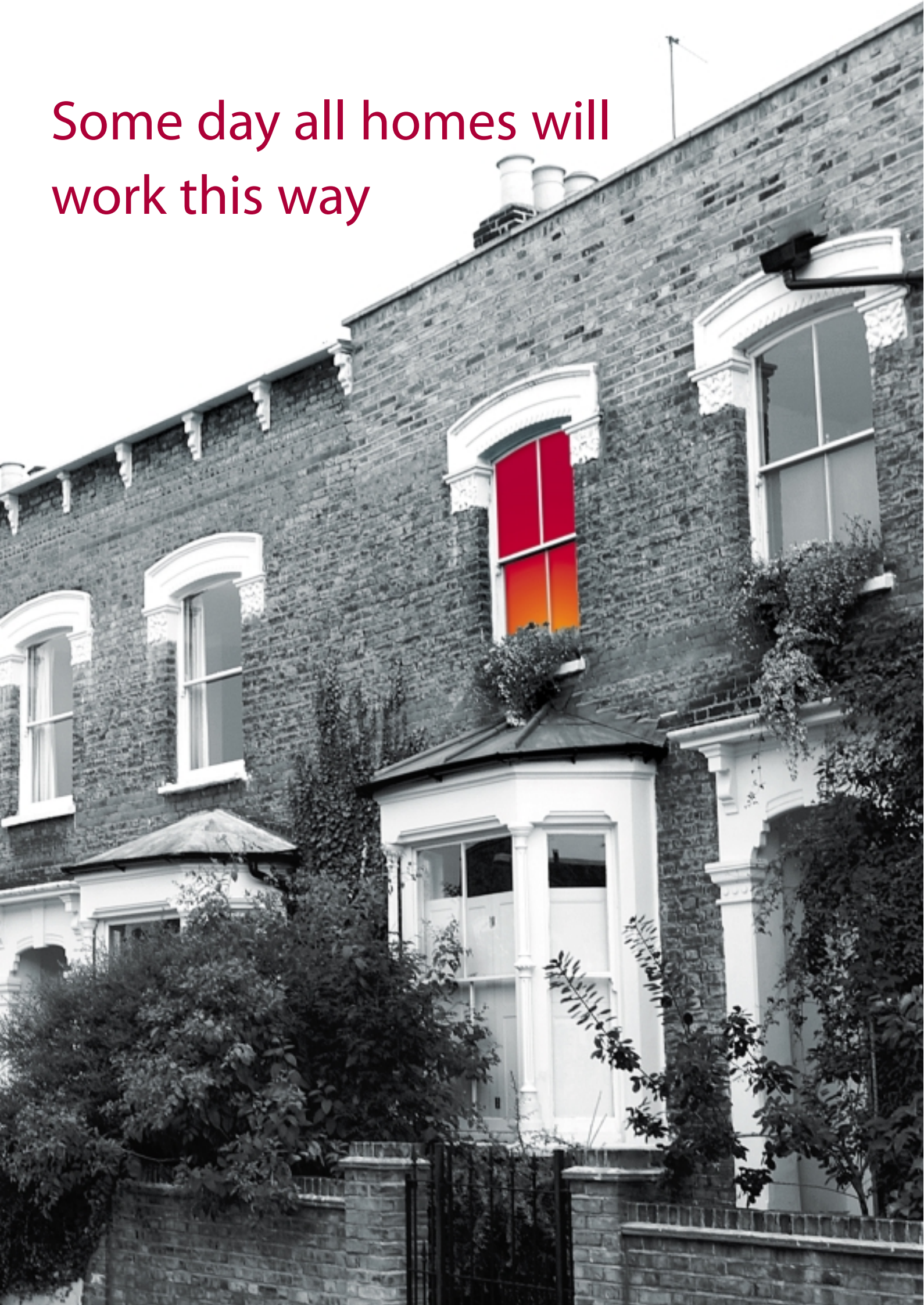
microgen

smart power: smart design: smart living

Some day all homes will work this way



microgen : smart power

Amongst the many challenges the twenty-first century holds for us, two stand out: the search for more efficient energy usage, and the need for a cleaner environment.

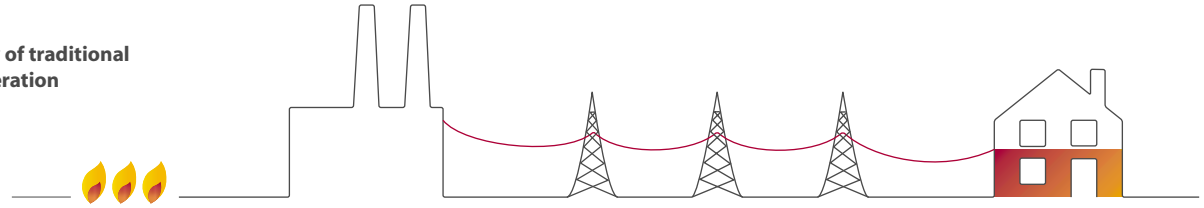
Microgen meets both of these. Its pioneering home energy system is an innovative micro combined heat and power unit that reduces both energy consumption and harmful emissions.

Like a conventional boiler, the home energy system produces heat and hot water. Unlike a conventional boiler, it simultaneously produces electricity for use around the home.

We think that's smart power.

An intelligent way to live

Inefficiency of traditional power generation



100% primary energy input

60% power station conversion lossses

3% transmission distribution losses

only 37% of original energy available to the home

Microgen's highly efficient energy conversion

100% primary energy input

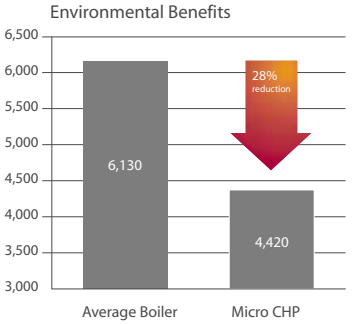
less than 10% losses due to efficient energy conversion by Microgen

over 90% of original energy available to the home

Microgen home energy systems benefit both the consumer and the environment.

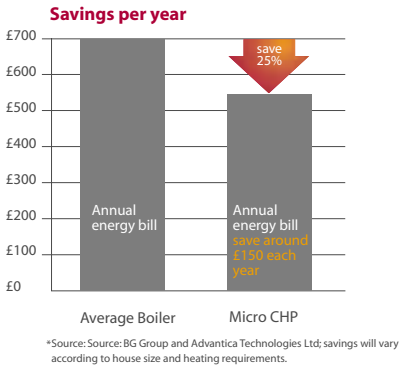
- Replacing conventional boilers with Microgen appliances reduces emissions of pollutants that cause acid rain.
- Similarly, Microgen appliances emit fewer greenhouse gases (which contribute to the global warming effect) than conventional boilers.
- Typically, Microgen will reduce household emissions of nitrogen oxide by 40% per annum and carbon dioxide emissions by 25% per annum.* This would represent a quarter of the UK's total Kyoto commitment if all 13m suitable UK homes installed Microgen units.
- Just 5m Microgen appliances installed would generate more power than Drax, the UK's largest power station.

Annual Carbon Dioxide Emissions (KG/YR)



*Source: BG Group and Advantica Technologies Ltd.
NB: Power generation mix, efficiency & emissions factors from DUKES 2000

microgen : smart living



*Source: Source: BG Group and Advantica Technologies Ltd; savings will vary according to house size and heating requirements.

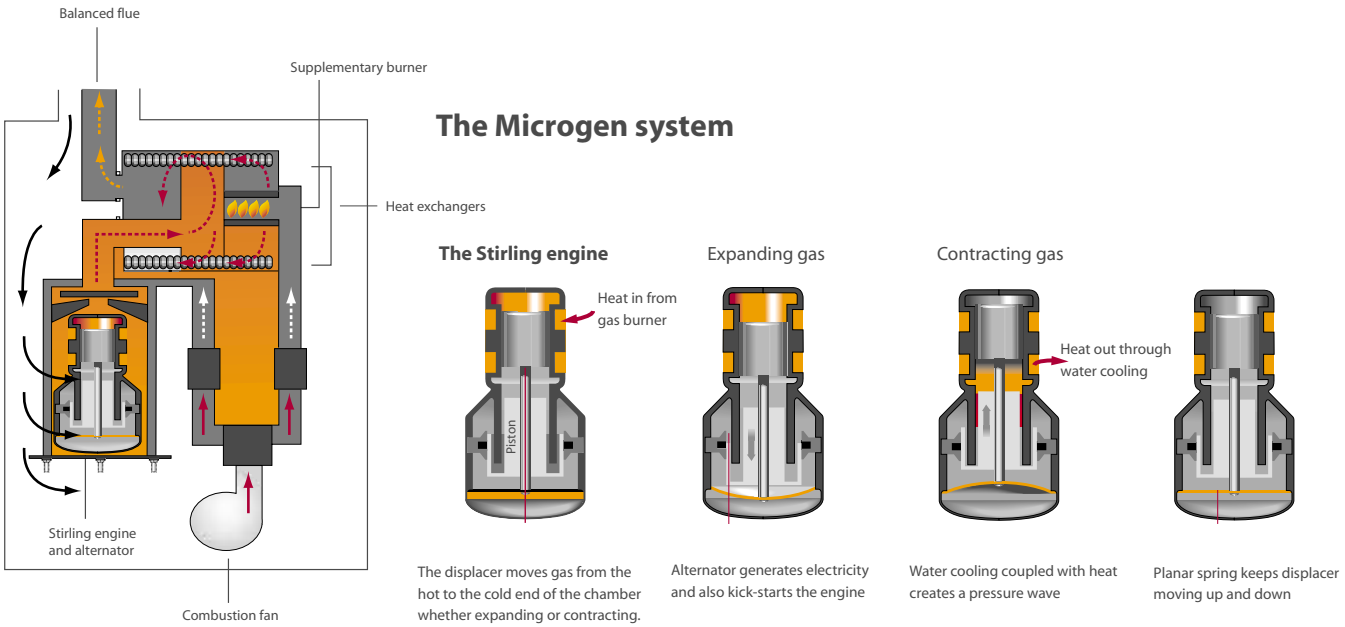
Using a Microgen unit will reduce the typical annual energy bill by approximately 25% compared to a conventional boiler, saving around £150 each year.*

At the same time, any electricity generated in excess of household needs will be exported to the national grid offering the possibility of even greater savings.

Microgen also offers an optional "black start" feature which allows you to heat water and produce electricity in the event of a power cut – keeping you warm and your fridge cold until grid supply can be restored.

That's what we call smart living.

microgen: smart design



The Microgen home energy system is unlike any conventional boiler due to its dual functionality.

The Microgen's revolutionary wall-hung design incorporates two burners to convert natural gas to heat, hot water and electricity. One heats the Stirling engine to provide heat and hot water, simultaneously generating electricity. The other is a supplementary burner that meets any additional demand for heat.

When running, the appliance produces 1.1kW of electricity – enough, say, to watch a DVD on your widescreen TV with surround sound whilst your meal heats up in the microwave. Any demand over and above this is taken from the national grid as usual.

To us that's smart design.

microgen : smart technology

At the core of the Microgen unit is an innovative Stirling engine. First invented in 1816 by the Reverend Robert Stirling and subsequently used in space exploration and submarine technology, this is one of the first domestic applications of the Stirling engine.

The engine works by creating a temperature differential between the head of the Stirling engine (heated by the engine burner) and the body of the Stirling engine (cooled by water). This temperature differential causes the gas inside the engine to expand and contract, moving the pistons up and down.

The electricity is generated when the power piston in the Stirling engine moves through the alternator. The hot gases are passed through the heat exchanger to produce heat and hot water.

microgen: smart features

- Overall efficiency of the Microgen system is greater than 90%* (the current minimum efficiency required of a new boiler being installed in the UK is only 78%).
- The electrical output of the Microgen system is 1.1kW.
- Heat output will be 15kW (51,000btu/hr) to 36kW (122,000 btu/hr).
- All models will be capable of modulating down to 5kW heat output.
- All models are designed to be wall-mounted.
- Fan-assisted balanced flue with rear or side flueing options.
- An optional grid-independent module will be available. This will keep the engine running in the event of a power cut; maintaining space-heating and some power.

microgen: smart benefits

Efficiency

The Microgen home energy system operates at greater than 90% efficiency and reduces the carbon dioxide emissions of a typical home by around 1.5 tonnes per year.*

In social housing, the installation of Microgen appliances can help landlords improve the energy ratings (SAP) of their housing stock while tenants benefit from reduced energy bills. Innovative energy saving products, like Microgen, can help with planning approvals and support local government policy.

Flexibility

Microgen units are readily adaptable to a range of uses and environments.

They have been designed to replace existing central heating boilers, and will be produced in both standard variants (15kW, 24kW and 36kW) and combi (24kW and 36kW).

This makes them suitable for both homes and small business premises with a supply of natural gas.

While initial models will use natural gas, we are looking to develop other fuel variants.

Reliability

Microgen appliances are easy to run and highly reliable.

The Stirling engine is a sealed unit with no requirement for regular servicing or maintenance. Its only moving parts are its two pistons which use gas bearings to minimise wear.

Microgen will offer an optional grid-independent module which will provide heat and some power in the event of a power cut - keeping you warm and your fridge cold until grid supply can be restored.

Each year around 38.4 million customer hours are lost due to power cuts (Source: OFGEM Distribution and Transmission performance report 2000/1).

*Source: Advantica Technologies Ltd and BG Group

microgen: smart questions

Does it need extra maintenance?
No. Microgen power boilers have the same maintenance requirements as conventional boilers.

Who can install it?
The Microgen system can be installed by gas engineers and plumbers who have been trained to work with this new kind of appliance.

How does it connect to the electricity system in my home?
The appliance is connected to your existing electricity system during installation. It's as simple as that.

Does it use the same connections as a conventional boiler?
The electrical, gas and water connections are similar to those on modern boilers, so Microgen can be installed as a direct replacement.

How long will it last?
Microgen appliances are designed to last at least as long as conventional boilers.

Will the electricity meter need changing?
Yes. A new "smart" electricity meter will be installed which will measure electricity exports as well as imports.

Do I get anything for electricity exported back to the grid?
A number of European countries already reward electricity exports, and the Microgen team is in discussion with the Government and relevant industry bodies to introduce this in the UK. Naturally, "smart" meters will help achieve this.

Making a real difference

microgen

Microgen Energy Ltd
100 Thames Valley Park Drive, Reading RG6 1PT UK
T +44 (0)118 929 3007 F +44 (0)118 929 2057
www.microgen.com