



Pathway to a Competitive European
Fuel Cell micro-CHP Market

The bridge to large scale market uptake

European-wide field trials for residential Fuel Cell micro-Cogeneration

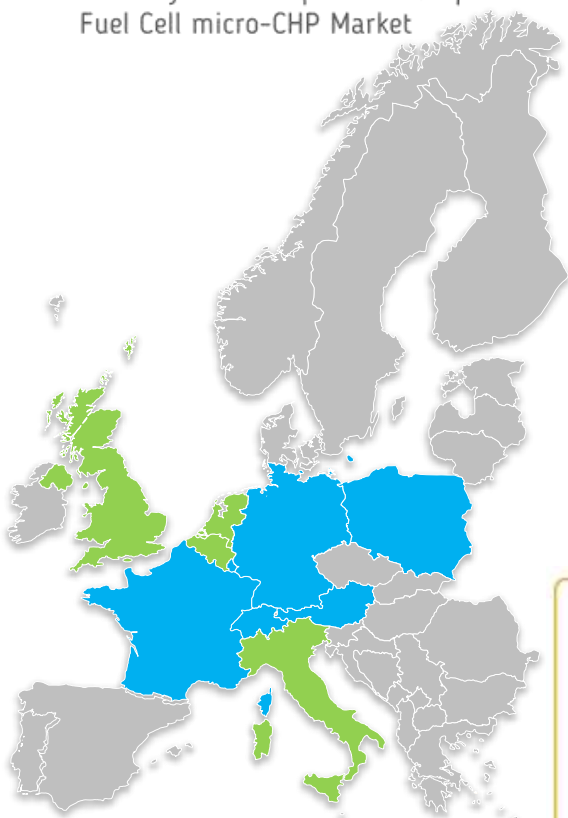


This project has received funding from the Fuel Cells and Hydrogen 2 Joint Undertaking (now Clean Hydrogen Partnership) under Grant Agreement No 700339.

This Joint Undertaking receives support from the European Union's Horizon 2020 Research and Innovation program, Hydrogen Europe and Hydrogen Europe Research.

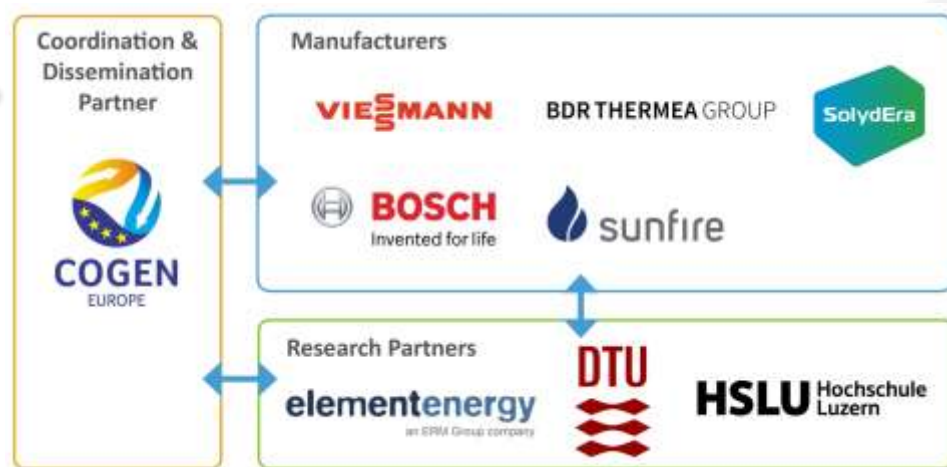


Promoting a successful transition to the large-scale uptake of Fuel Cell micro-Cogeneration across Europe



- Field trial + installer training + targeted market & policy development activities
- Field trial + local installer training

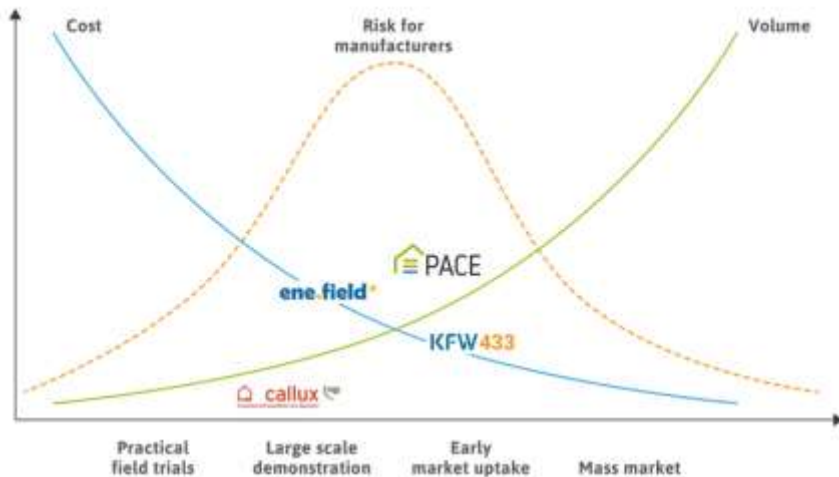
9	> 2,500	>500	10	4	€90m
Partners	Fuel Cell micro-Cogeneration units	Systems per manufacturer	Countries	Countries	Total budget
Representing manufacturers, utilities & research community	To be deployed across Europe between 2016-2023	Established production capacity per manufacturer	Where the units will be installed	Selected for policy & market development (Belgium, Italy, Netherlands and UK)	Including €33.9m Horizon 2020 funding via FCH JU (now Clean Hydrogen Partnership)



>10,000
FC micro-cogeneration
units/year post 2020

Driving the Fuel Cell micro-Cogeneration sector closer to mass market uptake

How to overcome the point of greatest risk in new product commercialisation?



callux ^(nlp)	ene.field*	PACE	KFW433
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• Period: 2008 - 2015	• Period: 2012 - 2017	• Period: 2008 - 2021	• Period: started in 2016
• Total budget: €75 million	• Total budget: €52 million	• Total budget: €90 million	• German NRW HWP grant scheme administered by KfW bank
• German HWP co-financing: 50%	• EU co-financing (FCH JU/FP7): 30%	• EU co-financing (FCH JU/Horizon 2020): 37%	• Beneficiaries: End customers
• 500 systems installed in Germany	• → 1,000 systems installed in 11 European countries	• → 2,500 systems to be installed in 11 European countries	• Eligible size: 0.25 kW _e - 5 kW _e
• ≈ 5 million operating hours	• ≈ 2 million operating hours so far	• 500 units/manufacturer	• Grant value per system: €5,700 - €28,000
• CO ₂ reduction by 30% on average per year			

Fuel Cell micro-Cogeneration units have demonstrated initial technology readiness in previous European and national demonstration projects.

Reduce costs and improve competitiveness

Improve products' performance

Establish Fuel-Cell micro-Cogeneration as a standard technology

Raise awareness on Fuel-Cell micro-Cogeneration

Demonstrate product readiness as a key component in the delivery of EU's energy goals

Why Fuel Cell micro-Cogeneration?

Heating and Powering your home

Fuel Cell micro-Cogeneration is a highly efficient home energy system that simultaneously produces heat and electricity



Empowers consumers



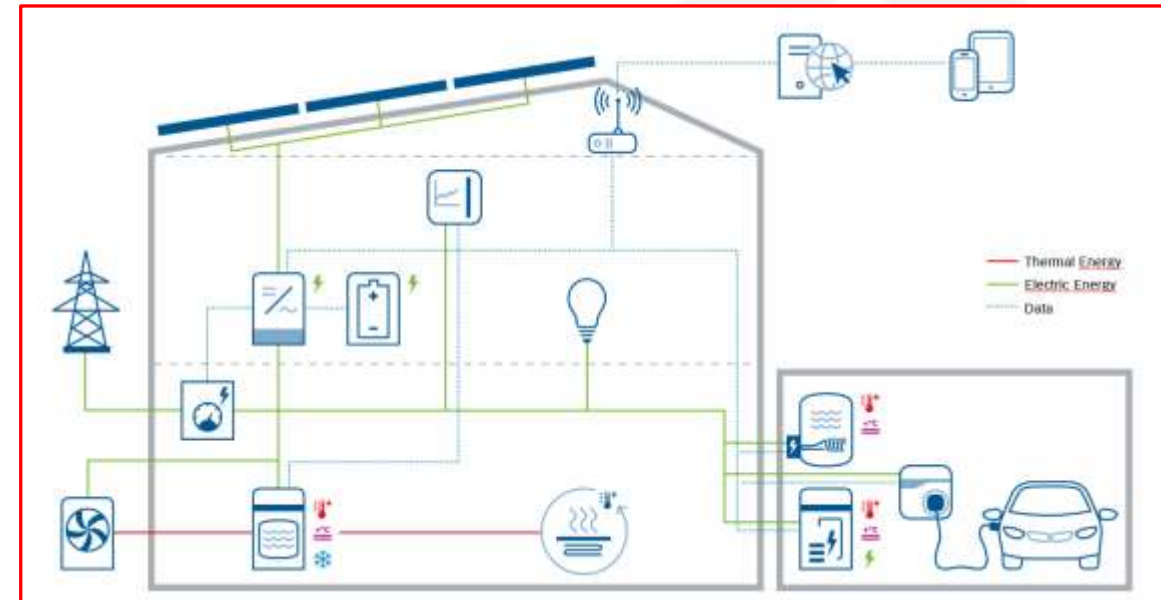
Supports the European energy transition



Provides greater flexibility for the energy system



Fosters innovation and high-value jobs



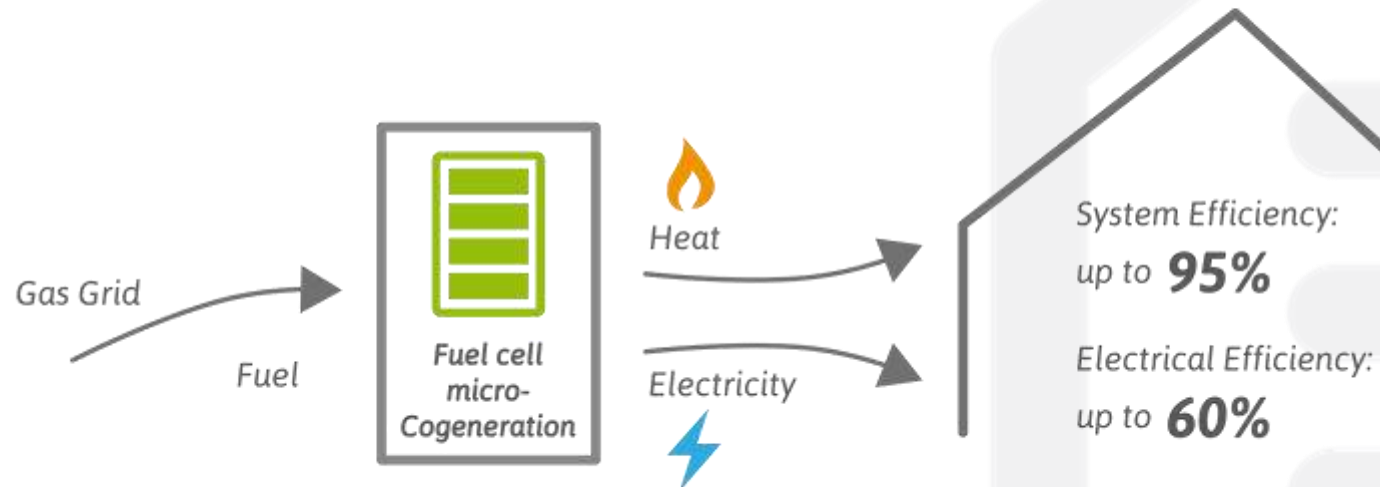
Why Fuel Cell micro-Cogeneration?

Heating and Powering your home

Supports the European Energy Transition

With total efficiencies of more than 90%, including electrical efficiencies of up to 60%, this technology can achieve **significant energy savings and CO₂ emission reductions**. On average in Europe it would save around 1 tonne of CO₂/kW every year, thus delivering more than 32 million tonnes of CO₂ emission reductions across Europe in 2030.

This “**fuel flexible**” **technology** will be progressively fuelled by renewable energy sources, such as hydrogen and renewable gas.



Why Fuel Cell micro-Cogeneration?

Heating and Powering your home

Provides greater flexibility for the energy system

By generating heat and electricity near the point of consumption and stepping in when the output of renewables is low, Fuel Cell micro-Cogeneration relieves the stress on the electricity grid during **peak demand** (e.g. for powering heat pumps and charging electric vehicles).



For our transition to a complex energy system, with increasing penetration of intermittent renewables, Fuel Cell micro-Cogeneration:

- Is a valuable demand-side measure for managing grid stability
- Overcomes the challenge of increasing penetration of electric heating
- Is low-carbon and renewable when utilising bio-gas and H₂
- ...in an existing, extensive natural gas network
- Contributes towards a cleaner, healthier environment

Why Fuel Cell micro-Cogeneration?

Heating and Powering your home

Fosters Innovation and High-value Jobs

Provides **new and highly skilled green jobs** in Europe, while building on the existing expertise of the heating industry.





Pathway to a Competitive European
Fuel Cell micro-CHP Market

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