

Microgeneration - The benefits and savings

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What is Microgeneration

Microgeneration, or Micropower is the production of energy for individual buildings or communities, from a renewable or low carbon technology

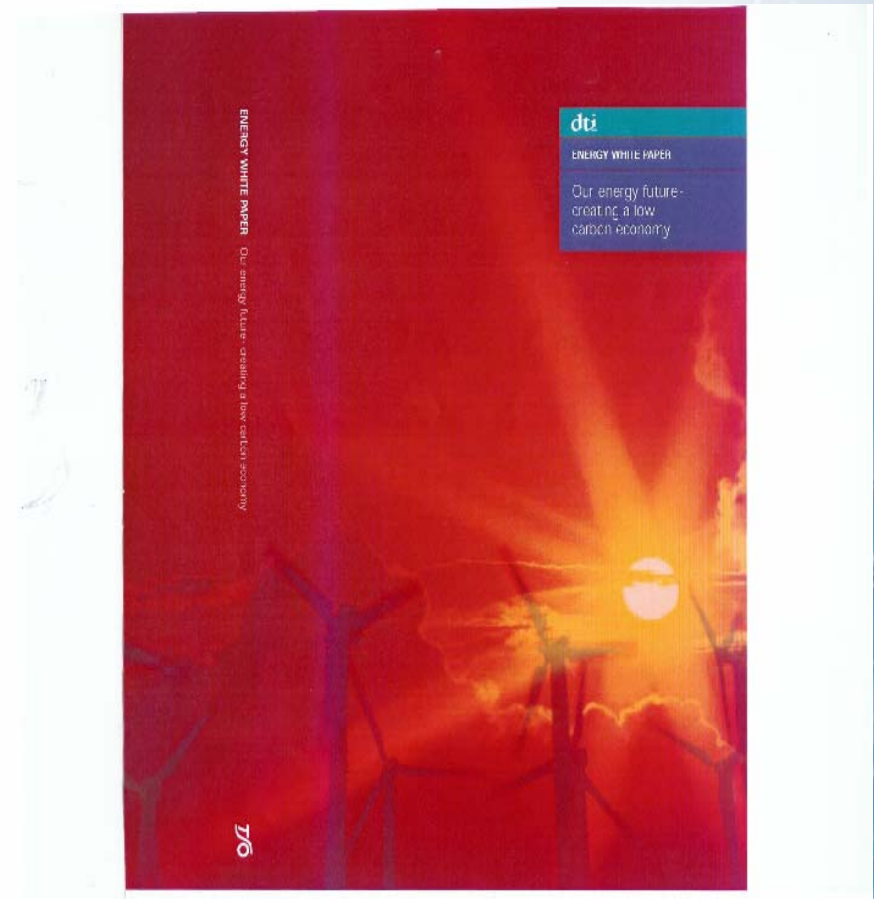
Microgeneration technologies emit low amounts of carbon dioxide(CO₂), or no carbon dioxide at all, whilst allowing consumers to generate their own heat and/or electricity.

Why Microgeneration

- Helps combat climate change
- Helps the environment by reducing emissions of harmful greenhouse gases
- Reduces dependence on Fossil fuels
- Microgeneration reduces emissions of carbon dioxide
- Saves money by reducing the amount of energy you buy
- Can Provide your own back-up power in the event of supply failure
- Provides a cultural change to energy use
- Domestic users with Microgeneration technologies change their attitudes towards energy use
- Microgeneration appliances create a visible reminder that consumers are “doing their bit”
- Fills a future energy gap???

Political Context for Microgeneration

- 2003:
 - Energy White Paper
 - Climate Change, Fuel Poverty, Competitive Markets, Security of Supply
- 2005:
 - Building Regulations for HE boilers
 - Biomass Task Force Report
- 2006:
 - Microgeneration Strategy
 - Low Carbon Building Programme
 - Climate Change and Sustainable Energy Act
 - Energy Review 2006
 - Stern Report; October 2006



Funding / Grants

- **Low Carbon Building Programme**
 - Phase 1 launched April 2006
£28.5m available for households, community organisations, housing associations, public sector and private business
All household budget of £3.5m for 2006 allocated, leading to a re-allocation of a further £6.2m into the funding programme
 - Phase 2 to be launched by end 2006
£50m available for public and charity sectors (social housing, libraries, hospitals, schools etc)
- **Energy Suppliers**
 - Energy Efficiency Commitments
- **Local Authorities**
 - Energy Efficiency Advice Centres
- **Regional Development Agencies**

Types of Microgeneration

- Solar thermal hot water heating
- Solar photovoltaics (PV) electricity generation
- Wind turbines
- Heat pumps
- Biomass heating
- Micro-combined Heat & Power (CHP)
- Fuel-cells
- Micro-hydro

Solar Thermal

The production of hot water from sunlight
Most commonly installed form of microgeneration
Around 80,000 units installed end 2005
Requirements

Cost

Flat plate - £2,000 - £3,000
Evacuated tube - £3,500 - £4,500

Benefits

Provides almost all the hot water requirements during the summer
Around 50% to 60% of hot water all year round
Emissions savings 400-700kg per year



Solar PV (photovoltaics)

The production of electricity from sunlight
Available as roof mounted panels or roof tiles
Typically 1-3kWe output

Cost

£4,000 - £9,000

Benefits

No greenhouse gases

Reduction in emissions of 300-400kg per year

Reduction in electricity bills

Can produce half of a family's electricity needs

Surplus electricity can be sold back to the grid



Wind Energy

Harnessing the wind to produce electrical power

Fastest growing form of electrical energy in the world today

Available in retail outlets

Cost

Roof mounted systems start from around £1,500

From 1kW up to 6kW around £4,000 to £18,000

Benefits

Savings of around 30% of annual electricity supply

Reduction in electricity costs

Reduction in CO₂ of around 500kg per year

Surplus electricity can be sold back to the grid



Heat Pumps

Takes heat from an energy source, such as air, soil or water and transfers to a higher useable heat energy

Technologies include both Air and Ground source heat pumps

Range of sizes available 4kW_{th} to 20kW_{th}

Cost

Range from £5,000 to £20,000

Benefits

Reduced heating bills

Coefficient of Performance range from 2.5:1 to 4:1

Typical saving of around 2 tonnes of CO_2 per year

No regular maintenance



Biomass Boilers

The use of organic matter of recent origin to produce heat
Uses fast growing trees to produce wood chip or pellet
Range of sizes available 6kW_{th} to 50kW_{th}

Cost

Range from £3,000 to £5,000

Benefits

Cost effective when local fuel source available
Local investment and employment
Can use grain or corn as a fuel
Carbon neutral process



Micro-CHP

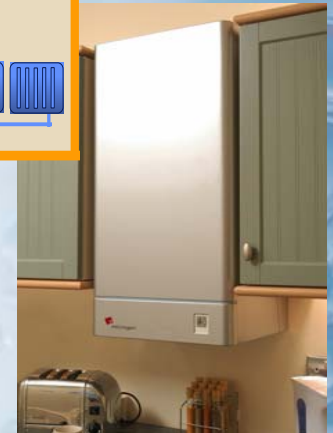
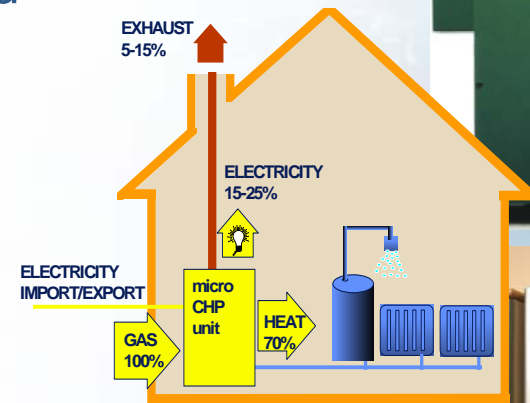
Produces heat and power from a single fuel source
Internal & external combustion Engine
technologies available and being developed
Sizes available from 1kW_e up to 17kW_e

Cost

From around £3,000 to £20,000

Benefits

Reduces primary energy needs by up to 30%
Typical CO_2 reductions of 1.5 tonnes per year
Reduces electricity bills
Provides space heating and hot water requirements



Case Study – Mini-CHP - Affordable Housing Scheme



- Grampian Housing Association
 - Site located at Station Road, Newmachar
 - Project part funded by Scottish Communities
 - 14 semi-detached low cost homes
 - Commissioned December 2002
- 1 off DACHS unit, plus 2 off small condensing boilers
 - Space heating and hot water served by centralised plant (mini-district heating scheme); restricted DHW to encourage responsible use of hot water
 - Electricity supplied over a private wire network; electricity purchased via pre-payment cards that can be topped up in the local supermarket



Fuel Cell

Technology being developed to provide domestic CHP
i.e. produces heat and power into the home

Combines hydrogen and oxygen in a chemical reaction
to produce heat and power

Commercial availability 2010 – 2015

Cost

£??????

Benefits

Currently being produced with Natural gas

Reduction in dependence of fossil fuels and pollution

When using hydrogen has zero emissions

Only by-product is water



The Future....

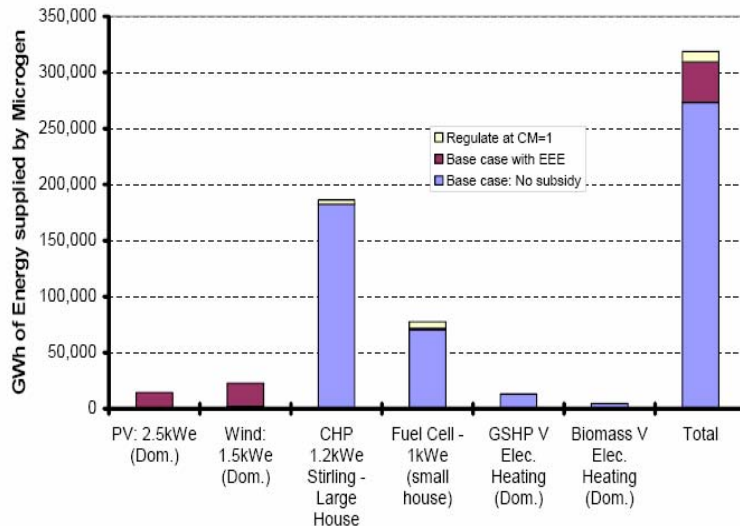
- Solar thermal and Heat pump applications rising by over 20% per year
- 10% of electricity produced by renewables by 2010
- New cleaner, more efficient technologies being developed
- Security of supply from fossil fuel producers
- More mass produced products will lead to lower and more attractive pricing levels
- Removal of export of electricity barriers
- Bridging the energy gap - Is Nuclear the only answer

Energy Savings Trust Report on Potential for Microgeneration*

By 2050, fairer valuation for exported electricity is vital for assisting renewable microgenerators.

9

GWh of energy generated due to microgeneration in 2050



- Data in the graph is for total output, including heat and electricity.
- Electricity demand in UK is circa 380 TWh/annum, or 380,000 GWh/annum (2000 figure). (electricity only).
- Summing all microgen. electricity outputs in 2050 gives circa 100TWh/annum (approx 25% of UK 2005 Electricity demand).
- This capacity could be reached sooner subject to improved regulation and support.

• 25% of UK electricity supply from micro generation

- MicroCHP will be the single biggest contributor

- MicroCHP not dependent on long term subsidy or market distortion

***Microgeneration
- The benefits and savings***

Thank you for your attention.