

Response from the Institution of Gas Engineers & Managers (IGEM) to the Scottish Government Draft Heat in Buildings Strategy – Achieving Net Zero Emissions in Scotland’s Buildings Consultation

Introduction:

Licensed by the Engineering Council, IGEM is the professional engineering institution for gas representing thousands of engineers, technicians and managers across the UK.

As advocates of excellence, IGEM’s core aim is to help all those involved with gas to achieve and maintain the highest standards of professional competence. Working with stakeholders from across the industry we seek to represent the views of our members and the wider gas community and to inform and influence current and future gas and energy policy.

IGEM fully supports the transition of the energy system to meet a net zero future and are playing a key role in supporting the evidence base for the application of low carbon gases in the gas network. As well as developing the first Hydrogen Technical Standards, IGEM, through its Gas Quality Working Group are facilitating a change in UK regulations on the quality of gas allowed to be injected into the gas transmission and distribution network – to enable a higher proportion of greener gases such as biomethane and eventually hydrogen.

Our role in the government’s Hydrogen Programme Management Group, sees us working directly with gas network companies, safety experts, academia and policy advisors to assess the evidence base and develop informed recommendations on the future of the gas grid.

We welcome the opportunity to respond to this consultation and aim to represent the collective views of IGEM Members and our gas industry stakeholders. We have selected questions from the consultation which are of greatest relevance to our Members and provided our response below:

Scale of the challenge (page 20-22 of the Strategy)

1. To what extent do you support the pathway set out for achieving the 2045 net zero target and the interim 2030 target?

IGEM commends the Scottish Government for the ambitious pathway set out in the Heat in Building’s Strategy to achieve net-zero carbon emissions by 2045. The strategy sets out a carefully considered and balanced approach – acknowledging the range of heat decarbonisation options and being clear about the uncertainties and knowledge gaps yet to close.

The strategy makes clear that the Government is putting the consumer and a ‘Just Transition’ at its heart. Bringing the consumer on the decarbonisation journey is a critical dependency for net-zero – ensuring that consumers do not bear an unfair burden or suffer from fuel poverty as a result is key.

IGEM supports the energy efficiency improvement measures called for within the strategy and we agree that they are a critical precursor to reducing energy demand and reaching emissions targets. As such, the work on energy efficiency improvement must be coordinated in tandem with the rollout of heat technology conversion.

With regard to the conversion of buildings to zero or low emissions heating systems, and the rapid scaling up from 2025, IGEM supports the Government’s inclusion of ‘systems that use hydrogen’ as one of the potential future options listed. It is important for the Strategy to acknowledge the potential for hydrogen in decarbonising the energy system and in its planning, ensure it is flexible in its delivery and avoids locking out or unnecessarily delaying the rollout of viable technology options as they emerge.

IGEM supports a regulatory approach that advocates for a range of low carbon heating technologies and crucially, take full account of their suitability depending on factors such as building stock, location and local energy infrastructure.

IGEM fully supports the Government's call for the increased use of biomethane, low-carbon and green hydrogen in the mains gas network, working towards at least 20% by volume of gas to be green gas by 2030. Plans for which have been outlined in the Energy Network's Association's Gas Goes Green report, Britain's Hydrogen Network Plan. This is an area that IGEM, through its Gas Quality industry-led committee, is working actively to facilitate a change to the UK regulations in order for this to materialise.

2. What are your views on any risks of unintended consequences from this pathway?

With regards to new homes consented from 2024 to use zero direct emissions heating – IGEM and its Members understand the necessity of taking immediate action on emissions from heat. However, the right drivers must be in place to encourage 'hydrogen ready' heating technologies such as hydrogen ready boilers, to prevent developers and consumers being locked into technologies that prove costly, ineffective or inflexible. An approach which focusses early heat pump adoption for off gas grid buildings would enable immediate action, but also retain the option of wide spread hydrogen deployment for grid connected buildings once the safety case has been evidenced.

Those drivers must also be mindful of any unintended consequences that could limit the opportunity of converting local/regional areas to run on hydrogen delivered by the existing gas grid. IGEM strongly advocate for any new build regulations or standards to allow for, and encourage, the use of hybrid systems e.g. heat pumps alongside hydrogen-ready boilers.

Although the Strategy is mindful of the impact of heat decarbonisation on consumers and fuel poverty, it is not yet fully clear how households will be able to meet the high retrofit and installation costs associated with heat pumps, and their acceptance of the level of personal disruption that is involved with this option. It is therefore essential that the pathway in the final Strategy supports the option of hydrogen to deliver a low upfront cost and low disruption route to decarbonisation of heat.

Strategic Technologies to 2030 (page 24-30 of the Strategy)

3. What are your views on our assessment of strategic technologies in low and no regrets areas to 2030?

IGEM acknowledge that a range of heat decarbonisation technology options will need to be deployed to achieve net-zero by 2045. We support the Strategy's considered and measured approach to the deployment of heat pumps in certain buildings currently using mains gas – specifically where cost effectiveness is assessed on an individual basis and the locality to potential hydrogen supply in the future is taken into consideration.

The Strategy must take into account concerns over heat pump installation and running costs, in addition the effectiveness of heat pumps for certain types of housing stock and some non-domestic buildings. Very recent research on decarbonising heat in buildings examines the challenge of retrofitting old housing stock with low carbon heating technologies, stating that heat pump only systems could be unsuitable for up to 54% of the existing UK housing stock¹.

The additional strain on the electricity grid from widespread heat pump use should also be taken into consideration. There is potential for hybrid heating solutions, for example, where a heat pump is installed and a hydrogen ready boiler is used as back up. This model can provide

¹ Energy & Utilities Alliance, [Decarbonising Heat in Buildings: Putting Consumers First](#), April 2021

considerable flexibility to meet the variations in energy demand due to weather changes – meeting storage challenges through the network’s capacity to store gas within the distribution system itself². With the peaks and troughs of renewable electricity capacity, hydrogen can provide back up when wind and solar generation is insufficient, and any excess electricity used to produce hydrogen. Hybrid heating systems can also avoid the need for disruptive solid wall insulation and radiator changes required for standalone heat pumps.

We look forward to seeing the Government’s research on the consolidated evidence on heat pump performance in situ across Scotland. This will help form crucial decisions on the viability of and dependency on different heat technology approaches – and may inform your ongoing review on the use of hybrid heat systems.

4. What are your views on any risks of unintended consequences from this pathway?

Not maintaining a technology agnostic approach will risk higher heat decarbonisation costs over the longer term, and reduce consumer choice – potentially adversely affecting the achievement of net-zero carbon emissions in Scotland by 2045 and the interim 2030 targets.

Decisions on technology pathways must depend on clear evidence on public acceptance and clarity on how the costs will be born in a fair and just way. The performance of schemes such as the Renewable Heat Incentive and the Green Homes Grant Scheme are testament to the fact only a small portion of the public are able or willing to engage with such schemes. Public opinion on the contribution heating makes to climate change is very low, with only around five in ten people recognising that their boiler contributes to climate change³. As such, it is crucial that the Strategy maintains consumer choice and is supported by high quality and extensive public engagement.

IGEM calls for the Strategy to go further – to be implemented in conjunction with low-regrets policy decisions that will drive further investment in hydrogen demonstration projects and encourage the adoption and use of critical technologies supporting hydrogen production, transmission, storage and carbon capture. These include:

- Advocating for a mandate to be in force by no later than 2025, which would mean that most homes would have hydrogen-ready appliances by 2040⁴. This is a clear no regrets enabler to prepare for a 100% hydrogen conversion. This needs to happen early on in the process to avoid future retrofit and minimise costs.
- Implement policies that support and accelerate research in hydrogen technologies for production, transmission and consumption.
- Invest in developing Carbon Capture and Storage (CCS) networks. Policy makers to work with industry and local/regional authorities to explore and support hydrogen potential projects.
- Develop stronger incentives for energy-intensive industrial sectors to decarbonise more effectively and efficiently. This includes policy drivers to encourage closer collaboration between industry sectors and energy utilities.
- Invest in hydrogen production for a widespread gas network conversion to take place from 2030. Expanding production beyond the level that is needed for current projects. This requires GW-scale capacity additions each year, together with the required low carbon electricity generation and/or natural gas and CCS capacity⁴

² Institution of Engineering & Technology, [Transitioning to hydrogen: assessing the engineering risks and uncertainties](#), June 2019

³ Energy Systems Catapult, [Understanding Net Zero: A Consumer Perspective](#), April 2020

⁴ Energy Networks Association, [Britain’s Hydrogen Network Plan](#), January 2021

- Investment in hydrogen storage capacity needs to be expanded at the level of several hundred GWh per year from 2025⁴

Communities (page 49-51 of the Strategy)

21. What are your views on how we can support place-based deployment of zero emissions heat within our delivery programmes?

IGEM urge the Scottish Government to work closely with the gas distribution provider, SGN and their partners on the detailed planning required to deploy low carbon heat in the most suitable locations.

We support an approach that focuses the deployment of heat pumps in off gas grid buildings, where hydrogen or hybrid technologies are unlikely to be a viable option.

Gas Networks (page 65-69 of the Strategy)

31. What are your views on the changes set out above for the gas networks?

IGEM is supportive of the Scottish Government's statement that 100% hydrogen could play an important role in heating emissions, once safety trials prove successful. We agree that key strategic decisions on the gas network are required by 2025 to drive planning for delivery beyond 2030. As part of the UK Government's upcoming consultation on the case for encouraging or mandating hydrogen-ready boilers, IGEM will be strongly advocating for the mandating of hydrogen-ready boilers.

We are very encouraged by the Strategy's acknowledgement of the socio-economic case for converting parts of the gas networks to 100% hydrogen, and the importance placed on the identification of strategic areas most/least likely to have access to hydrogen in the future

32. Are there further actions that could be taken by government or industry that you think would make the changes set out more cost effective? Please provide evidence to support any suggestions.

IGEM support the recommendation that a hydrogen-ready boiler mandate should be in force, by no later than 2025, which would mean that most homes would have hydrogen-ready appliances by 2040⁴. Supporting the mandating of hydrogen ready boilers by 2025 will help reduce potential retrofit costs in the future, once it is clear which buildings/areas will be converted to a hydrogen supply through gas mains.

The Climate Change Committee's Sixth Carbon Budget acknowledges a role for hydrogen in heating buildings in its 'Balanced Net Zero Pathway'⁵. It details that key decisions will need to be made in the 2020's on the balance between electrification and hydrogen in decarbonising heating. The Committee supports the installation of hydrogen ready boilers, and sees this as a small cost to bear to help mitigate against; the time needed for the heat pump supply chain to fully ramp up; the continued installation of fossil fuel boilers in existing buildings; any emerging issues in a heat pump programme; and/or evidence that hydrogen can be rolled out effectively across the UK.

IGEM encourage the Scottish Government to expedite the analysis required to establish where hydrogen can feasibly be delivered across Scotland – the results of which should be built into the final Heat in Buildings Strategy. This will help prevent deployment of more costly heating technologies in areas where hydrogen is deemed viable.

⁵ Climate Change Committee, [The Sixth Carbon Budget: The UK's Path to Net Zero](#), December 2020