Air Source Heat Pumps

This online resource paper provides information about what air source heat pumps are and how they can contribute to good design

Overview and Purpose

An air source heat pump takes heat from the air and boosts it to a higher temperature using a compressor. It then transfers the heat to the heating system in the dwelling. An air source pump is hence an alternative way to heat dwellings. The pump uses electricity to run, but it should use less electrical energy than the heat it produces. It enables a house occupant to generate renewable heat and potentially save money on energy costs in the long-term.

There are two main types of air source heat pumps: air-to-water and air-to-air. They work in different ways and are compatible with different types of heating systems.

Key Points to Consider

1. Regardless of the type used, the air source heat pump works using the following general principles:
2. The air source heat pump absorbs heat from the outside air into a liquid refrigerant at a low temperature;
3. Using electricity, the pump compresses the liquid to increase its temperature. It then condenses back into a liquid to release its stored heat;
4. Heat is sent to the radiators or underfloor heating. The remainder can be stored in the hot water cylinder;
   The stored hot water for showers, baths and taps can then be used.

Air source heat pumps deliver heat at lower temperatures than gas and old boilers. Hence the user will need to run them for much longer periods to heat a home to a comfortable temperature.

A well-insulated home is essential – otherwise the heat the pump generates escapes more easily, and the user may find the temperature does not rise to a level that may be expected.

Air-to-water heat pumps take heat from the outside air and feed it into the wet central heating system of the home. They are most suitable for larger radiators or water underfloor heating, because the heat they produce is cooler than that from a conventional gas or oil boiler. To be most effective, they need a large surface area to release the heat.

It is more straightforward to incorporate larger radiators or underfloor heating for a heat pump while the home is being extended or in a new-build property. It can also cost less than retrofitting underfloor heating at a later date.

Air-to-air heat pumps take heat from the outside air and feed it into the dwelling through fans. A warm air circulation system is required to move the heat around the dwelling. These systems cannot produce hot water, so a separate immersion heater or other heating system is required.

In the summer, an air-to-air heat pump can operate in reverse. Hence, this heat pump can be used like an air-conditioning unit to provide cool air for the house.

Air source heat pumps require little maintenance and can provide heating and hot water, but they are not flawless systems. These are some of the key advantages and disadvantages:

Advantages

- Energy efficient and low carbon – air source heat pumps generate less carbon dioxide than many conventional heating systems;
- It is less disruptive than installing a ground source heat pump, especially if the property is subject to retrofitting;
- The installer can save money on heating compared with some older systems.

Disadvantages

- The installer requires a garden, and enough space within it, for the external condenser unit;
- Condenser units can be noisy and blow colder air into the area immediately around them;
- Electricity is required to drive the pump so they are not zero-carbon (unless the electricity comes from a renewable source such as solar panels or a wind turbine).

The Practical Implications for Planning Officers and Applicants

A property owner does not normally need planning permission for an air source heat pump, as it is usually classed as permitted development. However, if the property is a listed building or the dwelling is located within a conservation area, then the consent of the local authority is required. The applicant will also need to check that the installation will meet the relevant building regulations.

In the legislation, air source heat pump equipment is covered under Class G – 'The installation, alteration or replacement of a microgeneration air source heat pump

(a) On a dwellinghouse or a block of flats, or

(b) Within the curtilage of a dwellinghouse or a block of flats, including on a building within that curtilage.'
The legislation also states: 'Development is not permitted by Class G unless the air source heat pump complies with the MCS Planning Standards or equivalent standards.'

The MCS are a regulatory body for installers of renewable energy. It is advisable to choose a MCS regulated installer to ensure standards are met. They also provide a dispute resolution process should anything not go according to plan.

Permitted development rules for air source heat pumps also state the following:

- Only one air source heat pump is allowed at the property;
- An air source heat pump cannot be installed if the property already has a wind turbine;

- The outdoor unit cannot exceed 0.6 cubic metres;
- It cannot be installed within one metre of the boundary;
- An air source heat pump cannot be installed on a pitched roof or within one metre of the edge of a flat roof;
- It cannot be installed on a wall above the ground floor level, if that wall fronts a highway.

Full government planning guidance for renewable technologies in England can be accessed here: **www.legislation.gov.uk/uksi/2011/2056/made.**

Relevant Craven Local plan policies and guidance

- Policies **ENV3: Good Design**
  Good Design SPD

March 2023. This webpage provides general information about relevant planning topics and we hope you find it helpful. Please be aware that it is not a statement of Council policy and does not provide formal policy guidance. For those things, please refer to the Craven Local Plan and supplementary planning documents.

Related Documents

Air Source Heat Pumps resource paper