



Pathway to a competitive European  
Fuel Cell micro-CHP Market

# Trial Overview & Customer Insights

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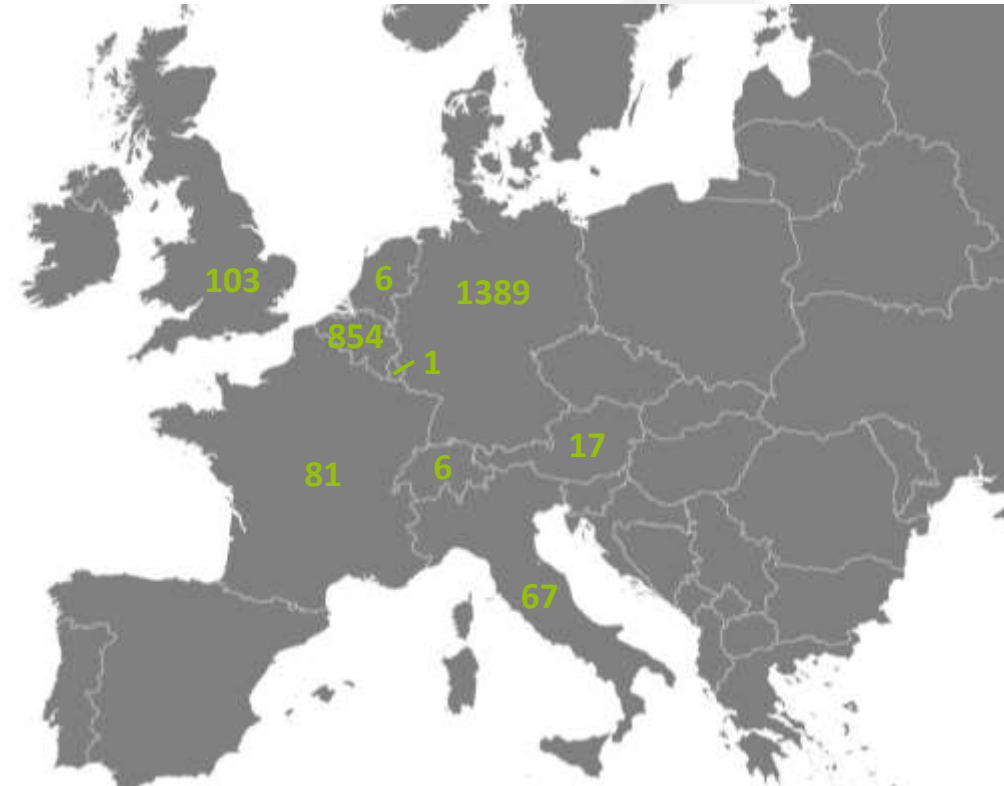


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2,500 FC mCHP units were installed in the PACE project in 9 countries across Europe since 2016

### Product innovation and field demonstration

- ✓ Demonstrated **over 2,500 fuel cell mCHP units** with improved efficiency, reliability and reduced maintenance requirements (10-year servicing contracts).
- ✓ Successfully **reduced the cost of manufacturing** fuel cell systems and **provided documentary evidence** of this cost reduction to Clean Hydrogen Partnership.
- ✓ Built **routes to market** for FC mCHP through **installer training, marketing and sales development** and built relationships initiated in previous trials.
- ✓ Installed and tested new equipment for the manufacture of **next-generation systems** using **increased automation, manufacturing equipment** and **processes** designed/ready for mass production.





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# PACE has delivered exciting new products from a group of manufacturers with two Fuel Cell technologies trialled

Buderus Logapower FC10.2	Buderus System Logaplus	BlueGEN	BlueGEN BG15	Dachs 0.8	eLecta	Vitovalor 300-P, PA2 and SA2	Sunfire-Home 750
							
100	200	750	750	200	300	>750	500
SOFC	SOFC	SOFC	SOFC	PEM	PEM	PEM & SOFC	SOFC
0.7kW	1.5kW	1.5kW	1.5kW	0.75kW	0.75kW	0.75kW	0.75kW
				 	 		
1-2 family homes (up to end 2018)	1-2 family homes, residential buildings and SMEs with high electricity demand	SMEs, apartment buildings and multifamily homes	SMEs, apartment buildings and multifamily homes	1-2 family houses (for new and existing buildings)	1-2 family houses (for new and existing buildings)	Domestic and small commercial	Residential building (with LPG supply)

# A wealth of resources have been created via the trial activities to help promote the uptake of FC mCHP technology across Europe

All reports available on [Home - PACE \(pace-energy.eu\)](https://pace-energy.eu)



## Recommendations for overcoming regulatory barriers

- Working group established to **debate issues arising in different member states**.
- Overview of barriers across 5 pillars: **financial incentives, electricity tariffs, grid connection, building standards, customer information**.
- The lack of **consistency and standardisation** across member states in Europe is one of the most significant barriers.



## Market experience and lessons learnt from trial

- Compilation of **key lessons learnt** from trial: manufacturing, site selection, site preparation and installation / maintenance.
- PACE has allowed OEMs to **establish best practices** across all areas of manufacturing and deployment.
- Importance of **cooperation between stakeholders and across to member states** cannot be overstated.



## Training recourses and recommendations for certification

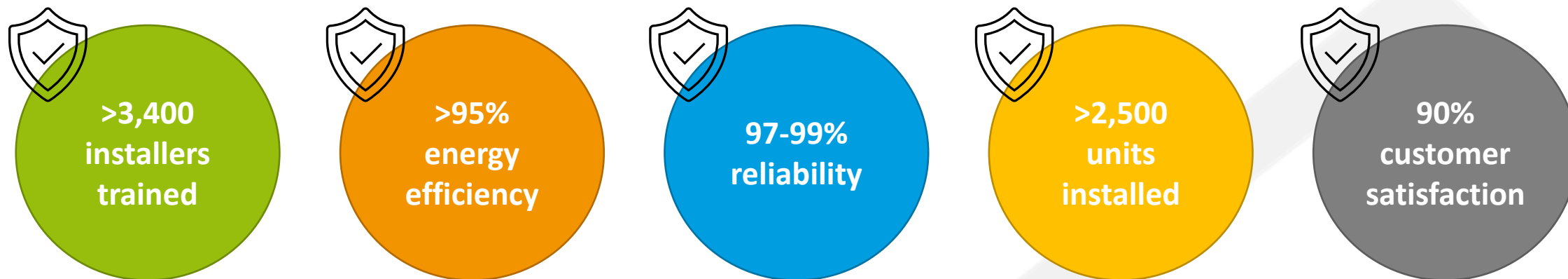
- Working group established to facilitate **exchange of information on approaches to training**.
- Creation of **updated training materials** as an outreach tool.
- A lack of standardised training and formal certification are **not a significant issue** holding back the technology from more widespread uptake, but **could be helpful alongside more significant changes**.



## Recommendations for servicing and after sales support

- OEMs established **innovative sales and marketing channels** suitable for ramp-up to >1,000 systems a year.
- Importance of presenting a **low-risk offer** to customers and emphasising **sophistication of existing servicing** and aftersales support.

PACE has allowed for FC mCHP technology to be tested at scale and has proved that it is performing well and is ready for wider market uptake



The PACE trial has helped the OEM group to acquire valuable experience and has overcome unanticipated challenges to achieve a successful result. The PACE trial has provided experience across Europe, demonstrating the capabilities of the technology for the sector. It is important to note that this would have not been possible without funding from the Clean Hydrogen Partnership funding.

Customer attitudes to FC mCHP technology have been collected through end-user surveys throughout the project

### Three sets of surveys have been sent to PACE customers throughout the trial

- Before installation ("Pre-operation")
- After 1 year ("During operation 1")
- After 2 years ("During operation 2")



1,760 survey responses received of >2,500 units commissioned

High level of engagement!

### Survey aims:

Overall statistics on **satisfaction with the units**

Data on **willingness to pay** for equivalent units in the future

Comparison of **perceived versus expected savings** from the units

Analysis of the **way attitudes to the units** change through time

**Customer testimonials** on unit performance and satisfaction

## Customers are 'early adopters' who are motivated by cost and energy savings



I am the type of person to worry about being 'green'



I am the type of person who likes to try new products



I feel a moral obligation to reduce my emission of greenhouse gases



I would be willing to pay a little more for an energy system if I knew it was less harmful to the environment

Respondents display positive attitudes towards 'green' climate change agendas as well as towards new technologies, products and brands.

This may indicate the general profile of these customers as 'early adopters' of the technology, keen to advance the technology and less averse to the financial and operational risks involved.

### *Motivations for purchasing a FC mCHP*

Energy savings  
(22%)

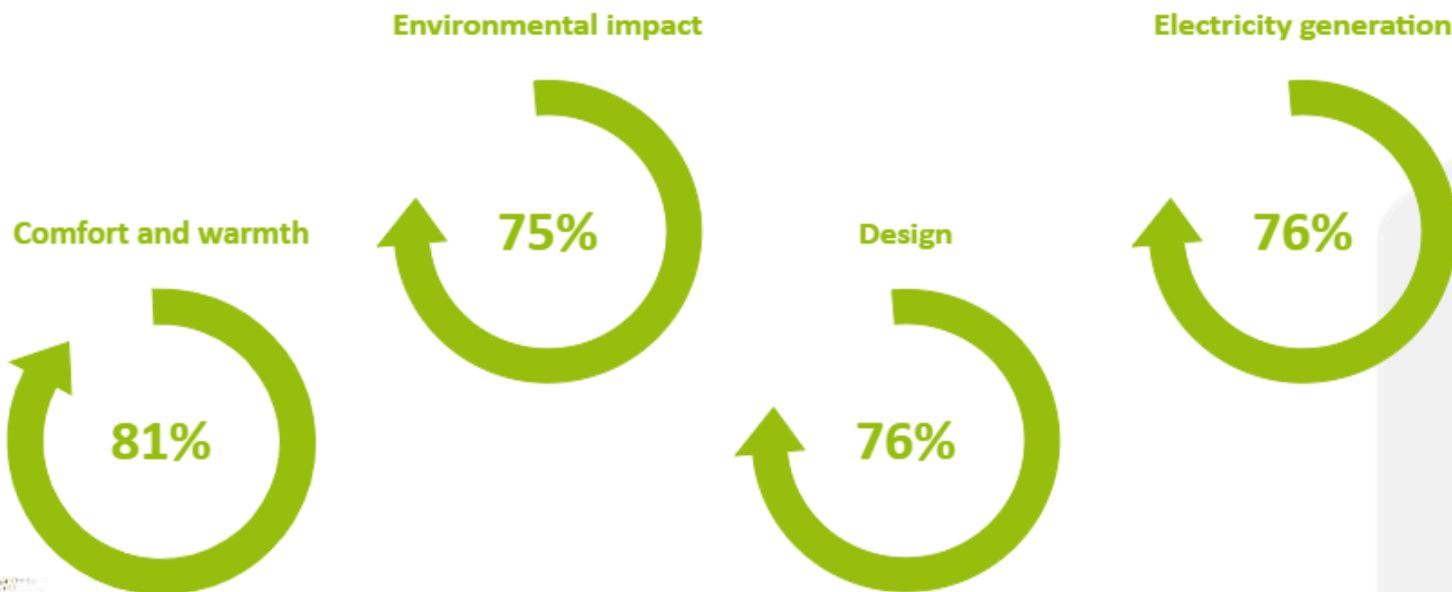
Cost savings  
(19%)

CO<sub>2</sub> reduction  
(17%)

## End-users are pleased with the performance of the technology

Surveys show that >75% of users rated their experience the design, environmental impact, electricity generation and comfort and warmth of their FC mCHP as 'positive' or 'very positive'.

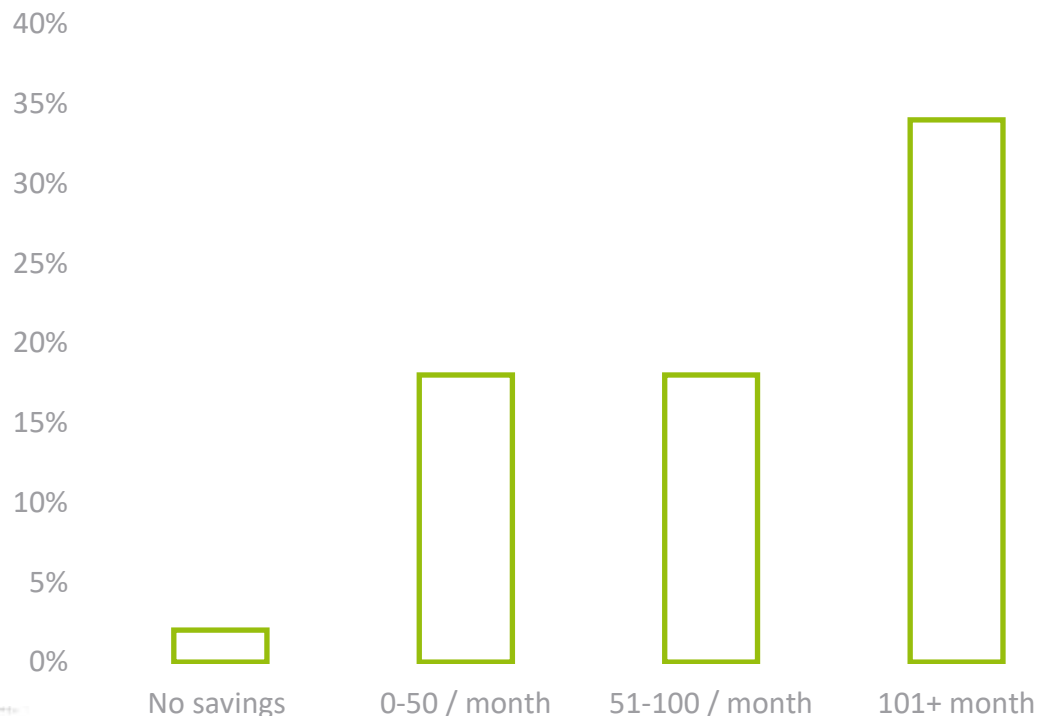
“We find the technology fascinating. We will and have already recommended FC to others. Everything is good! We can only recommend it! Try it out for yourself, it's worth it!”





## FC mCHP helped to protect users from volatile power prices, delivering savings despite significant spikes in energy prices

70% of customers experienced a reduction in their electricity bills following the installation of their FC mCHP. 34% experienced a saving of more than €100 /month or €1200 /year.



Frustratingly, the financial benefits were somewhat lower than the expectation, as they were impacted by a number of external market conditions including **COVID-19, the war in Ukraine and the subsequent, ongoing energy crisis across Europe.**



Despite this, 16% did still experience a decrease in their gas and oil bills following the installation of their FC mCHP.



70% experienced a decrease in their electricity bills.



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**Thank you.**

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