



Assessment and mapping of the high-potential areas for the use of hydrogen for heat in buildings in Scotland

Scottish Government Policy Response

The Climate Change Plan¹ envelope for buildings requires emissions from homes and buildings to fall by 68% from 2020-2030, which is equivalent to over one million on-gas homes converting to zero emissions heat over the next eight years. The scale and pace of this transition is unprecedented, and to stand any chance of meeting our statutory climate target for 2030, we must very rapidly increase deployment of readily-available low-regret technologies, which are not dependent on just one fuel.

For homes and buildings, this means heat pumps and heat networks in the 2020s. However, hydrogen also remains an important component of the future Scottish energy system, with demand uses already identified across industrial and transport sectors. Hydrogen also presents significant export opportunity for the Scottish economy going forward.

If there was policy certainty from the UK Government (UKG), hydrogen could also play a role in heating buildings, either through the gas network or supplying heat networks. However, this potential is dependent on strategic decisions by the UKG on the future of the gas grid that will not be made before 2026, as firm evidence on safety, feasibility, and cost becomes available.

More specifically, policy on gas and regulation of the gas network is reserved to the UKG, with investment in the network paid for through customer bills¹. Alongside other action in reserved areas to

¹ [Securing a green recovery on a path to net zero: climate change plan 2018–2032 - update - gov.scot \(www.gov.scot\)](https://www.gov.scot/publications/climate-change-plan-2018-2032-update/pages/100/)



support delivery of our Heat in Buildings Strategy², to enable our ambition to maximise volumes of renewable hydrogen in our energy system as quickly as possible, we are urging the UKG to expedite progress on amending regulations and legislation to support hydrogen blending and accelerating decisions on the role of 100% hydrogen in the gas grid. We will also continue to press the UKG to progress the consultation on enabling and requiring hydrogen-ready boilers.

The Scottish Government's Hydrogen Policy Statement³ sets out an ambition to build a production capability of 5 GW of renewable and low-carbon hydrogen by 2030, and at least 25 GW by 2045. To support these targets, £100 million in funding has been allocated to the development of the Scottish hydrogen economy. In addition, our Draft Hydrogen Action Plan⁴ supports the growth of regional production hubs to maximise the benefits of integrating hydrogen and renewables production into the energy system. The actions set out in the plan support the development of industrial, transport, and heat demand for hydrogen to develop a skills base and supply chain.

Whilst the long-term future of gas remains uncertain, emissions reductions can be achieved in some part with gas blending. Decisions on gas blending will be taken by UKG in 2023. By 2030, we expect to see blending of hydrogen with natural gas develop across all areas of the GB gas network and may also see the conversion of parts of that network to deliver 100% hydrogen towards the end of the decade.

We want to see as much renewable hydrogen in the energy system as quickly as possible. However, blending of hydrogen will, on its own, only deliver small emissions savings and it is also

² [Heat in Buildings Strategy - achieving net zero emissions in Scotland's buildings - gov.scot \(www.gov.scot\)](https://www.gov.scot/Topics/energy/heat-in-buildings-strategy)

³ [Scottish Government Hydrogen Policy Statement - gov.scot \(www.gov.scot\)](https://www.gov.scot/Topics/energy/hydrogen-policy-statement)

⁴ [Hydrogen action plan: draft - gov.scot \(www.gov.scot\)](https://www.gov.scot/Topics/energy/hydrogen-action-plan-draft)





important that we continue to consider the potential for conversion and repurposing of parts of the network to 100% hydrogen. In the short-term, this means understanding which actions can ensure this option remains open for Scotland and supporting key demonstration projects such as SGN's H100 Fife project which will deploy 300 hydrogen boilers into homes in 2023/24. In the medium- to longer-term, increased availability of hydrogen for heat will have positive implications for the suitability of hybrid heat pump systems, which may be cost-effective solutions in conjunction with hydrogen, and we will keep this under review.

As mentioned above, as 2030 rapidly approaches we are prioritising deployment of energy efficiency, heat pumps, and heat networks for the decarbonisation of Scotland's heat. Nevertheless, hydrogen may be particularly appropriate in certain locations in Scotland, where there is local supply or where industrial demand creates economies of scale. Therefore, we commissioned via ClimatexChange a research project taken forward by Arup Group consultants which aimed to explore where in Scotland hydrogen – if proven viable and effective – might ultimately be most appropriate for heating homes and buildings, and we are using this evolving understanding to guide our approach. This initial, high level analysis, will feed into the Scottish Government's internal analysis and complement other ongoing work in this space.

The ability to utilise hydrogen for heating buildings could support a hydrogen demand base in Scotland, especially given the number of hydrogen production projects already in development in Scotland, although a full grid conversion is unlikely to occur prior to 2030. By identifying the areas with the greatest density of domestic and non-domestic properties in Scotland technically suitable to accommodate hydrogen for space and water heating, the outputs from this project could be used to estimate the scale of

the potential demand for hydrogen for heat that might be anticipated by 2030.

This report has been a helpful first step in identifying areas in Scotland where hydrogen for heat may be most suitable for deployment. However, the hydrogen economy is moving at pace. Large scale potential hydrogen production areas are emerging as this new sector begins to develop and we will continue to press the UKG for timely decisions on the future of the gas grid in the UK and Scotland, and we will keep the fast changing landscape of hydrogen development under review.