

# A Sustainability Strategy for Boddington

One way to head off the challenge of climate change through a reduction of CO2 emissions is the replacement of traditional fossil-fuel oil and gas heating with renewable sources. There are several options available, with heat pumps and wood chip boilers as principle alternatives.

In this article, we briefly explore heat pumps and share our experiences. The Boddington Sustainability Group would like to hear about your experiences, and how the Parish Council can support you in the transition. Please email [mthompson@boddingtonpc.uk](mailto:mthompson@boddingtonpc.uk) with your thoughts

Since around WWII, oil has been the default option within Boddington. For every 1000 litres of home heating oil burnt, just over 2.5 tonnes of CO2 is emitted; whilst for those on LPG, the footprint is around 30% lower. Oil extraction and transportation and associated spills and leaks combined with geo-political factors mean that its impact is much greater than just emissions.

The main alternative being promoted by the UK Government's panel of experts, the Committee for Climate Change, is that of heat pumps, which when powered from renewable electricity; are effectively carbon free.

## What is a heat pump?

**A heat pump extracts heat from one area and transfers it to another area; like a fridge. A fridge works by allowing the circulating refrigerant to change from a liquid to a gas and back again. Inside the fridge, a system of pipes allow the refrigerant to evaporate into a gas. This cools down the surrounding air, keeping the interior cold. The gas is then compressed by a pump, changed into a liquid and circulates through the pipes at the back of the fridge. Now the fluid is hotter and loses heat to the surrounding area. Effectively the heat has been extracted from inside the fridge and moved outside.**

**For heating a house, just imagine the fridge is turned inside out, with the cold part outside and the warm part inside.**

**The difference between a ground source heat pump (GSHP) and air source heat pump (ASHP) is where they extract the heat from. A ground source uses a loop of pipes in the ground to pull heat from the surrounding earth whereas air source uses a system like a car radiator to pull heat from the air outside. Overall, a ground source system is more efficient but the install costs are much higher.**

## Experience - Air Source Heat Pump

Two years ago, Bright Green Renewables in Daventry installed a Mitsubishi EcoDan ASHP at Mark's home to replace an aging oil boiler: "My house is 1970s construction; due to the dormer windows and narrow cavities it has been difficult to insulate to a high standard. The heat pump warms my radiators and a new efficient hot water cylinder. I've combined it with the solar photo voltaic panels on my roof and 100% renewable energy

from bulb to make my house effectively CO2 emission free for both electricity and heating. The addition of a Soltech solar diverter allows me to heat the water in the cylinder via an immersion when the sun is shining and the home generated electricity isn't being used elsewhere.

I have found the system very reliable and performs well – generating around 3 units of heat for every one of electricity; I am spending less than on oil previously."

James built his house in Lower Boddington six years ago.

"It's approximately 1,500 sqft and well insulated. The heating is provided by an ASHP with underfloor downstairs and radiators upstairs. We also have an Everhot cooker and Clearview stove. The heat pump has an output of 6 Kw and does the job well but struggles in sustained below freezing temperatures; this can be overcome by limiting the operating zones. Heat pumps have improved considerably over the last six years but they do need a well-insulated house because of the low temperature of the water. We also have solar thermal to heat the hot water and this works very well."

## Experience Ground Source Heat Pump

Steve opted for a GSHP at his house in Upper Boddington: "We installed a Nibe GSHP in 2016 using the government's Renewable Heating Incentive Scheme (RHI). Under the scheme you pay for the install and the RHI pay you quarterly payments for the next seven years. The amount paid is based on how much it will cost to heat your home. They use an Energy Performance Certificate (EPC) to calculate this. You can get indicative numbers from their website.

We replaced storage heaters which often ran out of heat in the late afternoon. We decided on a ground source as the efficiency is better; choosing Nibe as they have an excellent reputation.

Installation requires pipes to be buried in a trench about 1.2m deep; with an area 3.5 times the floor area of your house. This is because you need to spread out the heat extracted from the ground. If you try and extract too much heat from a small area you will freeze the ground.

The alternative is to drill down vertically and use a



14 kWh EcoDan air source heat pump. These are particularly good units as they continue to perform consistently in sub-zero temperatures.

vertical pipe to create the large surface area to extract the heat from. Borehole drilling is more expensive than the trenches. We opted for the borehole route due to garden size; drilling took about a week.

The GSHP is the size of a large fridge and looks quite modern with a colour display, sounding like a fridge when it's running. The GSHP also heats our hot water. Since the actual power of the GSHP is small (12kW) compared to a boiler (30kW), hot water can't be created as needed, hence we also needed a hot water cylinder.

Electricity usage has roughly halved using the GSHP compared to storage heaters, so very green and good for the environment. Without the RHI funding, I think the additional costs of the borehole drilling would have been prohibitive. Overall we're happy with the system and think we made the right choice compared to an oil or gas boiler."



Drilling one of three 134m boreholes for a ground source heatpump. .

There is a common misconception that you need a well-insulated house in order for heat pumps to work. Whilst it is true that for any heating source, anything other than a well-insulated house means you are wasting energy, in reality this isn't a barrier.

Heat pumps are most efficient when they can operate at low temperatures, ideally 30-40C. Whereas boiler systems typically operate at 50-60C. In order to stay comfortable you need to ensure that radiators or under floor emitters are sized appropriately for your property.

It is important therefore that you use an experienced, competent installer that does a proper whole house heating assessment and ensures any new system is well designed. Heat pumps have been fitted to old, stone houses and work perfectly well and cost effectively – if well designed.

There are also very generous grants available at present from Ofgem's Renewable Heat Incentive scheme, especially for those on oil systems. Typically, 70% of the installation cost is refundable. The current scheme is due to end in March.

Please do share your local experiences and recommendations.

Mark Thompson, [mthompson@boddingtonpc.uk](mailto:mthompson@boddingtonpc.uk)