

WHERE IS THE GAS HEATING MARKET, AND WHERE IS IT GOING? DELTA-EE GAS HEATING SERVICE

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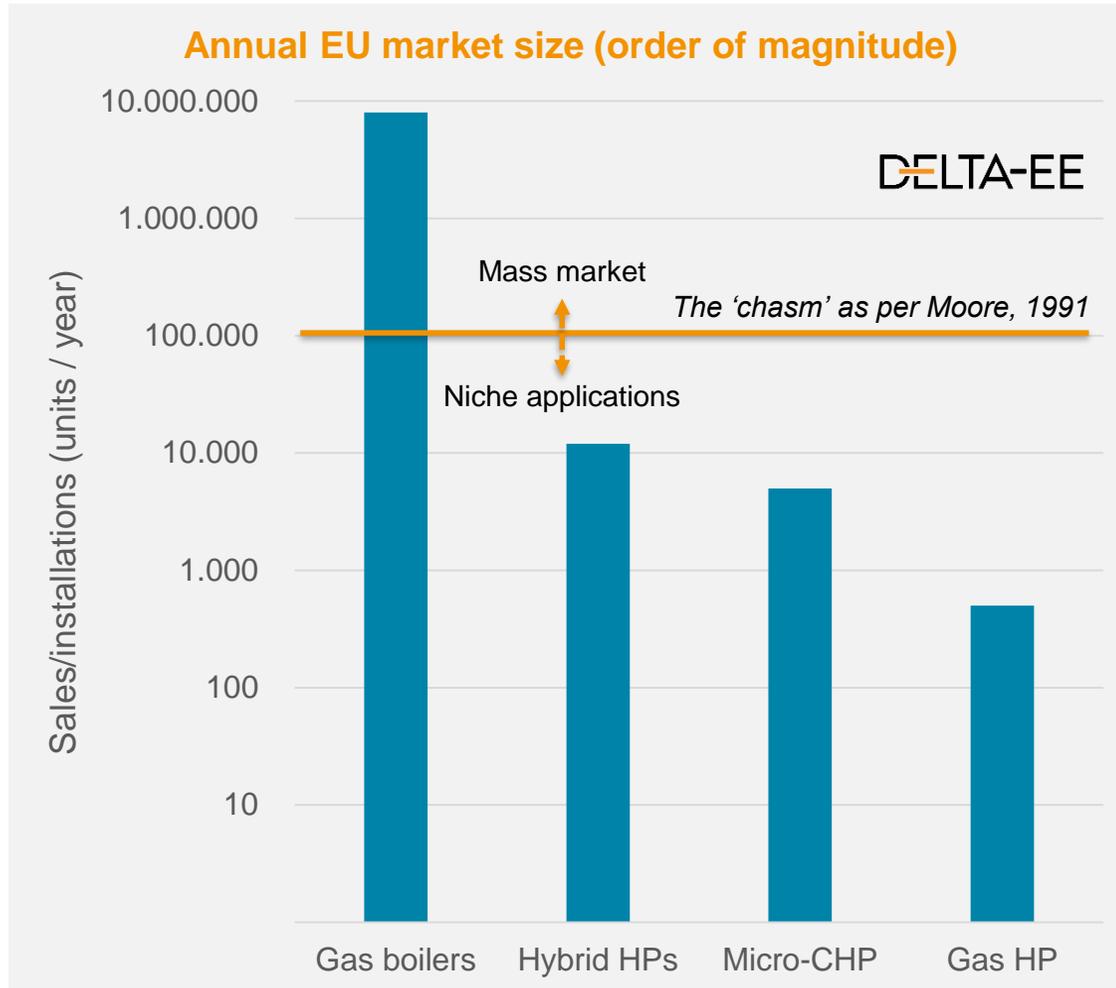
Topics

Considering the EU gas heating market out to the 2030s

1. Current status of gas heating in Europe
2. New build market: Gas is under severe pressure
3. Retrofit market: A battle yet to be fought
4. 'H₂ for heating': How it fits into Member States' future plans
5. Status of practical trials with H₂-using boilers
6. Customer awareness of high efficiency alternatives

Current status of gas heating in Europe

The boiler market is doing great today – but it can't last as it is

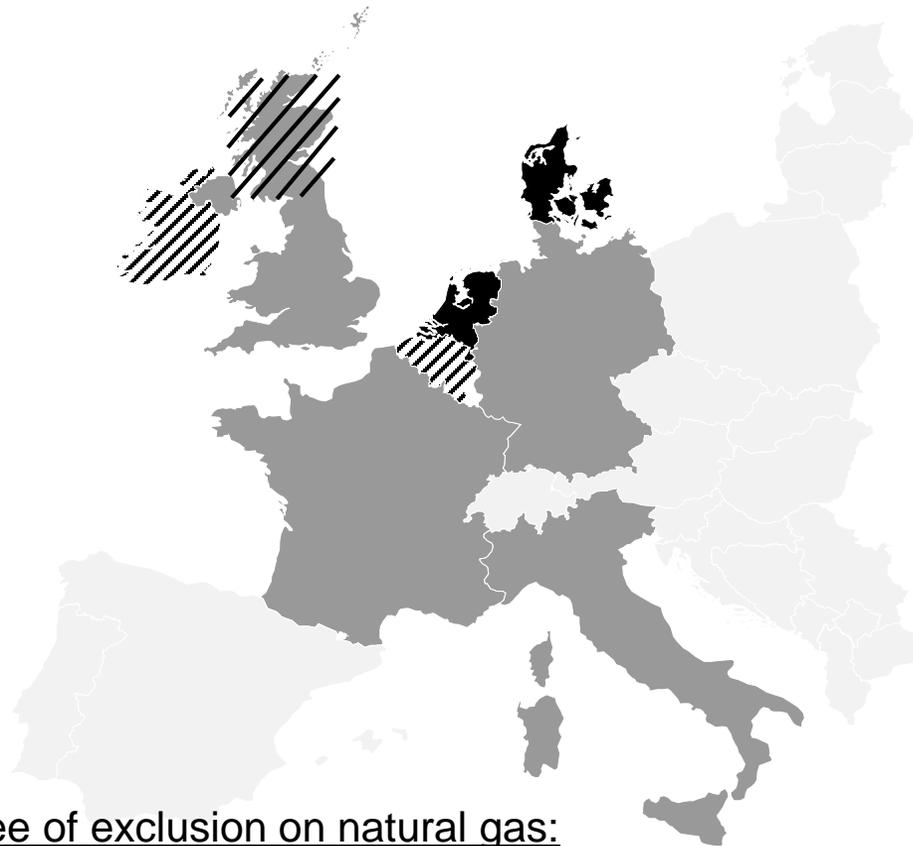


Current trends for natural gas heating:

- **Record revenues in FY2018** among Europe's leading brands; largely coming from gas boiler sales.
- **Strong growth in emerging markets** as natural gas supply expands – Turkey, Russia, Romania, China.
- **Good treatment in policy and incentives** (boiler subsidies still exist despite ErP, reduced VAT applies).
- **High customer acceptance and familiarity** + installer loyalty & resistance to change from condensing boilers.
- **Other stakeholders boosting market** – e.g. utilities building service-based offerings around condensing gas boilers, and the emergence of digital sales platforms.
- **But** – new, high efficiency gas heating still struggles to 'cross the chasm' and decarbonisation commitments cannot be met with condensing technology alone. Players must drive change or risk being usurped.

New build market: Natural gas is under severe pressure

Losing the battle for new build homes to electrification



Degree of exclusion on natural gas:

- Ban on new natural gas connections*
- ▨ Ban on new natural gas not enacted but proposed for future
- Preferential treatment of electric heating (current and proposed)
- Not covered

* Unless very exceptional circumstances

Market opportunity being increasingly limited:

- Across Europe's major heating markets there is a **growing trend to strongly disincentivise or even outright exclude** natural gas from new homes.
- At present, **gas hybrids receive a slight boost in some markets** as standards tighten (Italy and Scotland) but intent is to move to pure heat pumps.
- **Its not just a European thing** – the cities of Berkeley (US), Vancouver (Canada) and Canberra (Australia) are all looking to move away from if not stop entirely the use of natural gas in new builds.
- Ultimately though, the carbon emissions and market value from this segment is tiny compared to the existing building stock - **80% of the buildings in use now will remain by 2050.**

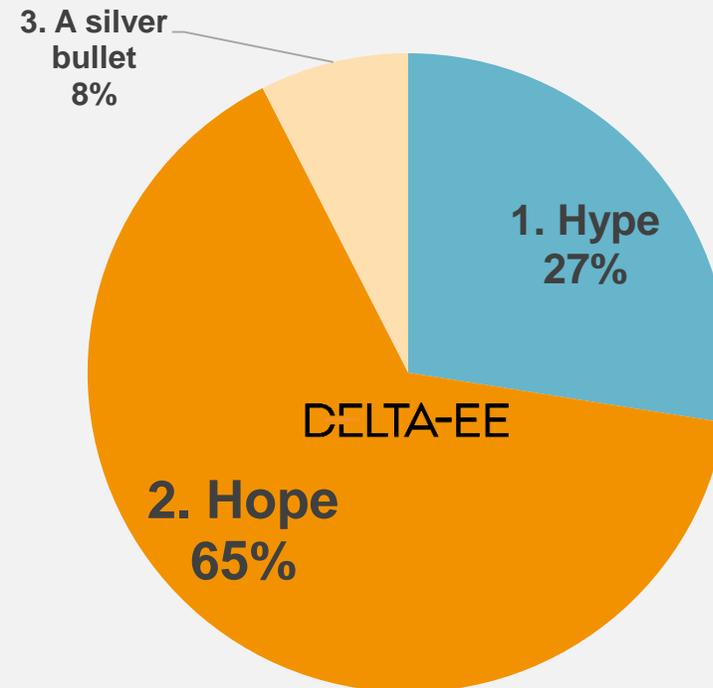
Retrofit market: A battle yet to be fought

The 2020s will be another good decade for gas heating, although preparing for more significant disruption from the 2030s should not be ignored

2020s are about learning, 2030s will see much more action:

- Due to the likely scale of disruption, **policy makers continue to defer the big decisions on retrofit** in favour of addressing the ‘low hanging fruit’ of new build.
- And, in light of ErP mandating a shift to condensing boilers, **gas can help meet upcoming carbon budgets.**
- When any big decision do get made, **they will take a long time to be transposed** into legislation and subsequent action. Extending the window for gas.
- Many energy departments seem to be **hedging on the greater availability of decarbonised gas** supplies in the future. They would enthusiastically welcome this. The 2020s will be vital for building up capacity in this area.
- **H₂ is increasingly ‘on the table’** for consideration.

AUDIENCE POLL: Decarbonising heat with hydrogen is...



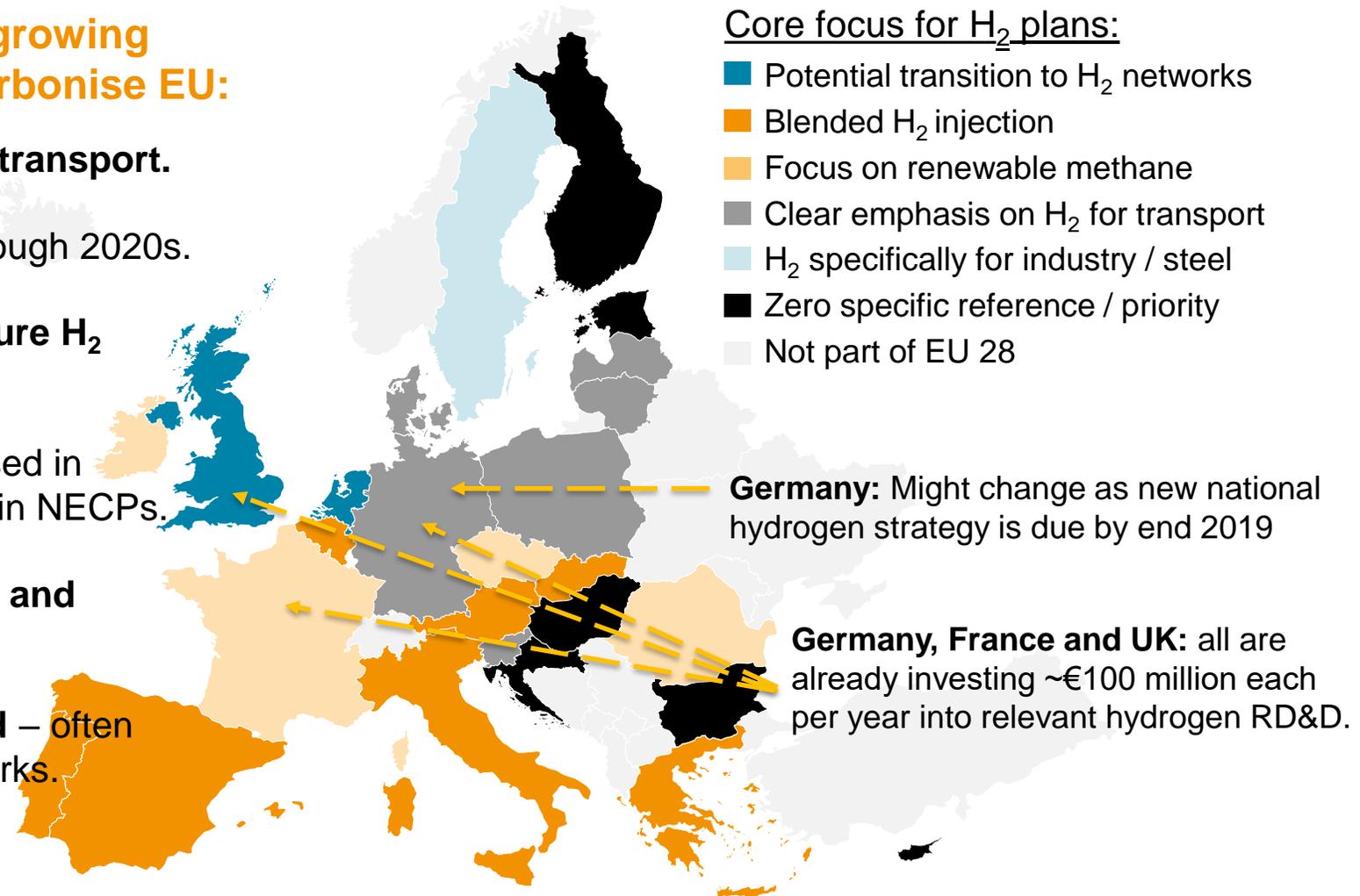
n = 40 energy industry representatives at Delta-EE Heat Summit, London, Sept. 2019

'H₂ for heating': How it fits into Member States' future plans

National Energy & Climate Plans (2021-2030) prioritise different applications

NECPs are generally supportive of a growing role for hydrogen as a means to decarbonise EU:

- Several countries see a **key role for H₂ in transport**.
- Many will experiment with **H₂ blending** through 2020s.
- A few are considering a role for **discrete pure H₂ networks** for heating buildings.
- There is also sentiment that H₂ could be used in **industrial sites** – that is not well reflected in NECPs.
- On the use of H₂ for heating, **clear leaders and followers** are emerging.
- Lots of investigation has been **industry-led** – often instigated by heating OEMs and gas networks.



Status of practical trials with H₂-using boilers

Many project milestones have been reached, but there is still lots to prove

Other notable mentions:

Netherlands: Also several up to 20% H₂ supply projects also live (e.g. 'Duurzaam Ameland')

Orkney Islands: Has a small pure H₂ project live ('BIG HIT')

England: 20% H₂ supply also live ('HyDeploy')

Level of commitment reached:

- 100 H₂ supply live
- 100 H₂ supply planned
- 20% blended H₂ supply live
- 20% blended H₂ supply planned
- <20% blended H₂ supply live
- <20% blended H₂ supply planned
- First project still to come



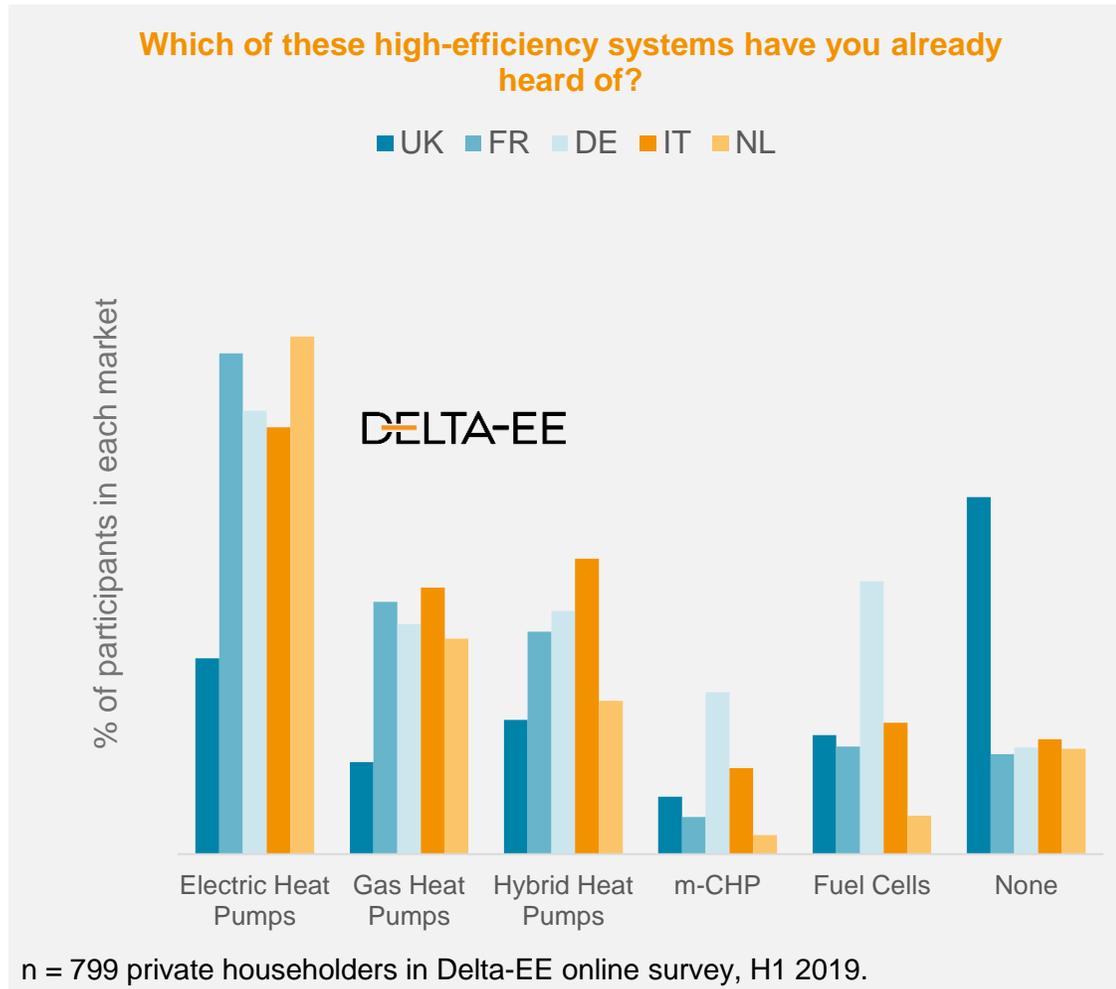
State-of-play by November 2019:

- Some **communal dwellings** are currently heated with pure H₂ in the Netherlands and Sweden*.
- As yet there is **no pure H₂ supply to individual boilers** in homes – earliest likelihood for this is 2022-2024.
- Few projects have already **demonstrated the viability of blended H₂** with no impact on users or appliances.
- H₂ is being injected into the **transmission grid in a trial** in southern Italy.
- Demonstrating the safety of using H₂ in homes, using a range of technologies will be the focus of **many € billions of investment during the 2020s**.
- If successful, and with sufficient means of H₂ production, then it **could become central** to many strategies for the heating market – but not until then.

* The Swedish project – RE8,760 – is more of an anomaly than a signal of wider ambition. H₂ is produced on site and put through a fuel cell.

Customer awareness of high efficiency heating technologies

Much more effort is required to educate customers on the alternatives



New gas technologies trail electric heat pumps:

- Only technology with **>50% awareness** was **Electric Heat Pumps** (our study of EU residential heating markets).
- Yet, **higher awareness of high efficiency gas did correlate** with markets where sales are strongest (GHP & hybrids in Italy, m-CHP & fuel cells in Germany).
- Regarding which high efficiency gas technology(s) will rise to prominence in future, **the market is wide open!**
- **Fuel cells have the strongest, most coordinated push** at present, and have significant cost reduction potential.
- Gas hybrids are, problematically, more economical to retrofit where pure electric heat pumps also do better.
- **Gas heat pumps are the most overlooked** of the options technologies – perhaps better suited for non-domestic?

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