

Energy networks: insight briefing

Hywel Lloyd | UK100

January 2022



Introduction the landscape and issues



As highlighted in the UK100 report Power Shift,¹ and that of others such as the Climate Change Committee (CCC)², local authorities are essential in the successful delivery of Net Zero; but are as yet underutilised actors that could do much more with the right resources, powers and roles in the transition.

This insight briefing looks at the transition affecting the energy networks that connect our homes and workplaces, our commercial and industrial buildings, to sources of energy for heat, and power, that fuel our lives. It explores how local authorities can be involved in that transition to Net Zero to make it more effective and for the greater benefit of all their local residents.

While we all may have a sense of who ‘supplies’ our gas or electricity, few know of the other companies that own, run and look after the pipes and wires that bring the gas, electricity and in some places heat to our home or office. The companies that run these direct connections to our buildings are known as network operators, be that for gas, electricity or heat.

There is also the National Grid, a company that primarily owns and looks after the movement at scale (transmission) of gas and electricity from the North Sea, the gas terminals at ports, as well as electricity from the larger scale generators dotted across the country.

The nature of the direct connection wire or pipe is important as it can help, or hinder, our ambitions to decarbonise. At the moment our gas pipes carry natural fossil fuel gas, a source of CO₂ emissions and other pollutants when burnt; electricity wires carry electrons that may have been generated by burning fossil fuels, now typically natural gas (as coal and oil are almost absent from the system). While the ‘carbon intensity’³ of that electricity continues to drop, it still averages 181gCO₂/kWh (2020),⁴ while those who benefit from piped heat will also have some emissions associated with the production of that warmth.

And of course the pipes and wire we have were fitted to reflect an historic approach to heating and fuelling buildings, often dual fuel and for typical levels of demand – these have changed as we have more home electrical equipment AND greater efficiency (so actually an overall drop in demand); and will change again as we electrify domestic vehicles and many domestic heating systems. This could see greater demand, though there are many and varied research efforts into efficient energy storage and home energy capture to address this ‘overall demand’ question, and provide a buffer to reduce it.

The final challenge is when demand for energy occurs. We can all appreciate there are peaks, in the morning when we ‘all’ get up, and in the evening when we all get home. Much of the energy system is designed to meet ‘peak’, and some elements only function at peak times. Flattening the peaks can make the system easier and cheaper to run, which is seeing the growth of what are called Time of Use tariffs (ToUs). They are designed to incentivise energy use at different times. Having an energy store, a hot water tank, a storage heater or a battery can all help shift demand, much like a fridge stores food and shifts demand for groceries – just as we don’t all go to the shops for our breakfast we need not all ‘demand’ energy from the networks when we get up or get home.

¹ <https://www.uk100.org/publications/power-shift>

² <https://www.theccc.org.uk/publication/local-authorities-and-the-sixth-carbon-budget/>

³ How much CO₂ emissions are produced per unit of power generated

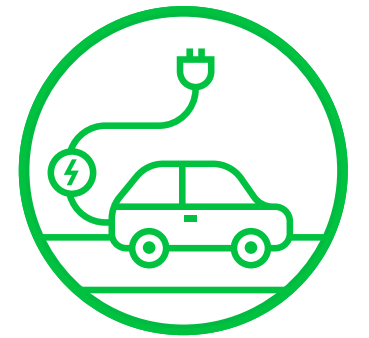
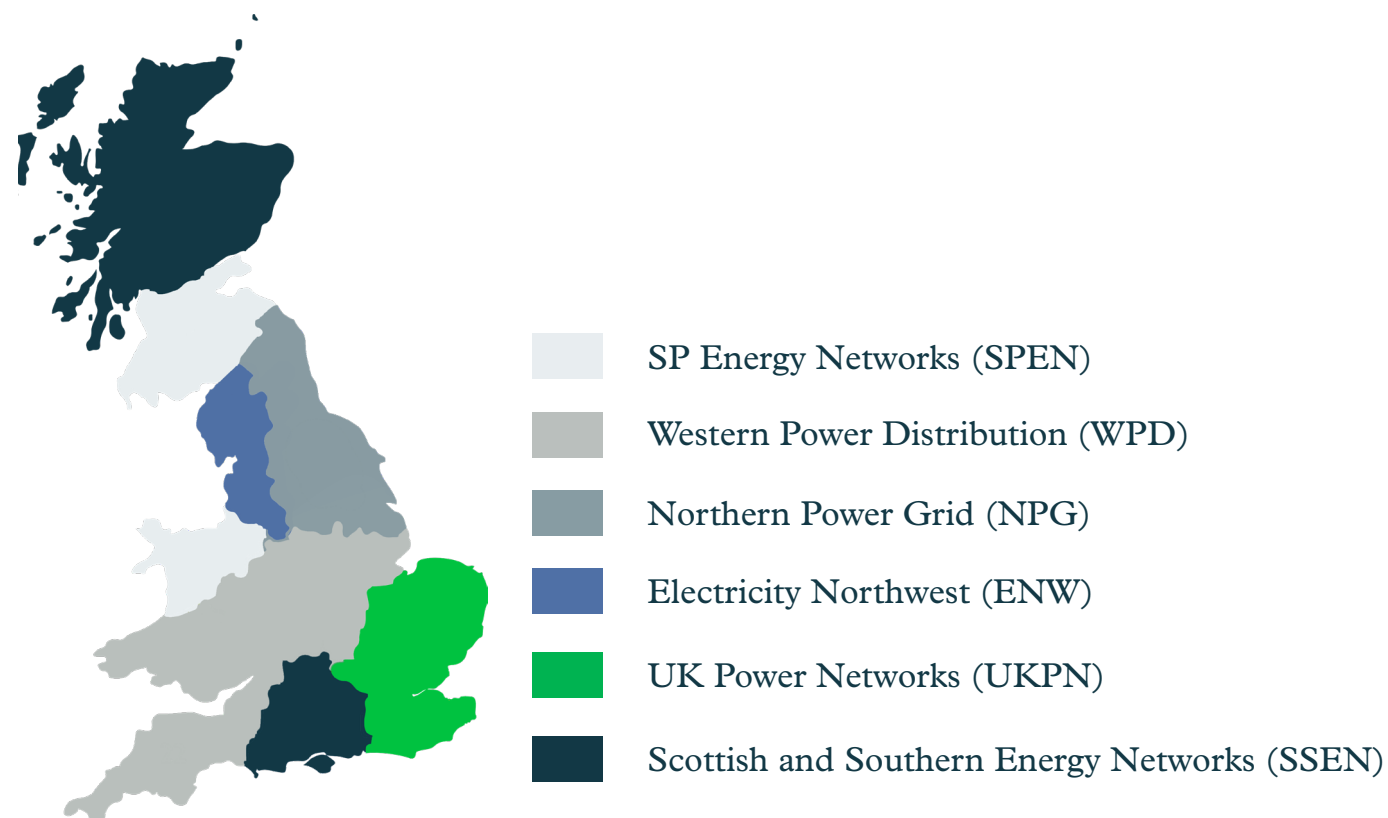
⁴ <https://www.nationalgrideso.com/news/introducing-our-carbon-intensity-app>

Planning for Net Zero

The subject of our recent work has been understanding the nature of the Net Zero transition for one group of network operators, those responsible for the wires that distribute electricity. They are working up their approach, and associated business plans, for much of the 2020s, and in doing so are working to predict what capacity they need, how demand for electricity will evolve and when or whether that affects their physical equipment, from substations to wires. Any local authority with a Net Zero plan will have some measures in their plan that would affect these questions of what demand for electricity where, and how best to provide it.

We have focused on the electricity Distribution Network Operators (DNOs) because much of the transition involves moving to electricity as the primary fuel. As they are writing their business plans for the period 2023/28 now this presents an opportunity to shape those plans to help, not hinder, the ambitions of our members and local authorities UK-wide.

DNO area coverage



We should note much of the ‘method’ of the business planning is governed by the regulatory framework of the privatised energy system overseen by Ofgem (the Office of Gas and Electricity Markets). That has seen a cycle of stakeholder engagement thus far, with some draft plans published during 2021, and Open Hearings on the plans scheduled for March 2022.

In some respects their business planning cycle, also known as the price control period, is a little like a Comprehensive Spending Review and associated grant settlement for local government, albeit for five years rather than three, or even one.



What is the role of local authorities?

We know that local authorities are key to effective local action, not least because they can help engage citizens, understand the lie of their ‘patch’, have a legal role in planning and often add value through an integrated approach to solutions, which no other actor can replicate.

As local authorities plan their climate response many include action across several sectors including:

- reducing emissions from homes, especially the stock they and local registered social landlords manage
- switching to 100% clean energy tariff for their own assets
- energy efficiency measures for own buildings
- supporting staff to shift behaviours on travel, working arrangements and food;
- the procurement of low and no carbon goods and services
- addressing transport emissions through modal shift, greater public transport, car sharing clubs for staff/residents, or shifting public vehicle fleets to non-fossil fuels and increasing the availability of electric vehicle (EV) charging
- measures concerning land use, waste management and nature-based solutions and the planning system.

Some of these are directly relevant to the function of the DNO, ranging from energy efficiency to connecting up EV charge points, and increasingly a role in local planning for the energy system of the future.

In engaging with the DNOs and looking through their published material and drafts of business plans it is clear that all of them attach a growing importance to their relationships with local authorities in their areas. This ranges from those that have already taken steps to align their plans with local ones, to measures proposed to support local area energy planning (LAEP), and to create relationship managers to be a direct point of contact with local authorities. These could potentially help develop longer term strategic relations as well as improved dialogue over connections policy and practice.



We can also see proposals to create teams to help customers take on low carbon technologies, such as heat pumps, with a cumulative estimate from all six DNOs for as many as eight million EV charge points and four million heat pumps installed by 2028. Clearly some of these will interact with local plans for EV charge point roll out, heat networks and heat network zoning, and some could apply for those living in social housing for rent. This table sets out the high level figures for each DNO as described in their draft business plans in summer 2021.

	ENW	NPG	SPEN	SSEN	UKPN	WPD	Total
Homes and businesses	2.4m	3.9m	3.5m	3.8m	8.3m	8m	29.9m
Sub-stations	35k	63k	30k	106k	125k	180k	~539k
Charge points	1m	830k	1.5m	1.3m	1.6 to 2.7m	1.5m	7.7m to 8.8m
Heat pumps	~100k	~251k	900k	800k	Unpredictable	600k	2.6m to 4+m
Net Zero target	2038	63% by 2035	28% by 2028	35% by 2028	2028	2028	N/A
Local authorities covered	35	38	37	80	116	130	436

From a wider energy system transition we can also see a greater appreciation of the role of local authorities in the recent Heat and Buildings Strategy⁵ which highlights how local authorities can help provide local knowledge and data to help:

- identify the most appropriate areas for heat networks
- support uptake of low carbon technologies
- understand supply chain and economic growth opportunities
- partner with businesses.

The future of the energy networks are key to the sort of future a community could have – robust joint working between the networks and local authorities should help deliver better local solutions at lower cost, making the most of local understanding, integration of demand and supply; while a lack of coordination could see poorly planned, mixed technology and service deployments which provide poor value for money and undermine the decarbonisation transition.

⁵ https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/1026507/heat-buildings-strategy.pdf

Challenges and barriers that need to be overcome



Many local authorities have over the years expressed concerns about new connections to the energy system – the ease, cost and timeliness. Currently many are particularly concerned with issues relating to renewable generation opportunities and/or EV charge point roll out.

For those with agreed climate emergency plans, targets ahead of the UK 2050 Net Zero ambition, or particular regeneration and development schemes there is also a keen awareness of the need to develop a strategic relationship with the energy networks to ensure they support local ambition. And on the ground that there is an agreed LAEP to support delivery.

Both from the local authority side and the DNOs' perspectives there is a growing recognition of a need to better understand each other's role and responsibilities, and build some ways of working that add value to each.

This needs to take account of relative size and scale, as even the smallest DNO has over 30 local authorities within its licence areas with up to 130 local authorities served by WPD across South Wales, the Midlands and the West Country. This in turn highlights some DNOs work in the different legislative environments of England, Scotland and Wales (where powers on such things as building regulations vary), while a number of local authorities find themselves on a DNO boundary. Lincolnshire, for example, is served by three DNOs.

While Ofgem has encouraged DNOs to think about using LAEP as a part of the development of their business plans it is not a mandatory requirement. In Wales, the Welsh government is piloting LAEPs with a view to national coverage, in Scotland there has been some initial exploratory use,⁶ while in England the Department for Business, Energy and Industrial Strategy (BEIS) is exploring a framework for such planning. And those local authorities that are planning authorities will note these approaches are, at present, generally outside of the formal planning process.

⁶ This appears to say energy planning is ongoing without necessarily using LAEP terminology - <https://www.gov.scot/publications/local-energy-policy-statement/pages/4/> - while SSEN do appear to have adopted it - <https://www.regen.co.uk/event/ssen-stakeholder-engagement-scotland/>

If there is to be a UK-wide approach, what it should look like, how it should be regarded in the planning process, and what input local authorities should have to the design of the method or framework, are all pertinent questions.

In addition, given UK100, the CCC, and the National Audit Office (NAO),⁷ all acknowledge the importance of the role of local authorities in achieving Net Zero, what else that might mean with regard to the energy system transition needs consideration.

This has often been a particular question regarding the provision of heat and warmth given the important role local authorities play in addressing fuel poverty and building energy efficiency; and that heat is less portable than electricity. As a lot of domestic heat is electrified or the development of heat networks expands, there will still be a role for local authorities, in planning, in marrying energy efficiency upgrades with new heating technologies, and in optimising local energy systems for residents' benefit. How best might local authorities ensure this input is managed over time, and how best to ensure the local voice is also understood and regarded in decisions made by the DNOs across their whole patch, or by Ofgem or BEIS?

And how best to build the capacity, capability and competence in local authorities to be an effective partner to all of the energy networks in this transition?

⁷ <https://www.nao.org.uk/report/local-government-and-net-zero-in-england/>



Proposed way forward



In the first instance there is a need to build on the DNO – local authority relationships; we have to ground them across both sectors. This can happen now, and could develop as part of the business planning process overseen by Ofgem, for example with local authorities contributing to the Ofgem-hosted Open Hearings scheduled for Spring 2022.

Such relationships should also be developed on a locality basis to support strategic engagement over time, a process that may require support to find the right balance of membership, representation and responsibility. Some elements of this could overlap with the plan to separate the operational and strategic roles of the DNO to create a Distribution System Operator (DSO). The role of local authorities in the emerging DSO arrangements should be explored.

Local authorities could and should contribute to any framework of local planning for energy to build in their insights, knowledge of planning and place-based assets (often with a longer life than energy assets, and with scope to introduce non-traditional energy assets); and to work through how any such plan should play into planning processes, or any cycle of revision.

Local authorities should play a full part in, and ensure they are fully engaged in the policy and delivery associated with the decarbonisation of buildings. UK100 and its members stand ready to work with and contribute to the DNO business planning processes to ensure that local voices are fed in and that the Net Zero transition for energy distribution is appropriate for both local energy planning needs and for the energy system too.



UK:
100