



West Midlands
Combined Authority

ENERGYCAPITAL

West Midlands Regional Energy Strategy

February 2025





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01

Foreword – Mayor of the West Midlands

In September last year, I announced my four priorities as Mayor: Jobs, Homes, Growth and Journeys for Everyone. Changing our energy system and tackling net zero creates significant opportunities to address all four priorities.

On Jobs, this strategy demonstrates how our region's energy system experts can drive the national mission for clean power by 2030, attracting talent and supporting highly skilled, well-paid jobs. But it will also take unprecedented upskilling. The West Midlands is uniquely placed to tackle this challenge, from supporting those out of work back into the workplace, working with colleges to make sure energy businesses have the skills they need, harnessing the expertise and creative solutions of our universities, and utilising technology with employers to direct specialist skills where they are most needed.

As a young and diverse region, the West Midlands is the place to be for anyone to work in the energy sector, by working in partnership to create a smarter energy system of the future.

On Homes, the WMCA is working hard to ensure everyone has a warm, comfortable and affordable home. We will use the new powers and funding devolved to us to make sure we improve the energy efficiency of those homes in greatest need, to prevent anyone having to choose between heating and eating. And as we accelerate housebuilding across the region, we will bring together house builders with energy specialists to make sure new homes are truly affordable, smart and comfortable to live in.

On Journeys, we are making good progress on greening our whole transport system across the region in partnership with our local authorities. We have made excellent progress towards our target for Coventry to become an All-Electric Bus City by 2025 and supported bus operators to invest in their depots, so they are electric-ready. We are investing in electric vehicle rapid charging hubs to build the necessary infrastructure to give drivers the confidence to make the switch to electric.

On Growth, we already have some of the world's leading businesses when it comes to electric light vehicles, battery manufacturing and recycling, and green construction. We have a huge concentration of energy experts and with the HQ for National Grid and the Energy Systems Catapult in the patch we can rightly claim to be the national hub for smart energy systems. We will continue to support high growth businesses and our Smart Energy Systems Cluster forms a key plank of our West Midlands Growth Plan. We are working with Government to ensure their industrial strategy supports our industrial base to transition to net zero.

Every aspect of this Regional Energy Strategy ensures that the net zero transition benefits all our communities. There are huge opportunities in energy for the West Midlands – by accelerating towards net zero ahead of the UK Government's 2050 national target, we can build a fairer and more equitable energy transition.



Richard Parker
Mayor of the West Midlands

02

Acknowledgements

A sincere thanks goes to the entire West Midlands Energy Capital Partnership and all stakeholders who have generously offered their time and knowledge throughout the development of this strategy.

In particular, those that have fed into detailed discussions at monthly West Midlands Energy Capital Collaboration Days and annual Partnership Conferences; one-to-one collaboration with West Midlands Local Authority officers; those who made written submissions into our research consultation; Energy and Utility Skills; Councillors on the WMCA Overview and Scrutiny Committee; and officers on the WMCA Policy, Strategy and Intelligence Panel; as well as the Energy Capital Board.

Your feedback and suggestions have been invaluable in ensuring that the strategy reflects the aims and ambitions of the region and wider Energy Capital Partnership.

Energy Capital's 2024 Partnership Conference



03

Executive summary

Since the first West Midlands Regional Energy Strategy was produced in 2018, several major changes have occurred, that have a profound impact on the energy system of the region.

- Addressing climate change has become increasingly urgent, leading to the region's commitment to reaching net zero by 2041, and a much more ambitious pathway to energy decarbonisation being needed.
- In just eight years, devolution has gone from establishing the West Midlands Combined Authority (WMCA) to securing a Trailblazer Devolution Deal with the Government to pilot a single integrated settlement including retrofit funding, with new powers on energy and net zero confirmed in the 2025 Devolution White Paper.
- The West Midlands has built a strong track record of effective collaboration, from the consortium approach to retrofit delivery to innovation projects of national significance.
- And now, through collaboration with the new National Energy Systems Operator (NESO), the region can ensure that Regional Energy Strategic Planning takes a place-based, whole system approach to planning for energy infrastructure, breaking down siloes and giving better visibility of what energy is needed where and when, to facilitate investment.



This strategy sets out how West Midlands leaders and communities can take advantage of these changes. By working in partnership with industry, Ofgem, NESO, Great British Energy, the National Wealth Fund, and central Government, the region can become the national trailblazer for smart energy systems.

This will support the Government's Clean Energy Superpower Mission, as well as local and national objectives to grow and transition our economy, reduce fuel poverty and support a health system that is fit for the future, and build a fairer society that has better access to training and jobs.

Executive summary

The West Midlands will continue to pioneer a smart approach to the energy transition that:



Delivers net zero



Creates investment opportunities



Reduces energy costs



Ensures a just transition for our businesses and communities

This strategy focuses on five strategic priorities:

Vision: By 2041, the West Midlands will have trailblazed the route to a smarter UK energy system, creating prosperity for the region and enabling a fairer net zero transition for our communities.



Smart Spatial Planning



Local Flexibility



Co-located Clean Generation



Skilled Workforce and Supply Chain



Commercial and Financial Innovation

Policy Foundation

Executive summary



Smart Spatial Planning

Ensuring that energy system planning is joined up with transport and spatial planning to enable the region to achieve its clean growth objectives.



Skilled Workforce and Supply Chain

Ensuring that the West Midlands is recognised as a hub of energy systems expertise, playing its part to make the entire UK energy system smarter, and growing sustainable demand for local supply chains to develop, integrated with skills and training offers.



Local Flexibility

A smarter energy system requires technologies that enable energy generation and demand to be balanced more effectively. This strategy will set out how the benefits of flexibility can be retained locally to support the decarbonisation of our built environment and transport systems.



Commercial and Financial Innovation

Directing the region's innovation efforts towards creating business models and finance products that help to overcome barriers and accelerate the delivery of smart energy systems.



Co-located Clean Generation

Ensuring that renewable energy generation can increase within the West Midlands, by locating it close to demand, to avoid putting pressure on the electricity network.

This will not be possible to deliver without extensive collaboration between public and private sectors, education providers, community groups and other partners committed to realising a shared vision. The Energy Capital Partnership remains as critical as ever to enabling the strategy's delivery. By working together towards shared goals, the West Midlands can make the necessary changes more quickly, at lower cost, and ensuring that communities retain greater benefit locally.

04 Introduction

This strategy sets out some of the key the challenges we face as a region in the energy transition, and how we intend to go about transforming those challenges into opportunities.

It explains why now is the right time for a strategy refresh, acknowledging that while the region has made significant progress already, there is much more to be done. It sets out a strategic vision for the West Midlands to become the pioneering region for smart energy systems, and five priority areas – our pillars – that are critical to successfully realising that vision. It explores each of these in detail, showcasing best practice and highlighting the opportunities to do more. Finally, it sets out how this strategy will be implemented by a wide range of stakeholders, including local and national government, businesses, universities, and communities, in partnership, as part of a system wide approach.

4.1 The need for a place-based energy strategy

It is becoming increasingly clear that a transition to net zero delivered in a way that is tailored specifically to local places will be faster, cheaper and result in wider societal benefits⁽¹⁾. This strategy sets out what is unique about the West Midlands, and where bottom-up, decentralised approaches that take into account local factors can complement national approaches.

By considering the energy transition from a place-based perspective, we can break down siloed ways of working to address cross-cutting societal challenges. For example;

- a neighbourhood approach to housing retrofit enables us to integrate air quality, transport connectivity, green space and community empowerment, with energy efficiency, community generation and flexibility
- accurate information about planned local investment and development can inform forecasts and help infrastructure providers to plan and prioritise network reinforcement more efficiently, leading to reduced waiting times for grid connections.

A shared vision for the region's energy system, allowing all stakeholders to work together towards a clear, common goal, will coalesce effort and help to reduce duplication. In the North East, strategies setting out the opportunities for offshore wind⁽²⁾ have enabled the industry to thrive, becoming a nationally and internationally recognised investment opportunity. The West Midlands can also establish its role in investment and play its part in the national effort to achieve net zero, while ensuring local communities benefit from the transition.

This strategy will enable the region to position its strengths nationally with a coherent voice and help to shape the work and investments made by the West Midlands Combined Authority and others supporting the region for the years ahead. Based upon strong evidence, it can be used to design and shape policy, enable new partnerships to be built to deliver impact, and help decision makers identify opportunities which ensure that the transition is fair and just.



In summary, the purpose of this strategy is to:

- present an evidence base of what is already known about the West Midlands' energy transition;
- set a shared vision and direction for the region that maximises the potential benefits that can be captured for the region, its citizens and the energy system as a whole;
- identify where action at the regional scale provides the greatest added value to ongoing local delivery; and
- showcase place-based decarbonisation success stories in the West Midlands.

(1) [UKRI: Accelerating Net Zero Delivery](#)

(2) [Net Zero Strategy for Tees Valley](#)

Introduction

4.1.1 Our previous energy strategy

This strategy should be seen as a new iteration of the first West Midlands Regional Energy Strategy. It does not duplicate previous work but instead identifies where the context has changed in ways that necessitate a fresh look.

The first Regional Energy Strategy for the West Midlands was produced in 2018, created in partnership by the region's three Local Enterprise Partnerships as part of the UK Government's Clean Growth Industrial Strategy. It was a framework developed to build on and support existing local activities, with four key aims:

- reduce energy costs for strategic industries
- reduce fuel poverty among households
- deliver the region's share of national and global carbon budgets
- create a regional energy infrastructure which puts the West Midlands at the leading edge of the energy system transition.

4.1.2 What has changed since the first Regional Energy Strategy?

4.1.2.1 Net zero

In 2018, the UK Government's climate change legislation required an 80% reduction in carbon emissions by 2050 compared to a 1990 baseline. Since then, further research found that to prevent the worst consequences of global temperature rises, greater ambition was required⁽³⁾. In 2019, the UK Government declared a climate emergency and updated its target to require net zero emissions by 2050.

The West Midlands is committed to playing its part to deliver net zero. In 2019, the WMCA Board adopted a target of net zero emissions by 2041. In 2021, the WMCA endorsed the first of four Five Year Plans to reach net zero, with many ambitious targets with implications across the whole energy system, from retrofit to renewables.

The change from 80% to 100% reduction in emissions is particularly significant for the West Midlands. Much of the remaining 20% of carbon emissions was allocated to so-called 'hard-to-abate' sectors, including heavy industry. The manufacturing base of the region, particularly in the Black Country, will present some of the most challenging issues as we decarbonise, whether due to the strain of additional electrification on the grid, or decisions on siting of low carbon fuel infrastructure. The need to reduce energy costs for industry now takes on another dimension and presents a key sustainability challenge. Planning effectively for and securing investment for the necessary infrastructure to support this transition is vital and the region remains committed to working with Government to deliver against its forthcoming Industrial Strategy to drive investment into key sectors and enable net zero.

4.1.2.2 Devolution

The previous strategy was developed in response to the inclusion of energy in the West Midlands' second devolution deal in 2017. Just six years later, in 2023 the West Midlands negotiated a Trailblazer Devolution Deal with the Government – one of only two such deals with English combined authorities. This represented a step change in devolution; the WMCA would be treated in a similar way to a Government department, receiving a single Integrated Settlement, determined at Spending Reviews, instead of bidding for a wide range of smaller, competitive funds nationally. This budget will be fairly allocated and paid at the beginning of each financial year, starting in April 2025, and gives the region unprecedented flexibility in the way it decides to use its resources. Confirmed in the 2024 Devolution White Paper, combined authorities will be expected to play a much greater role in energy and net zero.

One core tenet of the Integrated Settlement is the Devolved Buildings Retrofit Pilot. This scheme will distribute grants for domestic and public building retrofit and will take an allocative approach to funding for the region. The focus of the Pilot will be primarily to abate carbon emissions and alleviate fuel poverty for the region, with many wider outcomes and additionalities intended to be captured. This will enable delivery of retrofit schemes informed by place-based factors, as well as wider indicators of need.

(3) [IPCC: Special Report on Global Warming of 1.5°C.](#)

Introduction

As well as taking a flexible, area-based and cross-tenure approach, the Pilot will leverage devolved funds to grow the retrofit market and supply chain, leverage private capital, and boost demand for retrofit in able-to-pay/willing-to-pay households. This pilot represents a huge shift in the way in which retrofit funding is allocated and the powers available to the region to tackle the huge issue of fuel poverty across the region, as well as carbon emissions from buildings.

4.1.2.3 Energy security

Following the Russian invasion of Ukraine in 2022, energy prices rose sharply across Europe, with the UK particularly badly affected. Fuel poverty increased in the West Midlands, and industrial energy costs also soared.

The West Midlands Industrial Energy Taskforce was convened to hear the pressing concerns of industry and re-evaluate the region's approach to supporting its industrial base, building on the expertise and learning established through the work of the pioneering Black Country Industrial Cluster.

This coincided with the demise of European funded business advice services due to Britain leaving the European Union. The result of efforts by the region to tackle this problem was the establishment of a £20m funded Business Energy Advice Service pilot agreed with Government, offering advice to businesses in the region on how to reduce energy consumption and providing a foundation to build ongoing support services.

Where the UK's Energy Security Strategy focused heavily on increasing the domestic supply of energy, the West Midlands' approach of targeting demand reduction as a priority, alongside an increase in renewable generation, allows for greater use of smart technologies to reduce the overall cost of increasing the resilience of the energy system.



4.1.2.4 Energy system regulation

Energy Innovation Zones (EIZs) were established by local actors under the 2018 strategy as geographically defined areas in which specific energy innovation challenges can be tackled. The concept was developed by the West Midlands Energy Policy Commission, chaired by Sir David King, in 2017-18 and employed in the 2018 strategy as a way of pioneering place-based energy system innovations in the West Midlands. Due to the limitations on derogation of national regulations at the time, a number of innovation projects stemmed from these areas and EIZs developed in a range of ways to pioneer different approaches.

However, following Ofgem's proposals for an enhanced Future Regulation Sandbox mechanism, the possibility of evolving the concept of EIZs to pursue system solutions that require regulatory innovation could now be possible.

Following the effective demonstration of the value of regional energy system planning under the first strategy period, the announcement of Regional Energy Strategic Planning by Ofgem presents a huge opportunity for regions. This will bring together planning for all energy vectors, with a clearer picture of energy demand across a region, and local zoning will become increasingly important. Integrated planning will help to break down the traditionally siloed approach to planning across energy vectors, enabling greater consideration of place-based factors.

4.1.3 Track record

The region's first strategy paved the way for the creation of the Energy Capital secretariat – a small team of experts to support and coordinate the work of the partnership, accountable to the Mayor of the West Midlands, tasked with seeking the powers and funding necessary to support the strategy's delivery. By 2021, Energy Capital had become a fully-fledged part of the West Midlands Combined Authority, expanding to a team of 30 by 2025. The team has a multi-million-pound, predominantly externally-sourced budget, built on the foundations of a series of innovation projects, proving a sound evidence base and strong ambitions. Energy Capital, working in partnership with local authorities and industry, has developed a clear understanding of which aspects of the energy transition are best addressed at the regional level, having developed a strong evidence base through nationally funded projects, including the following examples.

Introduction

4.1.3.1 The Regional Energy System Operator (RESO)

Funded by Innovate UK, this project looked to explore the advantages of a new kind of energy system operating at a city scale, using Coventry as the case study, and provided a wealth of data to inform local action. The new operating system identified, included local low carbon energy generation, storage, and management and integrated infrastructure to support future mobility assets such as electric vehicles into its overall envelope. It was concluded that local markets supported, targeted and encouraged by a RESO would offer potential benefits of up to £3.4m per year to Coventry. A preliminary cost benefit analysis suggested implementing RESO in the West Midlands would deliver a net present value of £721m over 30 years. The approach identified was deemed to be replicable and would unlock local energy system benefits across the country.

The project, delivered in partnership with Coventry City Council, has been used to inform the strategic partnership established by the Council with E.ON, and provided valuable evidence into the development of Regional Energy Strategic Planning (RESP) function of the National Energy System Operator (NESO), established by Ofgem in 2024. This intelligence is still being used to shape our asks of Government on the role of places within the future operation of the energy system.

The project was looking particularly at the governance needed to establish and operate a RESO, both at local and regional level. The project was led by Energy Capital and delivered by multiple partners including Coventry City Council, Enzen, University of Birmingham, Camirus, University of Warwick, Electron, Places in Common, Western Power Distribution and Cadent. The project concluded in 2023, and the outputs continue to be used to shape policy, regulation and support the local energy system going forward, to enable net zero and green growth objectives.

4.1.3.2 Planning Regional Infrastructure in a Digital Environment (PRIDE)

Following on from RESO, the Energy Capital team continued to champion the role of place in the energy system, particularly the role of local area energy planning and local government in the new, whole-systems approach to Regional Energy Strategic Planning.

Planning Regional Infrastructure in a Digital Environment, or PRIDE, is an Ofgem funded, Strategic Innovation Fund project, led by National Grid Electricity Distribution in partnership with Energy Capital, Regen, Advanced Infrastructure and the National Energy System Operator (NESO). PRIDE runs from 2024-2027, having completed its Discovery and Alpha phases, and aims to support the implementation of the 'planning' part of a RESO. It will improve how local planning and network investment decisions are made, to fast-track the infrastructure and low-carbon technology deployment at a regional level to deliver net zero and green growth.

PRIDE is exploring three key elements:



Effective utilisation of the LAEP+ tool:

Developing the functionality of a digital tool to help local authorities plan a delivery route to achieve net zero and share that planning information with energy networks and all stakeholders in a data-driven and consistent way.



Energy System Governance:

Testing how the LAEP+ tool works within a governance structure made up of local authorities, energy networks and regional infrastructure providers, to inform decision making and provide democratic accountability for net zero planning at a local and regional level.



Informing the Regional Energy Strategic Plan:

Testing how the learnings from the tool development and the governance structure can inform and feed into the wider framework of the RESP function of NESO.

Introduction

4.1.3.3 Zero Carbon Rugeley Smart Local Energy System

This Innovate UK funded project, led by EQUANS, looked to identify an innovative design for a town-wide Smart Local Energy System (SLES) in Rugeley, Staffordshire. The aim was to spread the benefits of a new low carbon development into the existing town, harnessing the significant grid connection available from the decommissioned power station.

Rugeley is a town of around 22,000 people that has long been at the centre of energy. It was the home of several coal fired power stations that have now been demolished. The project delivered an energy system design for the area, which is sustainable, low carbon, and can drive the regeneration of the town and local energy infrastructure. This project consortium, led by EQUANS, identified the need for a new regional financing mechanism to support SLES developments, which subsequently led to the development of the Local Net Zero Accelerator programme, led by Energy Capital, funded by the Department for Energy Security and Net Zero.

4.1.3.4 Net Zero Neighbourhoods

To demonstrate the value of place-based delivery, the WMCA as part of its first five-year plan to achieve net zero by 2041, invested in a new concept of Net Zero Neighbourhoods. A Net Zero Neighbourhood is a community where net energy needs are reduced through demand reduction measures such that remaining energy requirement for vehicles, thermal, and electrical energy within the community is met by renewable energy generation, while also investing in other aspects to create community buy-in and a more sustainable place to live.

The aim of the programme is to develop a replicable financial and delivery model for creating low carbon energy communities on a street-by-street or neighbourhood-by-neighbourhood basis, capturing the wider outcomes created by this type of place-based investment. The initial WMCA investment enabled the region to work in partnership with all seven constituent local authorities to scope the potential for a cohort of neighbourhoods across the region. One neighbourhood – Brockmoor in Dudley – received seed capital, but shared learning and capacity-building enabled the region to position to secure investment for the rest of the cohort in 2024 through the Local Net Zero Accelerator.

4.1.3.5 Local Net Zero Accelerator

In February 2024, the Department for Energy Security and Net Zero (DESNZ) announced the Local Net Zero Accelerator (LNZA) programme. Consisting of £19 million of funding, it aims to unleash the potential of green growth driven by local government and attracting private sector investment through piloting new approaches. The programme includes funding for two Local Net Zero Accelerators, one in the West Midlands run by the WMCA and one in Greater Manchester run by GMCA, both aiming to develop an aggregated bundle of projects to secure long-term sustainable private investment, with an additional pilot being run in York and North Yorkshire.

The WMCA was awarded £6.5 million for its LNZA programme. The key aims of the programme are to establish a West Midlands Net Zero Fund, develop a pipeline of Net Zero Neighbourhood projects across the region, and attract private sector investment into the fund. It builds on learnings from the Zero Carbon Rugeley and Brockmoor Net Zero Neighbourhood projects, using some of the funding to expand the place-based Net Zero Neighbourhood concept into the other six local authorities in the West Midlands.



The West Midlands LNZA project will work with partners both locally and nationally to research and develop a means of blending different sources of investment into a regional fund, and attract investment into the fund including:

- grant funding from the central government
- return-seeking investment
- income from selling carbon credits from supported projects
- outcome-seeking funding from organisations wishing to support activities that demonstrably avoid costs of carbon emissions (including those that cannot be monetised as credits), health care, and energy infrastructure.

Introduction

4.1.3.6 Retrofit delivery consortium

Across programmes for Home Upgrade Grants and Social Housing Decarbonisation Fund, Energy Capital's consortium delivery approach has secured a total of £72m of capital funds including £28m grant funding, delivering over 10,000 energy efficiency measures in almost 3,000 homes across the West Midlands, engaging a wide range of both public and private sector partners. Taking a consortium approach enabled partners of all different sizes to participate, some of whom would not have had the capacity to apply for funding on their own. The WMCA has been able to provide shared learning and shared capacity across the region to increase the impact of these programmes in the region.

The learning from delivering these programmes has been crucial in making the case for devolved retrofit funding. The devolved regional retrofit pilot which will be delivered through the Integrated Settlement from 2025-2028 will see a huge step change in delivery, securing £167m into the region which will be allocated to local authorities and housing providers to build a long-term pipeline of retrofits to tackle fuel poverty and build a sustainable retrofit market across the region.

4.2 The West Midlands energy system

This section gives a snapshot of the current state of the West Midlands' energy system, drawing on data from Government and energy networks.

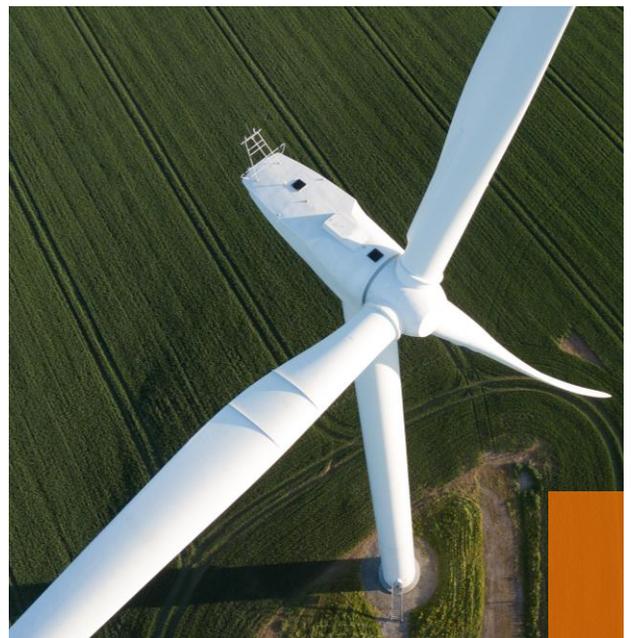
4.2.1 A holistic view of a multi-vector energy system

The urgent need to address climate change and drive deep emissions reductions across the economy to meet the UK's 2050 net zero target is changing our energy system. Our centralised energy system has evolved to take advantage of cheap fossil fuel energy, distributing power, gas and fuels from central supply points in single directional flows. While that has worked well in the past, it is inefficient and emits huge amounts of carbon. It also fails to maximise the benefits of cleaner technologies now available, which need more flexibility in demand, two-way energy flows and better connectivity across power, heat and mobility provision.

The energy system is becoming increasingly connected. Energy planning has traditionally worked on an individual energy vector basis; i.e. for gas or electricity. Decisions have been taken for one network with little consideration of the interaction with other parts of the wider system. A single vector view of the system would drive inefficient decisions for the future. Since the future of gas is uncertain, particularly as more domestic heating becomes electrified, understanding how these two vectors interact becomes increasingly important. Basing investments on single vector considerations, rather than a broader view of the whole system, may result in inefficient investment decisions.

In a similar way, it is insufficient to consider the energy system in isolation from the region's energy demand. The West Midlands has a large manufacturing base, with many energy intensive industries, and the efficiency of housing stock has ramifications for the future energy demand of the region.

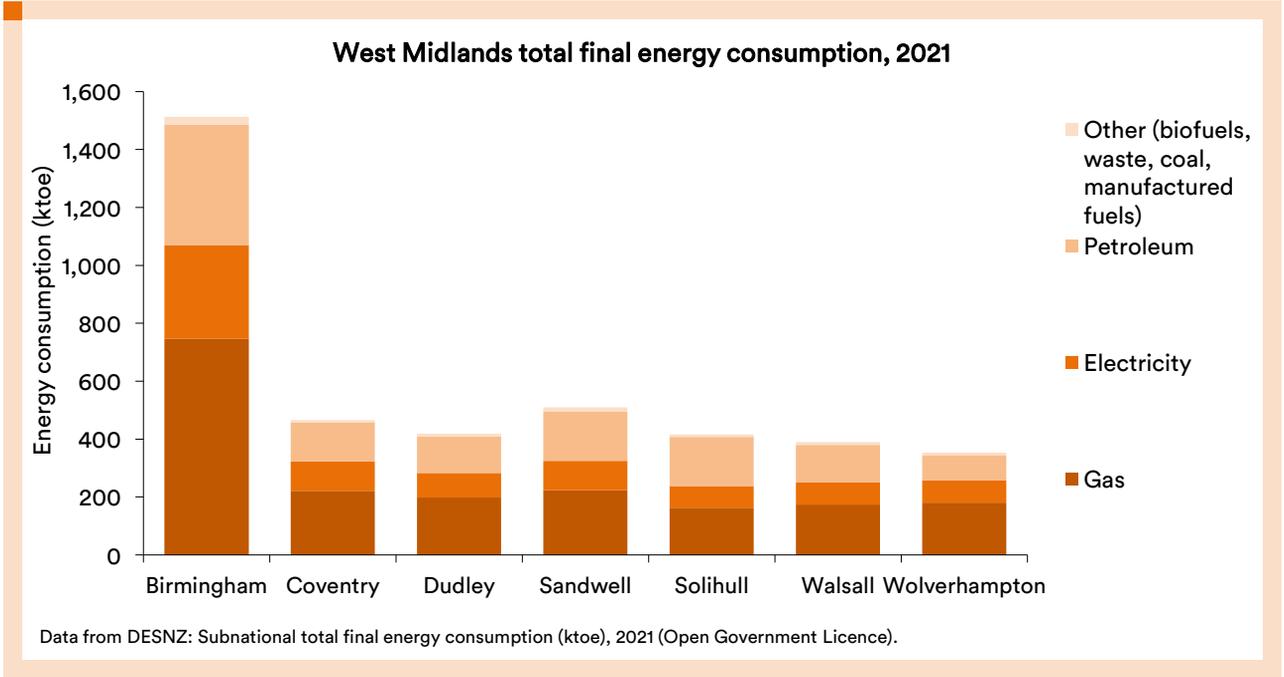
The following section provides a summary of the West Midlands' energy system: first from the supply side, detailing the key energy vectors, followed by the main sectors of energy demand.



Introduction

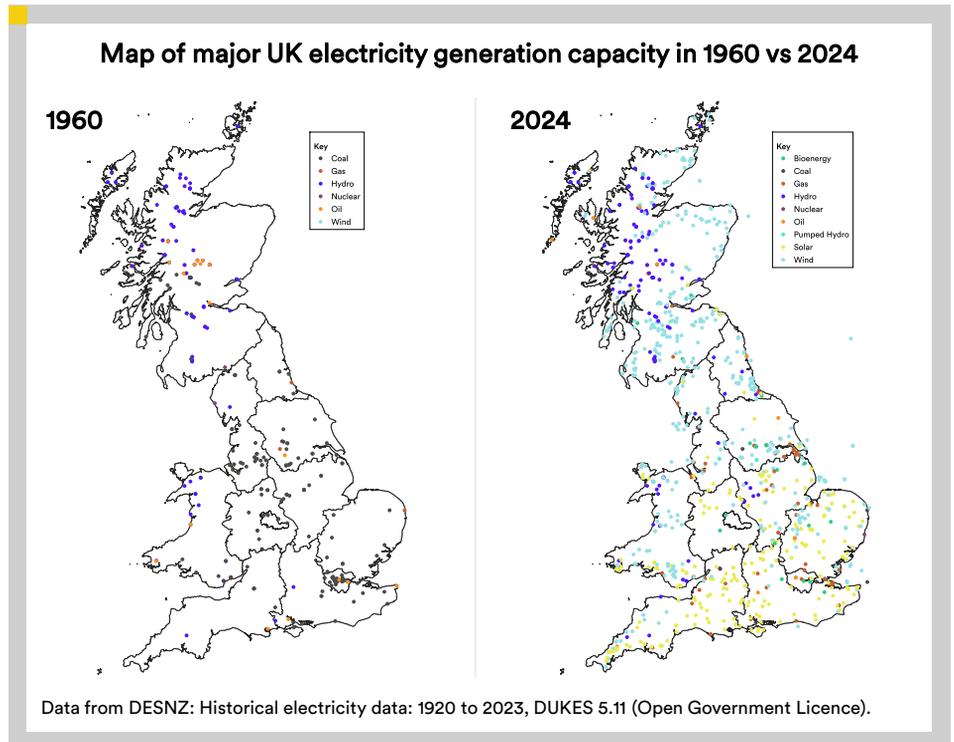
4.2.2 Energy vectors

The vast majority of current energy demand in the West Midlands is met by three vectors: electricity, gas, and petroleum.



4.2.2.1 Electricity

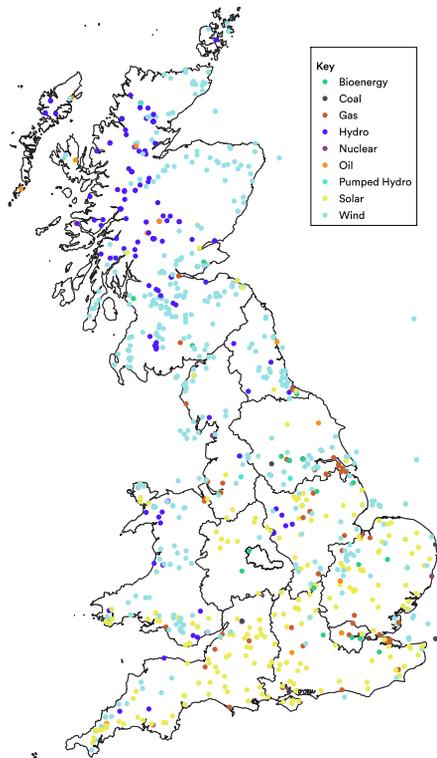
The electricity network of the West Midlands is shaped by the population growth experienced as a result of the Industrial Revolution. As electricity grids emerged in the late 19th and early 20th centuries, they were centred around coal power stations within densely populated urban areas near areas with a plentiful supply of coal. This pattern could still be seen by 1960, decades after the national grid had connected previously independent regional grids:



Introduction

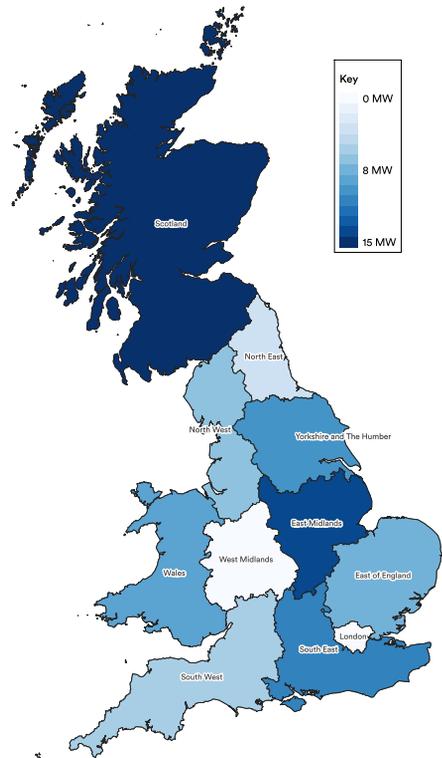
The need to decarbonise the electricity supply has already had a profound effect on the structure of the grid. By 2023, almost all coal power stations had been decommissioned, displaced by nuclear power stations and large increases in offshore wind and solar farms:

Map of major UK electricity generation capacity in 2024



Data from DESNZ: Historical electricity data: 1920 to 2023, DUKES 5.11 (Open Government Licence).

Map of major electricity generation capacity by region, 2023



Data from DESNZ: UK Electricity capacity per region 1940-2023 (from March 2024 Special Feature article Energy Trends) (Open Government Licence).

Since nuclear power stations have historically required to be sited near the coast, the West Midlands will not be able to benefit directly from nuclear or offshore wind opportunities due to its landlocked geography. Furthermore, the high population density⁽⁴⁾ of the metropolitan area significantly limits options for large ground-mounted solar farms.

This has led to the wider West Midlands region having less than 0.5GW of major electricity generator capacity – the least of any UK region.

In contrast with major sources of generation, the West Midlands has a rapidly growing range of embedded generation connected to the regional distribution network (as opposed to the national transmission grid). There are more than 26,000 solar PV installations in the seven metropolitan boroughs. Energy storage technologies, usually in the form of batteries, are also now present across the region, with National Grid Electricity Distribution giving the go-ahead for a rapid scale-up of these distributed technologies.

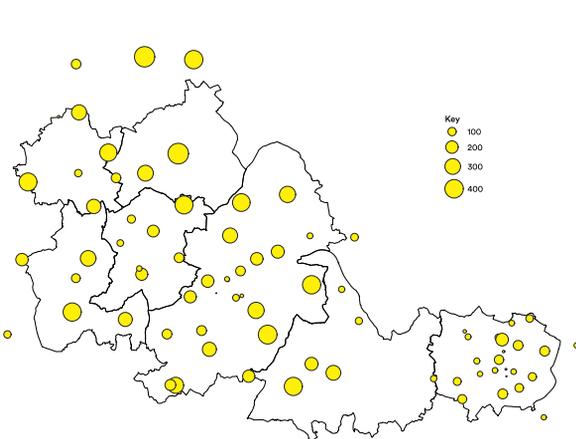
(4) This may also prove to be a constraint for newer generations of nuclear power plants which do not necessitate proximity to the coast.

Introduction

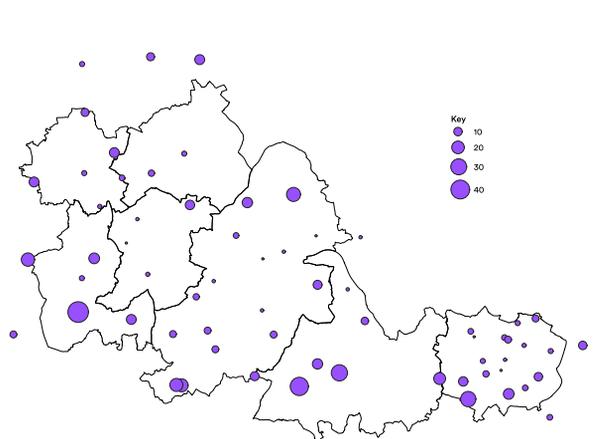
Number of Solar PV installations



Solar PV/Energy storage primary substation connections

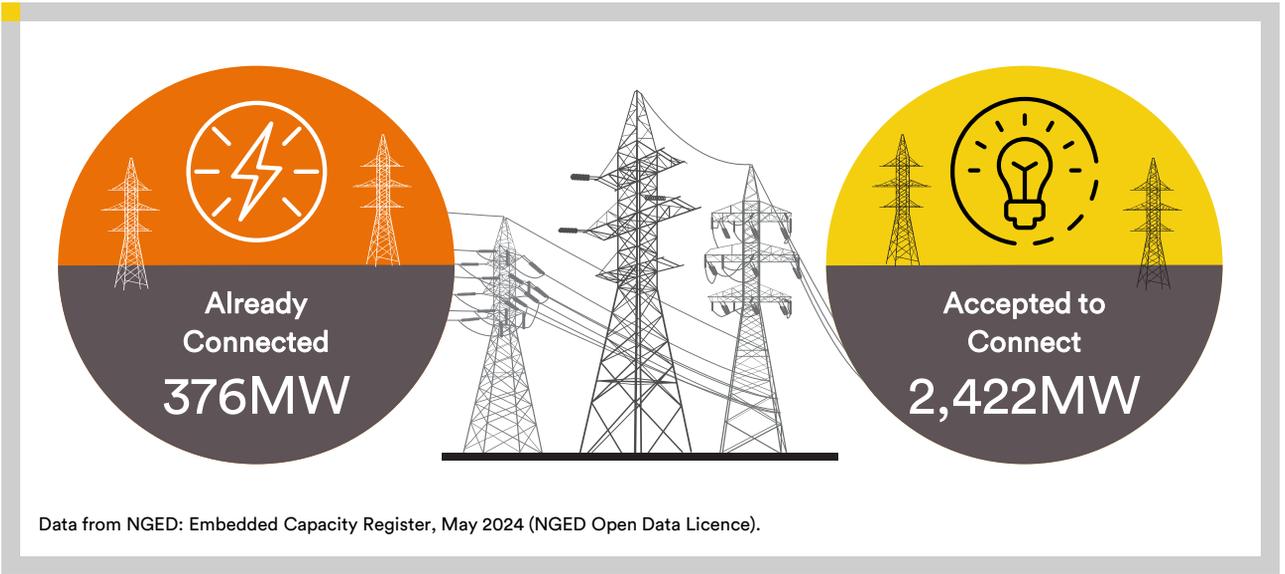


Data from NGED: LCT connections (NGED Open Data Licence).



Data from NGED: LCT connections (NGED Open Data Licence).

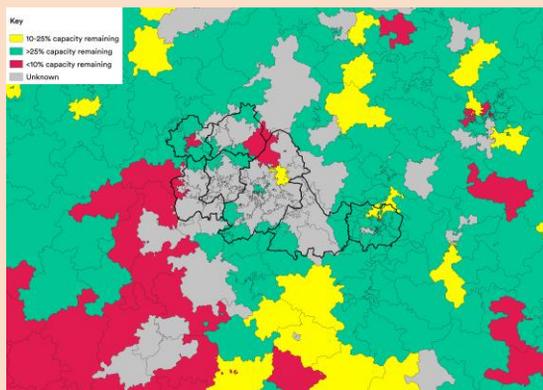
Introduction



The need to rapidly roll out low carbon technologies including heat pumps and electric vehicles will see a major increase in electricity demand, requiring significant investment in both transmission and distribution networks.

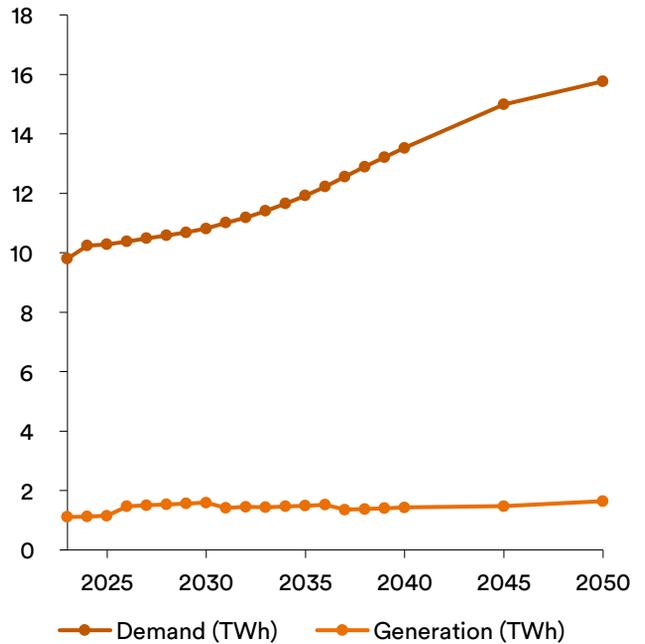
This could cause issues for distribution network capacity – the DNO has already identified several substations with limited headroom for additional connections.

Primary substation aggregated demand headroom



Data from NGED: Network capacity map (NGED Open Data Licence).

NGED DFES energy projections for WMCA area

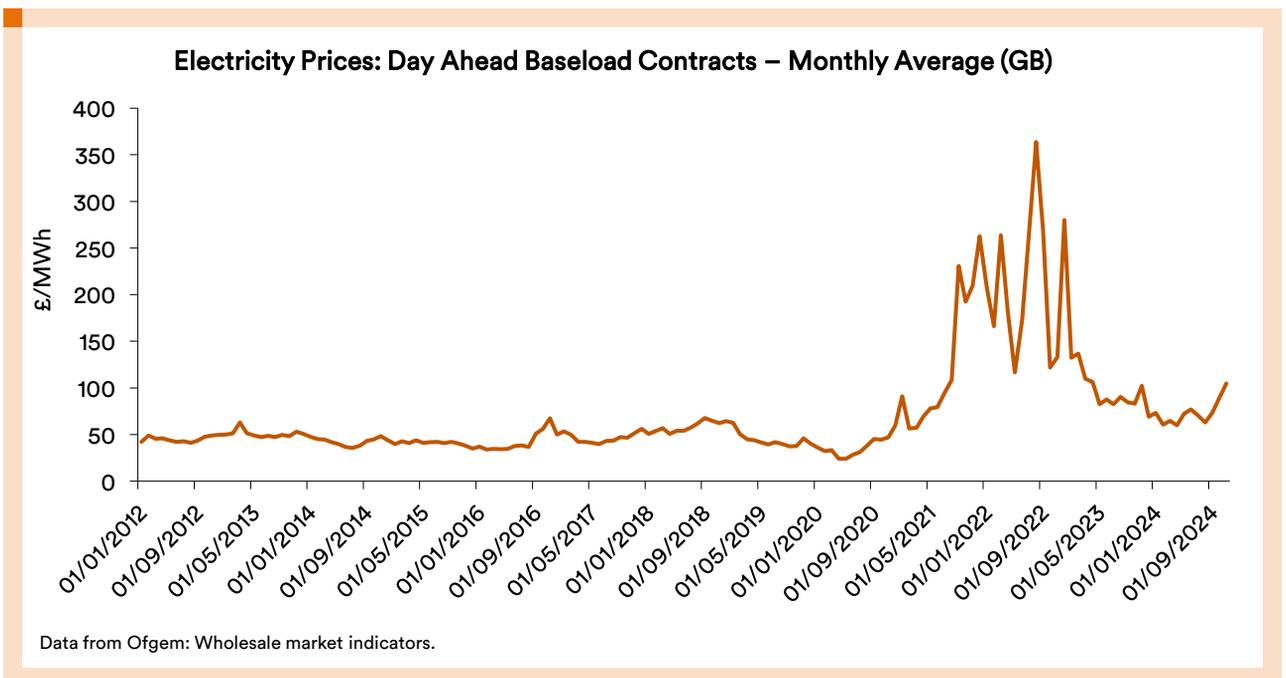
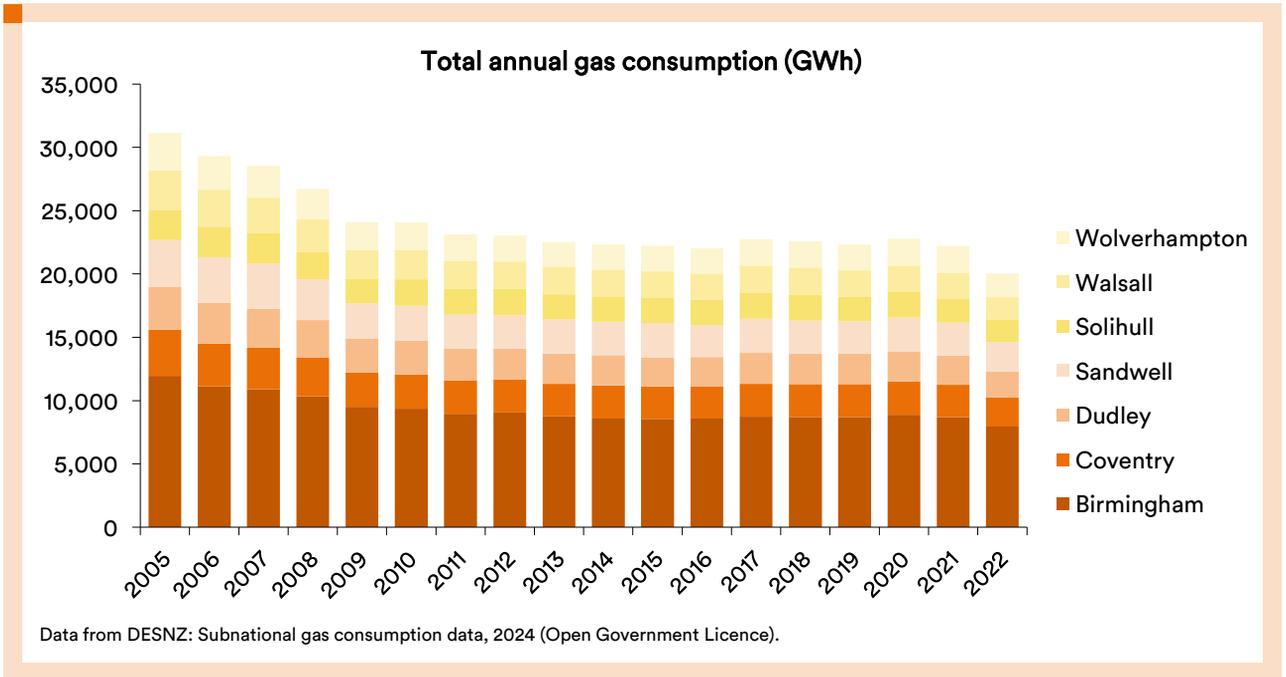


Data from NGED: 2024 DFES analysis (NGED Open Data Licence).

Introduction

4.2.2.2 Gas and other fuels

Currently, the largest single energy vector in the West Midlands is natural gas, which is burnt to provide heat for many domestic and non-domestic consumers. Although demand has reduced steadily by a third over 17 years, the high levels of dependence on natural gas left the region vulnerable to the energy crisis in 2022 due to its price volatility.



Introduction

Another large source of energy is petroleum – used primarily for transport, but also in industrial applications. In line with national policy, it is expected that the majority of transportation will need to electrify in order to decarbonise.

While electrification will be suitable for most applications, some may still require zero carbon fuels – either due to the weight constraints of large-scale batteries, or the energy intensity required for specific industries that would be prohibitively expensive to deliver via the electricity network. These fuels will mostly be hydrogen-based – either hydrogen gas itself or ammonia.

Case study – ammonia cracker, Tyseley Energy Park

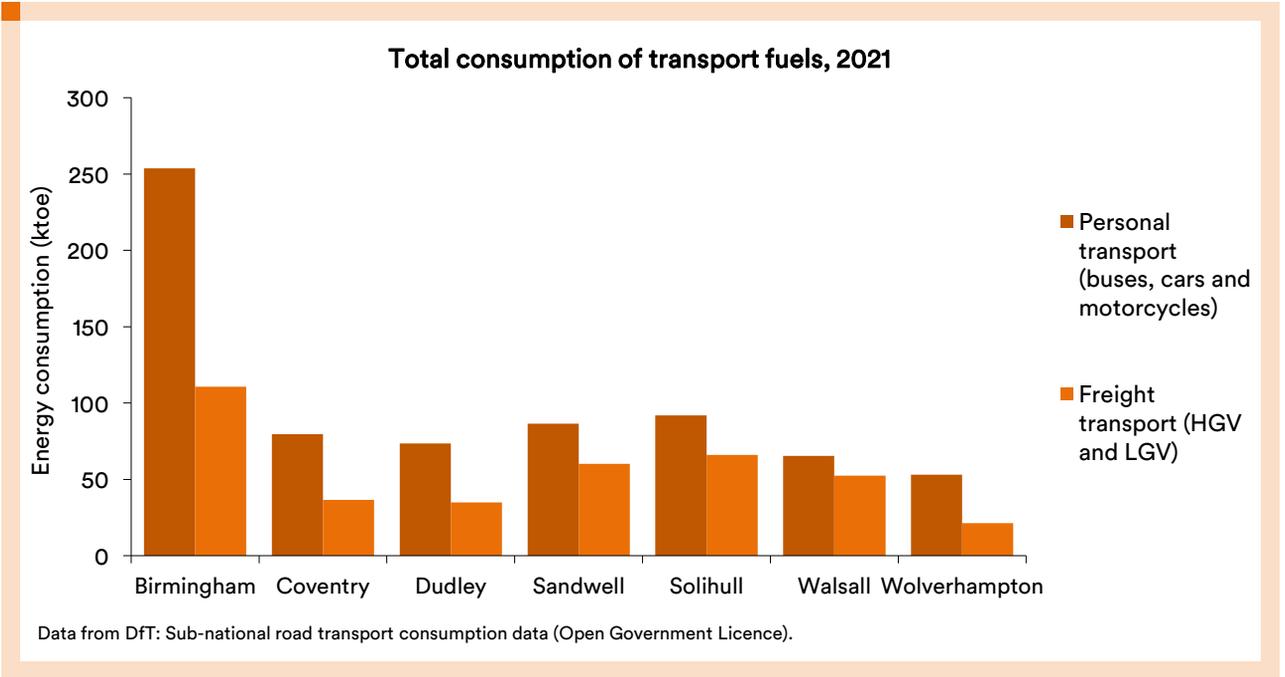


Tyseley Energy Park has been a hub of energy innovation since 2013, with power from a 10MW waste wood biomass plant, University of Birmingham’s Energy Innovation Centre, and a low and zero emission refuelling station.

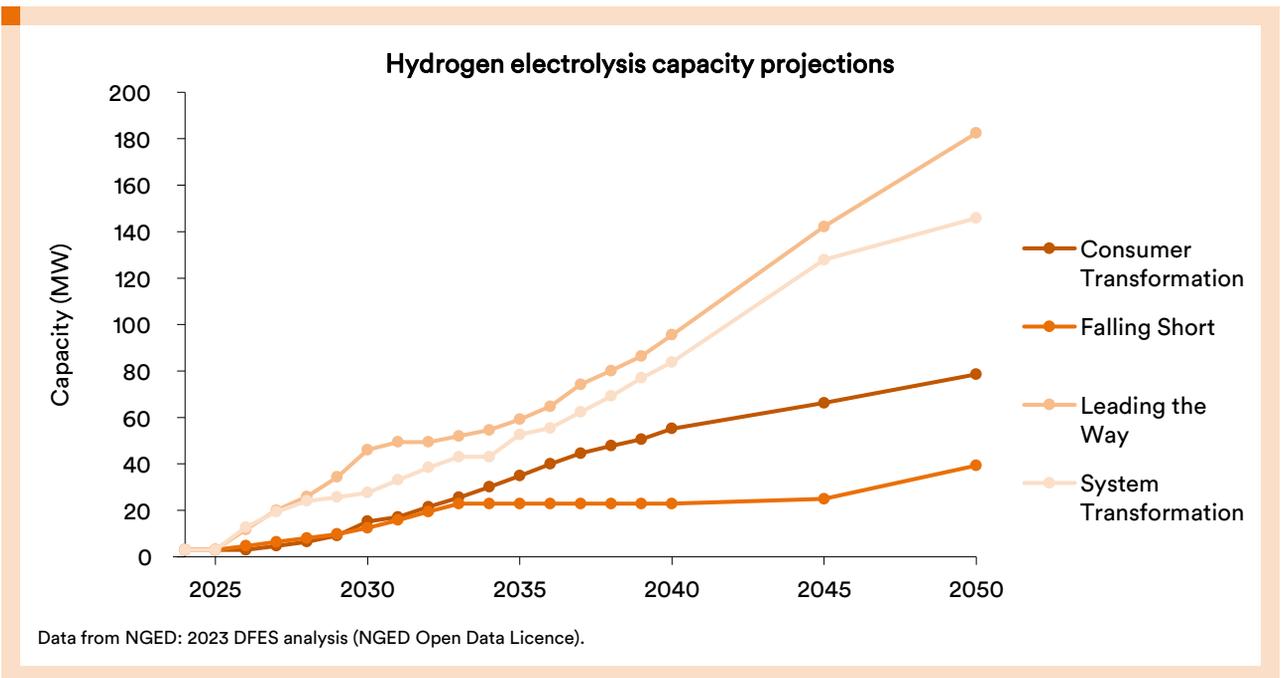
In March 2024, a £6.7m ammonia to hydrogen facility was launched in Tyseley by the Ammogen consortium. Capable of delivering 200kg of transport-grade hydrogen per day, the project is seeking to demonstrate the viability of ammonia as a vector for transporting hydrogen.



Introduction



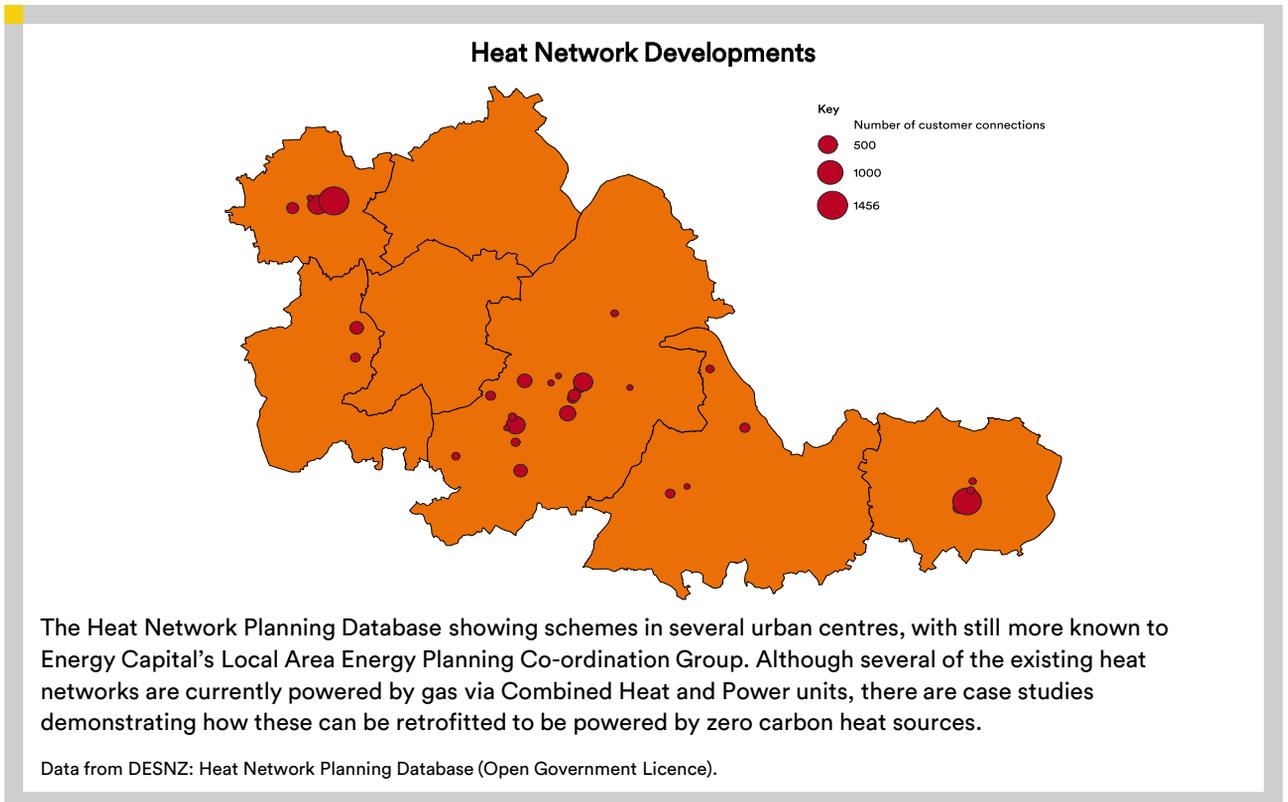
Energy Capital commissioned independent advice on the potential for hydrogen in the West Midlands. It concluded that the case for local hydrogen infrastructure was relatively weak, apart from in specific industrial clusters, and potentially long-range transport options such as coaches and HGVs. However, the wider business case for growing the regional supply chain to facilitate the growing national and international hydrogen economy was much stronger.



Introduction

4.2.2.3 Heat

As well as delivering heat via electricity or gas, heat networks are an alternative solution found across the West Midlands. In total, the region has secured almost £2.5m in Heat Network Development Unit funding.



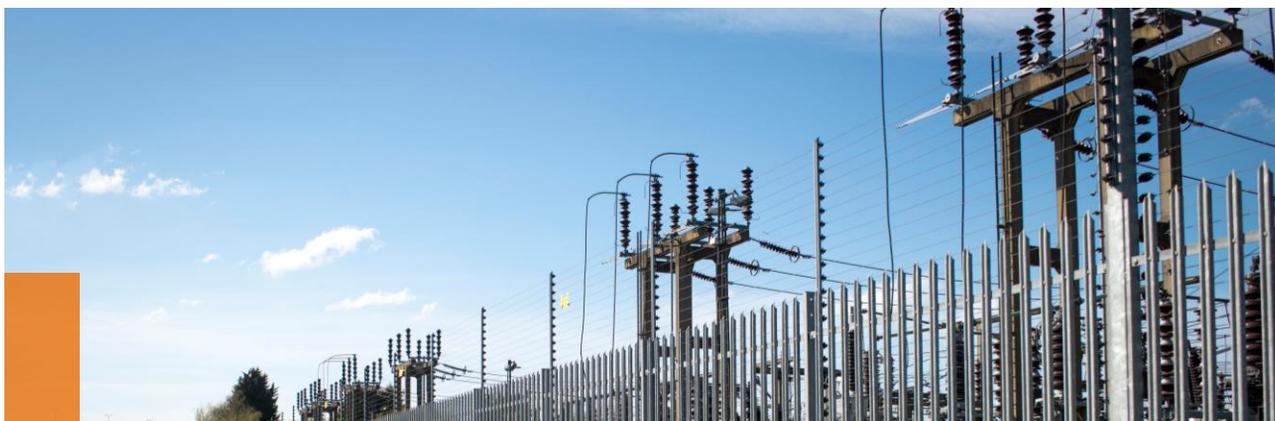
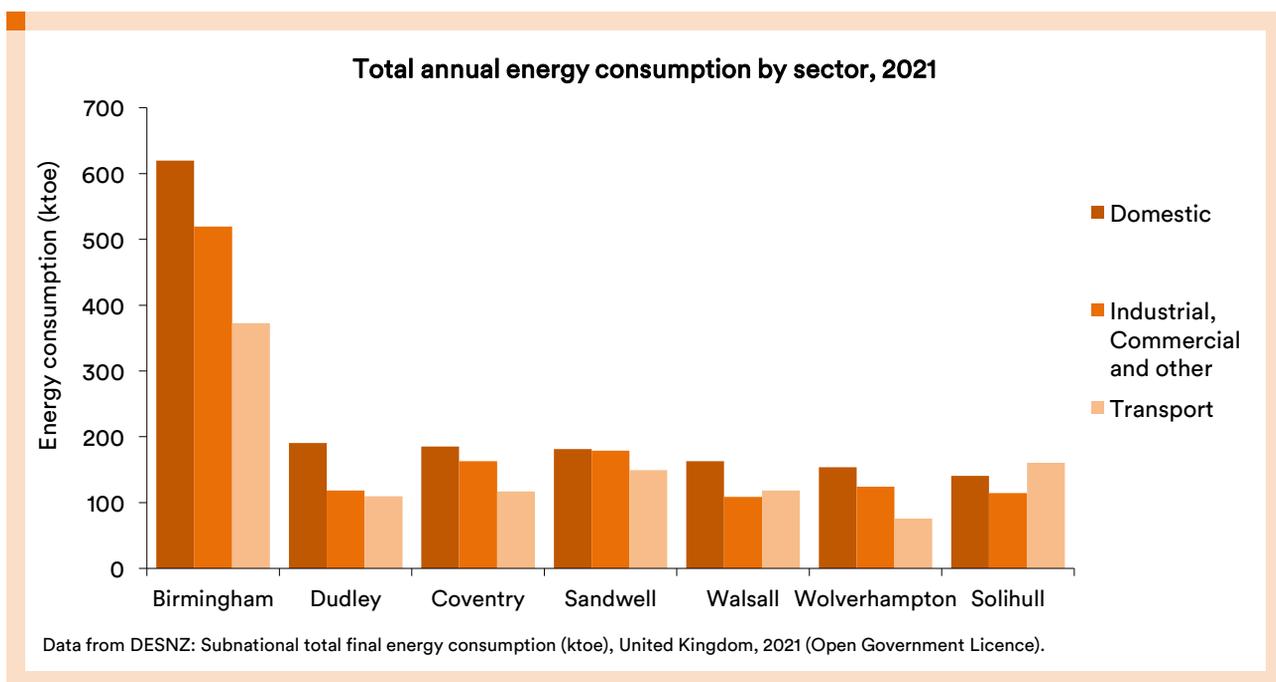
Introduction

Heat networks can reduce overall and peak demand on the electricity grid and, if combined with thermal storage, could act as a valuable, flexibility source.

The roll out of heat networks will need to be integrated with new legislation on heat network zoning⁽⁵⁾ and the design of heat networks must ensure they are resilient to future demand and climate conditions. They will need to be truly low carbon and affordable heat sources that are resilient to future environmental and policy changes and be designed in ways which ensure they can be adapted and expanded to serve future demand needs, all of which requires effective local planning.

4.2.3 Energy demand

Regional energy demand is roughly split three ways between domestic buildings, non-domestic buildings and transport.

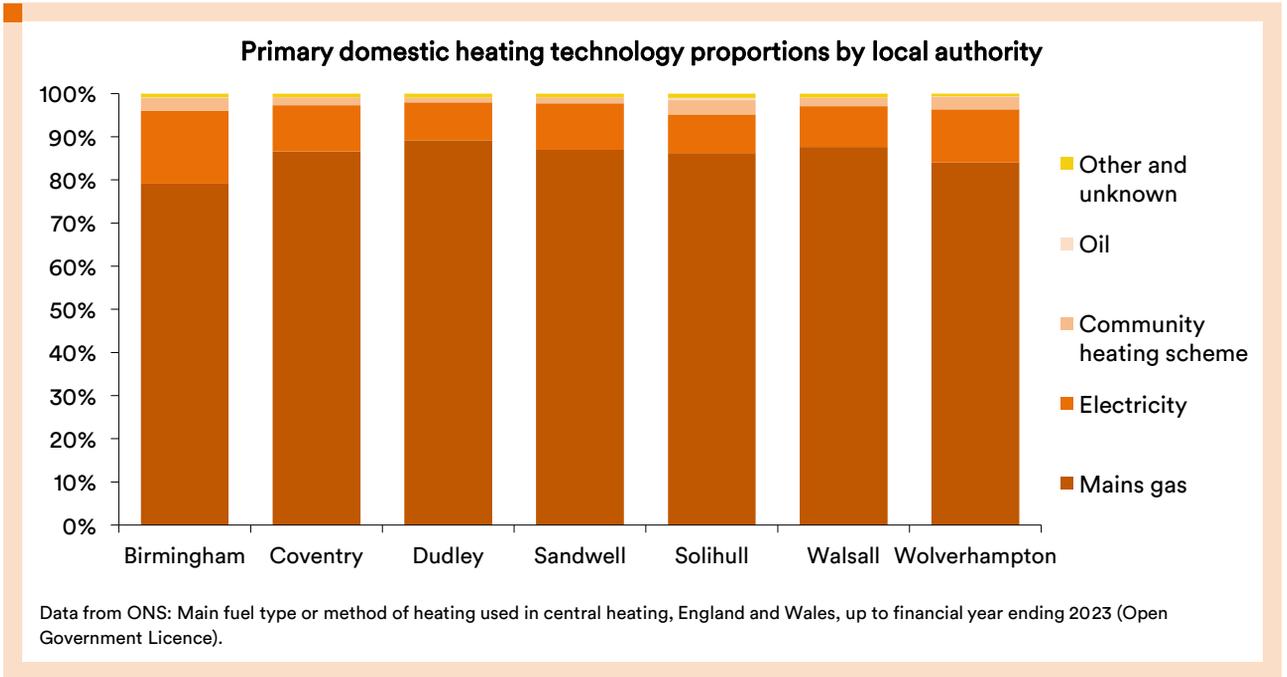


⁽⁵⁾ Heat Network Zoning will see specific areas of high heat demand density designated as heat network zones. In these areas, certain types of buildings (typically large heat users) will be mandated to connect, improving heat demand certainty and reducing risk for heat network investors in these strategically important areas for heat networks. Pilot studies have been carried out in [Birmingham and Coventry](#), with initial results published by DESNZ.

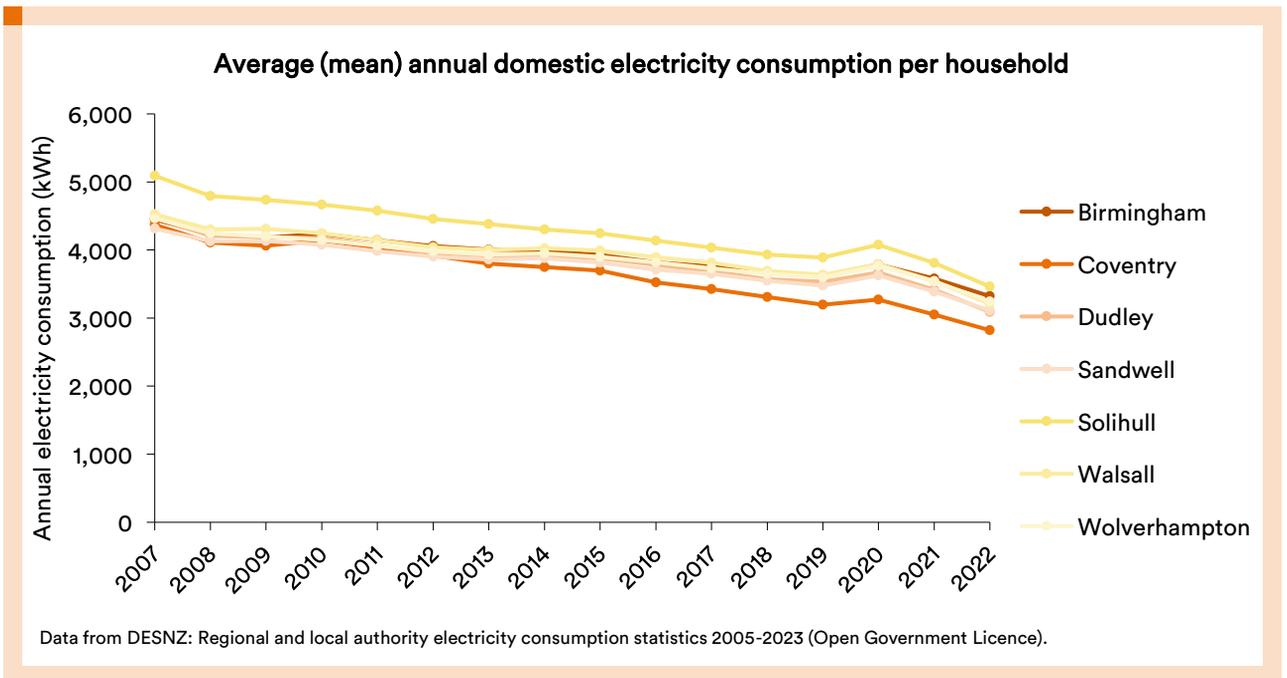
Introduction

4.2.3.1 Buildings – domestic

Currently, the vast majority of homes in the West Midlands are heated using natural gas.



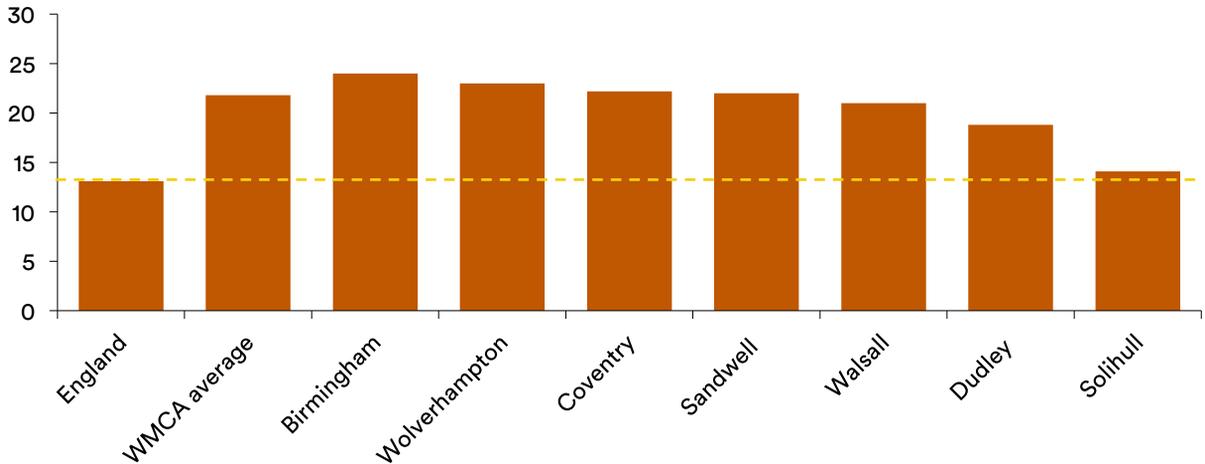
Although the efficiency of domestic buildings has improved steadily for 15 years, the continued use of gas, with its inherent inefficiencies, would limit future progress. This has implications for both fuel poverty and decarbonisation.



Introduction

The West Midlands has extremely high levels of fuel poverty spread across the region, worsened recently by the energy crisis caused by dramatic increases in the cost of gas on international markets. More than 180,000 homes in the West Midlands have received energy efficiency measures through the Energy Company Obligation scheme to support vulnerable households.

Proportion of households in fuel poverty, 2022 (%)



Data from DESNZ: Sub-regional fuel poverty data 2024 (2022 data) (Open Government Licence).

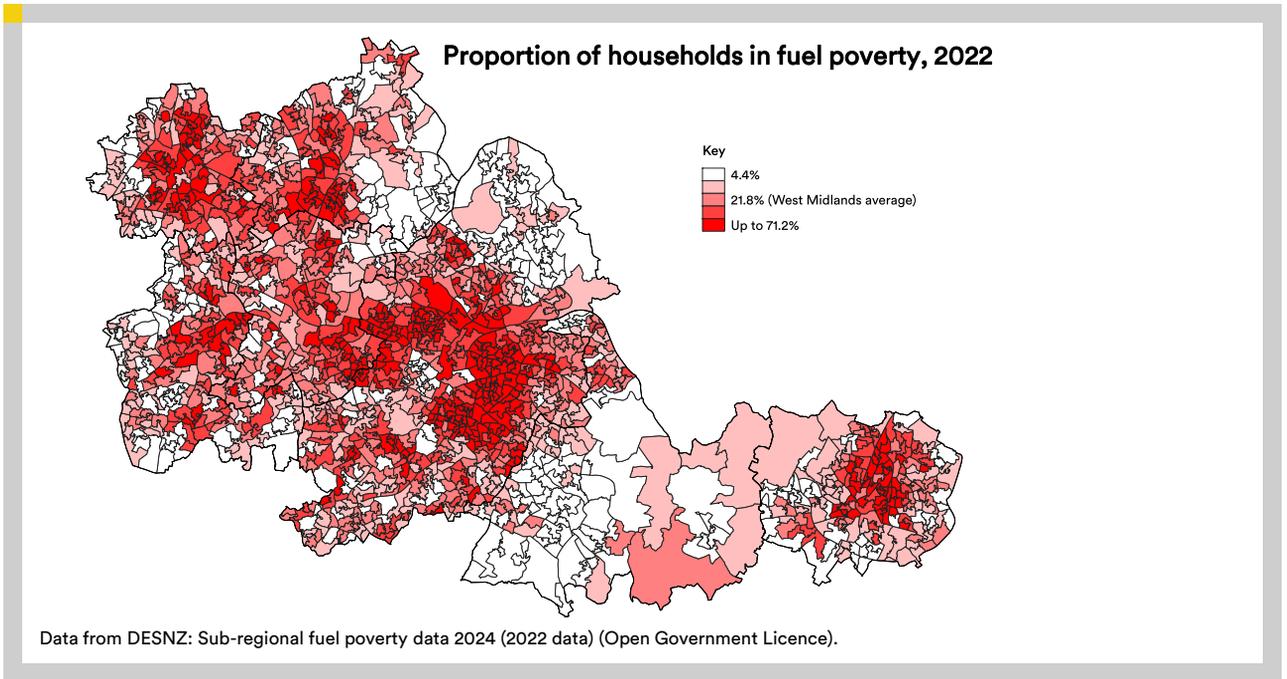
Households receiving ECO measures

More than
180,000
West Midlands households have received retrofit measures from ECO schemes



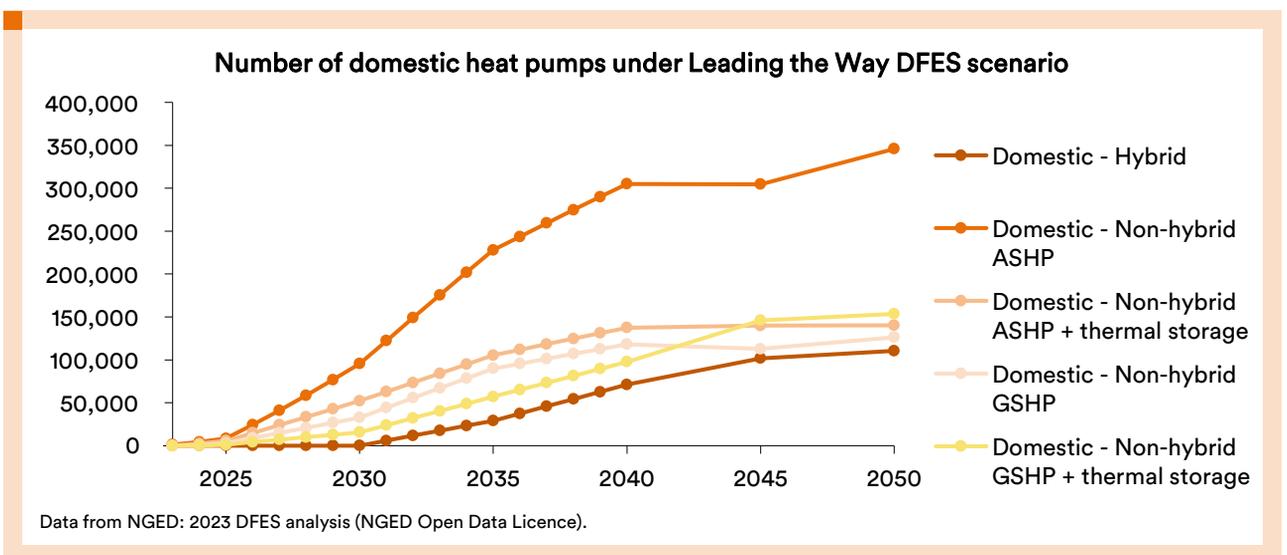
Data from DESNZ: Household Energy Efficiency Statistics, headline release (January 2025) (Open Government Licence).

Introduction



In order to address both fuel poverty and decarbonisation, homes will need to transition away from using gas for heating while also reducing heat loss through retrofit of efficiency measures.

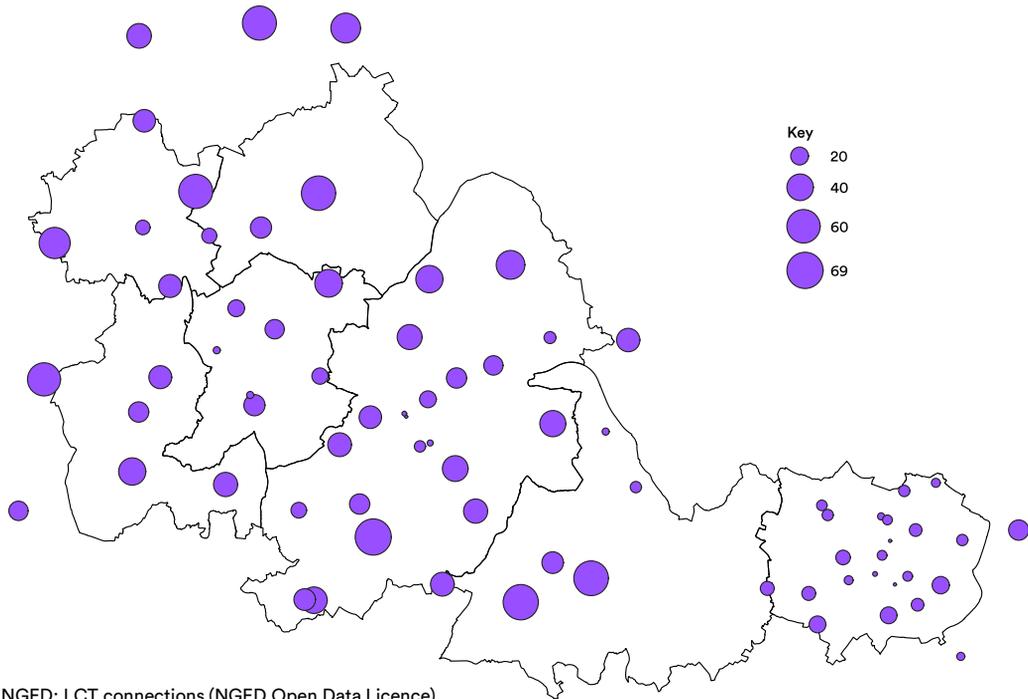
While heat networks are expected to be the most suitable technology for around 18% of UK heat demand by 2050⁽⁶⁾ – and potentially higher in the West Midlands due to the urban density – electrification will be the most common solution, primarily using heat pumps. NGED scenarios project up to one million domestic heat pumps in the West Midlands. Heat pumps are already in use in homes across the region, although the region lags behind the national average uptake of the Government’s current grant programme.



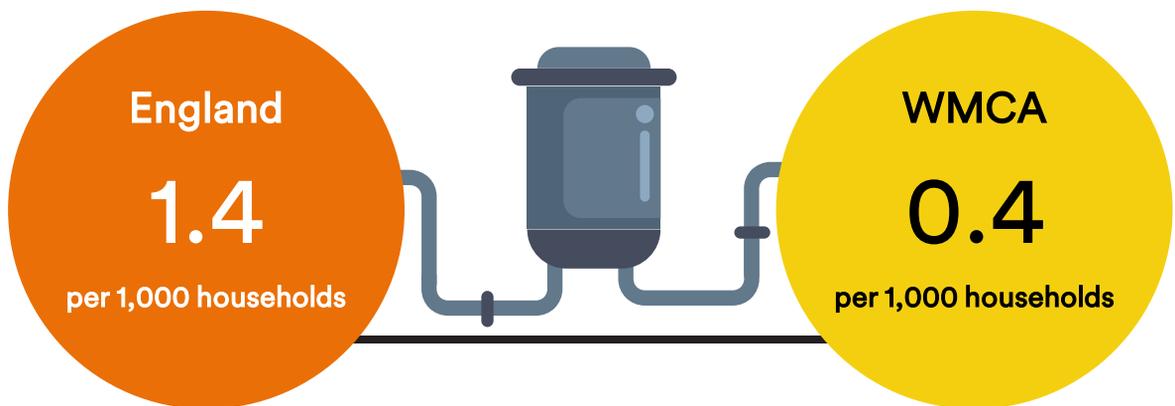
(6) UK Climate Change Committee: [Independent Assessment: The UK’s Heat and Buildings Strategy March 2022 \(theccc.org.uk\)](https://www.theccc.org.uk/reports-and-consultations/independent-assessment-the-uk-s-heat-and-buildings-strategy-march-2022/).

Introduction

Heat pump primary substation connections



Boiler Upgrade Scheme heat pump grants per 1000 households

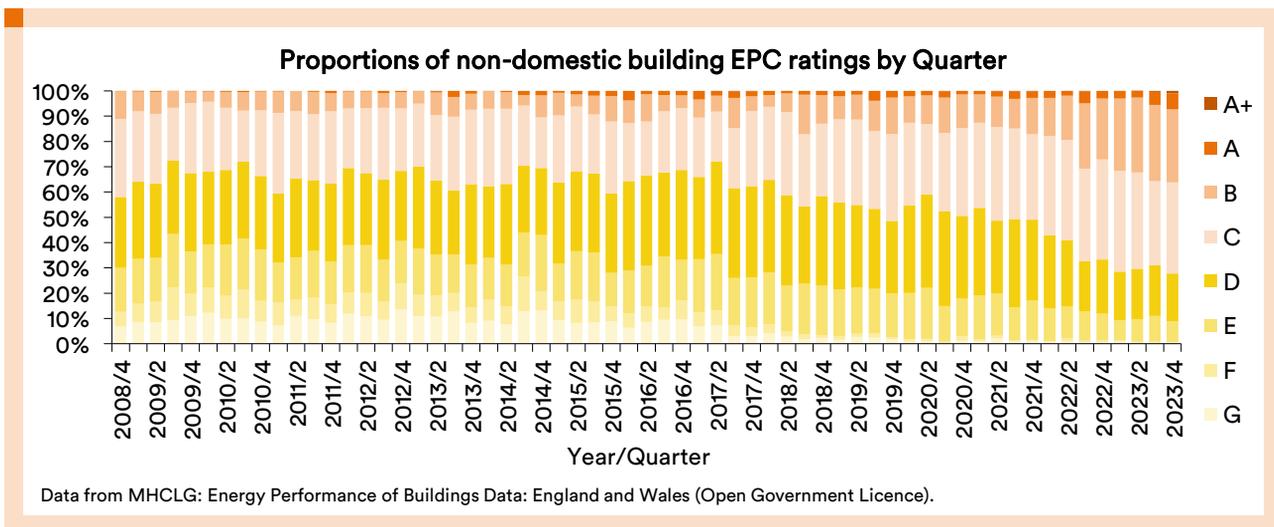


Data from DESNZ: Boiler Upgrade Scheme statistics (Open Government Licence).

Introduction

4.2.3.2 Buildings – commercial and civic

Similar to the domestic sector, efficiency has steadily improved – particularly in the last five years – but a transition away from natural gas will be required to achieve decarbonisation targets.



Electrification will be the primary solution, although there will be specific applications where low carbon fuels, such as hydrogen, will be required – for example, in high temperature processes where the cost of electricity network upgrades would be prohibitively expensive.

Case study – Public Sector Decarbonisation Scheme



Phase 3b of the Public Sector Decarbonisation Scheme awarded more than £91 million in grants to public bodies in the West Midlands to implement carbon saving measures. These included £2.5m to Birmingham Metropolitan College to replace gas heating systems with heat pumps; £1m to the University of Warwick for heat pumps, double glazing and roof insulation; and £3.3m to Birmingham City University to install heat pumps, solar panels and LED lighting in two major buildings.



Introduction

Case Study – Business Energy Advice Service



The Business Energy Advice Service (BEAS) is a £24m pilot programme designed to help small- and medium sized businesses save money and drive growth by providing free energy assessments and 50% match funded grants.

The objectives of this project are to support WMCA and regional efforts to overcome market failures inhibiting energy-exposed West Midlands manufacturers and commercial businesses (in the ITL 1 West Midlands region) from mitigating the impacts of energy cost rises and the transition to net zero.

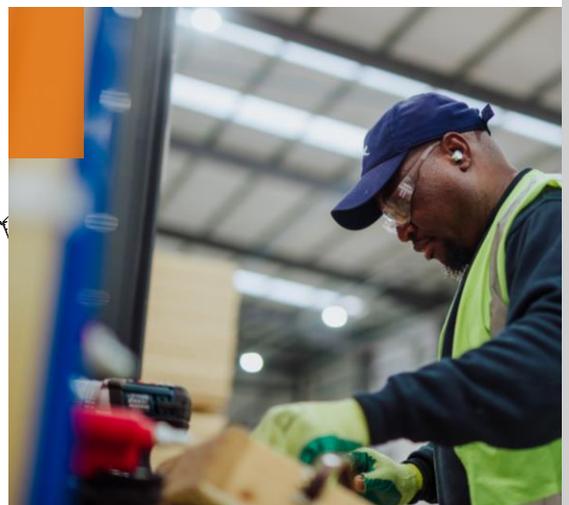
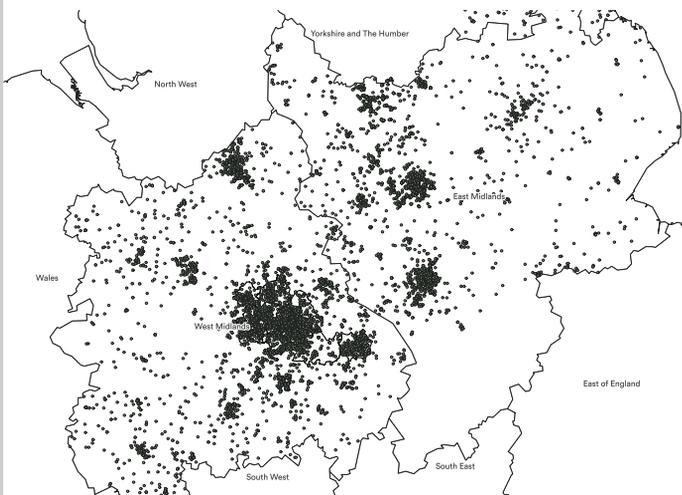
The programme was jointly funded by DESNZ and DLUHC (MHCLG). DESNZ providing circa £9m RDEL funding for energy assessment audits and roadmaps for SMEs in both the industrial and commercial sectors across the ITL 1 area of the West Midlands alongside £5m CDEL funding for energy reduction grants shared across Worcestershire and the Marches, Stoke & Staffordshire and Warwickshire. This funding complements, and is aligned to, the £4.5m SPF funding for the WMCA region Decarbonization Net Zero Programme (DNZ) and the £4.5m SPF funding for Net Zero grants delivered by our Local Authority partners. An additional £10.5m CDEL for grants from DLUHC was provided for the WMCA Area as part of the Trailblazer Devolution deal. Outside of the WMCA area the BEAS programme is aligned to other UKSPF funded energy efficiency projects. The data from these projects is also being collected as part of the BEAS programme.

To date the BEAS programme has delivered 1500 energy efficiency audits, awarded £2.5m in grants with a further £5.7m grants in progress.

4.2.3.3 Industry

The West Midlands has a proud industrial heritage. In 2020, the region's manufacturing sector accounted for £19.8bn GVA – 10.6% of the national manufacturing GVA. Using SIC code classifications to identify industries that are especially energy intensive, it is clear that the West Midlands has a very high density overall, and particularly in the Black Country.

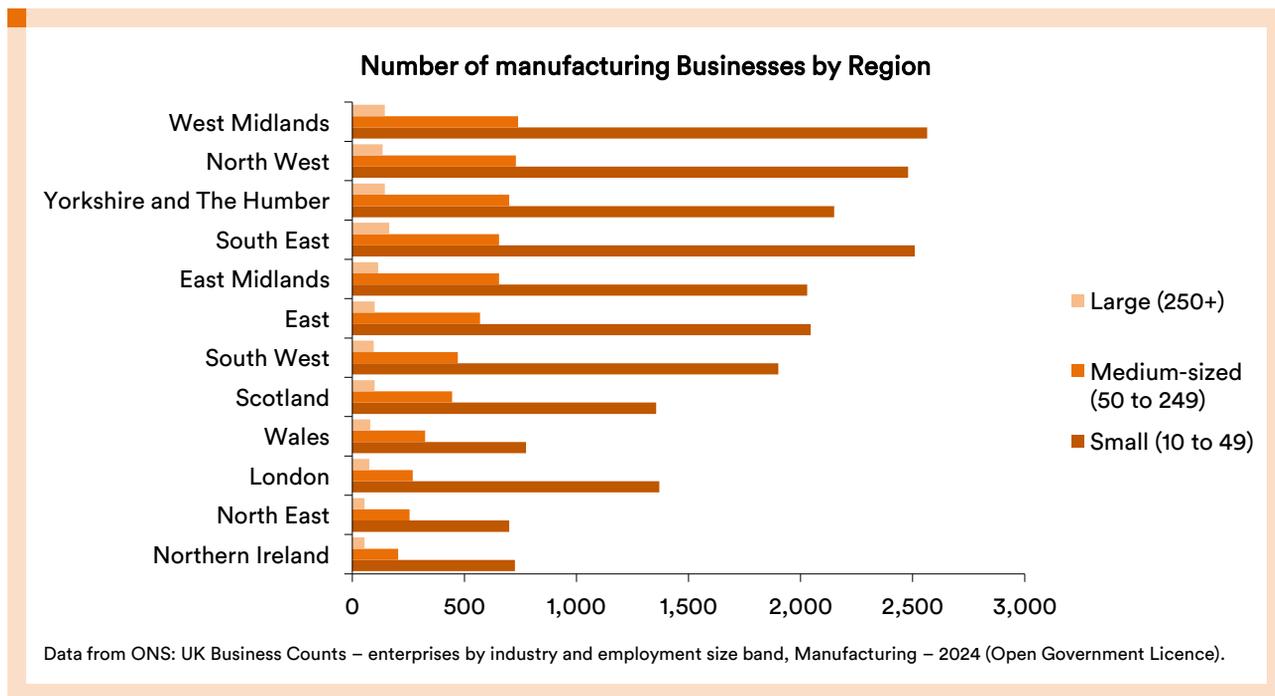
Map of energy intensive businesses, 2022



Data from DataCity and Economic Intelligence Unit analysis: Manufacturing businesses within SIC codes 10-33 (Copyright WMCA).

Introduction

Crucially, unlike some regions which have a small handful of businesses that account for the vast majority of manufacturing, the West Midlands contains the largest number of small- and medium-sized manufacturing firms of all UK regions.



This creates a challenge for decarbonisation. The number of stakeholders involved is much higher than in an industrial cluster centred around a single, large site, and support for businesses needs to be more bespoke and tailored to many types of business operations. Furthermore, where other places will have more obvious options for zero carbon infrastructure to support industrial decarbonisation, such as hydrogen distribution or CCUS pipelines, the value of such infrastructure is diminished when connecting sites are less spatially dense, and decisions on which locations to provide for become more challenging.

Case study – Black Country Industrial Cluster



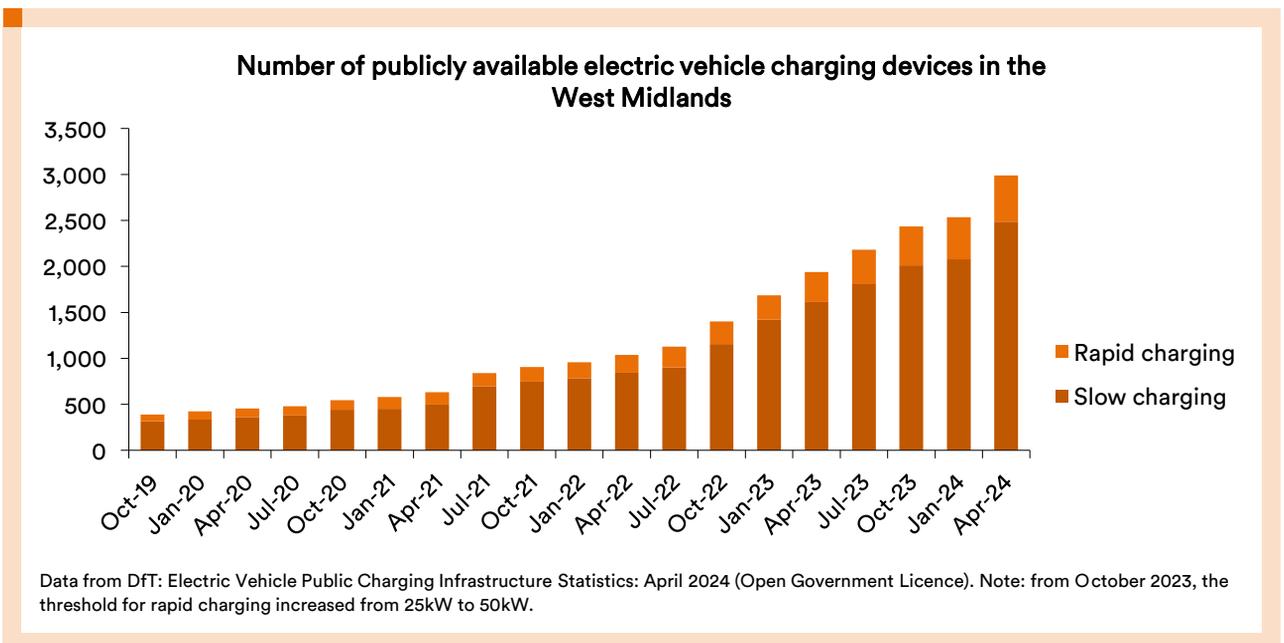
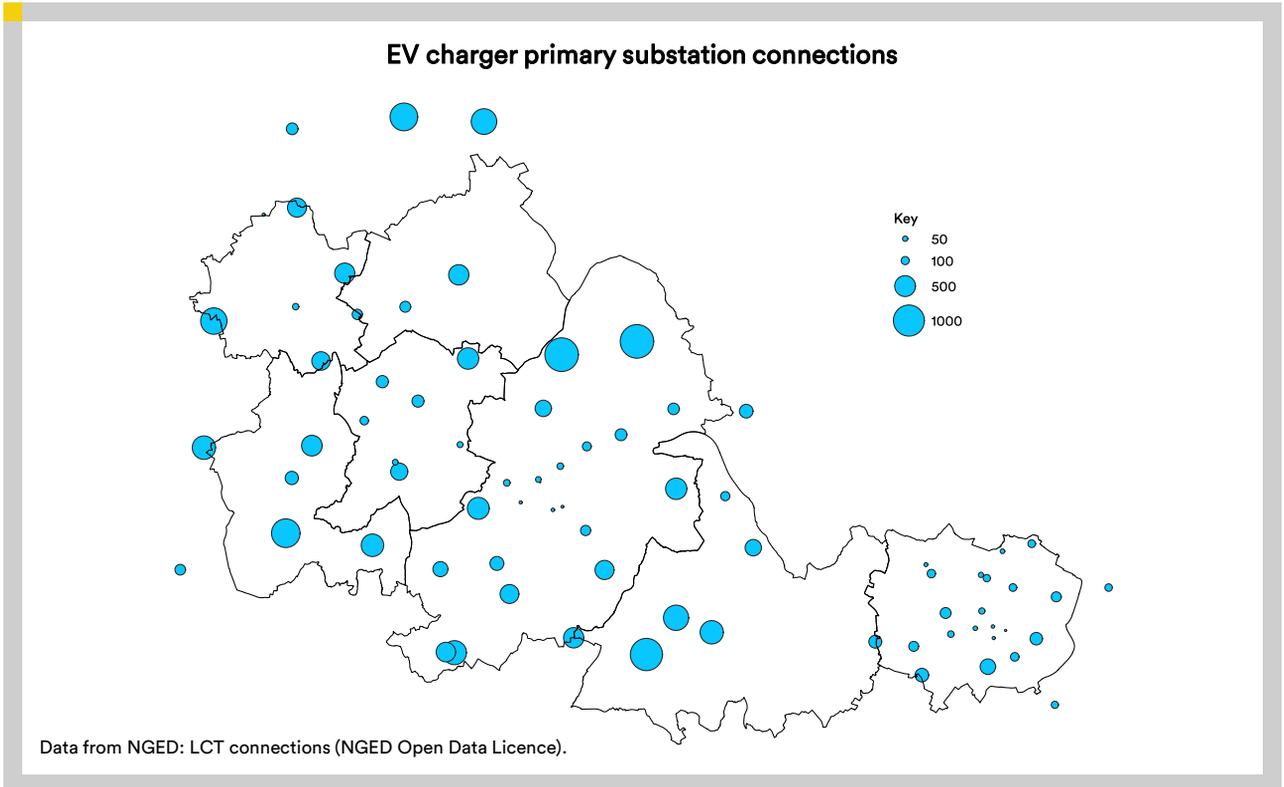
The Black Country Industrial Cluster covers an area of more than 3000 dispersed, energy-intensive manufacturing businesses. The Cluster was formed following the *Repowering the Black Country project*, one of seven industrial cluster decarbonisation projects funded by the Government from 2020-2023, and the only non-coastal, dispersed sites cluster. The organisation supports, informs and represents its members and local industry through the transition to a net zero economy.

4.2.3.4 Transport

As with buildings, decarbonisation will largely be driven by electrification, with fuel switching to low carbon fuels more appropriate for the heaviest vehicles.

Introduction

Electric vehicle chargers are being rolled out across the region at an accelerating pace, with a range of charging rates available up to 350kW. The implementation of smart charging allows for the use of cheap off-peak electricity overnight, and further developments in technology can enable widespread use of V2G connections, utilising EVs as storage and flexibility assets.



Introduction

Case study – Infrastructure for Zero Emission Vehicles (IZEV) Strategy



Transport for West Midlands is the statutory body responsible for developing a Local Transport Plan (LTP) for the region. The most recent LTP *Reimagining transport in the West Midlands* was produced in 2023, setting out ambitions for a ‘green transport revolution’. The implications for the underlying energy system in supporting this transition have been explored through the development of the Infrastructure for Zero Emission Vehicle (IZEV) Strategy. Led by Energy Capital and intended to inform both the LTP and Local Area Energy Planning (LAEP) processes, the strategy outlined some of the process changes needed in order to align and optimise energy system, spatial and transport planning for new transport developments.

The IZEV strategy looked to develop a series of least regret actions that would support the transition to a decarbonised transport system. A strong theme was the need to understand spatially the requirement for enhanced grid demand both for direct charging of electric vehicles but also to allow for onsite production of hydrogen using electrolyzers should this become a viable option for some of the larger vehicles. The LTP development process has since refined some of the projections and found that the primary decarbonisation pathway for the vast majority of vehicles will be electrification. Whilst there is still uncertainty regarding specialist or particularly long-range transport modes, ensuring that there is enough grid capacity to service both types of vehicles become of paramount importance. Understanding where and when this capacity will be needed is part of next phase of the strategy and will be developed further through LAEP processes.

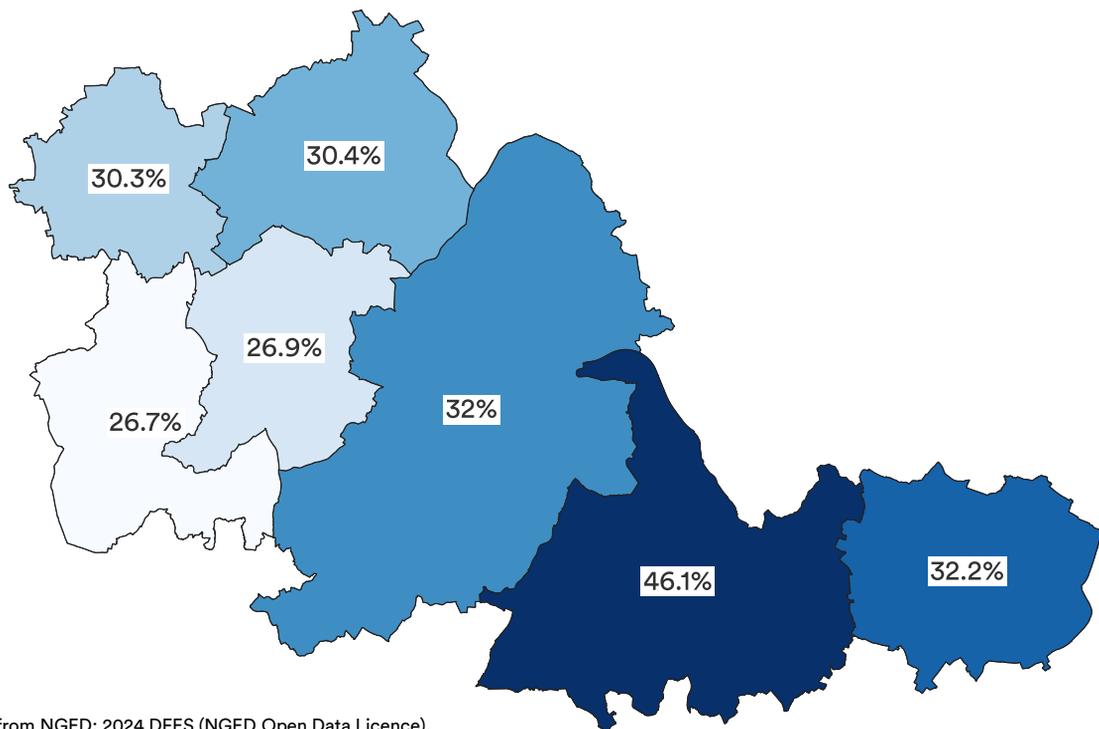
4.3 Summary – the need for a smart system

- Regardless of the energy transition, the West Midlands will continue to be a large centre of energy demand.
- With the transition away from the current widespread use of natural gas, demand for both power and zero carbon heat will increase.
- Investment in the electrification of local demand and upgrading the distribution network to feed this are essential aspects of the West Midlands’ energy transition.
- While other regions target being self-sufficient, the unique geographical circumstances of the West Midlands – scarcity of land for renewables and no coastline for offshore generation – necessitate the continued import of energy from other regions. Even with a significant increase in the expected capacity of embedded renewable generation, National Grid Electricity Distribution’s projections suggest that by 2040 the region may only be able to meet around a quarter of its own demand during peak periods:



Introduction

Percentage of electricity demand met by embedded renewables generation in 2050



Data from NGED: 2024 DFES (NGED Open Data Licence).

This does not have to be a disadvantage. With an abundance of generation in remote coastal areas across the UK, the West Midlands can take advantage of its central location within the national grid to ensure that clean energy generation is efficiently utilised, not curtailed.

This will require a smarter approach to energy, use both within and beyond the region.

Renewables are intermittent, and peaks in generation patterns do not match current peaks in demand. A more flexible system, where demand can be reduced, energy storage can be charged and discharged, and smart technologies can shift energy demand to avoid significant peaks, reduces the overall cost of the required infrastructure to meet the region's needs.

The need for a smarter energy system is recognised in Government Smart Systems and Flexibility Plan (2021).

This sets a commitment to leading the way in the transformation of our energy system to a smarter, more flexible system that will utilise technologies such as energy storage and flexible demand to integrate high volumes of low carbon power, heat and transport and achieve decarbonisation targets. It is estimated in this plan that increased flexibility could reduce system costs by £10bn annually by 2050. This in turn will reduce costs to businesses and consumers. Government's Clean Power 2030 Action Plan (2024) reiterated the need for a smart energy system and committed to consulting during 2025 on what the UK's Low Carbon Flexibility Roadmap will look like.

West Midlands academics and innovators are already using in AI and other smart technologies to power their businesses.

For example, formed as a spin-out company from Aston University, Grid Edge is a technology startup that has developed cloud-based artificial intelligence software empowering commercial energy consumers to intelligently control and optimise their building energy loads.

Introduction

The first comprehensive communication and control platform for V2G charging systems, their innovative AI software deploys predictive machine-learning algorithms and advanced data analytics to reduce energy costs, cut carbon emissions and unlock the revenue-generating potential of flexible energy assets.

The region has reaped the rewards of West Midlands 5G's Infrastructure Acceleration programme and has been consistently ranked highest in independent 5G mobile coverage studies, providing a valuable platform for innovation.

Smart grids use technologies including connected sensors, 5G mobile networks, AI, and digital platforms to collect and analyse data, and to communicate with producers, system operators, and consumers to optimize the overall system. These technologies allow system operators to implement innovative decarbonisation solutions while allowing consumers to take control of their energy use and interact proactively with energy markets. Some of the benefits can include:

- **Cost savings:** smart grids can optimise energy distribution and reduce the need for costly infrastructure upgrades, delivering cost savings for consumers. In an urban environment such as the West Midlands, grid technologies that minimise the need for new infrastructure can help avoid lengthy delays in planning.
- **Enhanced decision-making and participation:** Smart grids leverage advanced digital technologies such as AI, automation, and data analytics to provide consumers with real-time insights into their energy usage patterns. This empowers consumers to make informed decisions about their energy consumption habits and adopt more efficient energy use patterns. Demand response programmes and time of use pricing allow consumers to participate in flexible energy markets, ensuring value shared more equitably.
- **Resilience and reliability:** With greater distribution of assets and the integration of digital platforms and 5G mobile networks, smart grids enable more efficient energy distribution and management and increased resilience, with less reliance on single assets. Advanced monitoring and control capabilities allow for quick detection and response to disruptions, helping to maintain network safety, minimise customer outages and ensure high levels of network reliability.

Smart Energy has been identified as a key growth opportunity for the West Midlands. While the region's Plan for Growth initially identified Modern and Low Carbon Utilities as a priority cluster, additional research in conjunction with regional key stakeholders has narrowed and clarified the definition of this cluster to focus on Smart Energy Systems.

The West Midlands boasts significant clean-tech research hubs and is home to traditional energy utilities which are adopting smart net zero solutions. There is an established set of companies operating and a growing number of start-ups, supported by best practice leadership and academic and research excellence related to the wider energy system. Smart energy systems are an important, growing part of this ecosystem that will enable greater efficiencies, growth and societal benefit.

The West Midlands Smart Energy System Cluster



The [West Midlands Smart Energy Systems cluster](#) covers technology, data, products and services to support smarter, more efficient and flexible energy usage across systems in commercial industrial and urban settings. This includes applications such as smart meters, smart grids, micro-grids, sensors, digital twins, demand management technologies and energy monitoring among others.

"We need our energy system to become as flexible as possible, using different sources of energy at different times and keeping the overall cost down. The West Midlands has an important ambition to build on its unique assets and nurture a smart energy systems cluster, which can bring the businesses, investments and solutions we need to market, to make this necessity a reality in time to deliver Net Zero." – **Andrew Clark, Energy Systems Catapult**

05

The Energy Capital Partnership's Vision for the West Midlands

By 2041, the West Midlands will have trailblazed the route to a smarter UK energy system, creating prosperity for the region and enabling a fairer net zero transition for our communities.

If this strategy is successfully implemented, the West Midlands will have established itself as the region leading the way in smart energy systems, seizing the opportunities identified in the Smart Systems and Flexibility Plan and Government's Clean Power 2030 Action Plan.

5.1 Aims

5.1.1 Ensure the energy transition meets the region's net zero obligations

This strategy needs to play its part in supporting the West Midlands to achieve net zero by 2041. Energy plays a central role in decarbonisation; in order to rapidly reduce carbon emissions, the region must reduce its reliance on fossil fuels, increase renewable energy generation capacity, and increase the utilisation of existing renewable energy capacity within the West Midlands and beyond. The 2041 net zero target is very challenging and ambitious, but essential to demonstrate leadership and seize the opportunities offered by the transition. However, as demonstrated, the region will continue to rely on the wider network to achieve net zero, so we need to play our part in supporting the whole system transition. As such, this is not the only aim of the regional energy strategy.

5.1.2 Ensure the energy transition is affordable

The 2022 energy crisis highlighted the severe effects that energy prices spikes have across the whole economy. Fuel poverty in the region has increased leaving many residents unable to afford to heat their homes. Businesses have also suffered; in March 2023, 14% of West Midlands businesses were spending more than 20% of turnover on energy⁽⁷⁾ – historically only seen before in very energy intensive industries such as steel. We cannot therefore continue to just treat the symptoms; a systemic solution needs to be implemented.

Within this context, it would be easy to justify deferral of decarbonisation measures due to high up-front investment costs. However, such investment is crucial to bringing down long term costs and making the energy system more resilient to similar shocks in the future both locally and nationally.



To break down this Vision, Energy Capital has set out four high-level Aims, to ensure the energy transition:

- meets the region's net zero obligations
- is affordable
- is fair and just
- provides opportunities for investment.



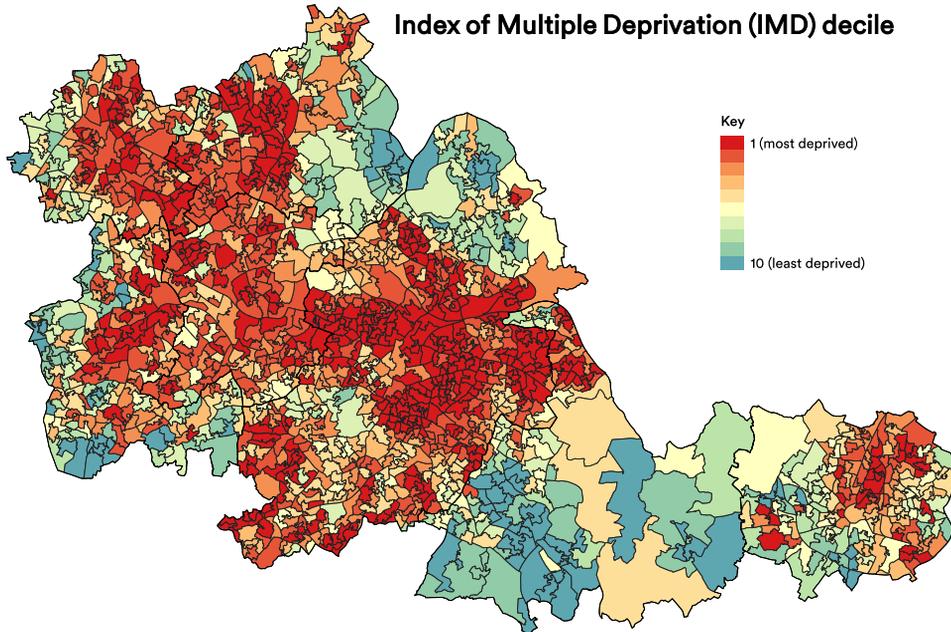
(7) West Midlands Industrial Energy Taskforce – final report.

The Energy Capital Partnership's Vision for the West Midlands

Public investment must therefore be well-targeted to support the most vulnerable customers in this transition – ensuring energy is affordable for fuel poor households and businesses and industry are enabled to identify ways to make their operations more energy efficient and resilient.

5.1.3 Ensure the energy transition is fair and just

The West Midlands contains some of the most deprived places in the UK. The energy transition must be used as an opportunity to reduce deprivation and requires a constant commitment to tackling injustices currently found in system and the region. Ensuring a fair transition is a key regional priority and is essential to bringing everyone along this journey together.



Data from MHCLG: English indexes of multiple deprivation by LSOA, 2019 (Open Government Licence).

National schemes for improving energy efficiency have historically been difficult to target, resulting in support struggling to reach those who need it most. A more appropriately targeted approach, allowing schemes to be tailored to local places and improving the success and fairness of funding allocations will be some of the outcomes sought from the region's devolved retrofit funding pilot.



The Energy Capital Partnership's Vision for the West Midlands

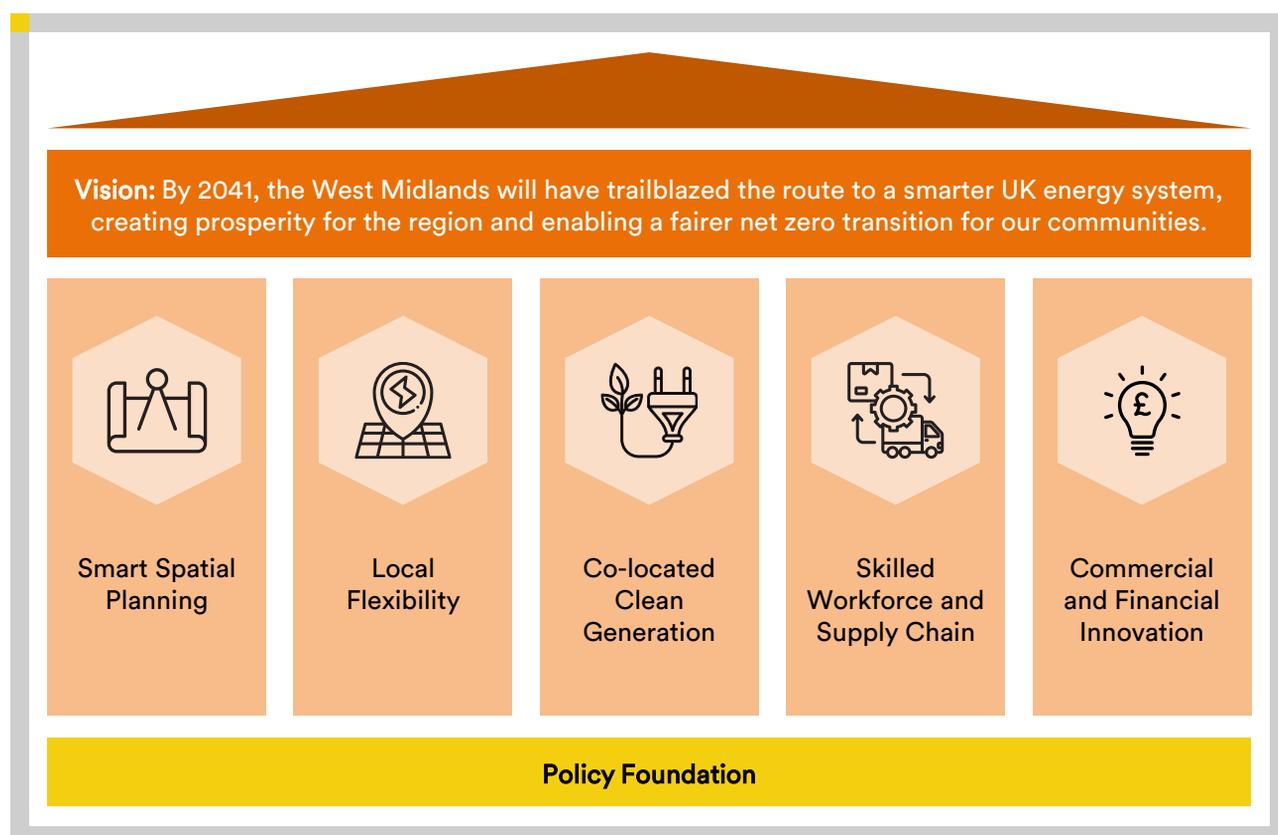
The energy transition, when considered as a whole, is a significant opportunity with huge rewards for places that commit to it collectively from the outset. As part of the Government's mission to make Britain a clean energy superpower, the West Midlands must strive to ensure that those rewards are retained, and benefits are felt, by those within the region – including harnessing the opportunity to create thousands of well-paid jobs for everyone and particularly broadening the opportunities available to the young, vibrant population of the West Midlands.

5.1.4 Ensure the energy transition provides opportunities for investment

Decarbonisation will require large-scale infrastructure investment. To meet the scale of the challenge, public money must be spent in ways that leverage further private sector investment. UK100 estimate that £5bn development funding could lead to up to £100bn total investment⁽⁸⁾.

In the West Midlands Plan for Growth, the smart energy systems cluster was identified as a key regional investment opportunity. This focus can be used to enable the development of sustainable markets for demand management and broader energy solutions across domestic, commercial and industrial sectors.

5.2 Strategic priorities



(8) UK100, [Accelerating the Rate of Investment in Local Energy Projects](#).

The Energy Capital Partnership's Vision for the West Midlands

This strategy sets out five strategic priorities that will enable the region to realise the Vision and achieve the Aims of this strategy:



Smart Spatial Planning – Ensuring that energy system planning is joined up with transport and spatial planning to enable the region to achieve its clean growth objectives.



Local Flexibility – A smarter energy system requires technologies that enable energy generation and demand to be balanced more effectively. This strategy will set out how the benefits of flexibility can be retained locally to support the decarbonisation of our built environment and transport systems.



Co-located Renewable Energy – Ensuring that renewable energy generation can increase within the West Midlands, by locating it close to demand, to avoid putting pressure on the electricity network and maximise the use of space in the region.



Skilled Workforce and Supply Chain – Attracting investment into the region to harness the energy systems expertise located here, and ensure the region plays its part to make the entire UK energy system smarter, whilst growing sustainable demand for local supply chains to develop, integrated with skills and training offers.

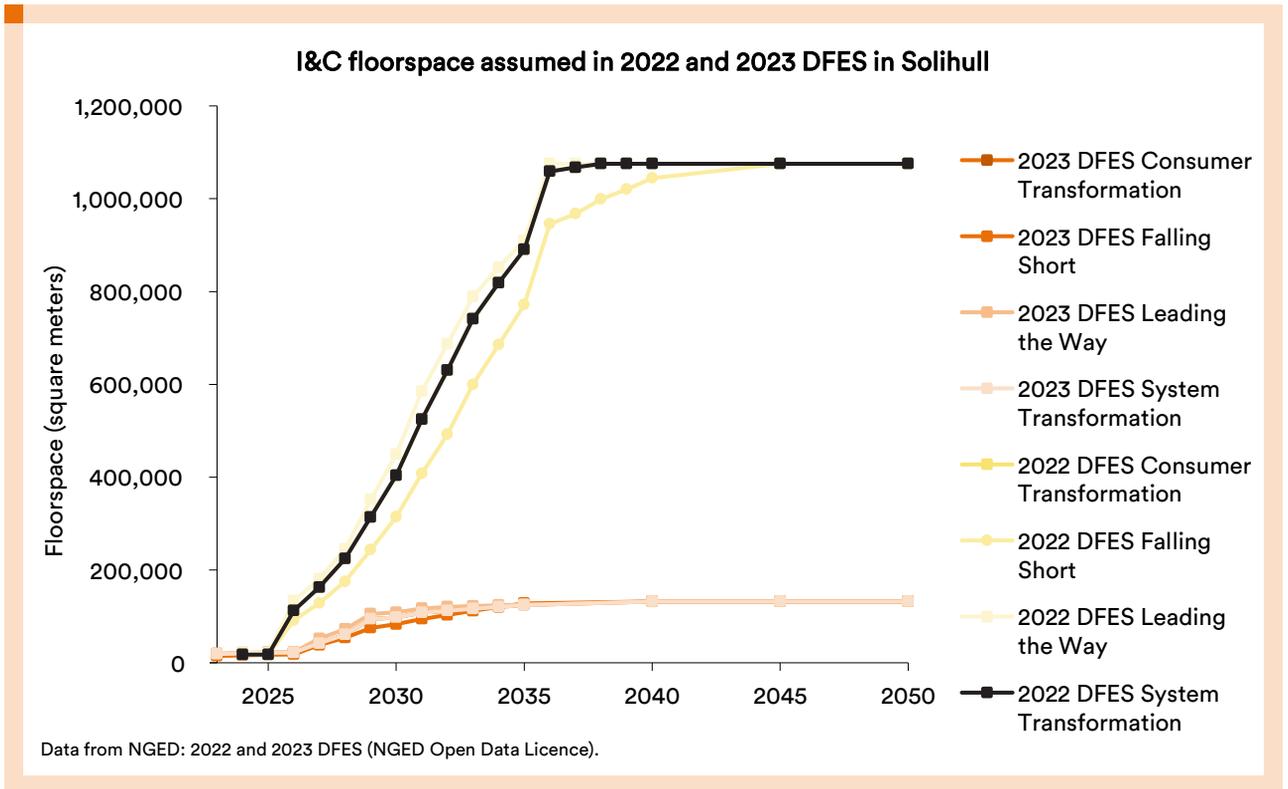


Commercial and Financial Innovation – Directing the region's energy innovation efforts towards creating business models and finance products that help to accelerate the rollout of place-based, smart energy system solutions.

These priorities are the pillars that support the Vision. Supporting the five Pillars, is a Policy Foundation, where intervention is essential to enable the activities detailed within the Pillars.



Pillar 1 – Smart spatial planning

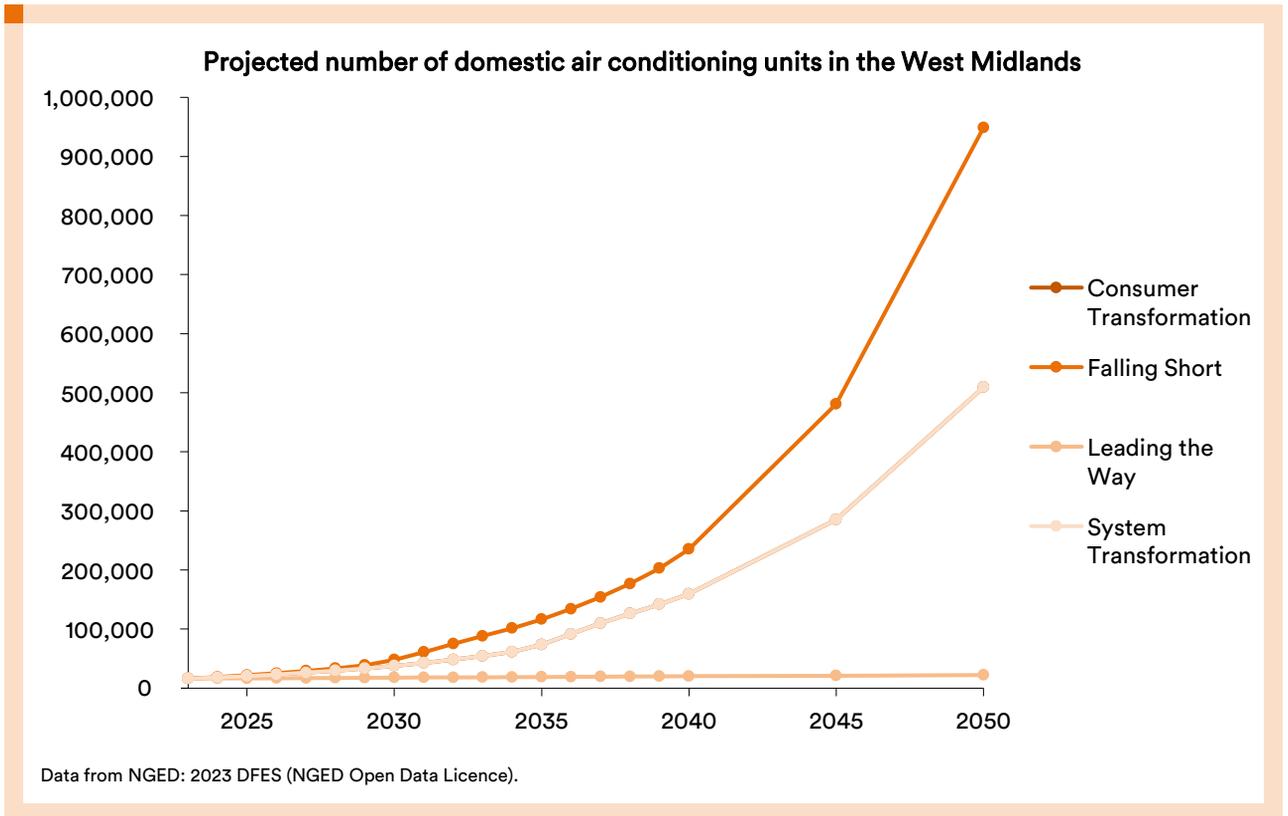


6.3 Why is change needed?

With such a significant increase in electricity demand anticipated over the next 20 years with the rollout of heat pumps and electric vehicles, a more strategic approach to planning is required to prevent the network from becoming overwhelmed. How they are deployed, and whether they are supported by localised energy storage and other smart features including demand side flexibility, will play an important role in determining how grid infrastructure is deployed and how much new infrastructure may be needed.

There is also a need to address climate adaptation. NGED project that with a lack of forward planning, the energy use of air conditioning units could be an enormous, unnecessary burden on the network. With a more strategic approach involving retrofit measures and development planning to limit urban heat islands, air conditioning demand could be reduced by up to a factor of 50.

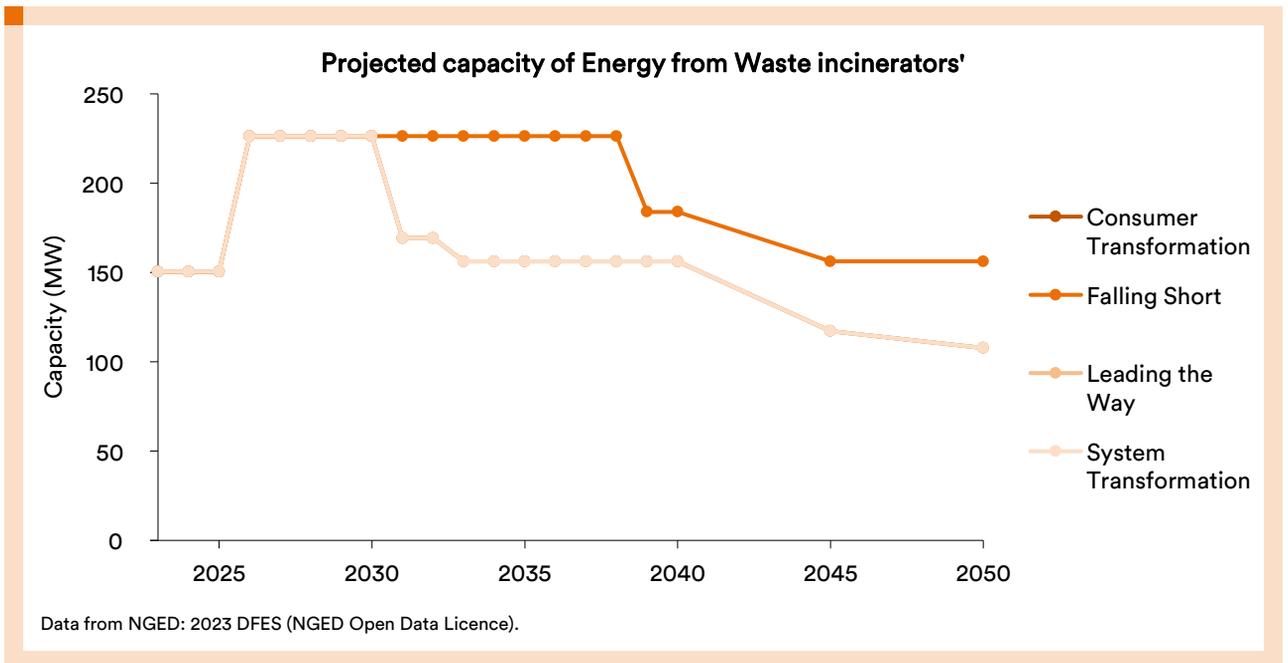
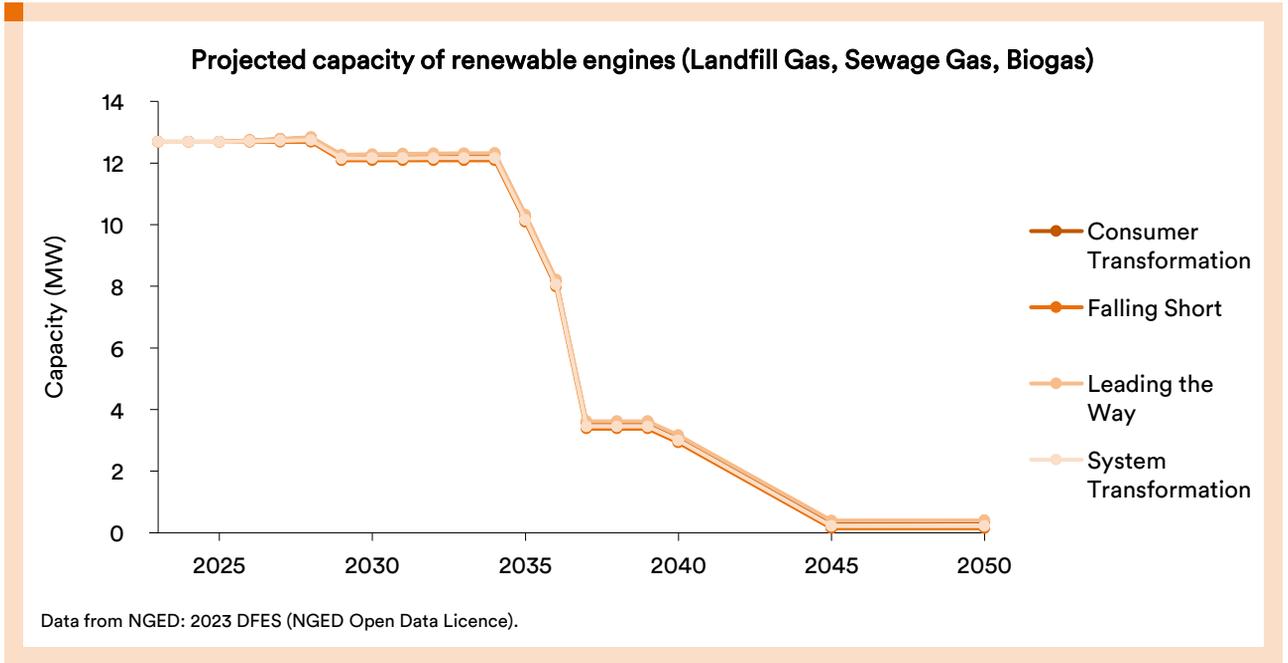
Pillar 1 – Smart spatial planning



In a similar way, current generation assets such as renewable gas engines are expected to wind down, and Energy from Waste plants have an uncertain future now that many have unfavourable levels of emissions. Strategically making the most of energy infrastructure that has been built around these generation facilities will reduce costs of future developments and minimise stranded assets.



Pillar 1 – Smart spatial planning



Pillar 1 – Smart spatial planning

6.4 What more needs to be done?

Energy Capital is facilitating the development of digital Local Area Energy Plans (LAEP) for all local authorities in the region. Funded through Ofgem’s Strategic Innovation Fund and led by National Grid Electricity Distribution, the LAEP+ tool uses interactive maps which allow for multiple datasets to be layered, including data on electric vehicle charging, industrial demand, new housing developments and other future demands. It is essential that these LAEPs are compatible with NESO’s regional energy planning process, allowing local authorities to feed in detailed, data-led insights to provide robust evidence for setting the regional strategic direction. However, additional, dedicated, long-term resources will be needed for local authorities to play a valuable role in energy system planning as set out in the 2024 Devolution White Paper.

Heat decarbonisation must be holistically embedded into local area energy planning to ensure that opportunities provided by a range of technologies and energy vectors are considered. Policy development around heat network zoning needs to be fully aligned with aspirations for whole energy system planning.

In the short and medium-term, locating developments where there is good existing grid capacity can avoid lengthy and costly upgrades. In the long-term, the siting of hydrogen infrastructure for industrial clusters will also be a key consideration for energy intensive developments.

Energy system data needs to become more visible and shareable with multi-disciplinary teams. This will allow rapid assessments of spatial plans to ensure informed decision making both in transport planning and energy system planning.

The energy sector also needs to work with the public sector to identify whole system solutions that bring added benefits to the area.

Case study – Transport for West Midlands (TfWM) Bus Depot Strategy



TfWM worked with Energy Capital to ensure their depot strategy takes energy infrastructure into account. With greater visibility of available grid capacity and potential issues caused by the large-scale electrification of bus fleets, business cases for investment can consider potential mitigations and added value early on, such as energy storage buffers, reducing risk and uncertainty.



6.4.1 Policies that can enable this Pillar

- The National Energy System Operator needs to ensure that an integrated, multi-vector approach is taken to develop Regional Energy Strategic Plans (RESP) from the outset to ensure necessary investment is not delayed.
- Digital LAEPs need to be accepted as a valuable input to RESP development and local authorities need to be resourced adequately to input effectively to RESPs.
- National Planning Policy Framework changes are needed to increase the number of decisions on renewables schemes that can be made locally to encourage projects that provide local energy system solutions.
- Heat network zoning regulations need to give certainty for areas where heat networks can be the most affordable solution and these need to link effectively into the RESP process.

07

Pillar 2 – Local flexibility

This pillar reflects the importance of flexibility in a smart local energy systems. Even if the smart, integrated planning processes set out in Pillar 1 are achieved, there will still be a need to address short-term constraints in the energy system using flexibility.

7.1 What would success look like?

The value of all types of energy flexibility, across supply and demand, and across all energy vectors, is recognised within energy system planning processes. Within network planning, solutions based on flexibility technologies are seen as valid alternatives to reinforcement, and the avoided or deferred cost of upgrade is attributed to the smart solution. There will be thriving markets for local peer-to-peer energy transfer and grid balancing services, which will enable greater utilisation of renewable generation both locally and elsewhere in the UK, while retaining the value provided by the flexibility services locally. A range of commercial technologies are available for use where appropriate, from batteries for electricity storage, demand management and reduction removing the need to accommodate sharper peaks in power flows, and thermal storage connected to heat networks.

7.2 What is the status quo?

Current network planning processes incentivise traditional reinforcement of the grid to accommodate higher demand. The first-come-first-served rule means that the high costs of reinforcement are not spread fairly among all beneficiaries. Queue management reform is a key priority under the Clean Power 2030 mission. Recent changes to the regulations through the Significant Code Review now look to connect ‘first ready’ in a bid to remove so-called ‘zombie projects’ from the queue, but this has not yet realised the value of freeing up queue capacity by accounting for more flexible approaches within the regulatory environment.

Some IDNOs and micro-grid providers are seeing the market opportunities and exploring alternative approaches.

Although flexibility markets do exist for grid services, the value created by storage assets is often not retained locally. Storage assets such as multi-MW batteries are being installed and operated directly connected to the transmission network and optimised to serve primarily a national market. This can have a deleterious effect on the local grid, as capacity is then taken up with little benefit to the potential local market. Flexibility markets do not currently incentivise locally aggregated micro-scale flexibility due to the higher level of risk involved and peer to peer trading of power remains challenging.

7.3 Why is change needed?

Smarter spatial planning processes identified in Pillar 1 will not be sufficient to ensure that demand is sited where suitable infrastructure already exists or is planned. There will still be plenty of cases where infrastructure constraints are a barrier to decarbonisation.

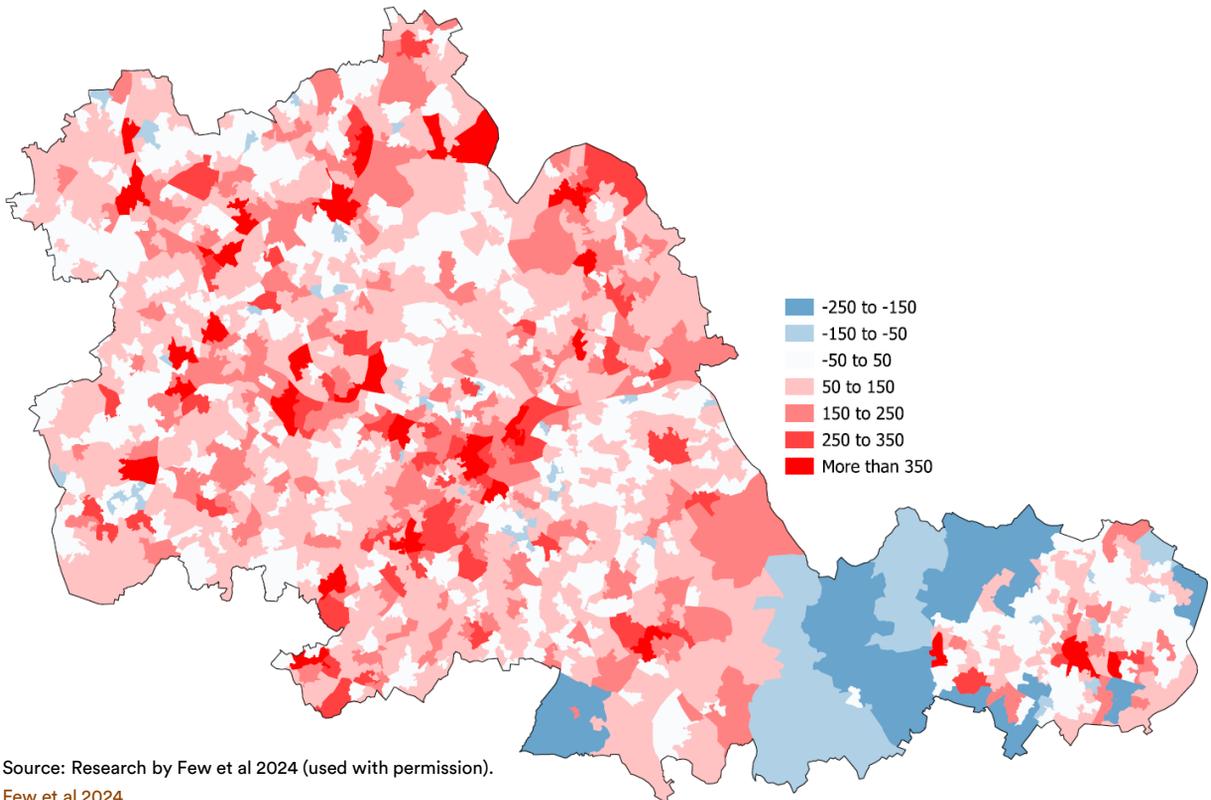
Distributed ownership of flexibility would enable and empower households, communities and businesses to more directly benefit from the value that flexibility provides to the energy system. This would help to ensure a just transition by creating opportunities for everyone to benefit from the necessary system changes.



Pillar 2 – Local flexibility

Extent of local network upgrade required to reach net zero

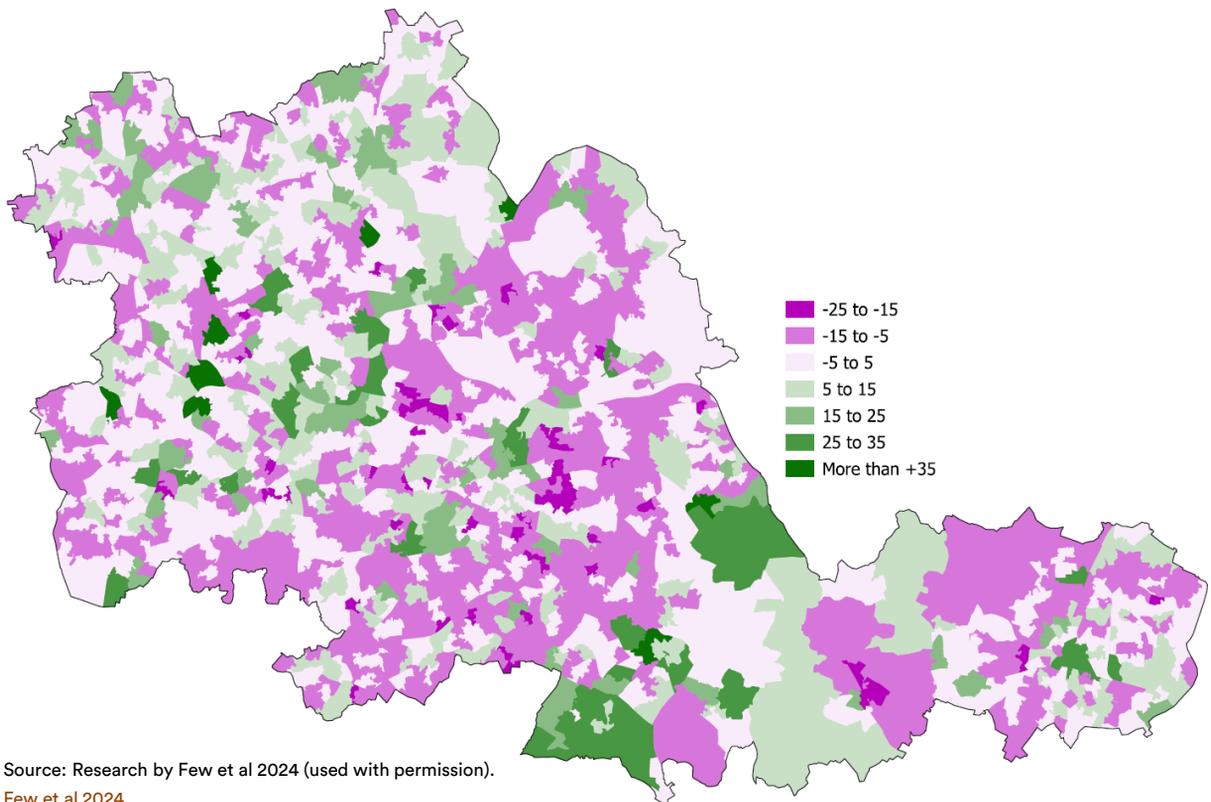
Estimated excess local upgrade cost in 2050 (£k per LSOA)



Pillar 2 – Local flexibility

Impact of demand reduction on local network upgrade requirements

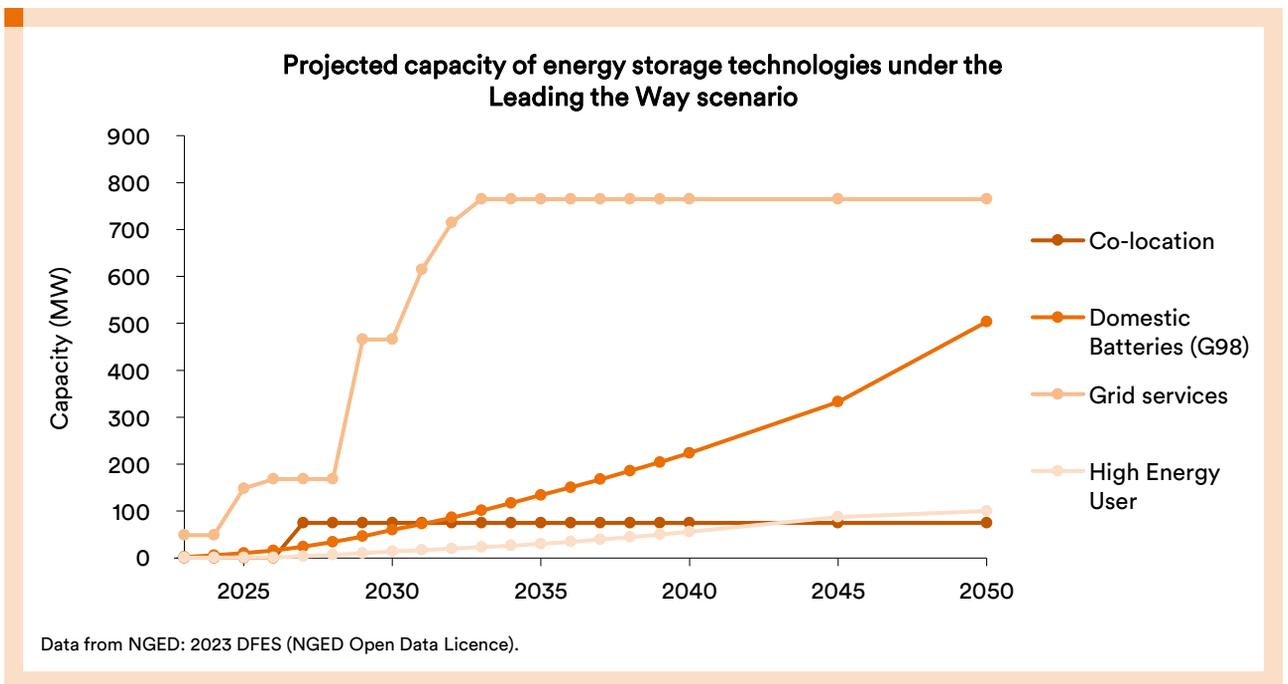
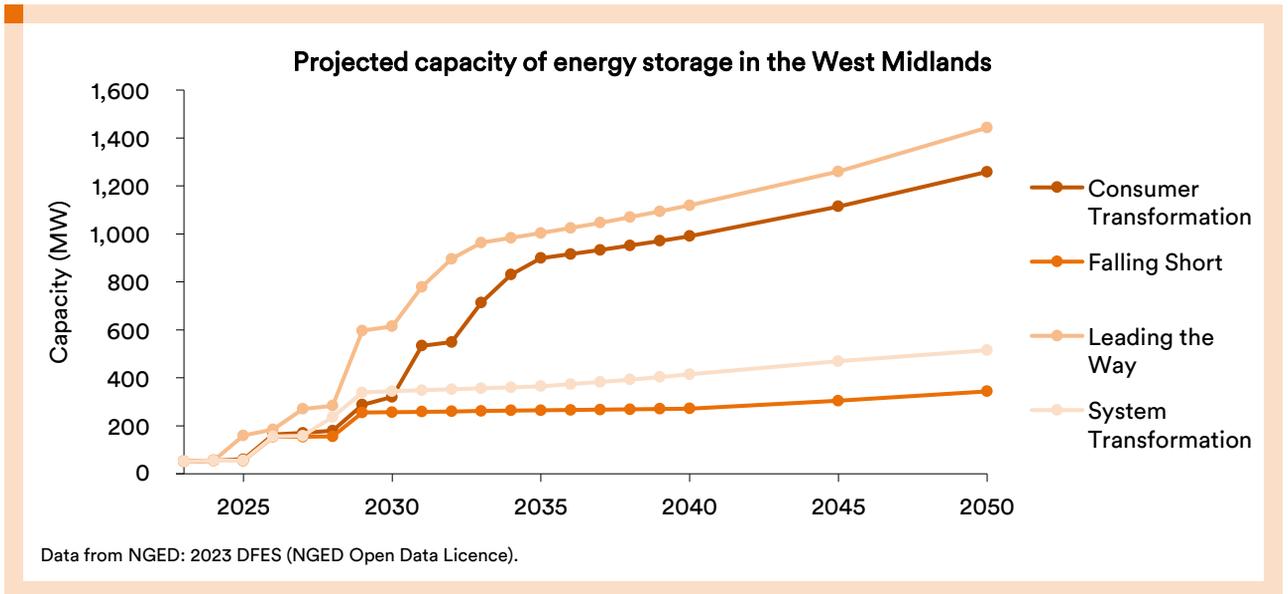
Estimated excess flexibility savings (£k per LSOA)



Researchers from Imperial College London analysed the GB electricity system at a neighbourhood-scale granularity to demonstrate the varied impacts of net zero across places. They found that, as in other urban areas, the West Midlands will require significant network investment in order to achieve net zero. The impact of demand reduction on these required network upgrades is very varied across the region; in some places, it could significantly reduce reinforcement needs, while in others a wider range of smart technologies will be necessary to bring down the costs of upgrades.

Deployment of storage technologies is projected to significantly accelerate. By 2050, the domestic flexibility market could contribute £1.3 billion per year to GDP and support 10,000 jobs nationally.

Pillar 2 – Local flexibility



Within the region, there is a large pipeline of storage projects with 1500MW capacity already in the planning system. The West Midlands can become the region that utilises this storage in the smartest possible ways, enabling local communities and businesses to retain greater value.

Pillar 2 – Local flexibility

Renewable energy capacity in pipeline (MW)



Case study – Project EQUINOX



The WMCA is working with National Grid Electricity Distribution and other partners to look at how to make green heating cheaper and greener still. During the project, heat pump users are asked to turn down their heat pumps during peak energy demand periods, to help save energy and support the electricity grid.

The EQUINOX project is investigating the potential for individuals to benefit from demand side flexibility (DSF) response through their heat pumps. DSF presents an opportunity to lower energy costs by rewarding consumers for adapting to demand fluctuations, ultimately contributing to a more cost-effective energy transition, including by avoiding costly infrastructure upgrades to accommodate the growing demand on the electricity grid resulting from the widespread adoption of heat pumps. At the regional level, this could also mean reduced disruption to businesses and residents from infrastructure upgrades.

But to unlock the full potential for DSF from heat pumps and to ensure the benefits of flexibility to customers are equitable, we need to understand how different groups access and engage with heating flexibility offerings, including fuel poor and vulnerable households.

This is why Energy Capital has supported the project by developing an Equitable Participation Framework (EPF), which aims to facilitate the development of this understanding and guide future heating flexibility offerings by identifying the key factors which can affect how well a customer can access and engage with them.

Pillar 2 – Local flexibility

Case study



The bespoke framework is enabling the project partners to identify relevant hypotheses and to ensure recruitment, as well as segmentation and analysis of the results, consider variations in customer experience and potential vulnerability. It is also already helping to formulate recommendations to improve the future design of heating flexibility offerings, by energy companies and by energy companies in collaboration with local government, so they can unlock the optimum flexible capacity in the fairest possible way.

More information will be available as the project draws to a close after three Trials over three winters until the end of 2025 (see lead project partner National Grid Electricity Distribution's [website](#) for more information).

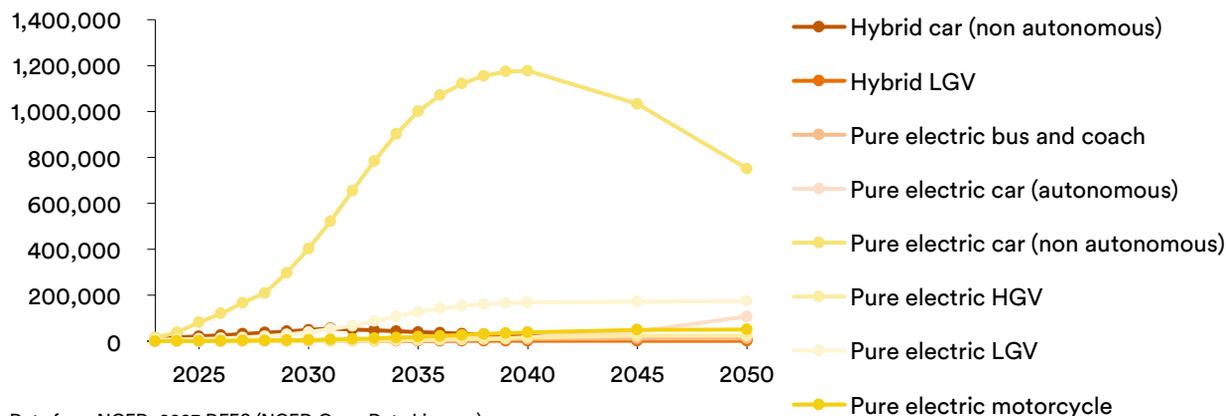
7.4 What more needs to be done?

Energy market regulations need to allow for the participation of aggregated flexibility in existing grid servicing markets, while also exploring innovative models peer-to-peer trading and microgrids.

Storage technologies with medium and long-term duration and high capacity will be essential to the stability of the energy system when the majority of energy generated comes from intermittent renewables. Solutions do exist, but more work is needed to ensure that they become commercially viable, and a sustainable market can grow, as identified in the [Murrant, Radcliffe and Joshi, 2020: Energy Storage Roadmap](#).

The ability to use V2X connections with electric vehicles to offer micro-scale grid services and act as home storage when parked, can be an opportunity for the region, given its strength in automotive manufacturing. While the number of electric vehicles in use in the West Midlands has the potential to increase dramatically according to NGED projections, the relative lack of car ownership in deprived areas demonstrates the risk that the transition could exacerbate existing inequalities. To prevent this, a proactive approach is required to ensure that communities more widely can benefit from the electric vehicle transition; for example, through the creation of car clubs, or charge points owned by and generating income for local community energy groups.

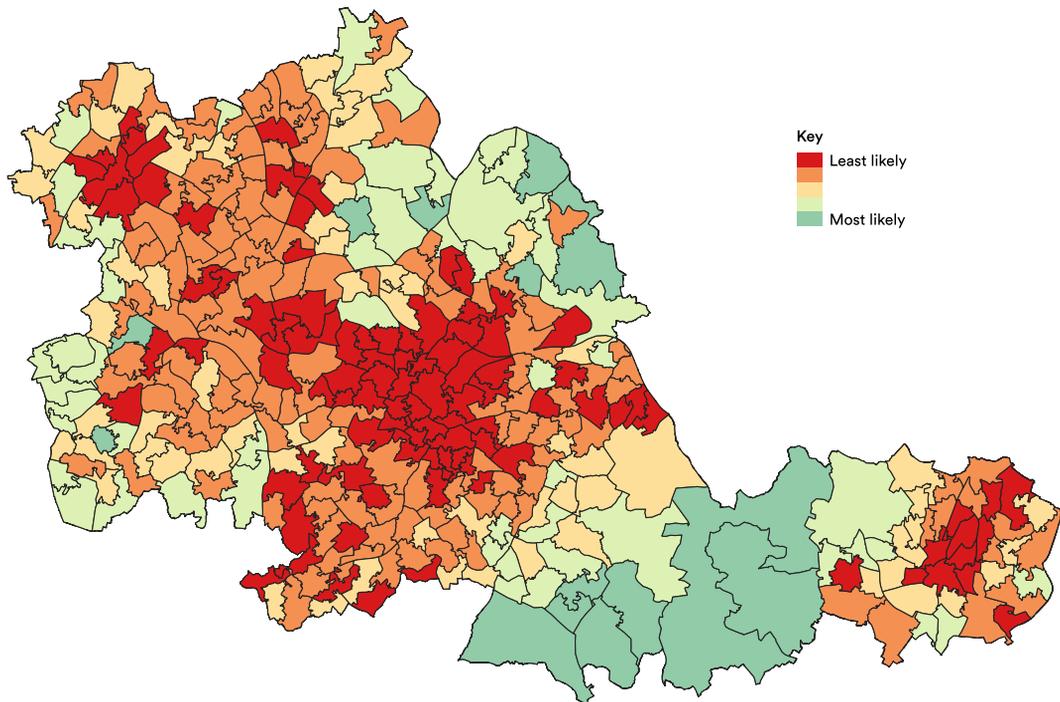
Projected numbers of electric vehicles under the Leading the Way scenario



Data from NGED: 2023 DFES (NGED Open Data Licence).

Pillar 2 – Local flexibility

Share of households with no use of a car or van, relative to UK



Data from ONS: 2021 Census data – Car or van availability, MSOA quintiles (Open Government Licence).

In addition, the West Midlands would need to offer a supportive innovation environment to encourage new commercial propositions. By establishing a reputation of enabling routes to market for upcoming businesses looking to develop their offering, we can ensure that our businesses and communities benefit from the new market propositions first.

The region will look to support a range of independent system aggregators that can benefit from the economies of scale that a place-based approach affords. The missing link in this approach is often a convening actor to bring multi-parties together. Our partnership approach can take a leading role in bringing together supply and demand, understanding the dynamic nature of the opportunities.



7.4.1 Policies that can enable this Pillar

- Regulation needs to incentivise inclusion of aggregated demand in flexibility markets.
- Through the Review of Electricity Market Arrangements (REMA), energy market reform needs to value the role of local flexibility.
- Half-hourly settlement of energy prices for all customers is needed to ensure that flexibility offers maximum benefit to the grid, reflecting short, sharp peaks in demand in the price.

08

Pillar 3 – Co-located clean generation

This Pillar highlights the importance of growing renewable energy generation within the region, while ensuring that a smart approach is taken to reduce the burden on the energy system and encouraging community-led projects to drive the transition.

8.1 What would success look like?

Renewable energy generation within the region grows, supported by GB Energy; the region remains a net importer of energy, but plays a significant role in demand management using behind the meter solutions and storage.

The renewables that are installed are co-located with high energy demand and/or storage, reducing strain on the energy system and producing better financial outcomes for investors.

Opportunities for investment in renewables can be identified using the digital LAEP platform, which enables supply and demand to be matched effectively. The region becomes more attractive for investors and developers due to the pipeline of opportunities identified by stakeholders without the risk of lengthy queues for a grid connection.

A multi-vector approach makes greater utilisation of waste heat sources, improving the business case for greater expansion of heat networks.

For example, an Urban Centre Hyper Scale data centre can be purposely sited adjacent to a new housing development which can utilise the waste heat from the cooling of the equipment to provide heating and hot water through a district heating scheme. The houses can be orientated to maximise solar generation from rooftop arrays which feed a communal battery to ensure all properties are able to take advantage of the low cost zero carbon energy.

8.2 What is the status quo?

Currently, the simplest ways to install renewable generation are not well suited to the West Midlands. Aside from offshore opportunities, the construction of large-scale solar and wind farms that use large areas of land are poorly suited to a densely populated region with limited undeveloped land.

Grid connected generation is developer-led. Energy consumers looking to reduce their energy costs and carbon footprint are left to explore their own generation options independently, but the available options are opaque. Often renewable energy initiatives are met with grid barriers, planning consent challenges or other issues such as insurance hurdles. While community energy demonstrates a good example of developers and consumers collaborating for mutual benefit, the sector is under-resourced and has struggled to grow to its full potential since the withdrawal of the Feed-in Tariff.

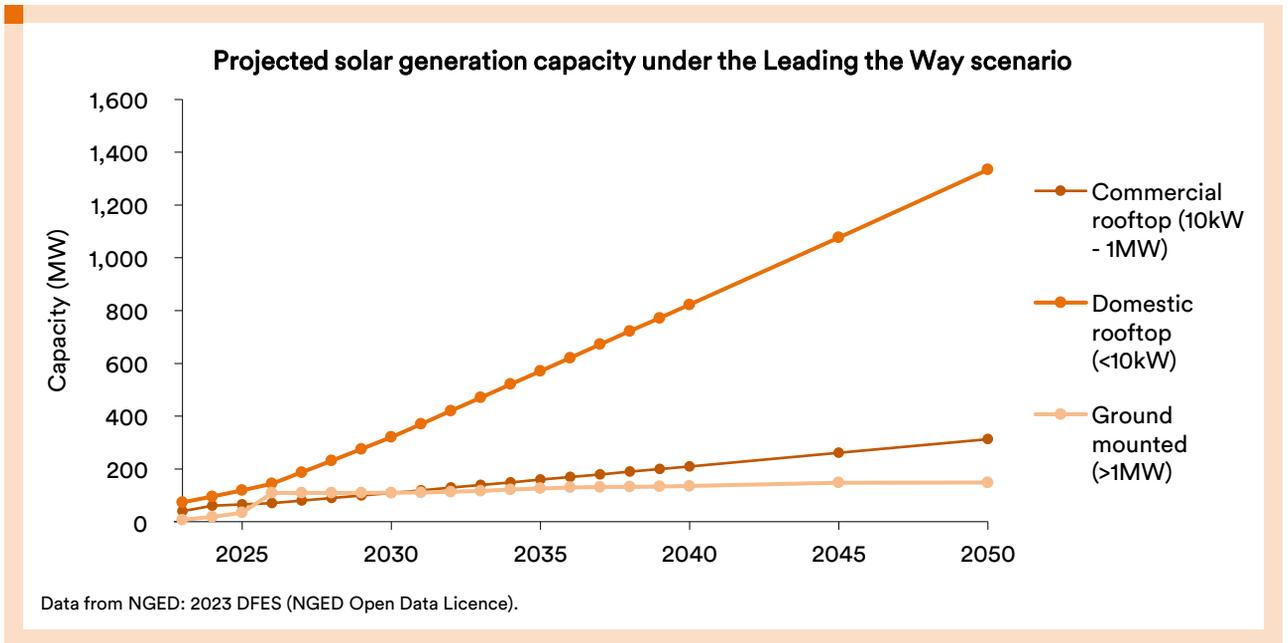
There are now more simplified means to share power generated by one organisation with another through well-established 'Power Purchase Agreements'. However, these have been developed for single off-takers and developers have been less willing to underwrite the risks of corresponding multi-party arrangements. This rules out many of the smaller entities with lower demands from benefiting from such solutions. Current energy system regulations limit the distribution of solar generation to residential off-takers to under 1MW, constraining the size of these types of community schemes.



Pillar 3 – Co-located clean generation

8.3 Why is change needed?

More renewable energy generation is necessary to meet the region's net zero targets, reflected in NGED's projections.

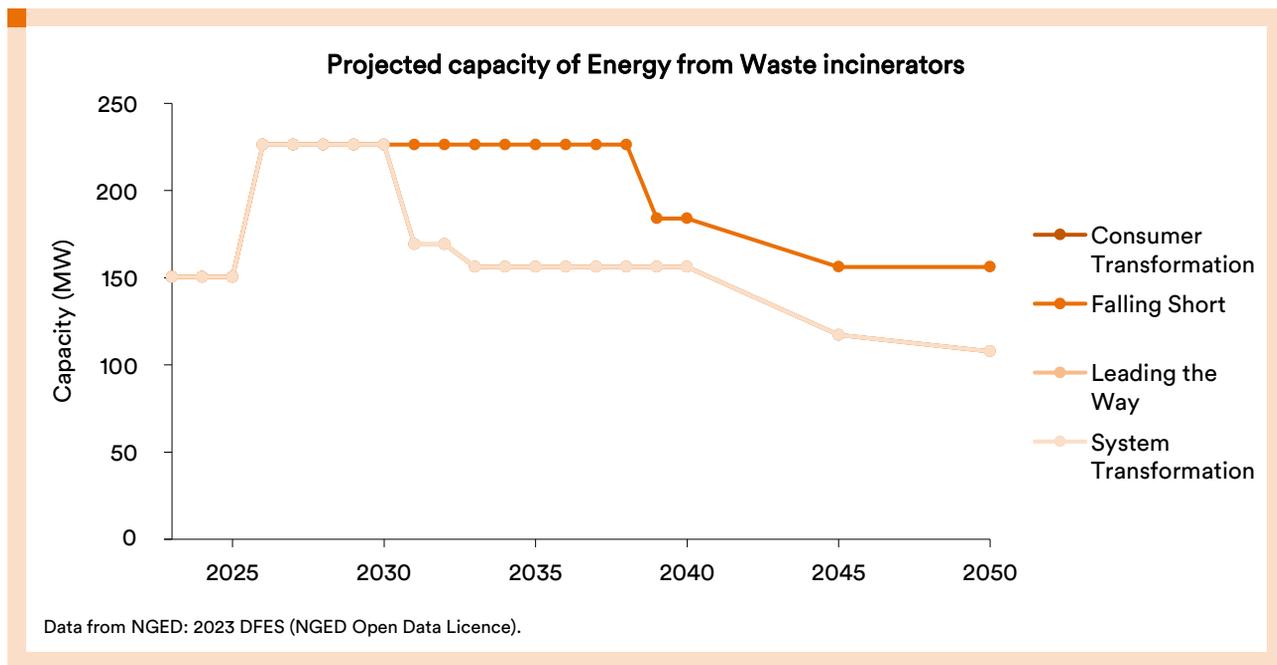


However, continuing with a developer-led approach would not take advantage of smart technologies and would result in unnecessary delays in connection times and upgrades to the grid.

Following the closure of the UK's last coal power station, waste incineration is likely to be the most carbon intensive source of power. New generations of Energy from Waste (EfW) plants, such as the modular design by KEW Technology demonstrated in Wednesbury, offer improvements. However, targets for improving recycling rates will reduce the supply of waste over time, as shown in NGED's projections:



Pillar 3 – Co-located clean generation



While EfW plants are operational, their heat sources should be used as anchors for establishing heat networks to improve the current business case for the infrastructure investment. When plants reach the end of their operational life, alternative, lower carbon heat sources should be connected to heat networks. Solutions, including recovery of waste heat from industrial processes, can be explored through local area energy planning.

At a local level, it is as important for the West Midlands’ energy resilience to invest in smaller scale distributed energy assets behind the meter. This will help to shield the region from a volatile energy market and ultimately increase the robustness of power supply. It will also enable businesses and citizens to invest in generation and participate in an active energy market themselves.

This approach can also be extended to consider ‘near-site opportunities’ where supply and demand are located in separate entities but could be joined via a private network or other connection in order to optimise both the technical and financial opportunities from the investment.

8.4 What more needs to be done?

The last whole systems analysis of renewables options for the region is now ten years old. The region will undertake new research, bringing together local authorities and communities across the wider West Midlands region to draw on insights provided by the LAEP+ tool and assess potential in their areas. This will inform potential investment by community and civic actors and facilitate collaboration with Great British Energy to enable investment into local schemes.

While digital tools will help to identify a pipeline of projects, in order to make the most of GB Energy’s £400m community energy loans and £600m local authority grants further work is required to create a range of off-the-shelf business models for co-located renewables and tackle the barriers to widespread deployment. This will need to include new ways to encourage neighbouring businesses to collaborate and co-invest and ensure they and their local communities can benefit.

Pillar 3 – Co-located clean generation



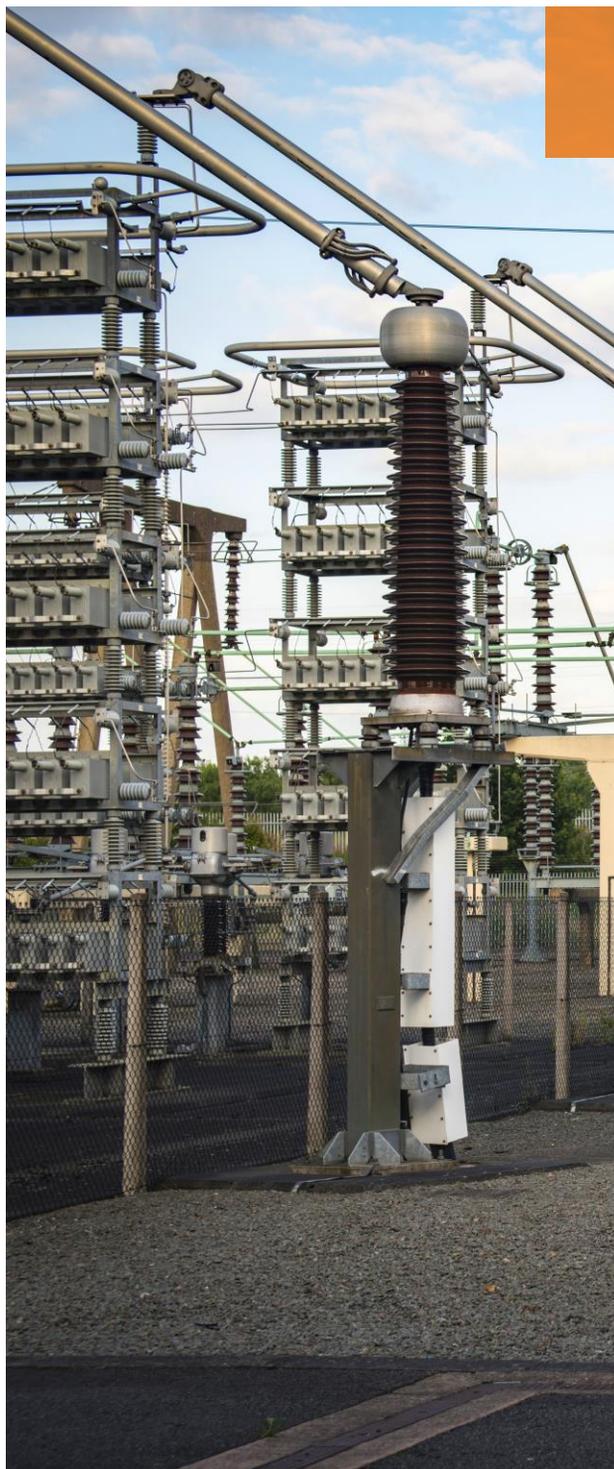
8.4.1 Policies that can enable this Pillar

- Commitment to effective heat network zoning is needed to inform future plans of where heat demand will be met with heat networks and facilitate delivery.
- GB Energy's Local Power Plan needs a broader remit to provide funding and investment for community and civic energy and support business & industrial decarbonization.
- Delivery of WMCA Homes for the Future standard is needed to ensure new build housing is constructed with appropriate levels of generation and storage and considers smart system solutions.

Case study – NEC Giga Hub



A Giga Hub containing 30 ultra-fast 300KW and 150 fast 7kW charge points was built at Birmingham's NEC in 2023. Solar canopies above the charge points feed directly into electric vehicles (EVs) when connected, or otherwise flow back to the grid. The grid connection required for the EV charge points meant that capacity was already in place for the renewables, improving the overall business case for reinforcement.



09

Pillar 4 – Skilled workforce and supply chain

Ensuring access to the necessary skilled workforce has been identified as one of the biggest challenges to achieving Government’s Clean Power mission (CP2030). This pillar considers the way skills provision and supply chain development within the West Midlands can be aligned to ensure that sustainable markets can grow to deliver the energy transition within the region and considers our role in providing skills into the national system to enable a just transition.

9.1 What would success look like?

The West Midlands builds on its current reputation and is known as a national centre of excellence for smart energy systems expertise, with programmes supporting the growth of the smart energy systems cluster, which continues to attract companies into the region and provide support and leadership so the region becomes recognised as a provider of skills and supply chain services with companies active nationally and internationally.

The region forms effective partnerships with industry, skills providers and Great British Energy to proactively contribute to the national skills needs, supporting the Great Grid Upgrade and CP 2030, harnessing a fair share of the estimated 130,000 jobs and up to £11bn GVA nationally by 2050.

A long-term plan for growth in demand for low carbon technologies and services gives confidence to regional supply chains to coordinate with skills providers to create sustainable pathways to high-skilled jobs.

Devolved funding for retrofit and other net zero programmes allows for integration and alignment with devolved employment and adult skills training offers, and wider funding to shape a range of regional skills offers to ensure maximum diversity and participation.

9.2 What is the status quo?

Skills have been highlighted as a major barrier to achieving Governments Clean Power Mission, but little has actually been implemented to mobilise action and tackle this issue holistically.

The supply chain is reluctant to invest until contracts are awarded, but by then it will be too late, resulting in delays and cost hikes.

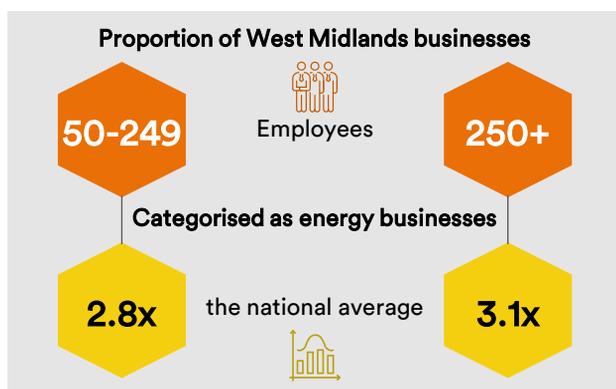
Specifically on retrofit, the sector has suffered from boom-and-bust grant funding rounds, leading to a lack of long-term certainty about job opportunities. This has resulted in a shortage of trained installers, as well as many of those who have qualified leaving the sector, and those remaining increasing prices whilst standards fall. Building decarbonisation is technically complex, and supply chain availability is limited. This has led to poor outcomes from short term funding schemes and little market growth.

The opportunity presented by a smarter energy transition is not yet being fully harnessed to attract new skills and talent. Those transitioning from education, those seeking to upskill or retrain, and those joining from other sectors are essential to supporting this critical transformation. A more integrated, place-based approach to skills development in the energy sector is needed to align with regional and national priorities.

A place-based approach to skills in the energy sector is not being taken. Training provision from STEM, through further and higher education, to the workplace is not co-ordinated. Skills providers and supply chains are operating independently; any interaction tends to be on an ad hoc basis due to the uncertainty surrounding long-term demand. As a result, there is a lack of coordination between skills provision and anticipated increases in demand in line with net zero and fuel poverty alleviation targets.

Pillar 4 – Skilled workforce and supply chain

The West Midlands has a proportion of medium and large energy businesses three times greater than the national average. Companies like E.ON, based in Coventry have thrived in the region, and recently, Octopus Energy moved its headquarters to Coventry, and Hitachi Energy has moved its UK headquarters to Birmingham. Solihull is also the home of Energy and Utility Skills, the voice of the sector. This provides a strong foundation for the public and private sectors to work together to channel skills development towards roles where they are most needed and can be turned into jobs.



9.3 Why is change needed?

Research indicates that by 2035, 55% of jobs in the WMCA region will require skills and qualifications at level 4 and above⁽⁹⁾. Green and net zero skills as part of energy transition will thread into many sectors in the region, presenting an opportunity to grow skills and support well paid jobs for everyone.

Within the energy system, the limiting factor is not just training new recruits, it is ensuring that experienced engineers and system planners are deployed most effectively and have themselves been upskilled appropriately to adapt to energy transition. This involves not only bringing in new talent, but redesigning roles, using technology and innovation and attracting people from all parts of society.

An innovative and place-based approach to skills development will be key to ensuring that the changes to the energy system arising from the net zero transition are able to be managed effectively.

⁽⁹⁾ Source: NFER Skills Imperative 2035.

There is an opportunity for each region to develop skills and expertise in partnership with industry, which can be both deployed locally and exported to the rest of the UK.

In the West Midlands the opportunity to grow skills and expertise in smart energy systems to support the demand side and flexibility aspects of the energy transition presents a huge opportunity for the region to play its part in supporting a just transition. This requires advanced engineering skills in energy system design and management; whole building management skills; local engineers in the retrofit supply chain; customer support and communication skills and a huge range of innovation and high-tech skills, offering job opportunities for everyone – a key objective of the region’s Mayor.

9.4 What more needs to be done?

The Devolved Retrofit Pilot will give an opportunity for the public and private sector to commit to a long-term delivery programme, reducing uncertainty for training providers to invest as we enable a sustainable local market for retrofit to grow.

A strategic approach is required to grow demand that works within current supply chain limitations in the short term. Opportunities to create value for customers without requiring huge leaps in skills or capacity will need to be identified for quick wins. This could include extending training provision for electricians to install solar PV, batteries and smart controls and upskilling builders to install external wall insulation. Similarly, it may be more appropriate, and valuable to customers, to train heating engineers to optimise existing heating systems and make them heat pump-ready, rather than to expect heating engineers to be able to design and install heat pump systems. More focus is also needed to grow capacity for communication, advice and customer service within the regional supply chain. If this is developed early, then customer confidence will grow and demand for more complex interventions will also grow more sustainably.

A current barrier to expanding training programmes is the lack of incentive for qualified practitioners to fill trainer vacancies, since trainer work tends to be insecure, and a shortage of qualified practitioners means there is currently no shortage of work. The supply chain will need to work with colleges, universities and independent training providers to ensure that skills are able to be passed on to an expanding workforce.

Pillar 4 – Skilled workforce and supply chain

Skills offers need to be coordinated and co-designed with business, creating pathways into good jobs and providing opportunities to upskill and retrain the existing workforce. Through this co-ordination we can better understand the profile of skills need and develop training provision to respond to this demand. The opportunity for the public sector to partner with larger employers in their area and coordinate research and innovation within the higher education sector, alongside shaping skills solutions across the further education sector are also key mechanisms to develop skills that lead directly to jobs. The West Midlands is one of the youngest and most diverse regions in Europe, but has high levels of youth unemployment that it needs to tackle to support long term economic growth. Building aspiration and opportunity for young people, through making available skills training pathways to apprenticeships underpinned by careers education, information advice and guidance will be part of this co-ordinated approach.

The public sector also has the ability to bring together a range of different funding streams to bring talent into the sector, bringing people back into work and targeting under-represented sections of the community, and especially young people. Smart Energy System programmes delivered through facilities such as the National Centre for the Decarbonisation of Heat could play an important role in meeting the needs of the sector alongside locally based training offers.

The Clean Power 2030 Action Plan: Assessment of the clean energy skills challenge identified some clear dominant clean energy sectors across regions of the UK. Northern Ireland was identified as having the highest share of clean energy job adverts falling under Smart Systems and Storage Flexibility. Smart Systems and Storage Flexibility also has the second highest share of clean energy job adverts in Wales while Heat & Buildings has the highest. The West Midlands will seek to work with devolved nations to build the skills base for smart energy systems.

9.5 Policies that can enable this Pillar

- A national framework and campaign on the competency requirements of the industry and the opportunity presented by the energy transition.
- A thematic regional approach to energy skills development nationally, based on prioritised regional opportunities, to tackle all of the sectors needs concurrently from education through to industry solutions.
- The Skills and Growth offer to replace the apprenticeship levy, ensuring regional priorities feed into the provision businesses can access for their employees.
- Lifelong Learning Entitlement, due to start from 2027, this will enable residents to access loans towards study at level 4 to 6 with a flexible modular approach to learning.
- Fully devolved, flexible net zero and retrofit funding for combined and local authorities to drive sustained local demand to enable this work.



Pillar 4 – Skilled workforce and supply chain

Case study – Retrofit Bootcamps



Skills Bootcamps are supported by the WMCA and delivered across the region by a range of further education, higher education and independent training providers. Bootcamps are funded, practical, accelerated short courses designed to equip individuals with the knowledge and skills needed by employers across the region. Bootcamps are co-designed with industry and offer unemployed and employed residents the opportunity to upskill or reskill in priority occupations in the region.

Retrofit Skills Bootcamps cover installation of EV charging, insulation and heat pumps, as well as retrofit coordinator roles, enabling people to enhance their employability and gain hands-on experience whilst networking with industry peers.

Case study – Path 2 Apprenticeships



Path 2 Apprenticeships is a pre-apprenticeship programme providing targeted support to unemployed and economically inactive West Midlands residents aged 19-29, to prepare them with the knowledge, skills and behaviours to successfully move into an apprenticeship. It contributes to the Youth Plan by helping to support young people into meaningful work and (re)engaging employers in the apprenticeship system.

A fundamental part of programme design is that employers are involved in the curriculum creation process, ensuring the relevant knowledge, skills and behaviours form part of the sector-specific curriculum content. This is in addition to a core functional skills offer, including Digital skills, green skills, Employability skills, English & Maths and Careers Education, Information, Advice and Guidance.



10

Pillar 5 – Commercial and financial innovation

This Pillar covers the importance of directing innovation efforts within the West Midlands towards commercialising existing low carbon technologies and seeking new ways to finance the delivery of net zero solutions.

10.1 What would success look like?

The West Midlands develops a reputation as a testbed for energy system innovation, where new business models are trialled, and low carbon technologies are commercialised. A wide range of finance sources are able to be channelled into integrated, place-based investment opportunities which lead to a broad range of positive outcomes beyond the energy system. Using innovative approaches, markets are created and sustained that support the delivery of this strategy.

10.2 What is the status quo?

The innovation ecosystem is one of the region's strengths, with several universities that are world-leading in energy research. Clean tech and smart energy systems are identified as a growth sector for the region and innovation funding is made available to support these areas.

Many individual innovation projects and solutions are being developed, but they have not yet been mainstreamed or commercialised. The lack of sustainable market demand causes a lack of investment in skills and supporting supply chain, which in turn result in a lack of finance and delivery.

When disaggregated, place-based decarbonisation schemes tend to have several aspects that are commercially viable on their own. At present, it is challenging to persuade investors to consider a place-based scheme in its entirety due to the added risk of less attractive investments, which are currently being left to the public sector to fund.

10.3 Why is change needed?

In relation to retrofit, consumer finance is available on a wide variety of products. If there were sufficient demand, then willing funders would be found. An improved understanding of the types of value proposition that significant numbers of people across the region would find attractive is required to begin to tackle the demand challenge. Whole house retrofit, for example, is unlikely to appeal to large numbers of people; the vast majority of people will never want to do this because of the cost and disruption when weighed against the benefits. However, commercial innovation of smart energy system models, such as energy-as-a-service, could be attractive to consumers and provide services to rebalance where risk sits to suit a diverse range of investor profiles.

Alongside this, relevant consumer protections, quality guarantees, and availability of good quality advice to provide customers with confidence and enable them to make informed decisions in their own interest and according to their needs is required. This requires innovation in consumer propositions.

Case study – Coventry Strategic Energy Partnership with E.ON



In 2023, Coventry City Council began a 15-year partnership with E.ON, forming an alliance that will build a cleaner and more sustainable city and drive a new green economy that will bring jobs and skills for generations to come.

As a result of the partnership, Coventry City Council and E.ON will work together to develop ideas and projects for the benefit of Coventry residents and develop a strategic plan aligned to all five priorities of the [One Coventry Plan](#).

Pillar 5 – Commercial and financial innovation

10.4 What more needs to be done?

The West Midlands smart energy systems cluster will provide innovation support for SMEs, focusing on developing and commercialising new R&D products and services for smart energy systems, and scaling up existing smart energy system companies through profiling, innovation and support on wider needs such as skills.

The cluster will also seek to identify inward investment, working with West Midlands Growth Company to leverage foreign direct investment in smart energy systems, including harnessing the profile of the ‘intellectual cluster’ around the Energy Systems Catapult and the region’s universities.

The region will seek to better understand what makes attractive retrofit value propositions and will seek to:

- understand what different groups of people are prepared to do within their homes and the appetite for different kinds of intervention;
- work with supply chain innovators to help support development and marketing of these service offers/propositions to these groups of people;
- work with finance providers to find ways in which these can be funded.

Targeted support is needed to enable small- and medium-sized enterprises (SMEs) to benefit from innovative business models. Anchor institutions can be used as testbeds and demonstrators to grow business confidence.

Continuing work is needed to develop the case to attract a diverse range of outcome buyers into net zero investments to make smart energy system solutions attractive propositions. For example, capturing the health benefits from increased thermal comfort and indoor air quality could be measured and viewed as an investment proposal by health providers in a similar way to the Warm Homes Prescription trial run by Energy Systems Catapult.

10.4.1 Policies that can enable this Pillar

- Energy levy rebalancing between electricity and gas to remove systemic cost barriers to electrification.
- Connected to the above, measures to remove the cost of removing gas supply and gas meters from households, to further incentivise installation of heat pumps by removing the standing charge.

- Incentives for energy providers to provide tariffs for low energy users that incorporate standing charges into unit costs.
- Measures to facilitate the provision of meter finance between suppliers, installers and finance providers to households and commercial users to spread the costs of energy efficiency measures through regular bill payments.
- Evidence base needed to prove waste-based pyrolysis gases can be used as a fuel/in commercial applications – waste classification is a key issue.
- Appreciation and support of Smart Energy Systems and its key role within the Clean Energy industries sector plan and wider NIS. Support the West Midlands in clearly defining smart energy systems so that relevant businesses – and particularly those in slightly adjacent industries and those who can transition/pivot – self-identify being relevant to smart energy systems and the opportunities of the industrial strategy being relevant to them.
- Recognition of the West Midlands as the strategic centre for Smart Energy Systems, and support in the active promotion of this cluster of businesses.
- Exploration of further place-based models of delivery and funding, for example through innovation and R&D to support the development of new technology for businesses within the cluster.
- Set the standard in terms of regulation and procurement towards smarter systems, including by re-surfacing the Smart Systems and Flexibility Plan, or a similarly updated document.
- Through the Clean Power Action Plan, investment in the necessary infrastructure to support smart energy systems, such as smart grids, micro-grids, and energy storage solutions.
- Bring together green financiers in a session in the West Midlands to meet businesses, utilising wider mayoral combined authority links.
- Design a national campaign related to use and perception of smart devices across the whole spectrum of settings.
- Support for pilot and demonstration projects that showcase the benefits and feasibility of smart energy systems.
- Alignment with Skills England on developing response to skills need, led by industry demand.

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Policy foundation

The Policy Foundation identifies the legislative and regulatory changes required for the West Midlands to lead the way in implementing smart energy systems. Some policies fit within a single Pillar, but most are cross-cutting and would unlock a broad range of opportunities.

11.1 Existing policies

11.1.1 Smart Energy and Flexibility Plan

The region will work with Government to deliver the UK Smart Energy and Flexibility Plan and emerging policies resulting from the Clean Power 2030 mission. The Mayor has offered to chair a Ministerial Roundtable to kickstart conversations on how to accelerate the rollout of smart technologies to enable the Government's Clean Power Mission.

11.1.2 Regional Energy Strategic Plan (RESP)

The region will work with Ofgem and NESO to deliver effective regional energy strategic plans. Following consultation with the region's Local Area Energy Planning Coordination Group, Energy Capital responded to Ofgem's consultation on the latest proposals for the implementation of RESPs and are working with NESO to shape RESP through Project PRIDE. It is expected that this will include a long-term vision, a series of directive strategic net zero pathways that show energy projections and guide system need, with oversight provided by a Strategic Board.

11.1.3 Great British Energy's Local Power Plan

The region will work with Great British Energy to finance and deliver the Government's ambitious plan to rapidly accelerate local energy projects, including those led by local authorities and community groups. This needs to extend to co-located power and storage projects.

11.1.4 Clean Power 2030 Action Plan

The region will work with Government to deliver clean power by 2030 (CP2030). The National Energy Systems Operator (NESO) has stated it will require a programme of investment estimated at £40 billion per year for the next six years. With a clean electricity supply by 2030, net energy importing regions like the West Midlands will be able to focus on a strategy of electrification for heat, transport and industry as viable routes to net zero. As expected, CP2030 has a strong emphasis on energy generation. However, the action plan does identify that energy system flexibility, including consumer demand side management, will be critical to achieving its mission to balance supply and demand.

11.1.5 Devolution White Paper

The Devolution White Paper, published in December 2024, reaffirmed the Government's position that regions, led by trailblazers in the West Midlands and Greater Manchester, will have a strategic role on net zero. This will include devolved funding for domestic retrofit delivery, and coordinating roles for green jobs and skills and for local energy planning to support regional network energy infrastructure development. The West Midlands Combined Authority and local authorities in the region will continue to work with Government to demonstrate the value and impact of devolution.

11.1.6 Invest 2035

Government's Industrial Strategy will form a 10-year plan to deliver certainty and stability for businesses to invest in eight high-growth sectors. The nine West Midlands clusters within the Plan for Growth will need to be strategically aligned with the eight sectors through the Local Growth Plan. The WMCA will continue to work with Government to align our Smart Energy Systems focus and cluster with the Industrial Strategy's Clean Energy Industries sector to cover net zero, energy and retrofit programmes.

Policy foundation

11.2 Policies being introduced

11.2.1 Half-hourly settlement

Ofgem's introduction of market-wide half-hourly settlement of electricity prices from September 2025 will be transformational in unlocking the potential of distributed energy flexibility, including storage and demand-side response. Consumers will be able to benefit by responding to price changes, shifting energy use from times when demand is high to save on bills. This will also benefit the energy system, reducing peak system demand and therefore delaying or eliminating the need for expensive network reinforcement to simply meet the need of short, sharp peaks in demand.

Smart technology will allow consumers to benefit from these market changes without needing to always be aware of shifting prices. Access to forecast data will also allow for pre-emptive shifts in demand: for example, automatically warming a home during the day in advance of an evening when demand is likely to be high. This can ensure that consumers are not priced out of essential energy use, including thermal comfort.

11.2.2 Heat network zoning

Heat networks will play an important role in the decarbonisation of heating across our region, alongside technologies such as heat pumps. This is largely driven by the high heat demand density typical of a more urbanised region.

Heat network zoning is a crucial enabler of unlocking the heat network potential, as it can reduce demand uncertainty by requiring certain types of building to connect to the heat network where a zone is designated. The region fully supports the principle of heat network zoning and is keen to see it succeed.

Key to ensuring the success of zoning will be the provision of adequate resources for local authorities tasked with delivering and supporting the delivery of zones as zone coordinators and resources to unlock the synergies and efficiencies from regional collaboration on heat network and heat network zone deployment. Resources must be additional and reflect activities, including the scale of stakeholder engagement, required to carry out zoning roles effectively.

Regional collaboration should also reference wider energy system interactions to ensure that heat networks deliver on both decarbonisation targets and fair heat price. The need for speed cannot override consideration of the need to inform and engage impacted stakeholders at all stages of the process. The WMCA will continue to work with Government on the future of devolving funding for heat networks.

The region also underlines the need for balance between the interests of Zone Developers, the necessity of a timely and proportionate procurement process and the need for local and regulatory oversight of the development of heat networks. Likewise, there must be true transparency in prices and price changes during heat network development and expansion to ensure fair and affordable heat is supplied by heat networks.

Finally, we also note the dependence of heat network carbon intensity on wider policy changes such as the rebalancing of energy levies and underline the contribution of heat networks to wider decarbonisation goals will be determined by the ambition of national and locally set carbon emissions limits.

11.2.3 Review of Electricity Market Arrangements (REMA)

As consultation continues on REMA, Energy Capital will continue to engage to ensure that the region's voice is heard. Reforms could benefit the region if they enable further deployment of smart technology, but there is a risk that simplistic models of locational pricing could harm regional businesses if they result in overall higher energy prices. Energy Capital will use this Strategy as a guiding principle to continue to make the case for market reforms that are not detrimental to the region.

Policy foundation

11.3 Further policy requirements

11.3.1 Rebalancing of energy levies

Government will need to remove a proportion of the policy costs levied onto electricity prices and move them elsewhere to eliminate the perverse incentives that are blocking electrification and increasing prices for those transitioning to clean heat. This will need to be done sensitively to ensure a just transition and must not disadvantage those most vulnerable to energy bill hikes. Many households are currently locked into gas heating due to the prohibitively expensive upfront and ongoing costs of electrified heating.

However, it should be recognised that in areas like Birmingham Ladywood, the second most deprived constituency in Birmingham, nearly 65% of properties are electrically heated via electric storage and resistive heaters. Careful consideration must be taken in transitioning these properties to heat pumps to ensure the outcome is not disadvantaging any further already vulnerable home occupiers.

Some conclude that the fairest approach would be to shift these policy costs on general taxation, rather than on gas bills, to limit price hikes for any fuel type. No option for levy rebalancing is without its downsides and all have distributional implications. Correcting the imbalance sensitively is therefore an imperative for a true just transition.

11.3.2 Further devolution of net zero responsibilities

The Government will need to work with the WMCA to make a success of the Devolved Buildings Retrofit Pilot and moves towards permanent devolution of funding and broadening the scope and scale of funds included in the Integrated Settlement. These wider responsibilities and funds cover strategic energy system planning and Local Area Energy Planning (LAEP), heat network zoning and coordination, industrial decarbonisation, and energy efficiency and retrofit. In this latter programme are commitments to devolve Minimum Energy Efficiency Standards (MEES), enabling works to leverage private finance into energy efficiency, regional energy advice and the three-year Buildings Retrofit Pilot.

In the latter, the Government must allow for the flexibility to fund and champion smart-enabled and flexibility-supporting technologies, showcasing their benefits and their advantage when paired with a regionally co-ordinated and place-based approach to energy infrastructure planning and retrofitting buildings. Success of devolution will give the West Midlands sufficient scope to trailblaze smart energy system approaches and further progress towards our 2041 net zero target.

11.3.3 Clear decision on the future of domestic heating

To ensure that local area energy planning is done with the foresight of any major changes, Government needs to clarify its position on the future of the gas network – in particular, its role in domestic heating. This will allow for the most appropriate scenarios to be analysed and interrogated while reducing uncertainty about the future direction for existing infrastructure. Providing this clarity will also contribute to the surer narrative of the transition to low-carbon heating in homes and create greater cohesion and strategic direction for businesses, local governments and residents to follow. Therefore, grant funding purposed with driving the transition of buildings to net zero will be met with greater acceptance and readiness by residents and the supply chain.

11.3.4 Reform of EPCs

The region will continue to advocate for EPC reform in line with the Energy Systems Catapult's current recommendations to improve reliability, to ensure certificates are compliant with net zero, and to ensure they do not clash with place-based approaches. A key facet of EPC reform should be to embed a smart readiness and flexibility metric that supports the Smart Systems and Flexibility plan and drives the installation of technologies in homes that will build capability and capacity in this area.

11.3.5 Harnessing local flexibility

Regulators, network operators, and industry need to work together to help establish local flexibility markets, open to local players, not just existing incumbents, that incentivise flexibility where and when it is needed to reduce network constraints. The market will also need to account for the avoided or postponed costs of traditional energy network reinforcement. Energy Capital will seek to work with the sector to shape policy by demonstrating delivery models through the Net Zero Neighbourhood programme.

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Delivery in partnership

Just as this strategy has been developed in partnership, it must be delivered in partnership. It is not intended to be an action plan for the Energy Capital's team in the WMCA or its constituent Local Authorities; implementation will require Energy Capital's partners to speak with one voice, all striving towards the same ambitious goal.

12.1 National Government

The region will require the Government to support this strategy, by building the required Policy Foundation; continuing to proactively seek opportunities to collaborate with regional partners and provide long-term funding to the region through devolution.

12.2 Regional governance – Energy Capital, RESP Board

Energy Capital's role within this strategy is to ensure a fair and just energy transition, where energy system governance ensures that investment is targeted to meet the needs of communities and places, supports decarbonisation of the region's major civic infrastructure systems, and creates a thriving market for clean tech innovation and economic growth.

Current plans indicate that the West Midlands RESP will be overseen by a Strategic Board to ensure the development process is transparent and robust and heighten the visibility of regional priorities. Energy Capital will continue to engage with Ofgem and NESO to shape the structures for implementing RESPs to ensure a strong voice for the region.

12.3 Energy Capital Partnership

The collective work of the wider Energy Capital Partnership will be essential for delivery of this strategy, including the West Midlands' local authorities, universities, businesses, community groups and infrastructure providers.

The Energy Capital Partnership's work is constantly evolving to respond to changing needs and shifting policy contexts. More information and details about how to get involved in the Energy Capital Partnership, can be found [on our website](#).

12.4 Continuous review

This strategy is not intended to be a static document. Just as the sector continuously evolves, this strategy will need to also. In order to remain relevant, it will be necessary to report progress towards the Vision and Aims, highlighting areas of success, addressing any challenges faced, and updating priorities to reflect any significant changes to the national or regional context. This will be undertaken by Energy Capital and will include subjective narrative and case studies, as commonly available metrics and indicators are a crude measure of the outcomes this strategy sets out to achieve and the broad accountability for the implementation of this strategy presents challenges to using such statistics in isolation.



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Glossary

Smart	The ability of a technology to respond in real time to communication signals, using digital technologies, to deliver a service.
Flexibility	The ability to shift in time or location the consumption or generation of energy.
Whole system approach	The consideration of the interactions between electricity, gas and liquid fuels, instead of each in isolation.
Smart, flexible energy system	One which uses smart technologies to provide flexibility to the system, to balance supply and demand and manage constraints on the network.
West Midlands Combined Authority (WMCA)	A regional body established in 2016 as the primary vehicle for devolved powers and funding in the West Midlands. The WMCA is led by the West Midlands Mayor, elected every four years.
RESP	Regional Energy Strategic Plan
SSEP	Strategic Spatial Energy Plan
NESO	National Energy System Operator
NGED	National Grid Electricity Distribution
NGET	National Grid Electricity Transmission
Grid, network	The system that carries energy across the country, connecting generation with demand. Sometimes used interchangeably, usually grid refers to national-scale transmission operating at higher voltages, while networks are the lower voltage distribution systems that connect transmission with energy consumers.
DESNZ	Department for Energy Security and Net Zero
V2G, V2X	Vehicle-to-grid, or vehicle-to-X – the use of technologies enabling electric vehicles to act as energy storage, sending power to the grid, a home, or any other energy demand when required.
NPPF	National Planning Policy Framework
MEES	Minimum Energy Efficiency Standards





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