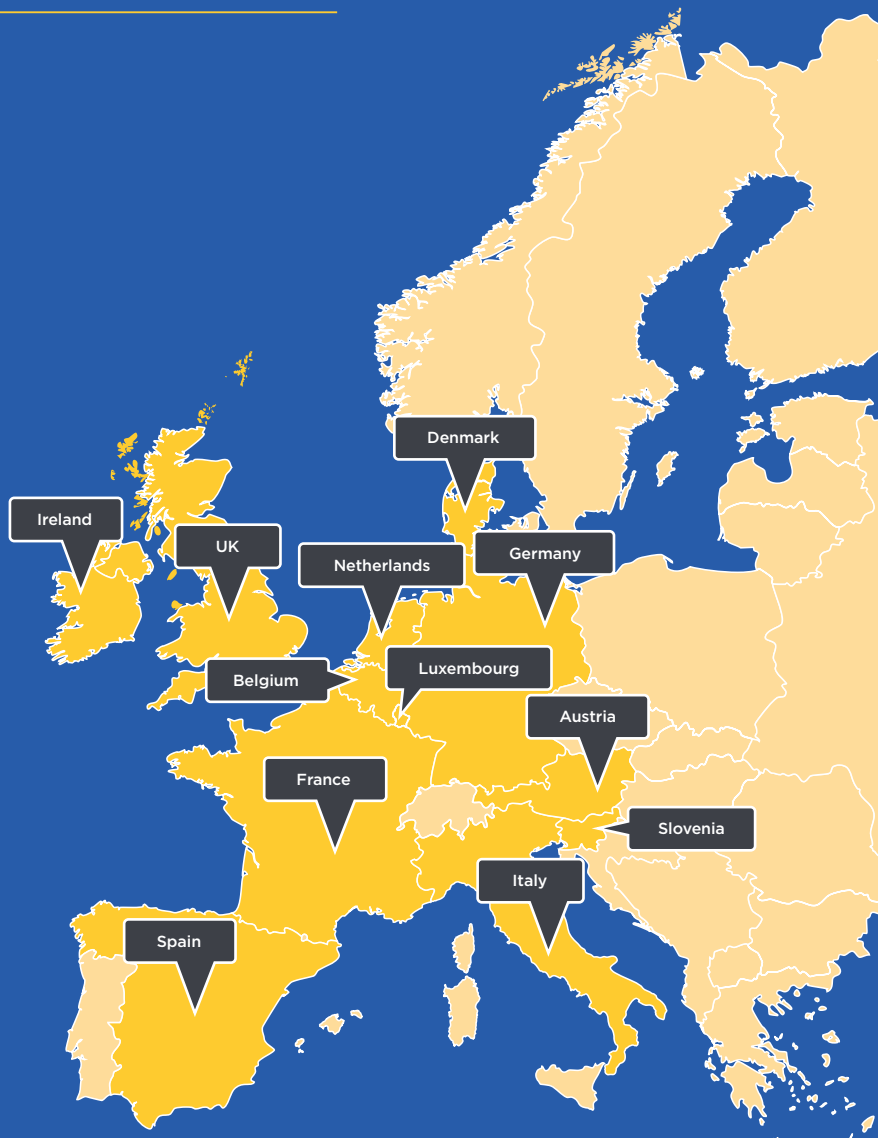
Information for field trial participants

ene.field

Measuring the benefits

Welcome to ene.field, Europe's largest ever demonstration and investigation project for fuel cell micro CHP technology.

Installations planned under ene.field



Introduction and welcome

Welcome to ene.field, Europe's largest ever demonstration and investigation project for fuel cell micro CHP technology.

Micro CHP stands for 'micro combined heat and power'. This technology generates heat and electricity simultaneously, using your gas supply as the energy source. In this instance it does so with a fuel cell, producing energy for you to use at home.

We thank you for your participation in this innovative project and we look forward to learning from your experiences of living with a micro CHP system.

In this document you'll find an introduction to the project and quick facts on fuel cell micro CHP. There are also some tips on how to use your system most effectively. The best thing to do is to understand what your system can produce and to keep an eye on the electricity and heat you use at home. Fuel cell micro CHP is a technology for everyone and fits well to a modern lifestyle.

If you want to learn more about the project or wish to get in touch with the ene.field team visit our website http://enefield.eu. Any technical related questions regarding your system should be directed to your installer or energy supplier.

For more information visit www.enefield.eu

Introduction to micro CHP

There are different types of micro CHP, such as Stirling engine or internal combustion engine, all powered by different fuels. ene.field focuses only on fuel cell micro CHP.

Micro CHP technology has changed rapidly in recent years. Many manufacturers are developing products for the residential market. Field trials in Europe and across the world have already begun and ene.field will collect the largest EU data set so far on how these products perform in real buildings.

The history – ene.field

ene.field began in 2012 after much planning and collaboration. Twenty-six European partners and the European Commission came together to develop the field trial. In early 2012, the project received a co-funding grant from the European Commission's Fuel Cell and Hydrogen Joint Undertaking Programme (FCH JU), who saw the European-wide benefits of the project and the lessons it will produce. The project officially started in September 2012.

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The aims

Your participation in this project is fundamental to ene.field achieving its aims to:

1 Create real-world lessons

Only by investigating the technology's performance in real buildings with real users can we judge its potential for current and future markets. We want to find out the economic and environmental benefits that fuel cell micro CHP can bring and we want to learn from end-user experiences.

2 Develop more mature product specifications

The project aims to produce new universal codes and standards for future products and installation procedures.

3 Establish a more mature supply chain

ene.field aims to develop the supply chain in all 12 member-states for larger-scale deployment. Nine manufacturers will be installing systems working with utilities, housing providers and municipalities.

4 Provide evidence for future adoption

ene.field hopes to accelerate policy support from governments and adoption from other channels by proving the economic and environmental performance of the technology in a variety of locations and situations.

Research techniques

To achieve these aims, ene.field will use various research techniques. The main method is remote monitoring of the performance of the fuel cell micro CHP in the buildings they are in. Each system's performance will be monitored and fed back to the project team. Monitoring will take place for at least two years at each site to gather enough information for confident conclusions.

End-user feedback is an essential part of investigating the real-life performance of new technologies. The project team is interested in your experiences with the technology and how you feel about its performance. Sharing your experiences will be vital for the project's success. Questionnaires to learn about your experiences and opinions of the technology will be sent out upon installation and after one year of use.

By now you will have had your micro CHP system installed. You probably know a lot about your system already. If not, this short section will introduce you to the technology and what you can do to get the most out of your system.

What are fuel cells?

Fuel cells are not new. The first was created in 1839. They have been developed for various applications ever since. Their most famous use was helping to power multiple NASA space-craft missions since the 1960s. They powered the Apollo missions. Now the technology is being developed to power and heat your home.

Fuel cells convert hydrogen directly into electric energy plus heat via the electrochemical reaction of hydrogen + oxygen into water:

Hydrogen + Oxygen = Water + Energy

As hydrogen gas isn't readily available in your home the fuel used in this process is natural gas, which contains hydrogen. Your micro CHP appliance will be connected to the gas mains in order to have a constant fuel supply.

The fuel cell micro CHP process

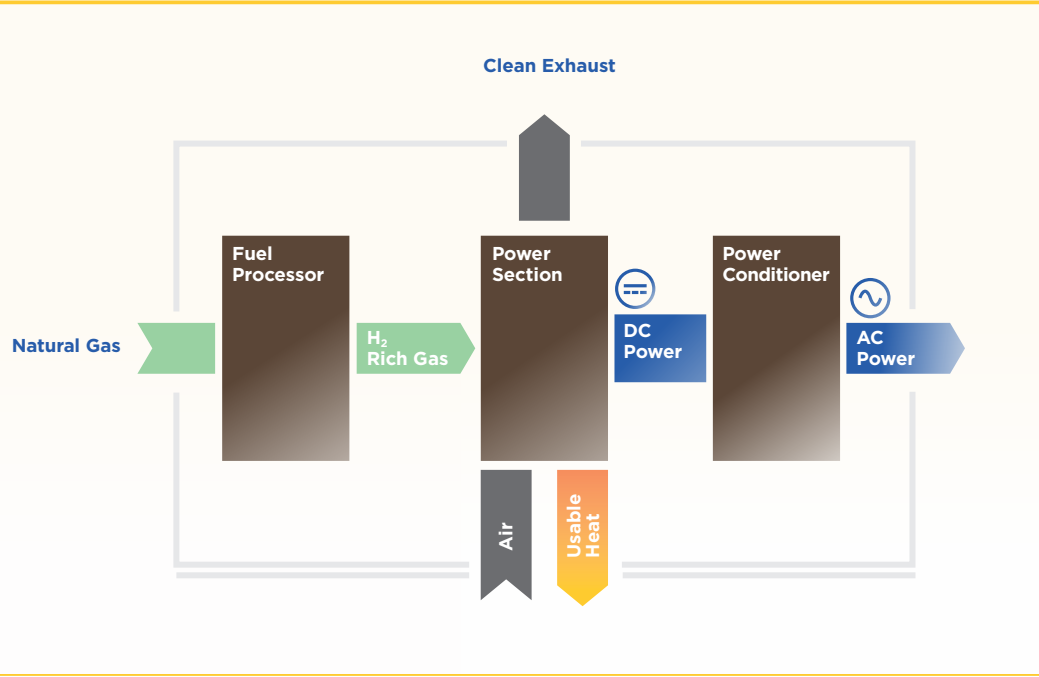
Once the micro CHP appliance is connected to the natural gas mains, a processor converts the natural gas into a hydrogen rich gas. This is used as the fuel in the reaction described previously.

Within the appliance, the fuel cells are combined to form so-called stacks in the power section. The more energy required from your unit the more stacks you will have. The hydrogen-rich gas reacts in the fuel cell stacks with oxygen contained in the air. Here, both DC electricity and heat are produced. The DC power is then turned into AC power (the electricity current supplied to homes) by a specific inverter device.

The electricity and heat produced are then available to power and heat your home and domestic hot water.

Most fuel cell micro CHP will also require some electricity consumption to help run the process (much like a boiler) and may also require fresh water input as well. These inputs are only small.

FIGURE 1: THE BASIC FUEL CELL PROCESS



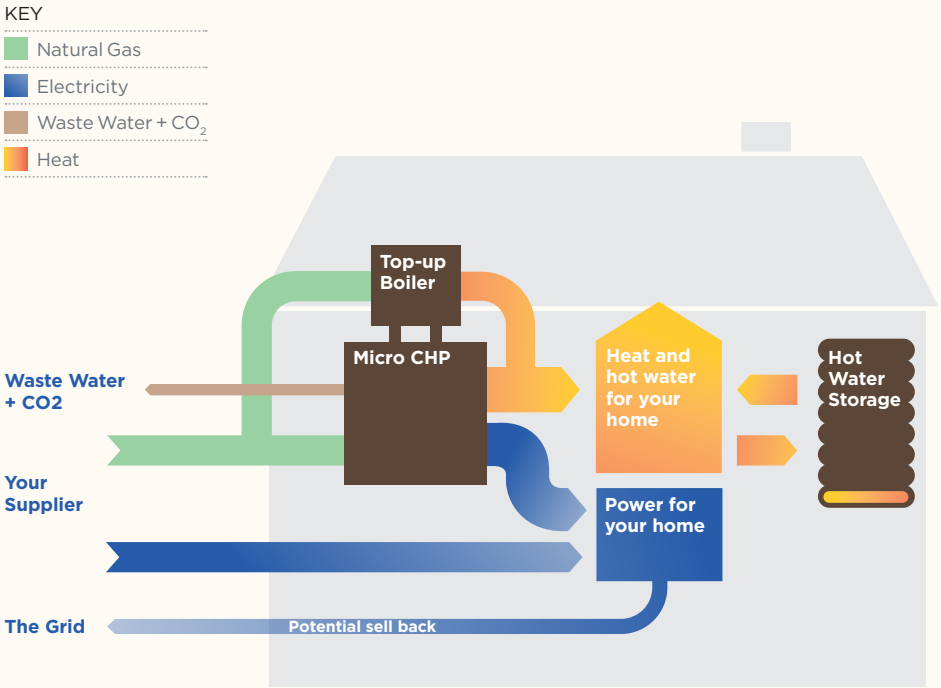
Different types of fuel cells

Different manufacturers prefer to use different types of fuel cell to produce this heat and power. There a many types but only two are used in ene.field. Your system will either be powered by a:

- Solid Oxide Fuel Cell (SOFC) or
- Polymer Electrolyte Membrane (PEM) fuel cell

Please contact your installer if you are interested in the specific type used in your micro CHP system.

FIGURE 2: A STANDARD FUEL CELL MICRO CHP SYSTEM



A standard fuel cell micro CHP system

This section outlines the components of a 'standard' system, so please make sure you discuss your specific system with your installer or manufacturer.

As you can see in the diagram, the standard micro CHP comes with two main units; one micro CHP unit, which takes natural gas and turns it into heat and power for your home, and a peak demand boiler that can produce heat on demand. Your micro CHP system has been designed to produce your home's average energy requirements. You don't use all your energy constantly however and your electricity and heat demand will 'peak' at some point during the day. A peak is when you require more energy than usual, like when everyone is home in the evening after work or school. It's at these times that your fuel cell micro CHP may need some assistance.

When your **heat** demand is too large for your system (each system differs) then your peak demand boiler will switch on and provide the rest. This peak demand boiler operates just like any other gas boiler. It is either inside the main unit with the micro CHP appliance, or separate. When the micro CHP unit realises it cannot provide all of your heating needs it sends a message to the boiler automatically to provide the extra. This makes sure you always have domestic hot water and heat whenever it is required.

The micro CHP system may also need some assistance in providing all of your **power** needs. When this happens you will simply buy electricity from the power grid as usual. Some countries even let you sell electricity produced from your unit back to the grid when your power demand is low. Find out if this is an option for you.

How to get the most from your system

Different systems produce different amounts of both heat and power and will provide varying amounts for your home to use. The most effective way to use your micro CHP is to reduce periods with peak demand for power, hot water and heat. You can do that by following these tips:

1 Power demand

You will have seen already that using all of your high powered appliances at once produces a large demand on your micro CHP. The best performance (and best financial results) will come from being aware of situations which might produce peak demands and trying to avoid them.

2 Domestic Hot Water demand

As with electricity spreading out hot water usage throughout the day will allow your micro CHP to produce more of your demand, leading to improved performance.

3 Heat demand:

Try to heat your home for longer periods at lower temperatures, this reduces the demand for your peak boiler and allows your micro CHP to do more of the work.

Each system is different however and produces different amounts of power and heat. To find out more about getting the most out of your particular system, please contact your installer or manufacturer.

For more information
visit www.enefield.eu

Further information or questions

If you require any further information on the ene.field project or have any questions then please visit the ene.field website www.enefield.eu

If you have a technical query or want to learn more about your specific fuel cell micro CHP system then please contact your installer or manufacturer.

energy saving trust

This document has been produced by the Energy Saving Trust.

Energy Saving Trust (EST) is a social enterprise with a charitable foundation based in the UK.

EST gives impartial, accurate and independent advice to households, communities and organisations on how to reduce carbon emissions, reduce fuel bills, use water more sustainably and drive smarter.

EST works with governments, local authorities, communities, third sector organisations and businesses.

For more information visit www.energysavingtrust.org.uk

New Energy World JU
fuel cells & hydrogen for sustainability

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