Briefing The strong case for a new approach to grid connection for transport and industry

green alliance...

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Summary

In recent years, a consensus has emerged that the electrification of industry and transport is central to the UK's journey to lower air pollution and net zero carbon emissions and will maximise the impact of the government's clean power mission. But many operators keen to pursue an electrification strategy are put off by the long waits and high costs involved in obtaining suitable grid connections.

To explore ongoing challenges in this area, we convened a roundtable in January 2025, with stakeholders from across industry, transport and the power system.

Crucially, the participants agreed that the connection issue is growing and more needs to be done to open up the potential of electrification for business decarbonisation and the modernisation of the UK's industrial base.

Reforms being made to connection processes should help to speed up connections, but it is unclear how quickly these can deliver. More needs to be done to anticipate future demand and support those trying to connect throughout the process.

We outline here the conclusions of those discussions, showing that all parts of the system need to help to simplify and speed up the process of grid connection. Specifically:

- **Distribution network operators** (DNOs) need to standardise and improve the customer journey.
- The National Energy System Operator (NESO) needs to deliver reforms at pace and ensure widespread transport and industry electrification is fully built into spatial energy planning.
- Ofgem needs to support the standardisation of customer journeys and ensure sufficient investment in grid expansion for widespread electrification.

- The government needs an industrial strategy with electrification at its heart, aligned with regional energy plans.
- Industry and transport businesses, and especially trade associations, should recognise that every grid upgrade project is unique, and geographical variations mean that experiences from other businesses will not necessarily transpire elsewhere.

Grid capacity could hinder industry and transport electrification

Electrification is fast being recognised as the central technological solution for many industries on their journey to net zero greenhouse gas emissions. Green Alliance research shows that a broad swathe of traditional 'heavy' industries are suited to this change.¹ This was confirmed in the recent seventh carbon budget advice from the Climate Change Committee (CCC) which now predicts that over half of emissions abatement across industry will come from electrification in 2040, a substantial increase on its previous estimates.²

Electrification will also play a crucial role in modernising the UK's industrial base, unlocking investment across UK regions throughout supply chains. Moreover, in the medium term, as UK electricity prices are decoupled from high and volatile gas prices, industry will be more secure and resilient while also benefitting from being powered by cheaper renewables.

But electrification is important across sectors. Heat pumps at the home, and potentially district, level are likely to be the primary technology to decarbonise home heating. The government's approach to transport hinges on the uptake of electric vehicles (EVs) across the automotive sector.

Already, the government has regulated to scale up the supply of electric cars and vans by introducing a zero emission vehicle (ZEV) mandate that will reach 100 per cent of new sales in 2035. It is also taking steps to electrify buses. Projections suggest there will be more EVs on the road than internal combustion engine powered vehicles at some point during the 2030s.³

These trends will be good for air quality and will reduce demand for fossil fuel imports in a volatile market. Electrification also improves energy efficiency. However, clearly, there will be challenges for power generation and the grid in delivering the net increase in electricity across sectors. This will have both a national impact, in terms of total capacity, but also a local impact in delivering that power to where it is needed across the country.

In recent decades, electricity demand has fallen in the UK.⁴ The UK Energy Research Centre (UKERC) has shown that there is 'headroom' capacity, where existing infrastructure can cope with increasing demand in the short

term. However, the researchers suggest that, while some additional industrial demand in the years to 2030 can be accounted with existing headroom, significant investment in the grid will be needed to meet higher demand in the 2030s and 2040s. On current trends, 42 per cent of large industrial sites will face a capacity restraint in 2030, rising to three quarters in 2040. By 2050, industrial electrification is projected to be equivalent to half of 2024 electricity consumption alone.⁵ Constraints will be in areas of high population density, such as south and central England.

Industrial and transport consumers are put off electrifying

Building renewable sources of electricity and connecting them to the grid, and reinforcing transmission and distribution networks to increase capacity, will be fundamental to the government's clean power by 2030 mission.

For many years, power suppliers have complained about long queues to connect. This has led to reforms around planning and connection, including moving from a 'first come, first served' system to a 'first ready and needed, first connected' approach for the transmission network, allowing the most ready and relevant projects to move forward more quickly.⁶ These reforms have now been approved by Ofgem and are starting to be implemented by NESO, with an expectation of completion in early 2026.

Ofgem is also considering a proposal to increase the threshold for triggering impact assessments on the transmission network in England and Wales (though not in Scotland), which may speed up some connections.

However, the discussion and resulting reforms have largely focused on supply side projects and demand which connects directly to the transmission network. New or increased sources of demand connecting to the distribution network are not in the scope of ongoing reforms. Anecdotal reports suggest that delays for end users are already a significant deterrent to electrification.

Reforms to the connections queue should shrink the overall amount of new network infrastructure or reinforcement needed, which should alleviate some pressure on distribution level demand side connections, but the overall impact on connection times is still not clear.

To explore this topic, we convened a roundtable, in January 2025, of energy system stakeholders and businesses, from a range of sectors interested in electrifying their operations.

It is worth noting that the scale of the challenges around demand is smaller than that on the supply side. As of February 2025, around 760 GW worth of projects were waiting in a queue to be connected to the grid (at both

transmission and distribution level), of which just over 40 GW are demand side projects.⁷ Of this, the distribution queue is around 170GW with around 25GW, or 14 per cent, for demand side projects. While still relatively small, the contribution of demand side projects to the queue has grown significantly in recent years and is understood to be accelerating with the proliferation of data centres as the use of AI grows. Taking action now will help to reduce pressure on the system in years to come.

The Energy Networks Association explained the breakdown of existing demand side projects in the queue:

- **53 per cent** do not need grid reinforcement
- **20 per cent** need distribution grid reinforcement
- **16 per cent** need transmission grid reinforcement
- **three per cent** need both new transmission and distribution reinforcement
- nine per cent are awaiting a decision about whether reinforcement work is needed

Addressing the 'ghost queue'

An important issue highlighted in prior conversations and at the roundtable was that there is effectively a 'ghost queue' of possible connection customers dissuaded from even trying to seek a connection. They have not formally requested grid upgrades from their distribution network operator (DNO) but have been put off by reported high costs and long connection waits. The reports they hear might be from similar sites nearby or in their trade association networks, or from informal inquiries made with their DNO. Instead of answering initial inquiries with standardised worst case scenario responses, DNOs should engage connection customers in more detailed and supportive conversations from the outset.

Ensuring network improvements deliver what customers need

Things should get better, eventually

While in many ways the challenges of grid connection for supply and demand are different, there are similarities. Connecting a new industrial site or a data centre requires connection to the distribution or transmission network, in the same way as a wind or solar farm does, and it needs the network to be able to safely move around enough power to demand locations. A new substation or 'grid supply point', which provides the connection to the network, can typically take two to four years to build. However, in especially constrained areas, two or three substations may need to be built, and new connection applications may have to wait six to 12 years for them to be completed, including community engagement and planning consent. Queue system reform and kicking out so-called 'zombie projects' (ie those that secure a connection offer but are unlikely to ever be built) from the queue should begin to ease this pressure.

Where new connections trigger wider grid reinforcement, this can require more complex planning consent and longer build times. The government's reforms to planning may speed this up, but will take some time to come into effect.

Ofgem is promising a more anticipatory approach in its regulation of investment and network operators suggest they are ready to respond. On the other hand, there are also constraints in the supply chain, so unlocking investment is just one part of this complex puzzle.

To get anticipatory investment right, there must be effective regional spatial energy planning. Network companies and NESO have been engaging with industrial clusters to scope out their future power demands but their mapping of needs outside industrial clusters, in other sectors like transport, has been more patchy.

The customer journey must improve

The existence of a 'ghost' queue is evidence that the information available to businesses is insufficient. Many have little idea where to start when it comes to their electrification journey. The paper industry, chemicals, food and drink suppliers and bus and heavy goods vehicle operators do not fully understand the energy system in relation to their needs. They will need support to understand the relationship between the distribution and transmission networks, the government's role and the positions of the regulator and NESO, in order to appropriately engage with their electrification needs.

It is common, including amongst participants in our roundtable, to hire consultants to help understand the system within which they are operating. Beyond comprehension issues, the quoted costs, upgrade times and application processes vary across the country, highlighting the extent to which electrifying a business that operates nationally can be a huge challenge.

A clear strategy for industrial electrification is needed

Much of the challenge businesses face comes from a lack of clarity about who should electrify and when. End users are left to consider the

decarbonisation of their own operations but without a national signal for which industries should be prioritised. Responses will be patchy and some businesses may put significant time and resources into electrification, increasing pressure on the queue, when others might be better placed to go first. The government should set out its stall, signalling which sectors should be electrifying in the short, medium and long term and how it can support them to do so.

It could be worth considering a change in approach to electrification in the long term, from one where interested businesses make inquiries with DNOs, to one where the energy system stakeholders approach and support end user businesses, guided by clear strategic direction from government.

Recommendations

Our roundtable agreed that, without early intervention, it is likely that pressure on the demand side connection queue will grow as more businesses across the UK want to decarbonise their operations, even if some may be put off by a costly process. Stakeholders across the system agreed that they could do more now to support the transition to a low carbon economy.

- DNOs should standardise and improve the customer journey, recognising that end users are not experts in electricity networks, supporting them to access transparent information about the likely costs and timelines for upgrades or new connections.
- NESO needs to deliver network connection reforms at pace and ensure that widespread transport and industry electrification is fully built into spatial energy planning. This should include engaging directly with industry and transport stakeholders, and be harmonised with the government's industrial strategy.
- Ofgem needs to support standardised customer journeys and ensure sufficient investment in grid expansion for widespread electrification is enabled. Some argue that Ofgem should be tougher, penalising DNOs which cannot deliver connections to agreed timelines. This may be part of its ongoing reviews and reforms.
- The government should set out an industrial strategy with electrification at its heart, aligned with regional energy plans. The strategy should clearly identify those sectors which should prioritise electrification first and clarify for all stakeholders how grid connections should be approached.
- Industry and transport businesses, and especially trade associations, should recognise that every grid upgrade project is unique, and

geographical variations mean experiences from other businesses will not necessarily transpire elsewhere. Businesses may find they can access more cost effective and quicker grid upgrades by joining together with other local end users on the same journey.

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Endnotes

¹ L Hardy and K S Herman, February 2025, *Plugging into industrial electrification*, Green Alliance

² Climate Change Committee (CCC), February 2025, *The seventh carbon budget: advice for the UK government*

³ Ibid

⁴ Gov.uk, 27 March 2025, 'Energy Trends: UK electricity'

⁵ A Gailani, B Barker, ML Hicks and P Taylor, February 2025, briefing, 'Electrifying industry and distribution networks: considerations for policymakers', Aldersgate Group

⁶ Ofgem, 15 April 2025, 'Summary decision document: tmo4+ connections reform proposals – code modifications, methodologies & impact assessment'

⁷ Energy Networks Association (ENA), February 2025, 'Connections data'