Notes on the position with the move away from gas boilers. December 2021

Editor's note: Since this article was written gas prices have increased substantially to double 2020/21 levels. Some of the comments in this article with regard to comparative running costs are impacted by this change and readers are asked to note the current position when making cost per kWh comparisons.

Colin Hewetson, a 50plus Service Provider, writes about his understanding of the potential gas boiler phase out. The position at the time of writing is:

- No Bill has been presented to the House of Commons to ban gas heating boilers or gas hobs / ovens. Government have indicated they will propose a Bill to ban gas boilers & hobs / ovens on new build houses from 2025 and all houses from 2030. If passed the Bill will go to the House of Lords, Royal Assent and become law some time later.
- Alternative energy systems will on the whole be limited to three options:
    1. Hydrogen (H2) gas boilers & hobs
    2. Electric combi hot water/central heating boiler
    3. Air to Water heat pumps or reverse cycle Air to Water heat pumps.

The Ductile Iron National Gas Grid is being replaced with polyethylene piping; work started 15 years ago and the methane (CH4) gas supply already contains 10% Hydrogen (H2). Some existing gas boilers will have to be replaced as H2 is not compatible with some materials. Some boilers will simply require replacement of the FFD (Flame Failure Device). New H2 boilers will be similarly priced to existing gas combi boilers e.g. £1200-£1500. Hydrogen boilers are likely to be extremely expensive to run due to lack of and process difficulty in recovering H2 from the atmosphere, [making the fuel] at least 3 to 4 times more expensive than CH4.

Electric combi boilers will be single phase powered to 15kW, enough for an average 3-bed semi-detached home and 3 phase for above, e.g. 20-25kW for 4 to 5-bed detached. Prices of electric boilers are likely to be greater than CH4 gas boilers (even though they need no gas valve for a pilot light or burner, no flu or FFD); I suspect prices will be around £1500-2000. They will be at least 3 to 4 times more expensive to run than CH4 gas boilers as (so called Green) energy costs around 4 times more than CH4 gas (currently).

Air to water heat pumps are the ideal solution to replace gas boilers as they are (if designed & installed correctly) extremely efficient, quiet and reliable and can connect directly to the existing underfloor or wet radiator flow & return headers used by the redundant gas boiler. Radiator and underfloor heating loop piping and headers flow and return piping size will be unaffected as the design recirculation rate would remain the same e.g. 20degC temp drop. They will also save kitchen/other space as they would be installed externally. Connections can be run in rigid copper pipe or black rubber/Neoprene/EPDM hot water high pressure flexible hoses. Design hot water flow & return would or should be 60/40degC on a new build (so long as radiators are correctly sized!) not 80/60degC as per current practice.

COP (Coefficient of Performance) at design winter (average) conditions of 0degC outdoor, 20degC indoor would be 5kW:1kW, 1kW input 5kW output due to heat of compression & motor winding heat. Most compressors used are Scroll rotary compressors with inverter variable speed control from 100-10% capacity. Most use environmentally friendly refrigerant R32. Average landed cost of a 15kW packaged air to water heat pump, certified & CE approved would be (from China) around £1400 or if purchased from Japanese main UK dealers (or UK boiler - heat pump manufacturers) anything from £3000-£8000 depending on manufacturer/competition/volumes.

UK energy supplier's electricity prices are on average currently 4 times more expensive/kWh than CH4 gas/kWh so as a rule of thumb a heat pump should on average cost slightly less or at worst the same as a gas boiler to run (at a COP of 5:1).

Note: The maximum size of heat pump available on single phase 30A supply for a 4/5 bedroom detached house would be a 5/6kW compressor model, 25/30kW output. 5000W/220V= 22.7A or 6000W/220= 27.2A. This is a far better solution than an electric boiler of the same size which would require a 380/3/50 supply. Cost of this?? Anything from £1800-£5000.

The opinions expressed in this article are those of the author. He may be contacted through The 50plus. There is more about the author at www.ref-consultancy.com.