

Appendix 3 Microgeneration

April 2013



Introduction

Microgeneration and historic buildings

Installing microgeneration systems reduces emissions from your house and lowers fuel bills. 'Microgeneration' is a term for the production of renewable energy on a small scale which can be generated on site. Common microgeneration systems include:

- Solar water heating
- Photovoltaics
- Biomass
- Micro CHP
- Heat pumps
- Wind turbines
- Hydro electricity

For more details on Cornwall Council's guidance and policies regarding the above microgeneration technologies see:

[Cornwall Council - Renewable energy](#)

[Cornwall Council - Sustainable Building Guide](#)

The general rule with historic buildings is that microgeneration can be installed as long as the overall character and in particular the principle elevation is not affected. Planning applications take this into consideration and are judged on a case by case basis.

Solar water heating

Solar water heating systems use evacuated tube or flat plate solar panels to absorb natural solar radiation and use the energy to heat water. They are easy to install and can be simply linked up to the heating system. They can be fixed to the roof or surface mounted. On historic buildings consideration should be given to location, method of fixing, space for housing the large thermal store (hot water tank) and associated equipment. For more information see:

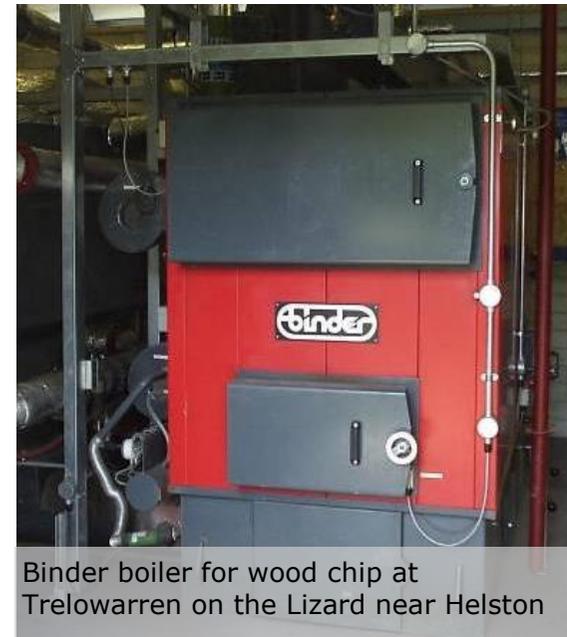
[Cornwall Council - solar photovoltaics / solar thermal guidance](#)

Biomass

Biomass is biological material such as logs, wood chips, wood pellets and waste matter such as straw. It is burnt in special high performance boilers to produce space heating and hot water.

Biomass is sustainable if the fuel can be locally sourced and adequate dry storage is available to minimize deliveries. On historic buildings, care is needed to house the large boilers, fuel storage space and to find a suitable location for the flue.

[Cornwall Council - biomass guidance](#)



Micro CHP

Combined Heat and Power (CHP) is a gas powered heating system which generates heat for space heating and hot water as well as electricity.

Heat pumps - ground and air source

Heat pumps take heat from the ground, water or air to provide heating. Ground source heat pumps use buried pipes to extract heat for use in distribution systems including radiators, under-floor or warm air heating systems and household hot water supply.

Heat pumps are efficient, using roughly a third less energy for heating than other types of electrical heating. They produce heat at lower temperatures over a longer period than a conventional boiler. For every 3kW of produced heat, a ground source heat pump will consume around 1kW of electricity.

Air source heat pumps extract heat from the outside air for use in radiators, underfloor or warm air heating systems and household hot water supply. Most air source heat pumps are situated just outside the property and can also be used for cooling.

The heat pump's distribution system usually goes to underfloor heating, conventional radiators or larger low temperature radiators. As heat pumps work most efficiently when heating water to lower temperatures, underfloor heating is often more efficient as it does not require very hot water.

The physical and visual impact of a ground or air source heat pump installation needs to be considered in all cases. Installing a ground source heat pump involves ground disturbance and the implications for any archaeology in the area should be investigated prior to works commencing.

Typical savings through installing ground/air source heat pumps or pellet central heating

Figures below are taken from the [Energy Saving Trust](#) and are based on a typical three-bedroom semi-detached house.

		Air source heat pump at 300% efficiency	Ground source heat pump at 300% efficiency	Wood pellet boiler
Capital costs		£6-10,000	£9-17,000	£11,500
Existing System	Savings			
Gas	£/year	£110	£110	£90
	CO2/year	850kg	850kg	3,100kg
Electricity	£/year	£650	£650	£630
	CO2/year	5,230kg	5,230kg	7,500kg
Oil	£/year	£290	£290	£270
	CO2/year	1,660kg	1,660kg	7,700kg
Solid fuel	£/year	£290	£290	£270
	CO2/year	5,430kg	5,430kg	3,100kg

Links

[Contact Cornwall Council's Historic Environment Service](#)

[Community Energy Plus - Air source heat pumps](#)

[Community Energy Plus - Ground source heat pumps](#)

[Cornwall Council - guidance on heat pumps](#)

The [Renewable Heat Incentive](#) (RHI) is a Government scheme which is due in Summer 2013 where payments could be received for heat generated by a heat pump or wood boiler. The figures in the table on the previous page do not include income from the RHI.

For systems installed after 1 August 2011, you may be able to get help with the installation costs of a heat pump or wood boiler (not stoves) through the [Renewable Heat Premium Payment scheme](#). See section 8 of the main guide.

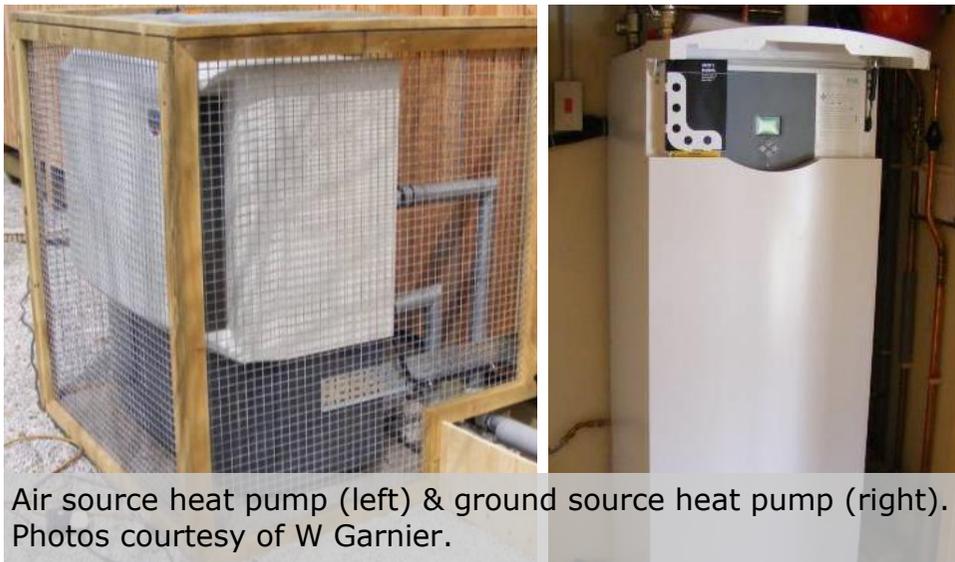
This technology is an eligible measure under the UK government's Green Deal which is a financing mechanism that lets people pay for energy-efficiency improvements through savings on their energy bills.

Further details of the Green Deal are available in Section 8 of this guide and can be obtained through the following links:

[Gov.uk - Green Deal](#)

[Energy Saving Trust - Green Deal](#)

[The Green Deal Oversight and Registration Body](#)



Air source heat pump (left) & ground source heat pump (right). Photos courtesy of W Garnier.



Pipework laid in a trench for heat pump installation. Photo courtesy of Community Energy Plus.

Wind turbines

Wind turbines generate electricity but are not always suitable for location in historic areas. They require a large and clean passage of wind and need to be clear from buildings, trees and landscape. Noise, aesthetics and impact on wildlife needs to be considered.

[Cornwall Council guidance on onshore wind/wind turbines](#)



Wind turbine at Heartlands, Pool

Hydropower

Historic watermills such as the illustration below of Cotehele have potential to produce hydro power to produce electricity. Care is needed to retain any original machinery and the special character of the historic structure. Other considerations on historic buildings are the stability of the building space for equipment and potential of flooding.

[Cornwall Council guidance on hydropower](#)



Hydro electric scheme at Cotehele Mill, S/E Cornwall (© Copyright [Brian](#) and licensed for [reuse](#) under this [Creative Commons Licence](#))

Photovoltaics

Solar photovoltaics (PVs) use thin layers of a semi conducting material which generates an electric charge when exposed to light. An inverter is used to converted this electricity for household use. Excess electricity generated can be exported to the grid and provides an income for the owner. PVs are available as bolt on panels or individual PV tiles. PVs are not always suitable for use on historic buildings but can be sited on inner or rear roofs, outbuildings or on ground based arrays.

[Cornwall Council guidance on photovoltaics and solar thermal](#)



Installation of solar roof tiles at Kynance Cove Café, The Lizard, Cornwall.



Solar photovoltaics at Heartlands, Pool.

Links

[Cornwall Council - Renewable energy](#)

[Cornwall Council - Sustainable Building Guide](#)