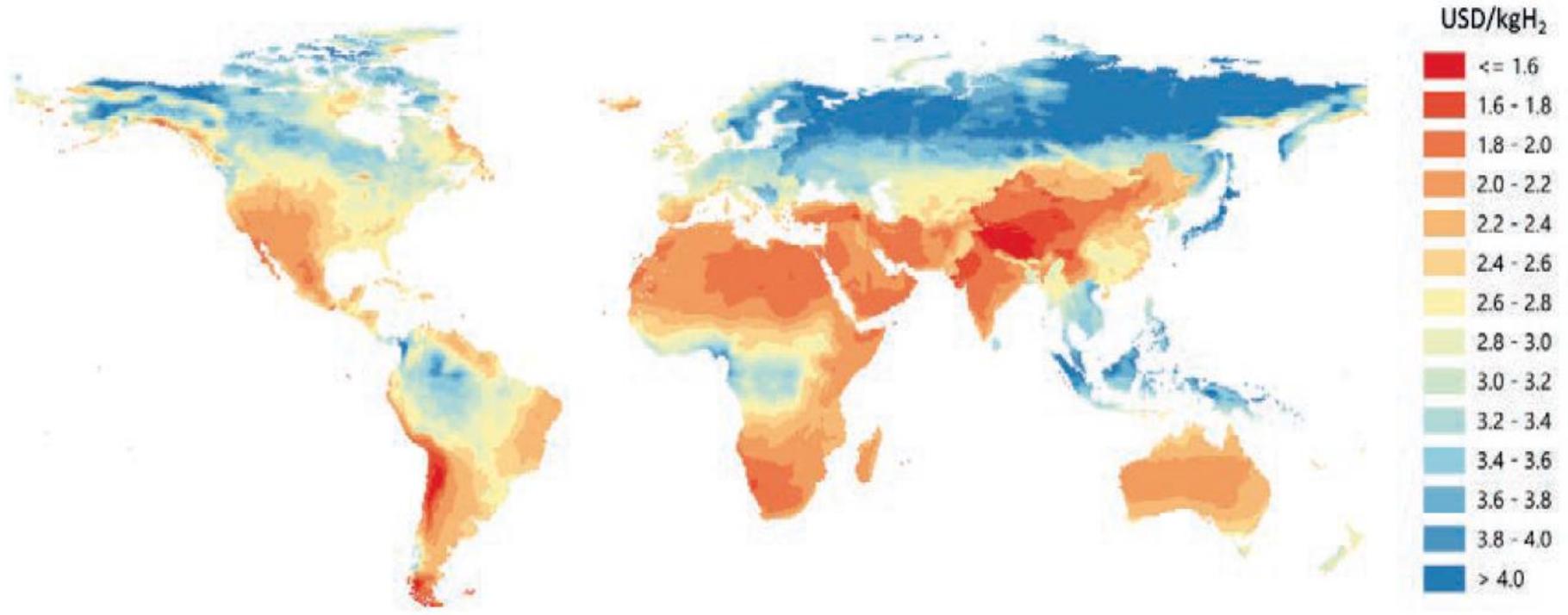


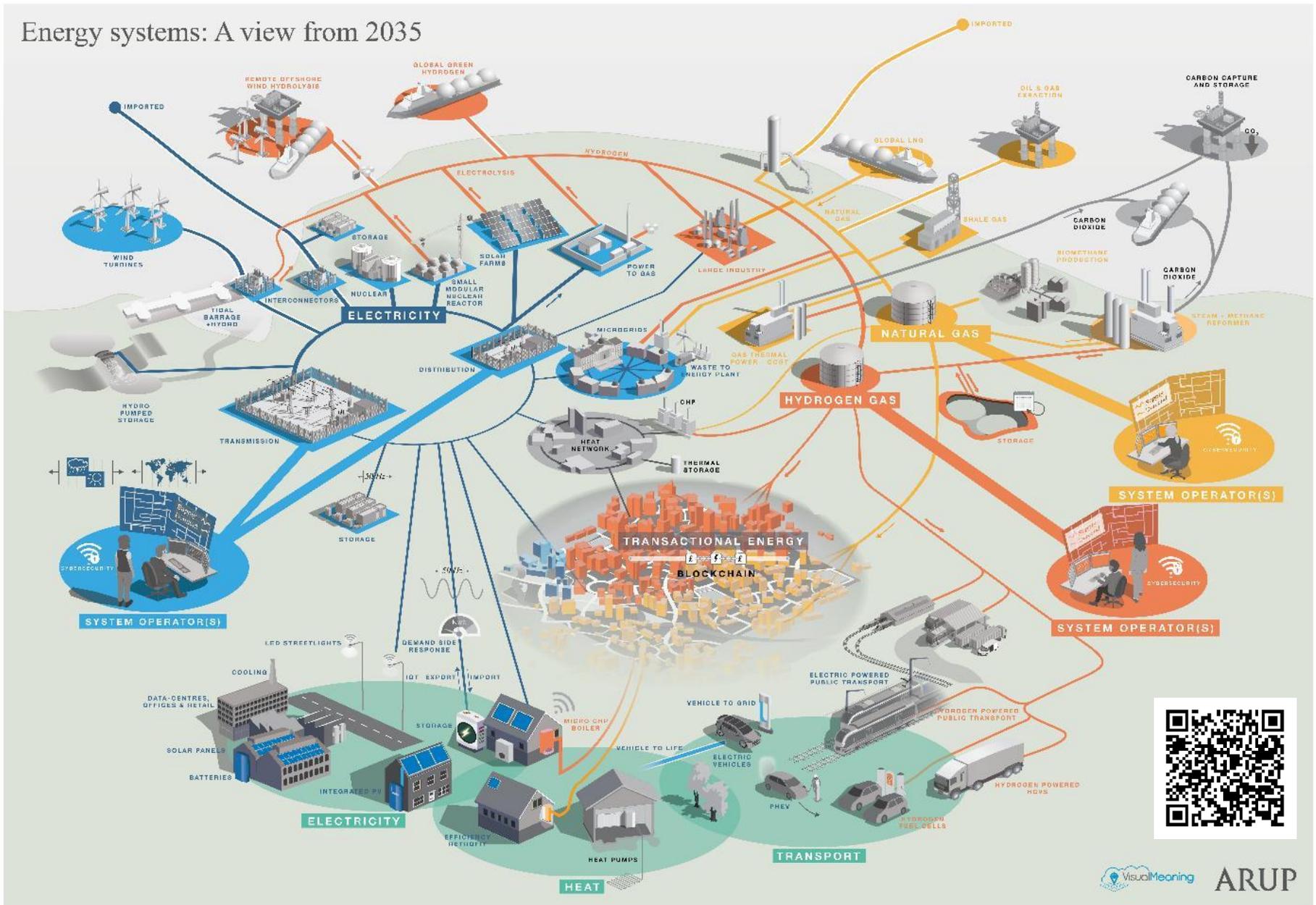
Hydrogen for Heating

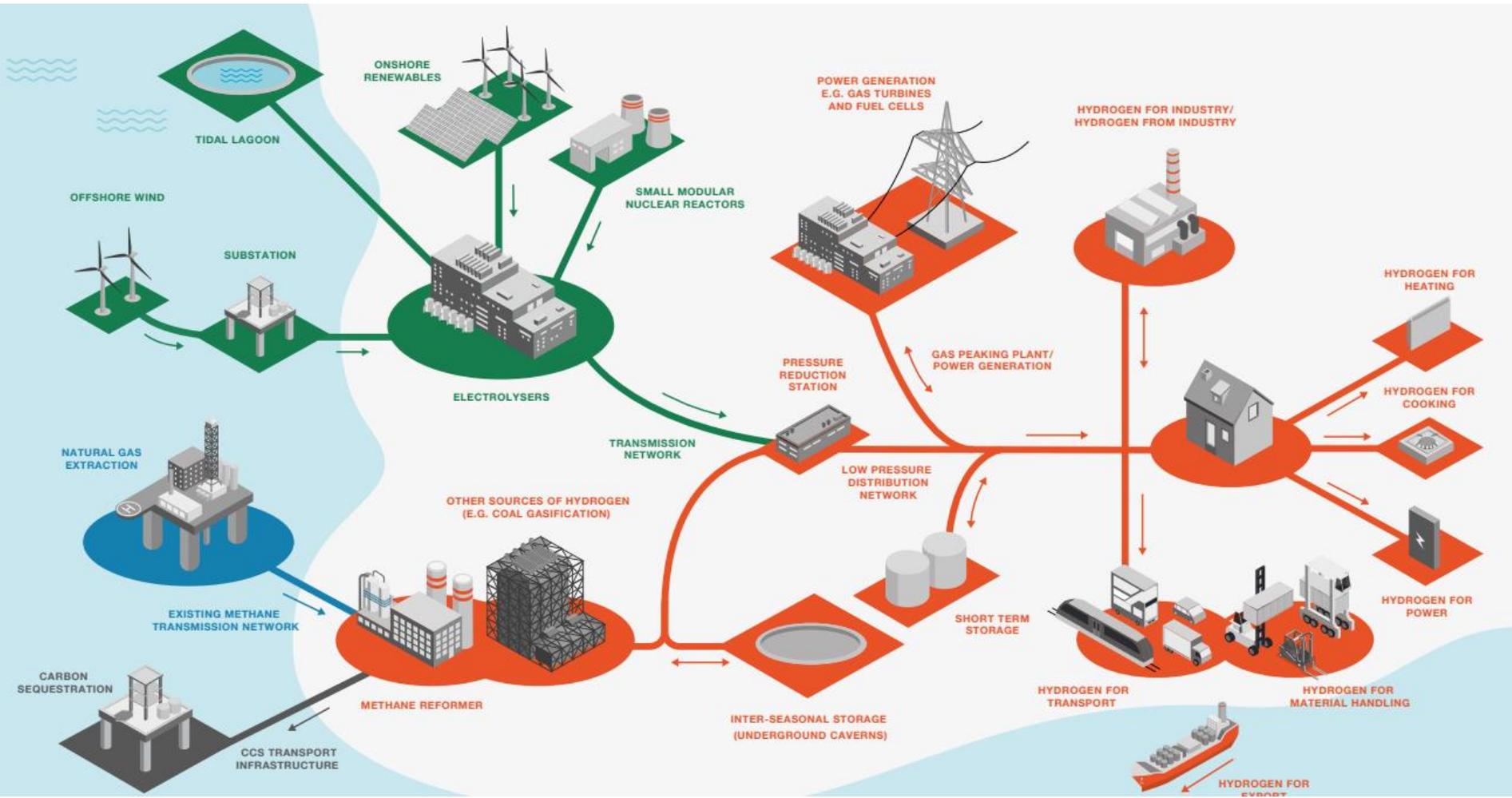
Heidi Genoni
19 May 2020



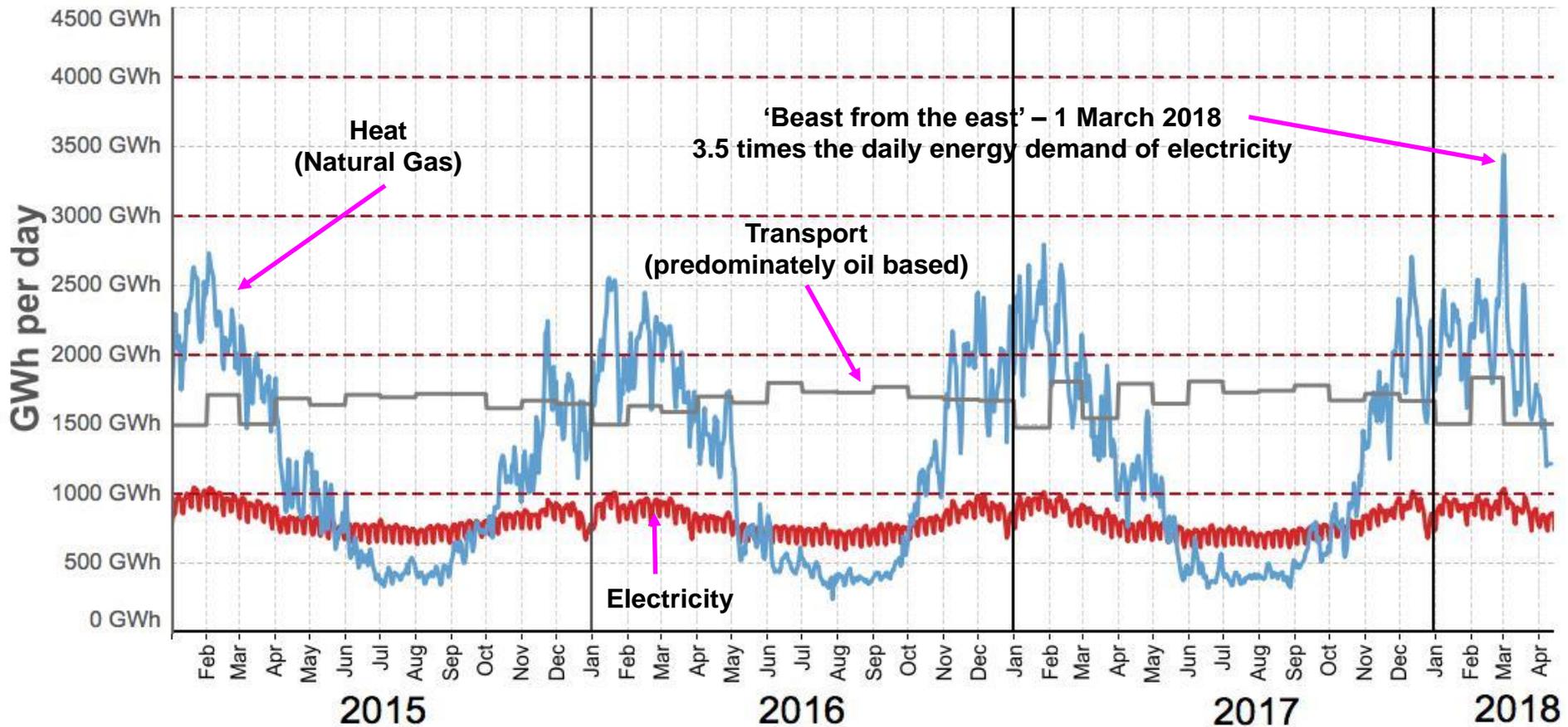
Source: IEA analysis based on Electrolyser CAPEX = USD 450/kWe, efficiency (LHV) = 74%; solar PV CAPEX and onshore wind CAPEX = between USD 400–1 000/kW and USD 900–2 500/kW depending on the region; discount rate = 8%.

Energy systems: A view from 2035





The Challenge – UK energy demand



Data are from National Grid, Elexon and BEIS. Charts are licensed under an Attribution-NoDerivatives 4.0 International license
Charts can be downloaded from <http://bit.ly/energycharts>



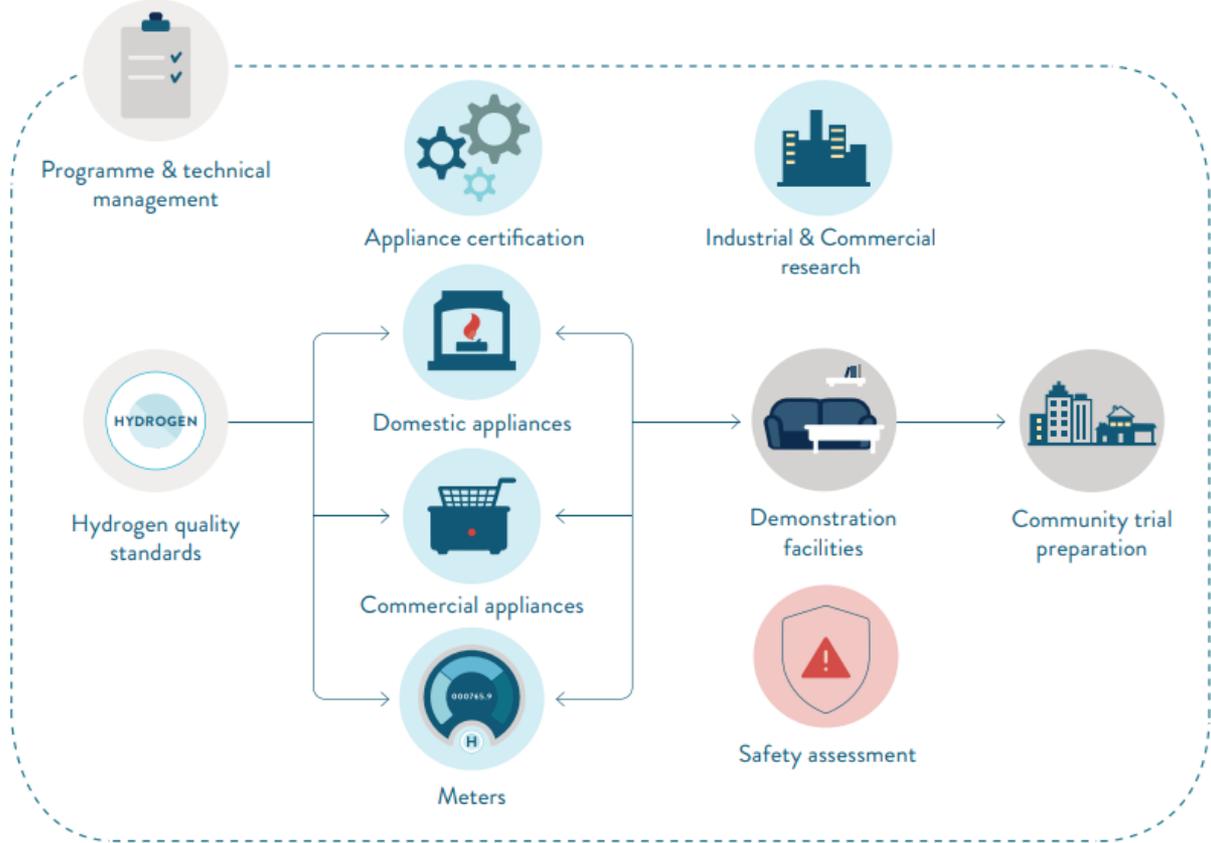
by Dr Grant Wilson grant.wilson@sheffield.ac.uk

Right solution for specific situations

- Reduce energy use – e.g. insulation
- Heat networks – high density built environments
- Heat pumps (ground or air) – ready now, new build, off gas grid
- Boilers – already can use a blend of nat gas/h₂, 100% H₂-ready is feasible and may soon to be available
- Others – e.g. hybrid (heat pump & boilers), micro fuel cell CHP

- Diversity / flexibility of solutions will be helpful
- All require varying levels of intervention / disruption
- Speed and delivery of deployment – less than 30 years left!

Hydrogen for heating innovation programme

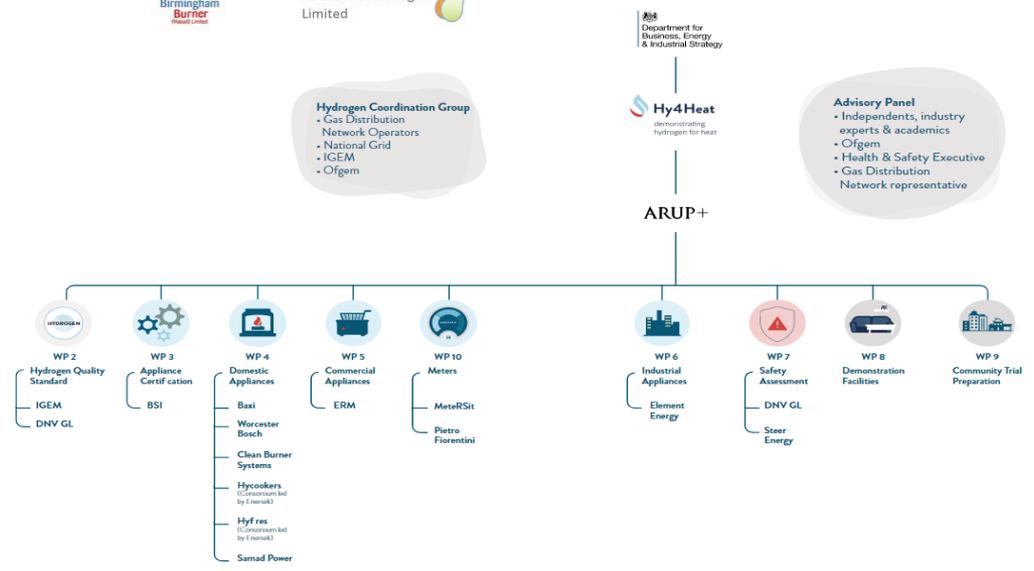


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www.hy4heat.info

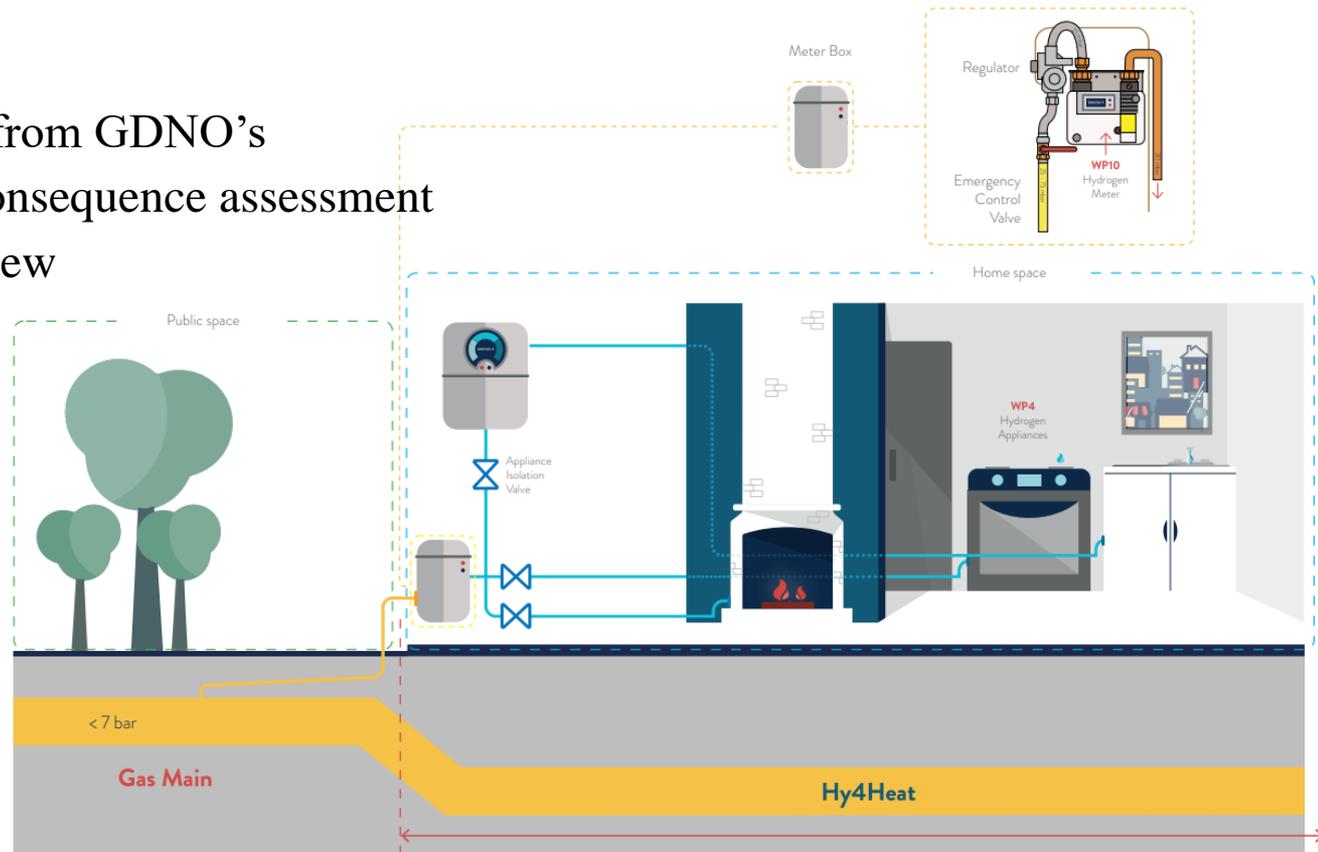


Hy4Heat



Safety Assessment

- Comparing risks of hydrogen and natural gas
- Undertaking experimental testing in a range of scenarios:
 - Leakage
 - Accumulation
 - Dispersion
 - Ignition
- Further incident data from GDNO's
- Analysis, QRA and consequence assessment
- HSE independent review



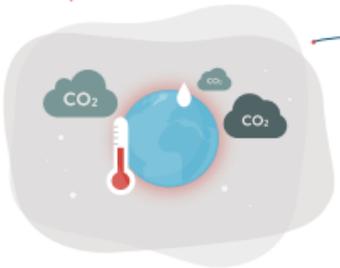
Hydrogen-ready appliances

- Domestic appliances (boilers, cookers, gas fires)
- Commercial appliances (cascade boilers, dry and wet space heating, micro-fuel cell chp)
- Metering
- Ancillary system components

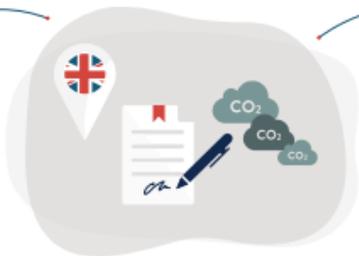


The Hy4Heat Programme

1 **Carbon Dioxide** is contributing to climate change and global warming



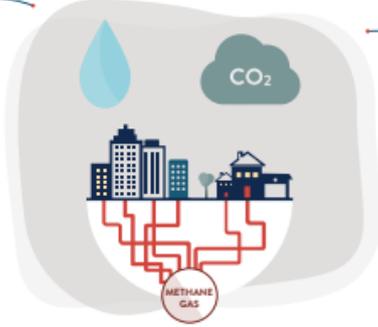
2 The UK government has a 2050 target to **reduce carbon emissions to net zero**



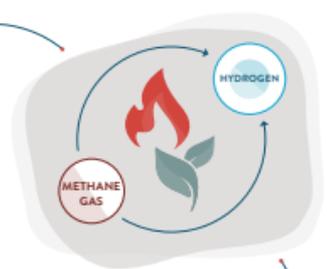
3 Heating and cooling UK homes is about **half all energy consumption and a third of carbon emissions**



4 **80% of homes** use natural gas (methane). When used for heating and cooking, this releases water and carbon dioxide



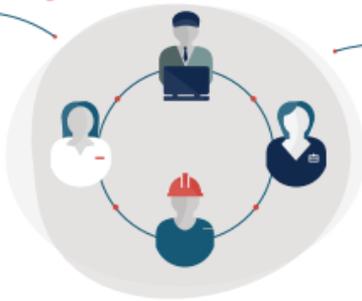
5 **BEIS** (Department for Business, Energy & Industrial Strategy) is looking at ways of **decarbonising heat**. One of the options is replacing methane with hydrogen



10 defining a hydrogen **quality standard**...



9 Hy4Heat is part of this work – and is a group of **industry partners and experts**...



8 through to **how much a change might cost**



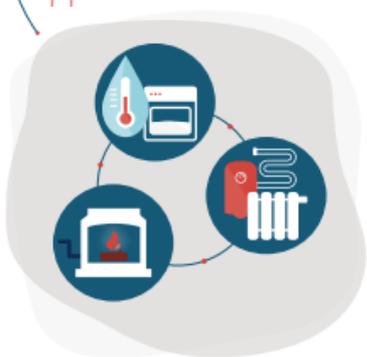
7 **BEIS** is considering everything: from **how hydrogen could be produced sustainably**, in bulk, with minimal carbon emissions...



6 Hydrogen, when converted to heat **releases no carbon dioxide**



11 developing appliances for **use with hydrogen gas**...



12 and **testing them** to make sure they're **safe, reliable and convenient**



13 Creating demonstration trials and **getting people's feedback**...



14 and planning in the future to **possibly change a whole community to using hydrogen**

