



Getting Houses off the Gas Grid – The Future of Powering Real Estate

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Mark Thomas of Communal Energy Partners (CEP) breaks down what was discussed at the webinar on Powering Real Estate, which was hosted by CEP & Charles Russell Speechleys, with guest speakers from both The ADE and Ballymore Group.

Carbon emissions have become an increasingly hot topic, particularly over the last decade. With the planet warming at an alarming rate, it's no surprise that the UK government is scrambling to put measures into place to help proactively decarbonise our country.

Direct greenhouse gas emissions from buildings accounted for 17% of the UK's emissions in 2019. This is, of course, unacceptably high. The ambitious Carbon Budget Order 2021 lays the groundwork to cut greenhouse gas emissions by 78% by 2035. In addition to this, the government has confirmed that it will change building regulations, so that from 2025 the Future Homes Standard will deliver homes that are zero-carbon ready, and all new homes will be equipped with low-carbon heating. Just how feasible are these changes, and what options are there to sustainably heat our homes now and in the future?

There's plenty of politics involved in the decarbonisation of buildings. As a result, we've not seen the same significant emissions reductions in the building sector that we've seen in the power sector over the last decade. It's becoming increasingly clear that this needs to change considerably over this decade and beyond.

This poses three main questions:

- **How do we ensure new buildings will be zero carbon?**
- **How do we move existing stock away from the national gas grid?**

- **What is the broader role of buildings in a net zero energy system?**

Gas Out – Electric In

It's commonly accepted that the burning of fossil fuels for energy has had a huge impact on our world's climate. Oil and gas reserves will potentially run dry in the next 50 years, and many expect to see costs skyrocket, resulting in a shift away from this finite resource to more sustainable sources of energy like wind, solar and hydro. A large portion of the electricity grid in the UK has already transitioned to sustainable alternatives. This shift makes electrical plant much more favourable for heating systems, meaning that the natural alternative to CHPs are electric heat pump systems.

Now, it's clear that heat pumps aren't a 1:1 replacement for CHPs and boilers. As heat pumps operate at a lower temperature (around 60°C), adjustments would have to be made to incorporate them. While this could present issues, it's worth noting that we're already seeing an industry shift to lower overall temperatures, minimising the impact of this temperature differential. This minimisation means that new builds will be optimised to make use of heat pump systems from the start, helping to drive zero-carbon solutions through new developments.

In the last few years, we've seen many heat systems developing a hybrid approach, relying on heat pumps to work to their

capacity, and using gas boilers to augment and boost their performance when the capacity of the heat pump is outstripped. This is a good first step, as it allows older buildings to implement more efficient heating measures, reducing reliance on fossil fuels, with the assurance that their boiler is ready to go if necessary.

As we're seeing a significant drive towards net zero carbon, there are a lot of new sustainability credentials coming into play that tie into the discussion on energy networks. We can see that to deliver a good energy system you could combine some old technology with new technology, but trying to combine what's good engineering, and what's good from a policy and sustainability perspective can be quite challenging. Take the misconceptions around ambient loops and district heating. Both are compatible, and it's completely feasible to fully connect these two systems. If you're running a lower-temperature heat network, then putting some higher-grade heat into it from an existing network isn't a problem at all.

Impacts & Concerns

Unfortunately, it's not as easy as install heat pumps – reduce carbon emissions. There has previously been a push by some, like the GLA, to maintain the heat network priority, which is understandable, but as a collective we're trying to phase gas out of our heating systems, and many of these heat networks are gas-based, making progress made a little redundant. However, the situation is a fluid –

one to watch over the coming months.

Another pressing concern is the relative cost of electricity versus gas. While many businesses, homeowners, developers and more are all emotionally invested in reducing carbon emissions, the burden of significantly increased energy costs is another matter entirely. Higher costs will, inevitably, filter down to the end consumer, meaning that residents will end up footing the bill for greener energy solutions.

An example of the disparity between gas and electric prices:

- **Gas 2.5p kWh @ 50% delivered commercial efficiency = 5p kWh**
- **Electric 15p kWh @ 200% delivered commercial efficiency = 7.5p kWh**

In this example, our electricity heating solution is 4x as efficient as its gas counterpart, yet still the overall price per kilowatt hour is 50% more. The government needs to do more to lower the cost of electricity, rather than simply increasing gas prices through taxation. All that a higher taxation rate achieves is a higher overall cost for the end consumer. A big part of decarbonisation is ensuring that everyone is onboard, and that we're all working towards a common goal. If the cost of heating a building with electricity works out considerably higher, then it's going to be a hard sell to those who end up paying for it.

Developer Setbacks

There are a few speedbumps in the road for developers when it comes to decarbonising. One of the most notable issues is that radiators will have to be much larger to function effectively at a lower temperature. One possible solution for this issue could be the widespread use of underfloor heating as an alternative.

For many years we've been installing CHPs and gas boilers as a standard, simply because there were very few alternatives available. Breaking away from the status quo is difficult in most industries, and real estate is no different. There are both legal and contractual issues that often block good energy sharing solutions. Even in situations where there's a perfectly sound engineering methodology, many developers are finding that it can be difficult to implement, especially in older buildings.

What Does the Future of Heating Real Estate Look Like?

Moving forwards, we'll be looking at an increasingly complex energy landscape, with more options than ever to facilitate efficient energy use. To accompany this change, policy and regulation should become more performance based - energy

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systems shouldn't necessarily all have to be the same if performance targets are being met. For example, now that ground source heat pumps have drastically improved their carbon footprint, they've become a more attractive proposition. Combine this with, say, an air source heat pump to create a layered system, and suddenly you're looking to achieve targets in a logical, efficient way. Flexibility like this should be incentivised and using a combination of different heating sources to achieve tangible decarbonisation milestones should become the new normal in real estate.

We'll likely see the introduction of heat network zones in England, following on from developments that have already been made by the Scottish government. What this means in practise is that in certain areas

where a heat network is seen as the most effective way to decarbonise an area, there may be additional planning incentives, as well as, potentially, a small, limited set of mandatory connections for new buildings to connect to heat networks in their area.

In the much longer term, there may also be further policy from the government to support connections to highly efficient hydrogen networks in some areas, most likely in places like industrial clusters, where we are already seeing decarbonisation using hydrogen.

Summary

Energy systems will need their design optimised based on technical, commercial and sustainable criteria. Good projects don't just take into consideration cost, or just engineering - the energy systems of the future need to strike a balance between decarbonisation and cost-efficiency for the consumer. This is considerably more challenging than historical alternatives, but we believe that a good energy system shouldn't necessarily come at a premium, and endeavour to create a solution that straddles the line between efficiency and affordability.

New buildings need to be optimised, old buildings need to be reformed and markets must become more flexible to accommodate change. A nationwide uptake of heat pump systems, and the resultant phasing out of gas boilers from 2025, as determined by the Future Homes Standard, is one of the most likely first steps towards a true green energy revolution. Couple this with the UK government's upcoming Heat and Buildings Strategy and recently released Hydrogen Strategy, and we should expect some real change over the next decade.



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