Sustainable heating for your home –

e) electric boilers and electric heating

Sustainable heating has a number of technological solutions, which will not all be of equal interest to every householder. This factsheet part deals specifically with electric boilers and electric heating. Other parts are:

a) Introduction to current and developing technologies
b) Liquid fuel replacements
c) Log-gasification and wood pellet boilers
d) Heat pumps

❖ Conventional electric boilers

- Electric boilers can be fitted as like for like replacements.
- They are cheaper to purchase but more expensive to run. A 25kW electric boiler costs around £900, compared to £1700 for a similar size oil boiler.
- Electric boilers are much more efficient than oil boilers (effectively 99% efficient as all 'waste' heat goes into your house, compared to 79% or less for an oil-fired unit).
- Servicing costs for electric boilers are much lower, with fewer repairs.
- They are also silent, do not produce any exhaust fumes, so don't create any smell or need a flue. They also save space as they don't need an oil tank.

Example of a conventional electric boiler (left) and a Tepeo 'Zero Emissions Boiler' (right)
Reproduced from https://www.thermogroup-heating.com/
https://tepeo.com/blog/2019/8/16/tepeos-zero-emission-boiler-lives

- Running costs are significantly higher at current prices (typically 16p/kWh for electricity and 4p/kWh for oil).

The Rural Community Energy Fund

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❖ Storage heaters

- Some houses in Barningham are fitted with storage heaters, which utilise cheaper night rate electricity to store energy for release of heat during the day. Older models lack controllability, are expensive to run and require a lot of units to heat larger houses.

❖ Developments in electric boiler technology

- A new range of electric boiler products will be on the market later in 2021. One example is the 'Zero Emissions Boiler' (ZEB) from Tepeo. This is in effect a new type of storage heater, designed to use cheap rate electricity which is then stored as heat for use later.
- The ZEB can be used instead of or alongside a conventional boiler, and is based on a heavy magnetite core that heats up to 800°C to store enough heat for central heating and hot water when needed. The manufacturers currently expect it to cost between £3,000 - £4,000 to install.
- The ZEB is the size of a washing machine, and needs a hot water tank as part of the system.
- Trials have shown the ZEB to be particularly cost-effective if the property can use off peak or locally generated renewable energy (from roof mounted PV panels, for example) as a cheap electricity source. There are also developing options for variable 'dynamic tariff' electricity supply contracts which could significantly improve the running costs of options like the ZEB.

❖ Electric heating and dynamic tariffs

- One possible way to make electric heating more viable is through dynamic tariff pricing. Most consumers are on fixed tariffs, with either a single rate or Economy 7 day/night dual rate. However, wholesale electricity prices are determined on the Half Hour Settlement market, with prices going up and down throughout the day in half hourly blocks, depending on the supply and demand at any given time. In general, prices are low overnight, highest in the mornings and early evenings, and can sometimes go negative if there is too much power being generated [in these circumstances, suppliers can earn money by switching off generation].
- Households are increasingly being fitted with 'Smart Meters', which can measure usage in these half hourly blocks. This makes it possible for homeowners to participate in the half hourly energy market.

- There are already dynamic tariffs available for domestic customers. For example, the Octopus Agile tariff is currently available and uses a Smart Meter to vary pricing on a 24-hour notice system. Each evening the user receives a text message giving them the predicted prices for the following day, which enables them to move their consumption to the cheapest times.
- In certain circumstances, where wholesale prices are negative, dynamic tariffs can pay customers to use more energy.
- The manufacturers of the Tepeo Zero Emissions Boiler have claimed that their system can be programmed to heat up at a selected electricity price, as well as integrate with a domestic PV system to store home produced energy, and it does seem increasingly likely that a combination of new electric heating technology, Smart Metering and dynamic tariffs is going to provide opportunities for homeowners to heat their homes from renewable electricity sources at competitive running costs in the near future.
- These options are developing rapidly and it is likely that electric heating will form part of the off-gas grid heating solution in the coming years.

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