

# Case Study: 14kW Air Source Heat Pump (ASHP) in Cheltenham

## Key Points

- Installed in a well-insulated home and connected to existing radiators.
- Compact, quiet unit ideal for residential area where space is limited.
- Some confusion over requirements for planning permission.
- The heat pump should supply all of the heating and hot water for a family of 4.

## Background

Cheltenham residents Mr & Mrs Potts are keen to reduce their environmental impact, whilst also reducing reliance on imported fossil fuel, such as gas. With a 19 year old boiler, they felt it was time to replace the gas heating system with a more 'renewable' system.

## Challenges

As air source heat pumps are not yet covered by permitted development rights, and the local planning authority were not familiar with this technology, there was some initial confusion as to whether planning permission was required. However, the planning authority decided that in this instance no planning application would be required; installations in listed buildings or conservation areas may require it.



**The 14kW Mitsubishi Ecodan  
Air Source Heat Pump**

## The System

The heat pump chosen was the Mitsubishi Ecodan HW140, the largest of Mitsubishi's domestic air source heat pumps and capable of heat output at 5 to 14kW.

Installed in a well-insulated home, this heat pump should be capable of providing all of the heating and hot water required. Mr & Mrs Potts have already installed cavity wall and loft insulation and they plan to double glaze the windows of their typical 3 bedroom semi-detached 1930s house in Cheltenham.

Although the system has not yet provided a full winter's heating, it is providing sufficient hot water. Initially, mains water pressure was much higher than the system's pressure; this affected the shower temperature but has now been resolved. The heat pump is running very quietly and should not disturb neighbours.



**The heat pump was fitted in a typical 3 bedroom semi-detached house.**

**The heat pump was connected to existing microbore pipe-work and radiators.**

## Case Study: domestic air source heat pump

### Financial Benefits

Air source heat pumps use electricity, which is a relatively expensive fuel source. However, because the heat pump has an expected coefficient of performance (COP) of around 3 to 4 (for every unit of electricity used, 3 to 4 units of heat are produced), this can make it a financially viable option, particularly when compared to off-gas fuels such as oil or LPG.



### Costs and Funding Sources

Installation costs totalled around £9,500, excluding grants. This included the heat pump itself, fully insulated water tank, controls and all the required pipework. All labour costs are also included. The installation took 4 days to complete, but there was only 1 full day plus a partial day without use of the previous gas heating before the heat pump was operating.

Local authority grants of £1,000 are available to Gloucestershire residents via Severn Wye Energy Agency; for further details see:

[http://www.swea.co.uk/grants\\_domestic.shtml](http://www.swea.co.uk/grants_domestic.shtml).

In addition, government grants of £900 are also available; for further details see:

<http://www.lowcarbonbuildings.org.uk/home/>

### Environmental Benefits

An air source heat pump is powered by electricity, which can be from renewable energy sources. At this time, the Potts' do not have any electrical microgeneration on their own property, but there are several 'green' electricity tariffs available; some of the suppliers of green tariffs only produce electricity from renewable sources.

With electricity supplied from a renewable resource (such as wind or solar photovoltaic), or via a green tariff, a heat pump may produce no net carbon emissions.

**Above left:** hot water storage vessel

**Below left:** existing radiator (with thermostatic radiator valve) and existing microbore pipework



### Maintenance

The system is almost entirely maintenance-free; an annual service is required for the Mitsubishi guarantee, and on an existing system such as this a power flush every 5 years is recommended.

#### Further Information:

##### Ecovision Systems

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[www.ecovisionsystems.co.uk](http://www.ecovisionsystems.co.uk)

##### Mitsubishi heat pumps

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