

110

29 November 2018

Hybrid hydrogen heating hopes



Ed Reed

Head of Research

01603 542129

e.reed@cornwall-insight.com

In a recent *Energy:2030* [Chart of the Week](#) we discussed developments on blending hydrogen with gas supplies as a means to help lower carbon emissions associated with heating.

The Committee on Climate Change (CCC) issued its *Hydrogen in a Low-Carbon Economy* report on 22 November, which set out the latest thinking on the potential roles hydrogen can play in meeting decarbonisation targets by 2050.

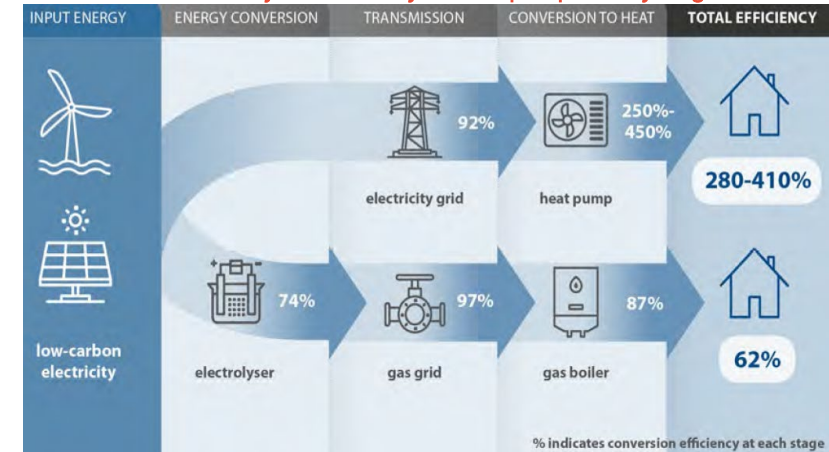
One of the key takeaways is that evidence from recent trials points to the potential for hydrogen boiler and heat pump hybrid systems to “almost completely displace fossil fuel use in buildings”, as opposed to blending hydrogen with gas that would not.

The hybrid system combines a heat pump with smart controls that allow ‘pre-heating’ of buildings. This is sized to provide ‘baseload’ heating requirements. During cold periods hydrogen boilers provide the necessary heat that the heat pump cannot.

The benefit of this hybrid approach is that smaller heat pumps reduce upfront costs, ensure more efficient production of heat (as heat pumps become less efficient when the outside temperature falls), and lessen overall peak electricity demand as the hydrogen boiler takes over to provide instantaneous heat during cold spells.

To work at scale though requires the existing gas distribution network to be fully converted to delivering hydrogen, which will not be possible until the 2030s, once all older iron pipes have been replaced with plastic pipes. The estimated cost of the national switchover from gas to hydrogen is in the range of £50bn to £100bn, although this could be significantly reduced where ‘hydrogen ready’ boilers are installed as part of the natural end of life

Relative efficiency of electricity in heat pumps vs. hydrogen boilers



Source: CCC

replacement cycle. The source of hydrogen is also an important consideration of the overall cost of the approach. As shown in the chart, the efficiency of creating hydrogen via electrolysis and then burning in a boiler is lower than heat pumps, although hydrogen boilers would only be used for limited periods.

The CCC acknowledges that this is just one of a suite of roles hydrogen could play in lowering the carbon content of GB’s heat load, but an option that could be implemented as a policy from 2020. This would allow decisions on how to fully decarbonise buildings connected to the gas network to be made by the middle of the next decade, and conversion of gas distribution networks to carry 100% hydrogen by the mid-2030s.

For more on future energy system developments request a free trial of our *Energy:2030* newsletter from [Neil Mearns](#).