Innovation, Technology and Low Carbon Heat – Event Write-up

On Wednesday 10 March 2020, Carbon Connect ran a roundtable in Parliament entitled "Innovation, Technology and Low Carbon Heat". The event was sponsored by Cadent and it was one of a series of roundtable discussions held as follow-up events on Policy Connect's Future Gas Series reports. This document was produced as a post-event write-up by Policy Connect. It was informed by the roundtable discussion, but it does not necessarily represent the views of those in attendance.

Innovation funding is fundamental to deliver the decarbonisation of the UK heat network, especially as it can boost progress in case of market failures. It is important to determine, however, the specific areas to which innovation funding should be directed, the types of innovation funding, as well as the necessary supporting and complimentary policy measures that are needed for heat decarbonisation.

In which areas could innovation be particularly useful to support heat decarbonisation?

Review existing research results to determine areas and types of innovation funding needed
Assessing currently available research results can be a helpful way to determine areas where innovation funding should be directed to.

Innovation funding is needed for upscaling hydrogen production
Innovation funding in particularly important to scale up several low carbon heat technologies, including hydrogen. There are several ongoing hydrogen projects, including H21, H100, HyNet and Hy4Heat, however, they are currently all in the trial phase. Hydrogen is one of the low carbon fuel options which can help facilitate the transition towards low carbon heat, but upscaling hydrogen production is dependent on increased innovation funding. For instance, the recently formed cross-industry coalition, the Hydrogen Taskforce called on the UK Government to commit £1 billion on hydrogen projects and develop a cross-departmental Hydrogen Strategy.

CCS needs to be part of the solution
Steam methane reformation (SMR) and autothermal formation (ATR) –which are potential methods for hydrogen production– as well as other low carbon heating technologies require carbon capture and storage (CCS) to qualify as low carbon or decarbonised technologies. However, CCS can be a barrier to the deployment of low carbon heating solutions due to the additional upfront and operating costs it incurs, and the role of CSS in low and negative emissions scenarios is not sufficiently understood. Innovation funding needs to be directed to CCS development to catalyse heat decarbonisation. While the UK has significant carbon storage capacity due to naturally occurring geological features, CCS requires substantial government action to take off.

How effectively is innovation in low carbon heat being supported by government policy? How could this be improved?

Consistent and coordinated policy support is key to the supply chain development of low carbon heat
In recent years the government invested significantly in innovation which indicates that it recognised the importance of innovation to achieve the transition to low carbon heat. But compared to other Western European countries, the UK has so far lacked continuous and coordinated policies and technical standards for the promotion of low carbon heating solutions, such as heat pumps and district heating. Furthermore, while innovation funding tends to be provided on a short-term basis,

supply chains need longer term policy directives and incremental change in the transition to low carbon heat. To ensure the decarbonisation of the UK heat network, a consistent and coordinated policy framework needs to be laid out to support the development of low carbon supply chains and help investors with long-term planning.

Strategic decisions about the future direction of heat decarbonisation have to be made by the mid-2020s and low carbon heat must be mass rolled out from the 2030s.
This is important given the long lead-in times of new infrastructure and technology deployment. While the upcoming Heat Roadmap should include as much detail about the future heat decarbonisation strategy and targets as possible to help market actors plan, due to the currently remaining uncertainties about the combination of steps needed to ensure the transition to low carbon heat, the Heat Roadmap shall be complemented by other policy levers to provide continued guidance and targets for heat decarbonisation.

Central coordination
Besides investment in innovation, the government needs to ensure that central coordination is provided for the switch to low carbon technologies, giving the long-term national strategy to heat decarbonisation. National coordination was of crucial importance in such transitions historically, such as during the switch from coal to natural gas. Alongside national coordination, highly coordinated planning and delivery has to be ensured at the regional and local levels as well to guarantee that policies at all levels are implemented in the right order and at the right time.

Facilitate partnerships between government and industry for innovation
Evidence from other countries –such as Norway, Sweden and Denmark– show that well-working partnerships between government and industrial actors, as well as other market forces is crucial for the success of innovation on national network transformation projects. Therefore, innovation funding needs to support these partnerships. It is also important to recognise, however, that in certain cases, there are market failures to incentivise the low carbon heat transition. In these cases, government intervention and government-launched innovation funding can help to drive the transition to heat decarbonisation.

Launch more consumer information and promotion campaigns
Consumer awareness of and market confidence in low carbon technologies has been low in the United Kingdom and the deployment of potentially long-term low carbon heat solutions, such as heat pumps, hydrogen boilers, gas hybrid heating systems and district heat networks has been low. Research from other Western European countries shows that consumer information and promotion campaigns –targeting behavioural change for consumers– are important tools to reverse this trend. They can help overcome the barriers placed by already deployed household appliances (e.g. gas cooking hobs) and consumer persistence on using 'old' technology, thus they can support the consumer support and uptake of low carbon heating technologies. Therefore, consumer information and promotion campaigns are crucial to ensure the success of innovation funding.

A **BEIS-run innovation competition campaign** for low carbon heat –similar to the Government-run competitions in Sweden– could make low carbon heating solutions more visible and desirable for consumers, as well as help reduce barriers for new market entrants.

Roadshows and showrooms related to innovation projects can also help raise consumer awareness and engagement. The demonstration of hydrogen-fuelled household appliance prototypes which is soon to be rolled out by the Hy4Heat project is a good example. However, as there is a limit to how much consumer engagement the Government can do, other organisations, including the media,

politicians, NGOs, businesses and community groups have a key role to play in this. A good example is the initiative by Eco Homes where those interested can visit homes heated by low or zero carbon technologies.

Capture consumers' attitudes to innovation and low carbon heat through citizens' assemblies and introduce consumer forums

As the transition to low carbon heat will require changes to people's homes and community spaces, it is important to understand public attitudes to innovation and low carbon heat. Citizens' assemblies can provide ideal tools to map public attitudes, and thus help shape national, regional and local policy on low carbon innovation. Upon seeking to introduce new low carbon heating services, service providers shall also introduce consumer forums to facilitate two-way communication with consumers.

Tackle negative images and fake claims on innovation and heat decarbonisation

Alongside negative media stories on low carbon heat, the failure of large-scale innovation projects funded from public resources can be a hurdle to low carbon heat innovation. Therefore, it is important to test innovation projects on a small scale before their larger scale roll-out to ensure that public support for low carbon heat innovation does not diminish. Moreover, it is also important to tackle fake claims market actors might state on what a certain newly introduced product is capable of which is crucial to sustain consumer confidence in low carbon heat and protect legitimate operators.

Provide consumer-centric solutions

Low carbon boilers are currently more expensive to install and run than their traditional alternatives and the installation of heat pumps can also expensive. Innovation needs to ensure that these costs are reduced further which is crucial to avoid consumers having to bear the cost of the low carbon heat transition. Furthermore, given that heat is not an exciting 'newbie', but rather a must, innovation is crucial to ensure that new, low carbon heating technologies provide additional benefits to consumers compared to traditional heating which can help to facilitate the consumer uptake of low carbon heating solutions. This can help overcome the understandable political unease about low carbon heat innovation and transition.

Ensure a just transition and provide consumer protection

Upon managing the transition to low carbon heat, it is important to provide special support to fuel poor households and guarantee that the transition does not place a burden on low income and marginalised consumers or increase the number of fuel poor household. Furthermore, extensive consumer protection mechanisms have to be in place to protect consumers if anything goes wrong during the low carbon heat transition, which is important to minimise burden to households and reputational damage to low carbon heating technologies. The Government has a crucial role to play in ensuring that the transition happens in a fair way.

Capitalise on the broad consumer awareness of net zero and deliver value for money

While domestic heat accounts for a significant proportion (13%) of the UK's emissions, the transition to low carbon heat is relatively costly which, alongside the changes it might bring to consumers lives, might place it further down on the decarbonisation agenda. To ensure that progress is made in this field, the Government shall build on the awareness of net zero and the opportunity COP26 represents to bring citizens on board with domestic heat decarbonisation. Highlighting how heat decarbonisation projects deliver value for money can facilitate this process further, including the health and environmental benefits, as well as the economic opportunities (the creation of new jobs, the development of new skills) it brings.

Provide regular training for heating engineers, installers and plumbers
According to a survey launched by industry member organisations, 74% of responding installers do not consider themselves very confident to recommend or choose the best low carbon options to their clients. As they should play a crucial role in the low carbon heat transition, it is important to provide regular training for heating engineers and installers to ensure that they have up-to-date knowledge about low carbon heating solutions. Keeping regular contact with consumers, this can turn them into advocates of low carbon heating technologies. To provide accurate and up-to-date knowledge, digital training tools have to be a crucial element of strengthening competencies.

In which areas should government innovation funds be targeted between 2020 and 2025 to support heat decarbonisation?

Focus on technologies which are readily available or close to commercialisation
Historically, it has taken new technologies 30-40 years of spillover time to be deployed at a wide scale. If the UK would like to make the transition towards low carbon heat soon, innovation funding has to focus on technologies which are readily available or close to commercialisation.

Ensure innovation for already existing commercial propositions
Besides investment in new technology, innovation funding for already existing consumer propositions across the entire value chain should also be provided to deliver value for money to consumers.

Find ways to repurpose the existing infrastructure
84% of the UK's heat comes from natural gas and similar to the Netherlands, the UK is locked into this system which is relatively affordable for consumers. Innovation is essential to switch from the lock of natural gas to low carbon heat. It can help find new ways to repurpose the already existing infrastructure – such as the gas network– in a low carbon way. Following this trajectory, it is important to explore options such as district heating and the introduction of hydrogen to the gas network.

Invest in energy efficiency and smart control systems
Energy efficiency shall go hand-in-hand with transition to low carbon heat to help achieve the UK's net zero target. In Scotland significant measures have been introduced to scale up energy efficiency. More action and innovation funding on energy efficiency, including smart control systems is needed across the entire UK.

Introduce new financial schemes to facilitate innovation
Encourage the introduction of new financial schemes, to help finance the decarbonisation of the heat network. Government innovation subsidies and grants can help to ensure that innovation is dedicated to improve low carbon systems complying with UK standards, which are different to European ones.

Invest innovation funding to developing storage capacities
There is currently a lack of storage capacity which is crucial for facilitating the use of renewables, such as solar or wind energy. Funding should be provided for innovation on energy storage.