In home installation or in separate installation cabinets.
Supply chain	Supply Asia, Europe by 2014	Expansion in Germany	Expansion across Europe

Technical characteristics of systems in ene.field

The systems deployed in ene.field present a good coverage of various type of requirements thanks to a wide range of technology, size and fuels.

GAMMA PREMIO	Cerapower FC10 Logapower FC10	Dantherm	Elcore 2400	Galileo 1000 N	Inhouse 5000+	ENGEN 2500	Vaillant G5+
							
LT PEM	SOFC	LT PEM	HT PEM	SOFC	LT PEM	SOFC	SOFC
1 kW	700W	0.5 - 2kW	300W	1kW	5kW	2.5kW	1kW
Natural Gas	Natural Gas, Gas	Natural Gas + Biogas	Natural Gas	Natural gas+ Biogas	Natural gas + Biogas + H2	Natural Gas	Natural Gas
Floor	Floor	Floor	Wall	Floor	Floor	Floor	Wall
Baxi Innotech	Bosch Thermotechnik	Dantherm Power	Elcore	Hexis	RBZ	SOFC Power	Vaillant

First Installations

BAXI INNOTECH, the Homburg Municiple Works and family Bossler are backing fuel cells for heat and power generation in the home: Wolfgang Ast, Managing Director of the Homburg Municipal Works, Friedrich and Julia Bossler and Guido Gummert, Managing Director of BAXI INNOTECH (from left to right)

Installation of the Elcore 2400 system at family Aberl: Jörg Schröter, Schröter Haustechnik (left), Martin Eichelbrönner, Elcore GmbH (right) and family Aberl represented by their last born son.

Trial Deployment

- Field trials have started in Germany and the UK.
- Field trial tracking system is in place.
- An implementable consistent monitoring scheme has been put in place.
- The data gathering questionnaires for analysis are prepared and translated in to all necessary languages

Data Collection and Analysis

- Agreement on data handling
  - End-user and installer questionnaires;
  - high detailed and standard monitoring;
  - collection of issues encountered;
  - clean room process.
- Installation and set-up manual for high-detailed monitoring equipment
- Field support report of the state of the art with regards to field support arrangements, training and certification.
- Utility Working Group establishment
- Regulations Codes and Standards Working Group establishment
- The work on the Lifecycle Costs Assessment (LCC) and the Environmental Lifecycle Assessment (LCA) has already begun.

Communication

- Project website with updated information on the project and technology
- Tailored communication to the different stakeholders; focus on utility /link to market.
- Information packs for householders translated to 12 different languages
- Newsflashes and press releases
- Creation of an Advisory Panel with representatives form USA, Japan and EU
- Beginning of the regional dissemination events – first workshop in Spain on September, and in Germany the 28 November.

Additional Outreach: Hannover Fair

Bottleneck for project

- Finalising field trial agreements with trial partners that have an interest in deploying units.
  - The complexity of drafting satisfactory contracts in several countries slowed progress
- Radical changes in the Utility market
  - Utility market has changed considerably over the period 2011 to 2013
  - Project is looking at new routes to field trial installation

Bottleneck for project

- Monitoring Plan and best implementation of plan
  - Standardisation of approach across range of products proved complex even among willing partners.
  - A difficult overhead in a deployment program. How much is research and how much market development?

Year 1 Milestones

Milestone number	Milestone name	Month	Actual
M1.2	Installation of first unit	6	12
M2.1	Data collecting and reporting training	6	13
M3.3	Establishment of Regulations Codes and Standards (RCS) working group	1	1
M3.4	Establishment Utility working group	7	7
M4.1	Project dissemination plan	6	6
M6.1	Annual consortium meetings and 6 monthly core partner meetings	6	6

Self assessment

WP1	Trial deployment	Behind but with recovery plan in discussion
WP2	Data Collection	JIT (delay on original plan)
WP3	Analysis	On plan
WP4	Dissemination	On plan
WP5	Commercialisation Framework	On plan
WP6	Coordination	On plan

Thanks for your attention

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Multi-Annual Implementation Plan 2008-2013/2017

Application Area	Market application	2015 mid-term	2020 long-term	Enefield objective 2015
AA3 – Stationary	Micro-CHP (residential), natural gas based	1,000 units / 10,000 € per system (1kWe + household heat) Assuming supported deployment from 2013+	50,000 units / 5,000 € per system (1kWe + household heat) Anticipating commercial introduction beyond 2020	960 units /10,000EU+ Supported deployment from 2013