

Micro-Renewable Energy Technologies

Opportunities and costs of installing these technologies in the home, community or workplace



Advantages of micro-renewable energy technologies

On average, around 40% of all electricity used in the home is solely used for heating. Renewable energy technologies provide an opportunity to reduce carbon emissions in the environment, as well as lower your energy bills for heating and electricity.

The following lists the main advantages of installing micro-renewable energy systems:

Biomass energy (heat only system)

Considered as carbon neutral, are available in a variety of sizes, can be automated, and existing oil boilers can be easily converted to a biomass boiler.

Biomass energy (CHP)

If biomass fuel is not available, micro-CHPs can run on gas, which are the same size as a refrigerator, and can save over £100 in fuel bills compared with a conventional gas-fired boiler.

Ground source heat pumps

Low running and maintenance costs for whole house (or other) heating.

Small-scale hydro

Is a very reliable and sound technology.

Solar thermal panels (heating)

A typical 4m² system will provide 40-50% of a dwellings domestic hot water.

Solar (PV)

- Low maintenance, with 25 year lifespan.
- Panels are available in a variety of styles and colours.

Wind energy (small-scale)

Available in a variety of shapes and sizes, and can be used in both rural and urban locations.

front cover photographs © freefotos.com

Improving the energy efficiency of your home, community centre or workplace should also be considered when you are considering installing a renewable energy technology.

Step 1

Questions to be considered first

Before deciding on which micro-renewable energy technology you wish to install, it is very important to consider the following:

Is your property a listed building?

If so, Listed Building Consent will be required for any works internally or externally. Please contact Built Heritage Service on 01569 768290 before progressing any further.

Is your property within a natural heritage or archaeological site?

If yes, discussions should be held with the Natural Heritage Service (01467 628002), the Archaeological Service (01224 664723), and with the local planning authority * before continuing further.

Is your property within a Conservation Area?

If yes, planning permission will most likely be required for any works. Please contact the

local planning authority for further information.

Planning permission may be required where:

- a new building would be nearer the road than the original dwelling or the building is less than 20m from any road;
- the installation of solar panels exceeds 10% of the roof area;
- any part of the development that exceeds the height of the highest part of the roof of the original dwelling house; or
- all works to a non-residential building or flat.

* (Contact details can be found inside).

Step 2

Which technology best suits your needs?

If you wish to supplement your **electricity needs only** the following technologies would apply:

- Biomass energy (small-scale or micro-combined heat and power plant (CHP))
- Small-scale hydro
- Solar Photovoltaic (PV)
- Wind energy (small-scale)

If you wish to supplement your **hot water and/or space heating** the following technologies would be the most applicable:

- Biomass energy (small scale or district heating scheme)
- Heat pumps (ground/water/air source)
- Solar energy (space heating)
- Wind energy (to power a heat pump)

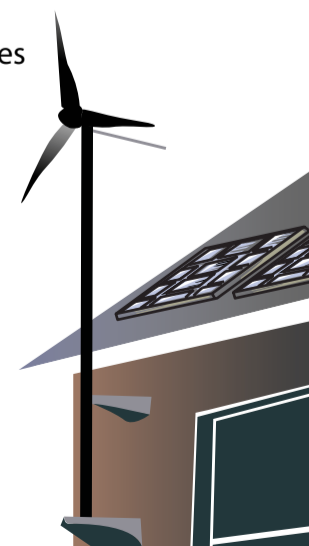
If you are considering to supplement **both your heating and electricity requirements**, a combination of micro-renewable energy technologies is possible.

If you propose to **store any heat and/or electricity generated**, consideration should be given to:

- Fuel cells (electricity)
- Additional hot water tanks (heat only systems)

Other technologies are also available including:

- Landfill and sewage gas
- Anaerobic digestion (e.g. using slurry)



Further information is available from any planning office, and online at www.aberdeenshire.gov.uk/planning/supplementary/index.asp in the form of **Supplementary Planning Guidance** entitled:

“Use of Wind Energy in Aberdeenshire” (available in two parts);
 “Use of Biomass Energy in Aberdeenshire” and
 “Use of Micro-renewable Energy in Aberdeenshire”.

Step 3

Viability of installing micro-renewable energy technologies

It is very important to consider at an early stage whether or not your property is suitable for your preferred micro-renewable energy technology. The following lists some of the main requirements for the most popular micro-renewable energy technologies currently available:



© Biomass heat only systems (Highland Wood Energy)



Gilbert Gilkes & Gordon turbine, courtesy of the British Hydropower Association



Biomass energy (heat only systems)

Requires space for storing biomass fuel (e.g. wood pellets) and a locally available fuel supply. A new boiler may also be required if none exists already.

Small-scale hydro

The end user/grid connection must be close to the hydro scheme. Any scheme should avoid adversely affecting natural heritage sites, including the river's ecology (further advice is available from the Scottish Environment Protection Agency. Noise and visual impacts should also be minimised.

Solar (PV)

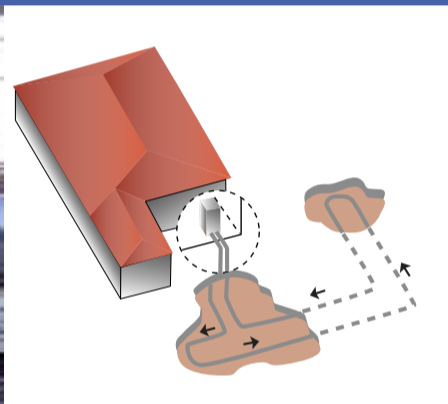
Panels must face within 90° of south, with minimal overshadowing from buildings/trees. Careful siting is required to minimise visual impact if the building is listed or in a conservation area.

Solar thermal panels (heating)

As solar PV, but in addition, panels require between 2-4m² of roof space, and a hot water cylinder may be required. The existing hot water system should also be checked for compatibility.



Image of a heat only system



© Fuel Cells (Scotland) Ltd



Biomass energy (CHP)

Requires an all year-round demand for heat and a communal heating system, and availability and storage of biomass fuel also needs to be considered.

Ground source heat pumps

Requires a large area of ground for pipe work, which needs to be free of obstacles (e.g. cables/drains). Air source and water source heat pumps are also available.

Fuel cells

Planning permission may be required to house any external equipment.

Wind energy (small-scale)

Requires a suitable wind speed (above 6m/s preferred), with uninterrupted wind flow (e.g. not obstructed by other buildings). A vibration dampening system may also be required.

Likely costs of installation

Although capital costs for installing renewable energy technologies are high, these are likely to reduce in the medium to long term, especially as fuel prices for gas and oil are expected to increase.

The following lists the main costs of the most popular renewable energy systems currently available:

Grants are available from a variety of sources, including the Scottish Community and Householder Renewables Initiative (SCHRI), who can be contacted on 0800 138 8858, or at www.est.org.uk/schri.

On average a UK household consumes between 3000 and 6000 kWh (kW - hours) of electricity per year. A 1 kW installation can generate about 1000 kWh of energy annually.

Biomass energy (heat only system)

Wood fuel boilers cost approx. twice as much as gas-fired boilers of equivalent output, but the cost of wood-fuel is cheaper.

Biomass energy - combined heat and power (electricity) (CHP)

£600-£1,500 per kWe (kilowatt-electricity) for a CHP, plus the cost for the distribution network.

Fuel cells

Costs will vary depending on the level of output required (i.e. from a few watts to several megawatts).

Ground source heat pumps

Costs for individual dwellings are typically between £800 and £1,000 per kW (kilowatt) capacity.

Small-scale hydro

Costs are site specific, but start from £4,000 per kW.

Solar thermal panels (heating)

Capital costs for a typical 4m² system which will provide between 40-50% of a dwellings domestic hot water are between £2,000 and £3,000.

Solar (PV)

Solar PV modules vary from £5,000 to £10,000 per kWp, or from £400 to £800 per m².

Wind energy (small-scale)

Capital costs are around £750 per kW of installed capacity (two thirds of this is the cost of the turbine). Stand-alone turbines cost about £3,000-£4,000, and domestic scale roof mounted about £8,500 (likely to drop to £1,500 in a few years time).

Main planning offices

Banff & Buchan and Buchan Areas
Town House
Low Street
Banff AB45 1AY
Phone: 01261 813200
Fax: 01261 813281
E-mail: bb.planapps@aberdeenshire.gov.uk

Buchan Area
Arbuthnot House
Broad Street
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