**Climate Change Actions**

**Notes on home heating and private transport**

**Intro**

Climate change is being brought about by the emission of greenhouse gases, arising not only from the fuels we burn but the goods we consume and the way our food is produced*.* For us in the UK fossil fuel use for transport and for heating are major sources of greenhouse gases.

Emissions can, and are being reduced through the adoption of less polluting technologies and by lifestyle changes.

**Cars**

The move from petrol and diesel fuelled cars to battery powered electric vehicles is underway; only electric cars are to be sold after 2030. Hybrid cars have been available for many years. Electric cars have been marketed for over 10 years but have only sold very slowly until recently. Many more electric models are now being offered, and though initial costs are high, Government grants are available and running costs are low. The network of charging points is being extended and electric car performance is improving. Costs of electric cars will likely come down and attain parity with petrol cars in a few years. An electric car is becoming a viable choice when acquiring a new vehicle.

Hydrogen is more suitable for larger vehicles; in several cities some buses now hydrogen powered using fuel cell technology. There are scarcely any hydrogen/fuel cell cars available.

Information available from a number of websites including

[Electric cars 2021 - UK guide to electric vehicles - Next Green Car](https://www.nextgreencar.com/electric-cars/)

**Home heating**

Over 80% of UK homes are heated by natural gas (methane), or away from gas mains by LPG (Liquid Petroleum Gas). Natural gas is highly convenient, well proven and lowish cost – around 3 to 3.5 p/kWh as delivered, or around 4 /kWh after conversion to useful heat in the home.

Gas boilers will not be permitted in new homes built after 2025 but the existing housing stock changes only slowly. The life of a gas boiler is 15 years or more, and a new heating system is only likely to be considered then, unless new regulations are brought in. There is no single obvious replacement for gas boilers, the move away from them will be difficult.

Possible options are:-

**A/ For individual properties**

*Under householder control – replace gas by*

* Direct replacement by electric heaters (storage, radiant, immersion etc), though running costs would be higher at around 18 p/kWh, (less with Economy 7 or smart meter tariffs) i.e. up to 4 times more expensive than gas per unit of useful heat. A move to electric heating would probably need to include improvement to the thermal performance off the house- more insulation, draught reduction, ventilation with heat recovery etc. to make more attractive economically

[www.homeheatingguide.co.uk/central-heating/electric-heating-options-explained](http://www.homeheatingguide.co.uk/central-heating/electric-heating-options-explained)

* Use electricity to drive a heat pump, in which heat is gathered from outside the house and put inside, in the same way as heat is taken from the contents of a refrigerator and released by a radiator at the back of the fridge. Heat pumps can be
  + Air source – 2 to 3 units of heat produced for every unit of electricity. Uses ambient outside air, relatively simple to install costing up to £10k, much more than gas boilers
  + Ground source – 3 to 4 units of heat produced for every unit of electricity. Heat exchange coil installed underground or in pond/river. Bespoke installation, high cost

Heat distribution within the house may have to be changed e.g. from hot water radiators to underfloor heating. For heat pump information:-

[www.renewableenergyhub.co.uk/main/heat-pumps-information/](http://www.renewableenergyhub.co.uk/main/heat-pumps-information/)

* Use wood, a traditional fuel for millennia. It is regarded as renewable, though not by everyone. Lack of suitable supplies will limit uptake, and there could be local pollution problems especially in urban areas even with approved stoves.

**B/ Neighbourhood schemes**

*Little or no householder responsibility*

* Supplied gas to contain “green gas” ie methane produced from non-fossil sources. Note: it is possible at present to buy gas from suppliers that is “green”, either from non-fossil sources such anaerobic digestors or by off-setting, but quantities are small.
* Supplied gas contains or is hydrogen. Only at development stage now and percentage of hydrogen would be small, unless all gas is hydrogen in which case gas appliances would need modification. Pilot schemes underway but sourcing “green” hydrogen challenging. At present hydrogen is widely produced and used in the refining and petrochemical industries; the raw material is methane and the by-product is carbon dioxide! There is no point switching to hydrogen produced in this way. A way round this would be to capture the carbon dioxide and store it permanently underground. A cleaner way would be to use renewably generated electricity to electrolyse water to produce hydrogen. This may help balance supply and demand on the electricity grid.

For more about hydrogen see:-

[Hydrogen | Energy Knowledge (energyinst.org)](https://knowledge.energyinst.org/collections/hydrogen)

* District heating – supply of heat via hot water pipes to properties. Little developed in UK and very limited prospects unless part of a new development. Heat was traditionally sourced from the waste heat from thermal power plant or by burning fossil fuel. Could have small schemes using ground source heat pumps. (In Glasgow, Strathclyde University has a relatively new combined heat and power (CHP) scheme. Powered by natural gas its overall efficiencies are higher than separate gas powered electricity generation and heat production. )

**C/ Reduction of home heating energy demand.** (Whatever the heat source adopted)

This should perhaps be looked at first however the house is heated.

Technology solutions include building new homes to “passivhaus” standards so there is little or no heating requirement ([Passivhaus News (passivhaustrust.org.uk)](https://www.passivhaustrust.org.uk/news/detail/?nId=989). This is ideal but the standard is significantly higher than the latest UK building standards that themselves are an improvement on previous practices. In addition only a very small proportion of the housing stock is renewed each year.

Upgrading the thermal performance of existing properties will require investment (may be difficult to know just what are the optimum investments) but will reduce heating costs.

**General comments**

There is no quick or easy way to move away from fossil fuels for transport and especially for home heating. The moves will depend mainly on technology but will also involve lifestyle changes.

Many new technologies involve increasing electrification, and electricity needs to be cleanly generated. Enormous strides have already been made in generating low carbon electricity. It will be more difficult to replace fossil generation completely while maintaining security of supply and keeping costs manageable. More generating capacity will be needed. Flexible charging regimes for electric vehicles may help balance the grid throughout the year, but increased demand for electricity for winter heating is likely to require raised electricity prices. Measures will be needed to ensure that the less well-off are not unduly burdened.