

General recommendations for Energy Efficiency improvements All property types



Insulation:

The best way to improve these properties is to improve their thermal efficiency and reduce their overall heat loss. This process can be distributive but in terms of capital investment will give the best return. The best approach to reducing the environmental impact is to reduce the amount of energy needed to heat the property. Some of the renewable heating options have a limited output (see renewables section) when you only have a standard domestic power supply. The following paragraphs outline possible ways to improve the houses' efficiency and reduce the energy required.

Loft insulation should be increased to a minimum of 300mm, although 400mm would be better. The process is a simple one if the loft is not full. If there is an existing floor in the loft the new insulation can be rolled over the top. If storage is required there are products readily available such as [loft legs](#) that will hold the new floor above the insulation layer as crushed insulation is not effective.

Windows and Doors:

The windows and doors are all generally in good order and performing well and need little attention. I would suggest periodic cleaning and lubricating the inner areas of the frames and mechanics, a good Hoover and application of light oil to the hinges will ensure the windows and doors open and close correctly and fully.

Airtightness/Breathability:

Insulating a property is not enough in itself - controlled air movement is very important. A well-insulated and sealed house needs to breathe. Obvious areas such as kitchens and toilets should have appropriate extraction systems. The more you insulate and seal a structure the more important it becomes to ventilate it in a controlled manner. Trickle vents in windows are an effective tool for the controlled ventilation of a property. These can be retro fitted into existing windows.

Heating system:

The current single-phase connections limit the output of an air source unit to 12kW which is less than currently required. To utilise renewable systems, the general thermal efficiency of the property will need to be improved to reduce the heat requirements below 12kW or will need the power supply upgrading to 3-phase. Alternatively, a hybrid system could be considered using both air source and a gas boiler (see renewables section).

Control systems:

I would also suggest that a modern digital system is used like [Honeywell's Evo home](#) control system. These types of systems afford a greater control of the heating at room level and also make the boiler work far more efficiently. It also offers remote monitoring and control functionality.

Renewable Heating Systems:

Renewable heating systems come in two forms – Ground Source and Air Source.

Ground Source:

Ground source comes in two forms: a pipe buried in loops underground which will need roughly 100m² for each kilowatt of heat required, so you need a large area of land. The other option is drilling boreholes to extract the heat from the ground.

Although more efficient than air source (4:1 as opposed to 3.2:1, heat kilowatts for electric kilowatts used) the initial setup costs and disturbance is far higher than a comparative air source system.

Air Source:

Air source is a far easier and cheaper installation process although less efficient (see above). The difference in relative costs makes it a better option. There is a small noise issue but correct placing of the unit(s) may well mean you will not notice it. Air source units do vary in what noise they produce.

Renewable systems differ to traditional fossil boilers in several ways, but the key difference is the working temperature of the system. Fossil fuel boilers have a working temperature of 75 to 80 degrees whereas renewable systems such as ground source and air source have a working temperature of between 35 and 50 degrees. This difference affects the size of radiators required to deliver heat into any given room. The size differential can be up to a 40% increase in radiator output/size. Another component that is different in the systems is the hot water tank. Tanks used for renewable heating systems are specifically designed to get the most out of the lower working temperatures and keep it. A buffer tank is usually installed as part of the system which will need to be housed somewhere locally in the house.

In situations where there isn't enough power to drive a renewable heat pump big enough to service your needs it is possible to utilise a Hybrid system incorporating a fossil fuel boiler. These hybrid systems allow you to run most of the year using a renewable heat pump with the fossil boiler providing a backup heat source when demand outstrips the heat pump capacity. Although not ideal it does allow you to be greener than a pure fossil fuel system.

Water Softener/Scale Inhibitor:

If the property is supplied directly from the mains water supply, it will have a high level of limescale. Limescale will coat the surfaces of heat exchangers which will reduce efficiency and reduce the longevity of taps. Two millimetres of scale will reduce the hot water production efficiency by around 10%. When fitting a water softener careful consideration should be given to the location of an untreated (Fresh) supply such as kitchens.

An alternative to a softener is the use of a scale reducer for filter systems, not as effective in removing scale but it does slow the build-up process.

PV:

The modern approach to the use of solar photovoltaic panels is to have sufficient to service the building's needs, rather than the old way of trying to produce the maximum and selling it back to the National Grid. A reasonable array will go a long way to offset the daytime needs of an average property.