# MINEWATER HEATING

## Observations from a visit to the Gateshead scheme

- The technology for using water from abandoned mines as a source of heat is proven, and up and running here in the UK.
- The temperature of minewater isn't particularly high – just 16 degrees at Gateshead, though potentially a little higher from deeper workings.
- A heat exchanger (something like a fridge in reverse) then raises the temperature. It's fresh clean water that's heated – the dirty minewater is pumped back into the mine.
- The heat exchanger is a big piece of industrial kit, not something installed in each house/office/school/factory.
- Minewater heating therefore needs to be part of a district heating scheme. This involves investment in a pipe network. It also requires a back-up boiler (gas-fired at Gateshead) to cover breakdowns and maintenance.
- The heat exchanger consumes electricity, but less per unit of useful heat than an air-sourced heat pump.
- Unlike warmth from air-sourced heat pumps, the warm water can be fed into existing central heating radiators.
- There are plenty of mineworkings from which water might be taken. The Coal Authority keeps good records and can provide advice.
- But where the water is accessed via a borehole it can be a hit-and-miss process, depending on underground water flows. At Gateshead several exploratory wells had to be drilled. Where water is already pumped (e.g. from a disused shaft) this can avoided.
- The boreholes are inconspicuous – a couple of manhole covers in the corner of a field.
- The other kit (heat exchanger etc.) is a more substantial presence – a modest-sized industrial building.
- There's a significant up-front capital cost, but in the Gateshead scheme the heating is eventually supplied at below conventional prices.
- Without grant funding (at Gateshead from government schemes) the economics don't stack, though higher energy prices are improving the prospects.

- The private sector, unaided, is therefore still unlikely to invest. Hopes are expressed that costs will fall as experience grows, but this could be wishful thinking.

**Conclusions**

Given that there are mineworkings under many urban areas, there are likely to be plenty of opportunities for schemes of this kind. The economics, however, remain a problem. At Gateshead there was an existing district heating scheme, which made it easier to plug in the minewater element. The challenges will be greater elsewhere.

It's hard therefore to see minewater heating developing into a more than a 'niche' product – workable in favourable local circumstances but probably not widely.

Furthermore, minewater heating does consume electricity and so long as the marginal source from the grid is gas-fired power stations – and that's likely to remain the case at most times of the day and year well into the 2030s – the heat isn't carbon-free, even if it's greener than other sources. Contracting for the electricity from renewable sources doesn't get round this problem – so long as there isn't enough renewable electricity in total it merely denies the power to other users.

***Prof Steve Fothergill***
***17 November 2023***