

The challenges of sustainable heat in the next government - Briefing

What are the challenges faced in the next government when it comes to the huge issue of heating? Our heat expert, Mitya Pearson of Carbon Connect, has picked apart the key issues, and expanded on what these mean for industry and regulation.

1. The sheer amount of energy used to provide heat for buildings dwarfs that of electricity – making its decarbonisation a tremendous challenge

Natural gas (methane) currently provides around 77 per cent of domestic heating needs in the UK. In order to tackle climate change, this reliance on fossil fuels for heat will have to end. Moving to low carbon sources is arguably the most significant challenge facing future heat policy.

Carbon Connect's *Future Heat* reports identify that by 2050, gas used to heat buildings could fall by 75-95%, with electricity use growing from a 10% share today to 30-80%, and district heat increase from less than 2% to up to a 40% share.

There is also increasing attention being paid to low carbon gases – such as biomethane and hydrogen – which could be a significant source of low carbon heat, and a useful solution in other areas such as the power and transport sectors.

Carbon Connect's overarching recommendation is that the next decade should be spent preparing by developing a robust strategy for decarbonising heat in buildings whilst testing and scaling up delivery models.

2. There is a dramatic variation in demand which is characteristic of heating for buildings but not of electricity

Considerable attention has been devoted to the potential for the mass deployment of electrified heat sources to solve the question of how to decarbonise the UK's heat sector. However, recent research has called into question the feasibility and affordability of such a move for reasons including the amount of renewable power sources which would be needed to meet peak heat demand and the storage infrastructure which would be required to manage the changes in demand associated with heating use.

3. There will be significant additional operational costs and investments required, totalling a sum in the order of hundreds of billions of pounds – and even higher if there is little progress on extensive, high-quality energy efficiency measures

Moving to low carbon heat will not be a cheap process. Issues surrounding the challenge of converting to sustainable heat infrastructures include:

The construction of new infrastructure

If heat is extensively electrified there will be a need to develop new sources of power, reinforce the electricity grid, and deploy tens of millions of new heating appliances to homes around the country. Similarly, the rollout of a low carbon gas such as hydrogen would require the repurposing of the gas grid, the construction of extensive carbon capture and storage infrastructure, as well as paying for the installation of hydrogen boilers in converted areas.

Fuel costs and energy efficiency

In addition to these high capital costs, moving to low carbon heat will almost certainly entail moving towards more expensive fuels. Natural gas is, in the absence of a carbon price, astoundingly cheap. On a pence per unit energy basis, hydrogen is expected to be twice as costly, and electricity today is already three times as costly. Improvements in the energy efficiency of our building stock can help mitigate these elevated operating costs and offset the expected growth in our heating needs from an expanding population, but progress in this area to date has been disappointing.

Carbon Connect's past work has endorsed an 'all of the above' approach to heat decarbonisation. The challenge of balancing reduced emissions, with security of supply and affordability will most likely demand a mix of solutions including increased energy efficiency, solar and geothermal technology, district heating, electrification and low carbon gas.

However, the body of evidence which points to the useful role low carbon gas could play in this mix means research into the practical steps needed to support this strategy is merited. This is further supported by the fact that low carbon gas could also provide useful solutions to reduce emissions in other areas such as in transport and the power sector.

Ultimately, the government's next steps will need to develop in-depth research into new technologies, as well as existing research by many institutions and organisations, in order to deliver a new heating plan with a blend of energy sources, with a delivery plan to ensure that a thoroughly explored strategy can deliver a cost (and time) effective network.