REGEN

Technical report

Industrial Energy Modelling - Roll-out Report

A technical report into commercial and industrial energy use in the Midlands and how businesses can decarbonise – focusing on two industrial clusters.

April 2026

About Midlands Net Zero Hub

The Midlands Net Zero Hub is funded by the government's Department for Energy Security and Net Zero to help local authorities, public sector organisations and the communities they serve reach their ambitious net zero goals.

About Regen

Regen provides independent, evidence-led insight and advice in support of our mission to transform the UK's energy system for a net zero future. We focus on analysing the systemic challenges of decarbonising power, heat and transport. We know that a transformation of this scale will require engaging the whole of society in a just transition.

Acknowledgements

We would like to express our sincere appreciation to all those who contributed to the successful completion of this report. This work benefited greatly from the support and assistance of many individuals and organisations. Thanks to all those on the project steering group for their curiosity, support and challenge. Thanks also to staff at local authorities and businesses who engaged with this project across our two clusters.

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Glossary and abbreviations

Term	Definition
ABP (AddressBase Plus)	Data product from Ordnance Survey, providing addresses
Cadent	Gas network operator for the Midlands.
CCC (Climate Change Committee)	UK body advising on climate targets and pathways.
Cluster	A group of businesses or facilities forming an industrial site.
East Midlands Combined County Authority (EMCCA)	LAEP study area, used for regional analysis in the report.
DFES (Distribution Future Energy Scenarios)	Localised future energy scenarios published by National Grid Electricity Distribution.
DNO (Distribution Network Operator)	Organisation managing the regional electricity distribution network.
EPC (Energy Performance Certificate)	Certificate showing a building's energy efficiency and main heating fuel.
ESA (Electricity Supply Area)	Area served by an 11 kV network around a primary substation.
Headroom	Spare network capacity for additional demand or generation.
HGV (Heavy Goods Vehicle)	Vehicle over 3.5 tonnes used for freight.
L&L (Leicester & Leicestershire)	LAEP study area, used for regional analysis in the report.
LAEP (Local Area Energy Plan)	Local authority plan for energy system transition.
MPAN (Meter Point Administration Number)	Unique identifier for an electricity supply point.
MSOA (Middle Layer Super Output Area)	Medium-scale statistical area used for public data.
ND-NEED (Non-Domestic National Energy Efficiency Data-Framework)	Dataset of metered energy use in non-domestic buildings.
Primary substation	Higher-voltage electricity substation supplying secondary substations.
Secondary substation	Local substation supplying individual buildings.
SIC (Standard Industrial Classification)	Classification used to group business activities.

Section 1:

Introduction

1.1. Project scope and purpose

This technical report is part of a wider project studying approaches to decarbonising medium-scale industrial clusters across the Midlands. The project focusses on clusters that host mixtures of light industry, research and development and logistics. These types of cluster are very common across the Midlands and nationally yet are often underrepresented in energy modelling and planning.

This study aims to better understand this challenge through an area-wide study of industrial energy use combined with a deeper study of six specific industrial clusters. The cluster-level studies are designed to support each cluster in decarbonising, but also to produce replicable approaches to inform other clusters.

This report demonstrates this approach through:

1. A summary of the findings from phase 1
2. Presentation of cluster analysis of two industrial clusters
3. Summary of how this approach could be deployed more widely.

The report aims to lower the barrier to entry for similar clusters to replicate the study for themselves or by relevant third parties.

Phase 1 of this project undertook a regional analysis of commercial and industrial energy in the East Midlands Combined County Authority and Leicester and Leicestershire areas, as well as studying four industrial clusters in detail. Relevant findings from this study are presented in Section 2.

Phase 2 builds on this work by applying a streamlined process to two new clusters and presenting the approach and process that we have designed alongside these results. The findings of each cluster study are detailed in sections 3 and 4. These chapters summarise the nature of the cluster, the current energy usage and mechanisms and barriers for the cluster to transition. Each section concludes with some specific next steps for these clusters to consider implementing.

The two clusters chosen for phase 2 aim to illustrate common industrial themes and provide examples to illustrate an approach that can be generalised more widely.

Ashbourne Airfield is a mixed-use industrial estate on the site of a former RAF base at Ashbourne, north west of Derby. Most of the existing industrial estate was built over 30 years ago, but there are significant development plans in planning.

Wardentree Lane is an industrial estate outside Spalding in Lincolnshire with a large proportion of food distribution businesses within a varied cluster.

The final section of this report, section 5, details how we have undertaken the cluster studies, as summarised in Figure 1. This is presented so as to allow others to use it as a basis for further roll-out of these methods, either to support other specific clusters in transitioning, or to inform wider area-based studies of industrial decarbonisation. We also describe strengths and weaknesses of our approach, options for developing it further and conclusions for how these methods should be best deployed.

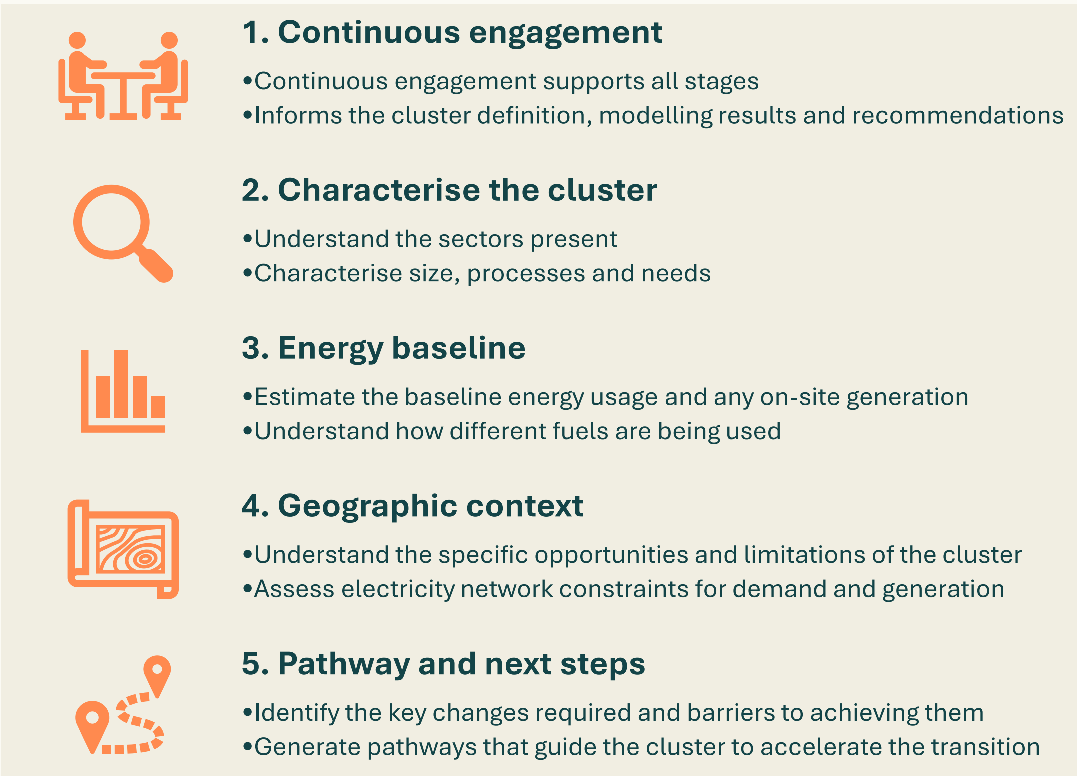

Figure 1: Framework of our approach to assessing the energy demand of a cluster.

Section 2:

Findings from phase 1

Presenting the regional results and key findings from the phase 1 cluster studies that have informed this phase 2 report.

2.1. **Phase 1 study region**

Phase 1 of this project studied two areas within the Midlands, both of which have a local area energy plan being produced. These are Leicester and Leicestershire (L&L) and the East Midlands Combined County Authority (EMCCA). Figure 2 shows this study region, marking local authority boundaries and major settlements.

Figure 2: Map of the phase 1 study area, showing the three cities and counties studied in phase one, as well as the four clusters. Local Authority Districts (May 2024) Boundaries UK BFE, Counties and Unitary Authorities (December 2024) Boundaries UK BGC, ONS, 2025

The choice of these regions was linked to the ongoing local area energy plan (LAEP) projects and a desire to ensure that industrial clusters were well represented in this process. The four clusters were chosen from across the region, with two clusters within each LAEP area.

2.2. Regional energy usage

Region-wide energy trends for the phase 1 study area showed that total energy use has decreased by 15.5 TWh, or 17%, between 2005 and 2023, as shown in Figure 3. In the same period, industrial and commercial energy use decreased by 7.5 TWh, with reductions across all energy sources except for bioenergy and waste. These trends are likely indicative of increased energy efficiency but may also be due to deindustrialisation.

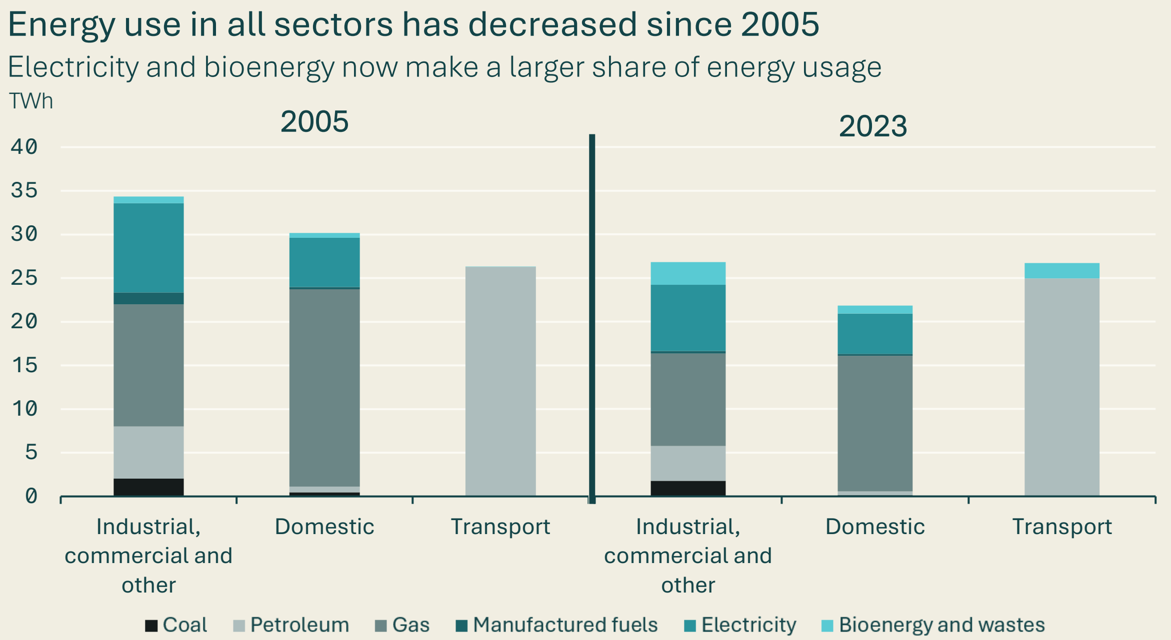

Figure 3: Total final energy consumption at regional and local authority level: 2005 to 2023, Department for Energy Security and Net Zero (DESNZ), 2025.
Note: Transport electricity demand is not included.

As a share of wider regional energy usage, the industrial and commercial sector makes up 35% of the total energy usage, roughly 60% of which comes from fossil fuel sources, as shown in Figure 4. This shows a significant potential for increased efficiency through electrification, which will also lead to lower emissions.

Roughly 60% of industrial and commercial energy consumption comes from fossil fuel sources in the phase 1 study area

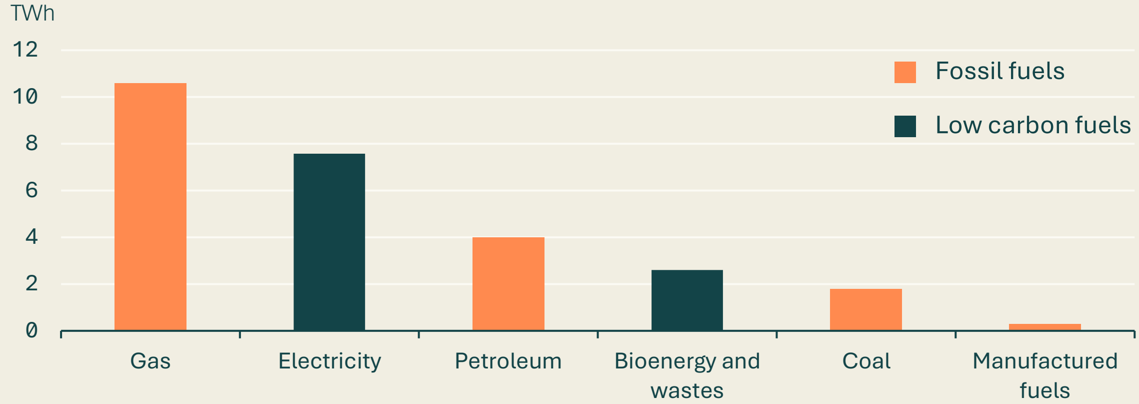

Figure 4: Total final energy consumption at regional and local authority level: 2005 to 2023, DESNZ, 2025. Note: Transport electricity demand is not included.

Analysis of energy use by sector within the study region showed that, despite making up just 6% of businesses within the region, manufacturing consumed nearly 50% of all industrial and commercial energy use. A further 22% of energy use is consumed by the transportation and storage sector. This is illustrated in Figure 5, which shows the number of businesses and the energy use by sector, as classified by Standard Industrial Classification (SIC) codes.

This result demonstrates one of the key takeaways from phase 1: the majority of energy use in the industrial and commercial sectors comes from a small portion of businesses operating within an area. These are often from within the manufacturing, construction, and logistics sectors. This trend is supported by government data from the Non-Domestic National Energy Efficiency Data-Framework (ND-NEED), which shows that a small number of sites across all sectors dominate energy use. This is most pronounced in the industrial sector, where 80% of gas usage is concentrated in the top 1% of sites.[1]

[1] The Non-Domestic National Energy Efficiency Data-Framework 2025 (England and Wales), DESNZ, August 2025.

Manufacturing and transportation and storage are the two highest energy use sectors in the EMCCA and L&L areas despite smaller numbers of businesses compared with other sectors

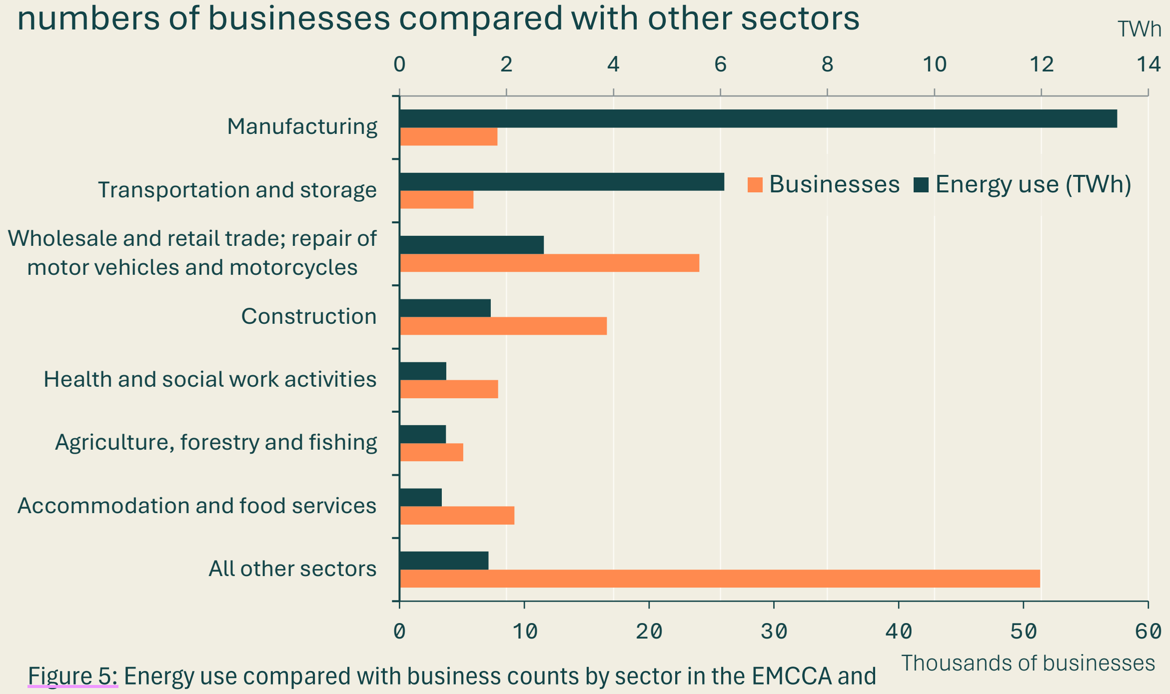

Figure 5: Energy use compared with business counts by sector in the EMCCA and L&L area. UK Business Counts - local units by industry and employment size band, ONS, 2025; Energy consumption by industry, ONS, 2025

2.3. Decarbonising industrial clusters

Industrial clusters vary significantly in several ways: size, building age, ownership, the activities and sectors present and many more factors. The details of decarbonisation pathways and the actions that individual organisations are able to take will vary significantly, but there are common themes which emerged from engagement with the four clusters studied in phase 1.

Electrification is the leading way to improve efficiency and decarbonise energy across transport, heating and most industrial processes. Direct use of fossil fuels must be reduced, and electricity allows the use of low-carbon renewables and higher efficiency technology, such as electric motors and heat pumps, which lower overall energy demand. Most of the findings from phase 1, therefore, relate to barriers and opportunities for electrifying existing fossil-fuelled processes.

Electricity connections

Despite analysis indicating that many primary substations have spare capacity, available headroom for new demand at secondary substations often presents a barrier to the electrification and expansion of industrial clusters. Ofgem are conducting a reform of the demand connections process, having recognised the scope of the connections challenge.[2] This may be able to improve the connections process, but it will not be an immediate fix for the challenge of reinforcing the network at pace.

There are options that can allow businesses to increase the electricity capacity of their site prior to receiving a larger grid connection. Some of these are administered by the relevant DNO, while others can be deployed by the organisation itself. The options could be considered alone or in combination with each other.

- **Flexible connections –** Connections which, when the network is under stress, may be requested to be turned down or off. While in most cases this may present an economic risk to businesses, some flexible connections only involve interruptions during pre-planned network maintenance, which could be more manageable for certain businesses.
- **Ramped connections –** Connections which begin at an initial lower capacity, before ramping up to a final capacity, allowing immediate buildout of some infrastructure while ensuring certainty for future electricity needs.
- **On-site generation –** On-site renewable generation and self-consumption may reduce the size of the grid connection needed.
- **Battery storage –** Battery storage may allow sites to charge batteries overnight with a lower cost for consumption during the day. This is likely to be most suitable for sites with a large difference between peak and average power consumption.
- **Local energy networks –** There are increasing options for organisations to share energy resources with neighbours, which can be mutually beneficial and can potentially reduce connection requirements by increasing area-wide energy efficiency. This can take the form of connections to allow the use of waste heat, or private electricity wires to better utilise renewable generation. These options are highly bespoke and dependent on the specific needs and resources of the organisations involved.

There is significant complexity to understanding the specific demands, constraints and opportunities of a specific site. Engagement with the DNO is the first step and specific technical analysis is also likely to be necessary.

Cost of electricity

Another barrier to decarbonisation is the high cost of electricity when compared with gas. Although higher efficiencies can be achieved using electrified processes, this does not always lead to lower bills due to the difference in cost. While national policy reform is needed to address this imbalance, this challenge can be mitigated through:

- Maximising on-site renewable generation and storage
- Improving the energy efficiency of machinery, heating or building fabric

[2] Demand connections reform, Ofgem, February 2026.

- Power purchase agreements, peer to peer trading option or private wire arrangements with external generators
- Shared energy infrastructure that improves efficiency across a wider site.

Electrification of freight

HGVs present a significant portion of total energy demand for the logistics and distribution sector. Electrifying these vehicles will involve a significant increase in electricity demand at these sites. This has implications for electricity connections, the cost of electricity and investment requirements. There is significant variation in the usage patterns for HGVs, and this defines the charging requirements. There is also uncertainty around how chargers will need to be distributed across supply chains, i.e. the proportion of energy that will be delivered at depots, destinations and on route. Resolving this challenge requires a strategic approach across logistic networks.

Data availability and engagement

Phase 1 used a wide range of public datasets, augmented by engagement with the clusters being studied. There are limitations to what conclusions can be drawn from public data sources, as they often lack the granularity needed to understand the nature of businesses within a cluster or to understand how much energy they use, what they use it for and what fuels provide it. This allows only high-level findings to be delivered.

Engagement with clusters has the potential to go far beyond this by using direct information on energy use and activity from the businesses. In reality, we found that this was time-consuming and challenging to get to meaningful data, for a number of reasons:

1. Clusters rarely had one organisation with a meaningful understanding of all businesses on-site
2. Businesses are busy and unable or not motivated to respond to requests for information
3. It was hard to identify individuals in a business who had access to or knowledge of energy use
4. All engagement efforts take significant resource.

A cluster study that leads to tangible, actionable outcomes need to have buy-in from the cluster in order to ensure there is sufficient accuracy and confidence in the findings, as well as ensuring the recommendations are appropriately structured for the relevant cluster to implement. Our method, described in Section 5, is deliberately designed to give meaningful results using only open data and desktop research, whilst being flexible to incorporate as much engagement data as can be gathered. We have also developed approaches to get the maximum value from a contact with the least effort from them.

Section 3:

Ashbourne Airfield

Cluster report for this mixed-use industrial estate on the site of a former RAF base in Ashbourne, 10 miles to the northwest of Derby.

3.1. Cluster profile

The Airfield industrial cluster is located on the former RAF Ashbourne base, which ceased use in 1954, although the runways are still visible in satellite pictures. Currently, the cluster is occupied by over 70 businesses and employs over 2,000 people.[3] Most of the existing buildings are over 40 years old, with only some development within that time frame. The developed land is a relatively small portion of the site to the southwest, the remaining site is owned by FW Harrison and JCB.

Figure 6: Map of the Ashbourne Airfield cluster and surrounding context.

[3] Ashbourne Airfield Industrial Estate, Invest in Derbyshire Dales, accessed March 2026

Further development of the cluster is now underway and is being delivered in two phases. The first phase has been granted planning permission and is under construction. This will see the development of 367 homes and two industrial buildings on an 8-hectare plot to the southeast of the existing site.[4] Phase 2 plans include up to 1,100 new homes and an additional 6-8 hectares of employment land to the north. Derbyshire Dales District Council recently launched a consultation on a supplementary planning document (SPD) for phase 2 in January 2026.

3.1.1. Cluster-specific data and engagement

We received a site map and an outline of future development plans from Derbyshire Dales District Council at the beginning of phase 2. This was useful for connecting other data sources to the correct site. We attempted to engage with businesses at the cluster through local business networks that the council was able to connect us with. Unfortunately, this did not result in the provision of site-specific business activity or energy data that would have improved the accuracy of our assessment.

3.1.2. Major employers and sectors

The Airfield cluster covers a variety of industries, including several major food manufacturers such as Moy Park, Trouw Nutrition, and Artisan Biscuits. The cluster also hosts other producers like Nenplas and MasterMover, along with numerous small and medium-sized engineering and manufacturing firms. Figure 7 shows the mix of industries at the Airfield cluster by business count.

The sector was identified by mapping to AddressBase Plus (ABP) data for each site, using the classification field and any organisation names within the available data.[5] Of all the sites identified within the ABP data, just under 90% had organisation names attached, which is unusually high. Where sites had an organisation name, public data on the government Companies House portal was used to attribute the sector, which significantly improves accuracy.

[4] Help shape future of the Dales' largest regeneration-site, Derbyshire Dales District Council, January 2026

[5] AddressBase Plus, Ordnance Survey, accessed 2025.

Manufacturing is the largest sector representing 30% of businesses

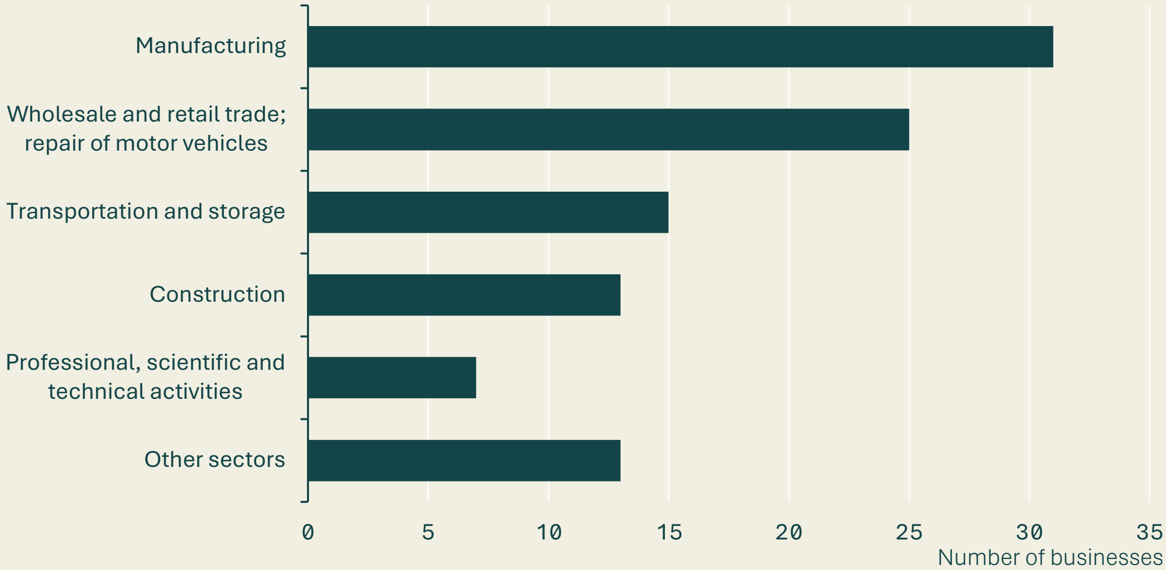

Figure 7: Analysis of businesses at the Airfield industrial site based on AddressBase Plus. AddressBase Plus, Ordnance Survey, accessed 2025

3.2. **Current energy profile**

Understanding the cluster's energy use from open data requires analysing several data sources together, as no single source gives a complete picture. We examined:

1. Non-domestic energy performance certificates (EPCs) to understand the range of fuels used for heating
2. Sectoral analysis to understand how industrial activity may impact energy use
3. Area-based metered energy statistics to correlate gas and electricity demand to the sectoral estimates.

Reviewing energy performance certificates (EPCs) indicates that there is widespread use of both gas and electricity for space heating, with almost half of buildings heated primarily by electricity.

A sectoral analysis of the businesses across the Airfield cluster indicates that manufacturing and distribution dominate energy consumption and estimates a total annual energy consumption across all sectors of 95 GWh. This value makes high-level assumptions about industrial activity based on sector-wide averages and is likely an overestimate, as it is based on national averages of energy use by standard industrial classification (SIC) sector.

We can contrast this result with allocations of energy use from metered electricity and gas, which gives a total of 28.3 GWh across the entire cluster. However, there is significant uncertainty around the allocations from this value too, as it requires allocating energy consumption between the Airfield cluster and neighbouring addresses. This data shows gas usage that is much higher than electricity; however, this contrasts with EPC data, which indicates that electricity is the most common heating fuel for units in the cluster.

Taking these sources together gives a more complete picture of energy demand at the cluster, though the disparity between the sectoral and metered analysis shows that this is an indicative process. More accurate baselining requires measured data from the businesses being studied.

3.2.1. Energy performance certificates

Analysis of EPC data for the Airfield cluster shows that 42% of units with a recorded EPC utilise fossil fuel heating and 44% use electric heating. The off-gas postcode register indicates that although the Ashbourne Airfield cluster itself is not classified as off-gas, parts of the surrounding area are.[6] It is therefore likely that some parts of the cluster do not have access to the gas network.

42% of units in the Airfield cluster rely on fossil fuels for heating

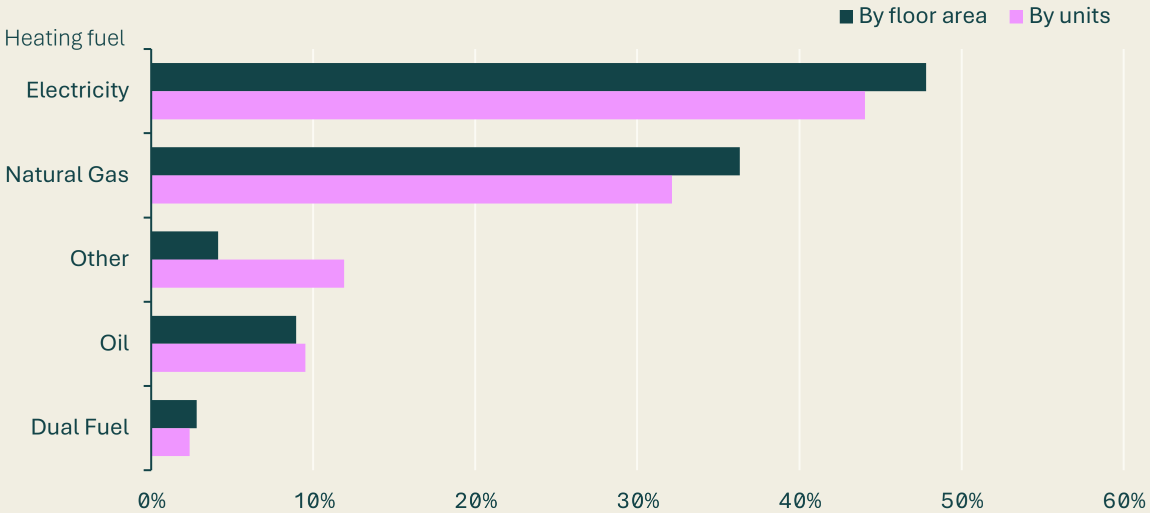

Figure 8: Analysis of non-domestic EPC data for Ashbourne Airfield. 84 certificates retrieved. Energy performance of buildings England & Wales, MHCLG, accessed March 2026

EPC records show a notable difference in certificate age between heating types within the cluster: approximately 65% of electrically heated properties hold EPCs lodged since 2020, compared with roughly 50% for properties using other heating systems. While this pattern does not provide direct evidence of retrofit activity, the higher proportion of recent EPCs among

[6] Off gas postcode register, XOSERVE, March 2026.

electrically heated units may indicate a relatively greater level of recent intervention or system updates in those properties.

Using the property type category from the EPC data indicates that this split between fuels is not consistent across building usage. Figure 9 shows the fuel data split by building type category for both the proportion of units and the proportion of floor area. Electrified heating is more common in the distribution sector. This may be due to a need for climate control systems, which can provide both heating and cooling.

Non-metered heating fuels are most common in industrial units

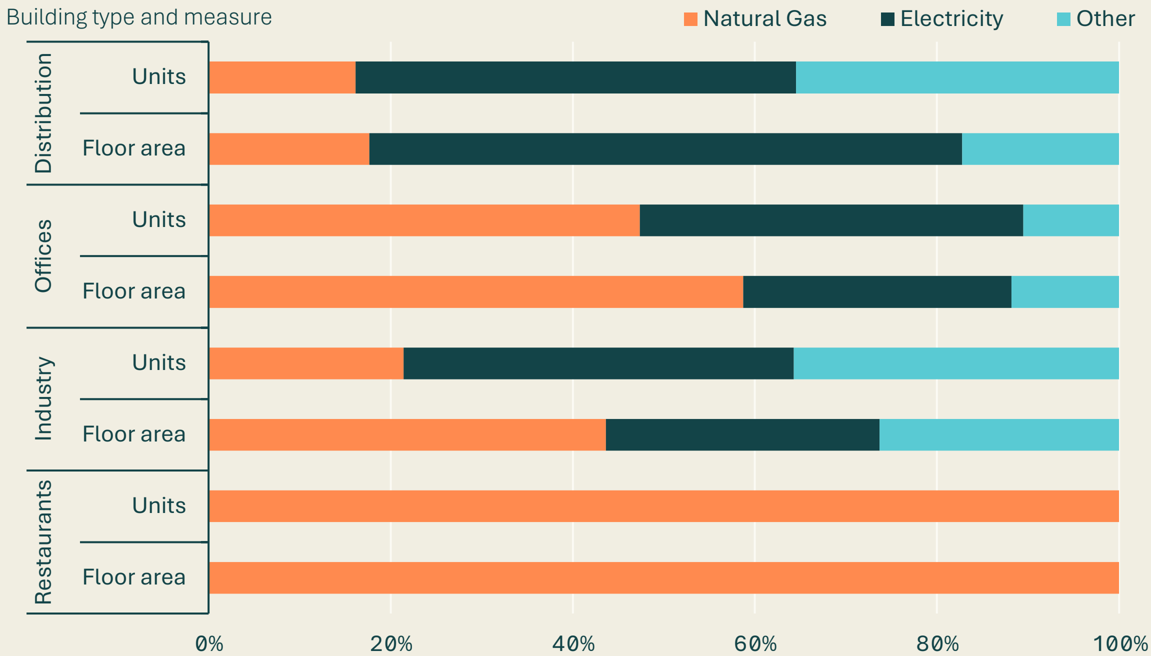

Figure 9: Non-domestic EPCs for Airfield: 31 distribution, 38 offices, 14 industrial, 1 restaurant. Energy performance of buildings England & Wales, MHCLG, accessed March 2026.

3.2.2. Sectoral analysis

By linking information on sector and headcount to GB-wide usage data across different SIC sectors, we can model energy use at the Airfield industrial cluster by industry. These results are plotted in Figure 10 and estimate a total energy consumption of 95 GWh, almost 70% of which is from the manufacturing sector. This aligns with this sector being both a major employer in the cluster and more energy-intensive than other sectors.

The sectoral analysis assumes energy use is in line with the average energy use by employees for each industry, or, in the case of manufacturing sites where public data on employment was not available, the average energy use by businesses for the relevant subsector.

Manufacturing represents around 70% of modelled energy use

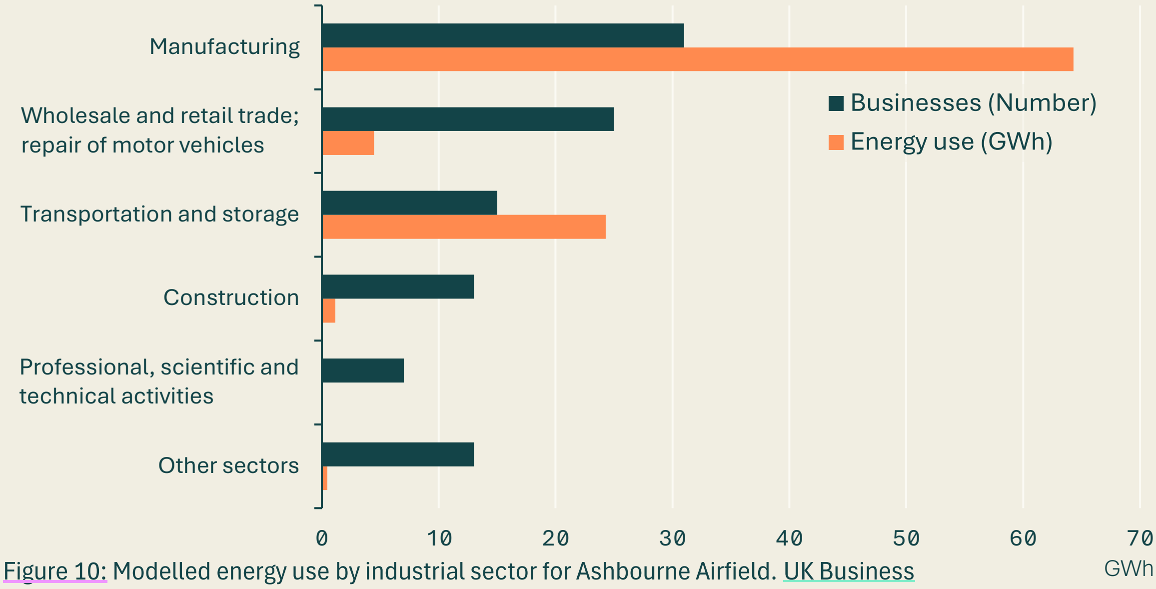

Figure 10: Modelled energy use by industrial sector for Ashbourne Airfield. UK Business Counts - local units by industry and employment size band, ONS, 2025, Energy consumption by industry, ONS, 2025, Energy consumption in the UK: End use data tables, DESNZ, 2025

We were able to conduct more detailed sub-sectoral analysis for the manufacturing sector by using the robust 'two-digit SIC code' data obtained for the majority of businesses through matching ABP organisation names to Companies House records and then to national energy statistics by subsector.[7] This enables more specific activities, such as 'manufacture of food products', to be analysed, as well as linking to the split between activities. It should be noted that this is still reliant on linking specific sites to industry-wide averages but is likely to give a more nuanced indication of energy use.

This analysis indicates that food manufacturing comprises approximately 30% of the manufacturing energy demand in the cluster, of which 64% of the energy use is from 'low temperature processes'. The SIC data does not define temperature thresholds, but this category is likely to include all cooking processes, with high-temperature processes relating to processes such as smelting and glass furnaces.

'Other manufacturing' is a significant contributor to the Airfield cluster's manufacturing demand. The accuracy of the energy assignment to this subcategory is hard to ascertain due to the wide-ranging nature of the activities within it, from watchmakers to aluminium processers.

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[7] Energy consumption in the UK: End use data tables, DESNZ, 2025
Sites without organisation names, whose AddressBase Plus class is either 'factory/manufacturing' or 'workshop/light industrial' were assumed to fit under the 'other manufacturing' category.

Food products are the largest manufacturing sector by energy use

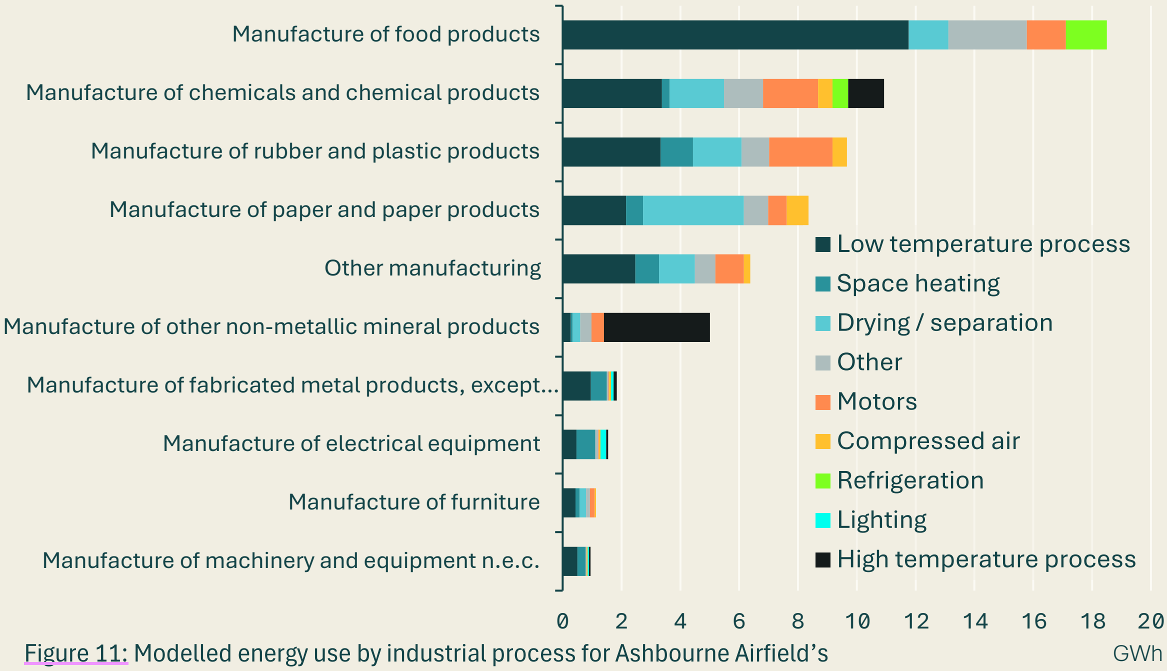

Figure 11: Modelled energy use by industrial process for Ashbourne Airfield's manufacturing industries. AddressBase Plus, Ordnance Survey, accessed 2025, Energy consumption in the UK: End use data tables, DESNZ, 2025

The manufacturing process data includes details on fuel use by process, which indicates that roughly 68% of manufacturing process energy is supplied by fossil fuels. Of the process energy demand in the cluster, over 60% is from low temperature processes, drying/separation or space heating, processes which are likely to be technically easier to electrify than high temperature processes, although cost and grid connection barriers may remain.

Half of fossil fuel demand is for 'low temperature processes'

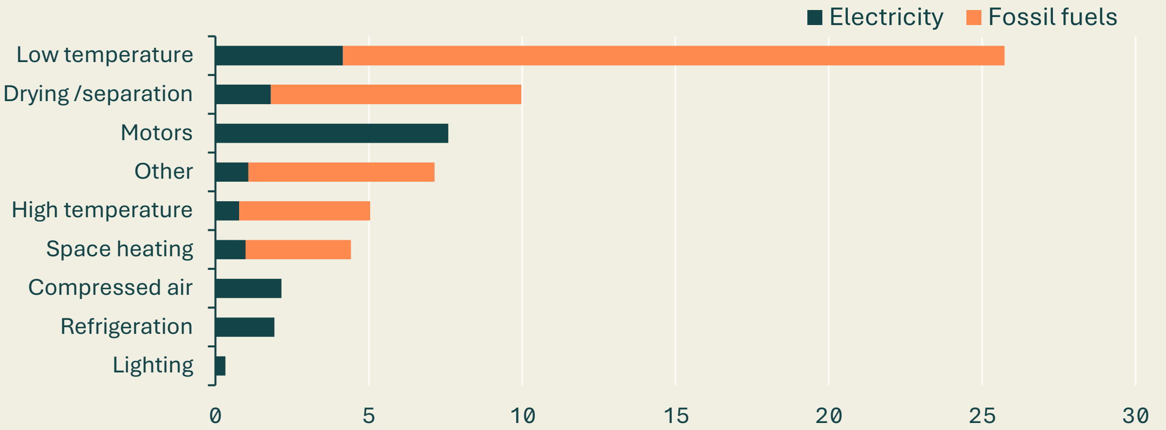

Figure 12: Modelled fuel use by industrial process for Ashbourne Airfield. AddressBase Plus, Ordnance Survey, accessed 2025, Energy consumption in the UK: End use data tables, DESNZ, 2025

3.2.3. Freight

No direct operational data or insights were received from occupiers at this cluster through our engagement efforts. Sector data indicates that there will be a significant number of HGV movements to support the industries present, and satellite imagery confirms that there are a significant number of loading bays present at industrial units within the cluster. Indicative analysis of decarbonising HGVs for Airfield is given in Section 3.4.2.

3.2.4. Metered energy use

As a benchmark for the sectoral energy analysis presented above, subnational energy consumption data was also analysed. This is available at the middle layer super output area (MSOA) level for metered gas and non-half-hourly metered electricity, and at the local authority level for half-hourly metered electricity.[8] Note that these data determine 'domestic' and 'non-domestic' gas consumption based on the total demand of a meter point. This means that gas consumption from some smaller gas users is categorised as 'domestic' and therefore excluded from our analysis. This is not the case for electricity, where meters are classified as domestic or non-domestic directly.[9]

Our estimates of how these values might be allocated to the Airfield cluster are shown in Figure 13. This indicates that gas usage is much higher than electricity usage. This contrasts with the EPC evidence that the majority of units in the cluster use electricity for heat but may be explained by low gas boiler efficiency compared to electric heating and higher additional gas usage for manufacturing processes.

These metered energy values are around three and a half times lower than the total energy use modelled through sectoral analysis and shown in Figure 10. Part of this difference is represented by the use of non-metered fuels, which are included in the sectoral analysis. Figure 9 indicates that there is a significant presence of these fuels for heating within the cluster. There may also be a portion of electricity demand met by on-site renewables, which is not shown in meter consumption. This is discussed in the following section. Finally, both sources have limited accuracy and will differ from the true data. Neither source gives a complete, accurate picture of energy consumption, but reviewing them together allows a more accurate assessment of the energy baseline, which informs decarbonisation options discussed in Section 3.4.

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[8] Sub-national final energy demand, DESNZ, July 2025.

[9] Subnational consumption statistics methodology and guidance booklet, DESNZ, December 2025, Table 1.

Metered gas demand is nearly four times higher than electricity demand

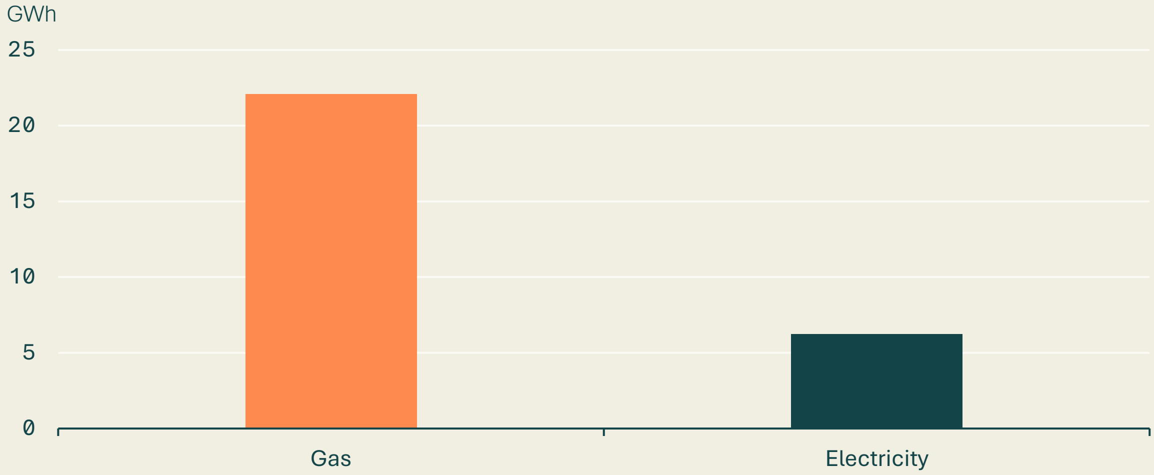

Figure 13: Allocation of metered gas and electricity usage at Ashbourne Airfield. AddressBase Plus, Ordnance Survey, accessed 2025; MSOA non-domestic electricity 2010 to 2024, MSOA non-domestic gas 2010 to 2024, DESNZ, 2025. Note: Half-hourly electricity meters within the cluster were assigned in proportion to the number of half-hourly meters across the wider local authority

3.2.5. On-site power generation

This cluster is not centrally managed, so there is no single entity with responsibility or oversight of on-site generation. A review of satellite imagery of the cluster indicates that several units have installed rooftop solar PV, many of which have large proportions of their rooftop space covered. As energy demand is electrified, the business case for wider PV deployment is strengthened, as it allows greater self-consumption.

3.2.6. Summary of baseline energy usage

We have analysed building performance data, metered energy usage and engagement data for the Airfield cluster. Taken together, they give us a picture of how energy is used and inform decarbonisation pathways. We have found that:

- Low temperature processes and drying and separation are the main fossil fuel demands for the cluster, driven by a large manufacturing base within the cluster
- Electrification of space heating is already common, likely linked to specific needs for climate control for some buildings
- There are considerable opportunities for on-site generation, but these may be constrained by the electricity network's ability to accept additional exports.

For this cluster, we have defined the total baseline energy demand from the sectoral analysis. This is because there is significant usage of unmetered fuel, which suggests that the metered data would be an underestimate. This total is then allocated between sectors from the sectoral and sub-sectoral analysis. The proportion of energy use between fuels is not defined in the sectoral data, so this proportion is derived from the metered energy use and is the same across all sectors.

Figure 14 shows this baseline energy use assigned to the subsectors used by the Climate Change Committee (CCC) in their analysis. These data form the basis of our decarbonisation pathway modelling, presented in 3.4.1.

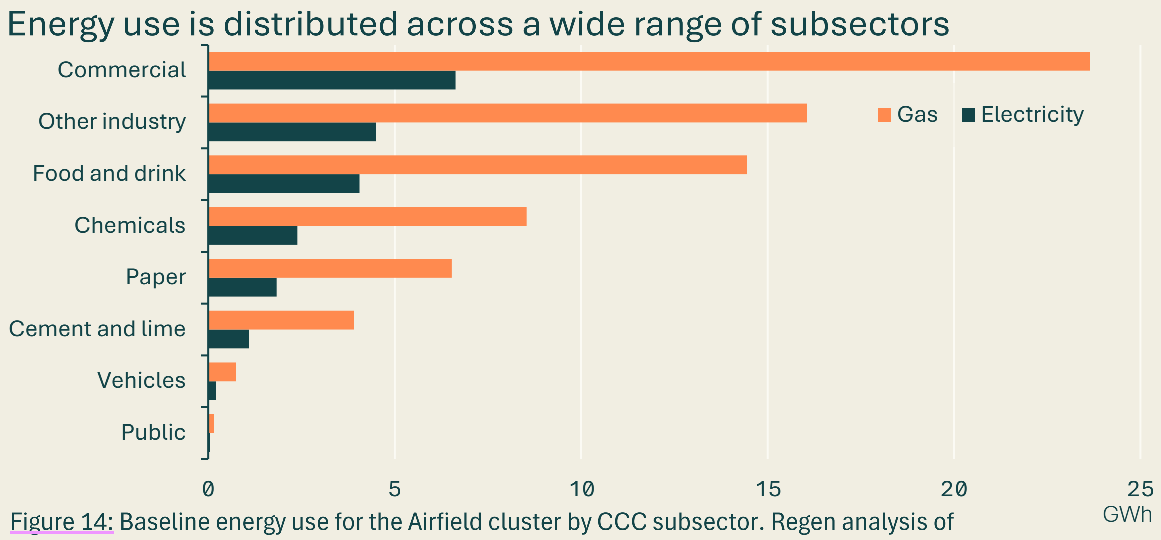

Figure 14: Baseline energy use for the Airfield cluster by CCC subsector. Regen analysis of baseline energy sources.

3.3. Geographic context

3.3.1. Known development projects

The Airfield cluster has recently had expansion plans approved for 367 homes, along with 8-10 hectares of industrial and commercial land, with further plans for over 1,000 additional homes, and an extra 6-8 hectares of employment land.[10]

3.3.2. Electricity network

The Airfield cluster is located within National Grid Electricity Distribution's (NGED) licence area and falls entirely within the area supplied by Ashbourne 33-11kV primary substation. Our analysis of the available network capacity at the substation indicates an abundance of generation capacity, but very limited capacity for new demand projects.

[10] Ashbourne Airfield project page, Planning Design, accessed March 2026

The Ashbourne primary substation has significant generation headroom capacity, but limited demand headroom

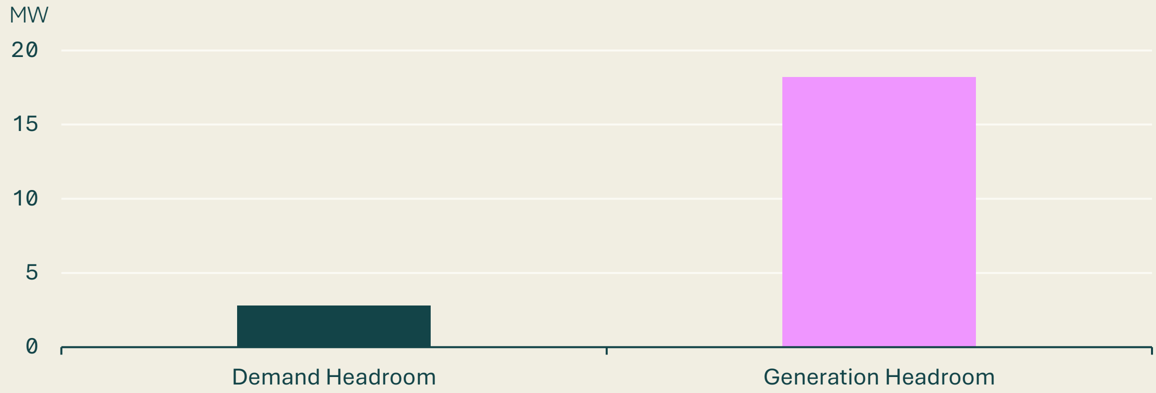

Figure 15: Headroom of primary substations near the Airfield cluster. Network Opportunity Map Headroom, National Grid Electricity Distribution 2025

Although capacity is available at the primary substation, individual sites in the cluster likely face constraints at their respective secondary substations. Figure 16 shows a map of the electricity supply area, the primary substation and secondary substations.

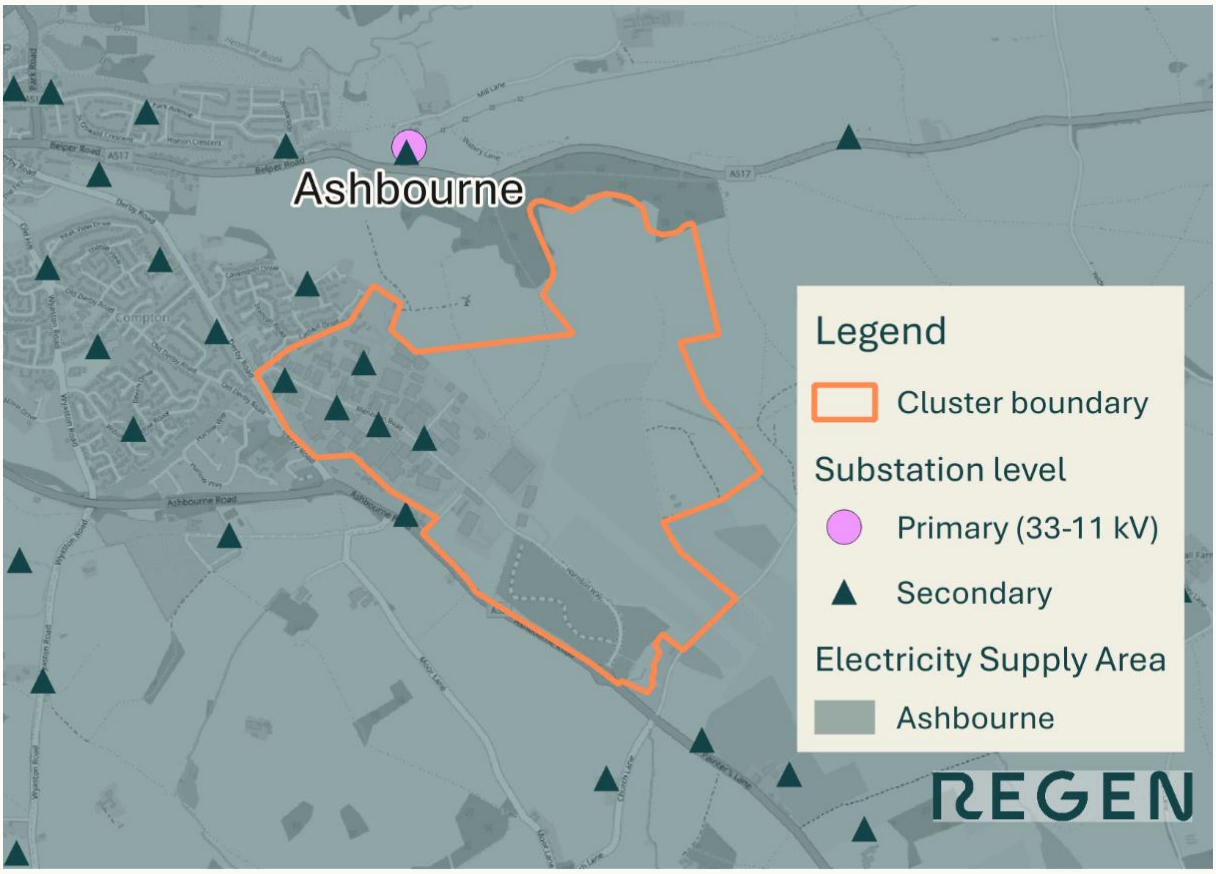

Figure 16: Airfield industrial cluster and surrounding primary and secondary substations. Network Opportunity Map Headroom, East Midlands Primary, National Grid Electricity Distribution 2025; Map data from OpenStreetMap

3.3.3. Hydrogen network

The proposed network of the East Coast Hydrogen project, shown in Figure 17, could reach within 10 miles of the Airfield industrial cluster. Based on timelines in the East Coast Hydrogen report and the most recent Hydrogen update to the market published by the UK government, this infrastructure is unlikely to be developed before the mid-2030s.[11, 12]

While our analysis indicates that the Airfield cluster does host manufacturers that may utilise high temperature processes, the demand from this alone is unlikely to be sufficient to justify expansion of the hydrogen network to the cluster. The CCC states that there will be no role for hydrogen in heating buildings, no hydrogen cars or vans, and "very little or potentially even no role for hydrogen in heavier vehicles".[13] This means that other sectors are also unlikely to drive hydrogen demand high enough to warrant expansion either. This indicates that hydrogen will not be available at the cluster.

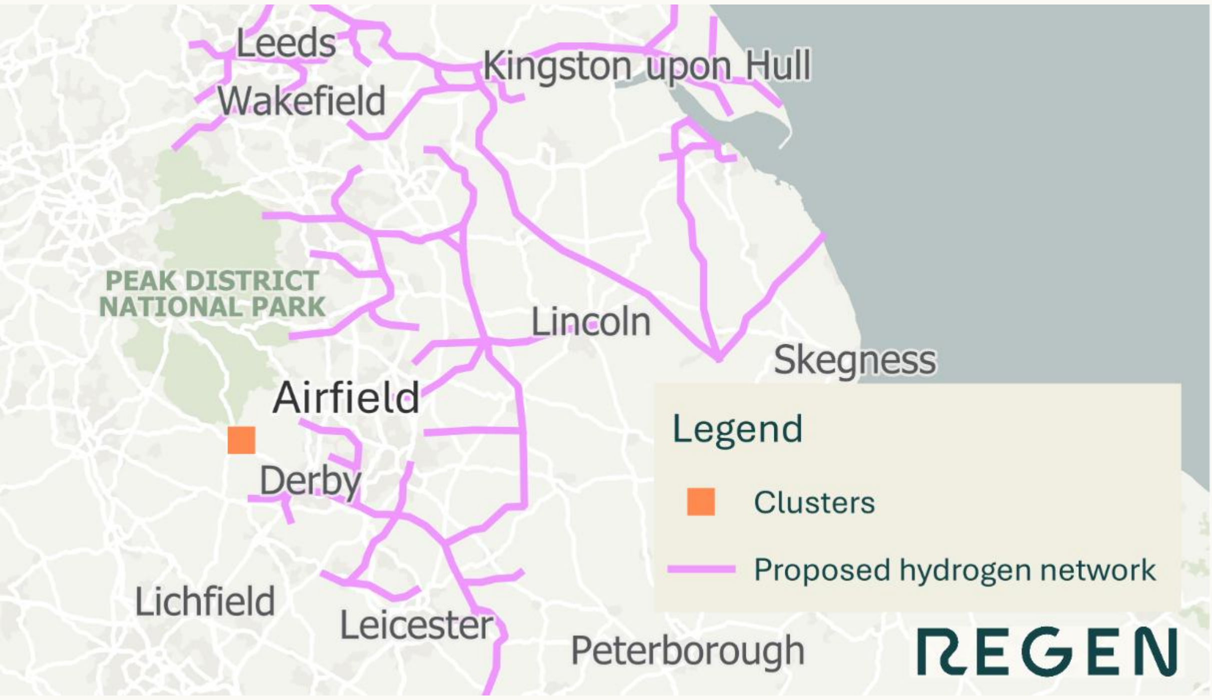

Figure 17: Map showing the Airfield cluster against the proposed hydrogen transmission network from the East Coast Hydrogen project. East Coast Hydrogen – Pipeline North Phase 1 NZASP Re-opener, Cadent Gas, 2024; Map data from OpenStreetMap.

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[11] East Coast Hydrogen Delivery Plan, East Coast Hydrogen, November 2023

[12] Hydrogen update to the market: July 2025, DESNZ, July 2025.

[13] The Seventh Carbon Budget, CCC, February 2025.

3.4. **Decarbonising Ashbourne Airfield**

3.4.1. Decarbonisation pathway

Based on our analysis of the cluster's baseline energy consumption, combined with subsector-specific energy decarbonisation pathways from the CCC's seventh carbon budget, we have produced an indicative energy pathway for the Airfield cluster, shown in Figure 18. This applies sector-wide assumptions to the baseline energy use. A more accurate and bespoke pathway would require detailed engagement and analysis with individual businesses within the cluster.

The pathway indicates a small amount of residual gas usage in 2050, which is primarily driven by the chemicals and cement and lime subsectors. The hydrogen usage, similarly, is driven primarily by the chemical's subsector, though as discussed in Section 3.3, it is unlikely that there will be hydrogen infrastructure at this site. Our analysis found only one chemical manufacturing site, specialising in industrial cleaning chemicals. A public sustainability policy indicates the organisation is assessing a net-zero ambition.[14] This site does not appear to be a chemical site that is likely to require fossil gas or hydrogen in a low carbon future. In reality, remaining fossil gas and hydrogen demand in 2050 is likely to be required only for heavy industry sites within the chemical industry, which are not present at the Airfield site.

The broader path for this cluster, as with the wider economy, is that electrification of fossil fuel demand is the dominant source of greater efficiency and emissions reduction. Cost and infrastructure barriers to businesses investing in electrification need to be addressed in order to ensure this is achieved.

The Airfield decarbonisation pathway retains a small portion of gas use by 2050 due to large volumes of manufacturing

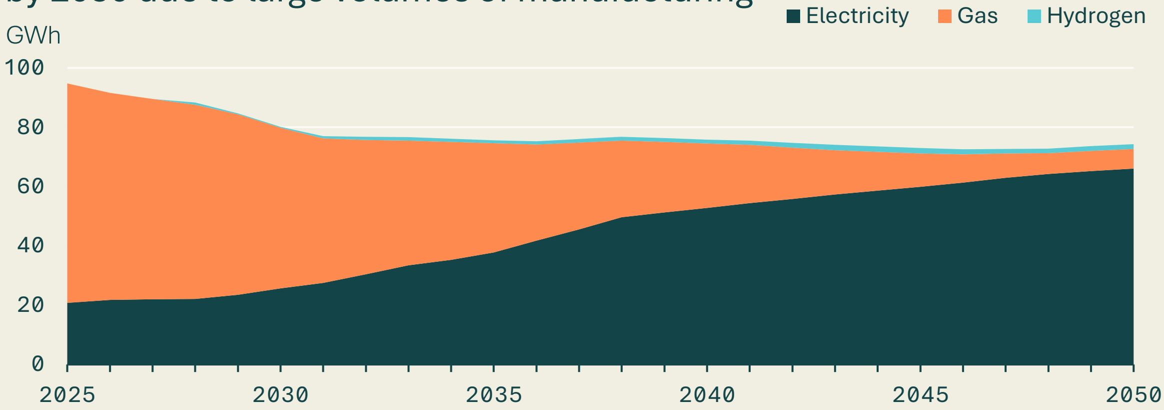

Figure 18: Airfield industrial cluster decarbonisation pathway, based on CCC seventh carbon budget industry and non-residential subsector pathways.

[14] XRO Chemical Services Ltd. Sustainability Policy, XRO Chemical Services Ltd., February 2025

3.4.2. Electrification of HGVs

The electrification of HGVs at the Airfield cluster could materially increase electricity demand at the cluster. We compared projections from NGED's DFES against a high-level sensitivity analysis based on high-level assumptions. This was in the absence of more detailed operational data on HGV movements from within the cluster.

NGED's DFES provides scenario-based projections of EV charger capacity, disaggregated to 11 kV substation level. Ashbourne Airfield sits within one 11 kV Electricity Supply Area (ESA): Ashbourne 11 kV substation, as shown in the map in Figure 16.

The relevant charger categories within the DFES projections are:

- **eHGV chargers:** Dedicated chargers for HGVs at service stations and public sites
- **Workplace chargers:** Commuter parking at places of employment
- **Fleet/depot chargers:** Charging infrastructure for vehicles returning to base

These projections are shown in Figure 19 for the 'Electric Engagement' scenario – the scenario with the most ambitious electrification pathway.

Ashbourne primary substation has 3.6 MW of eHGV and fleet/depot charging capacity forecast by 2050

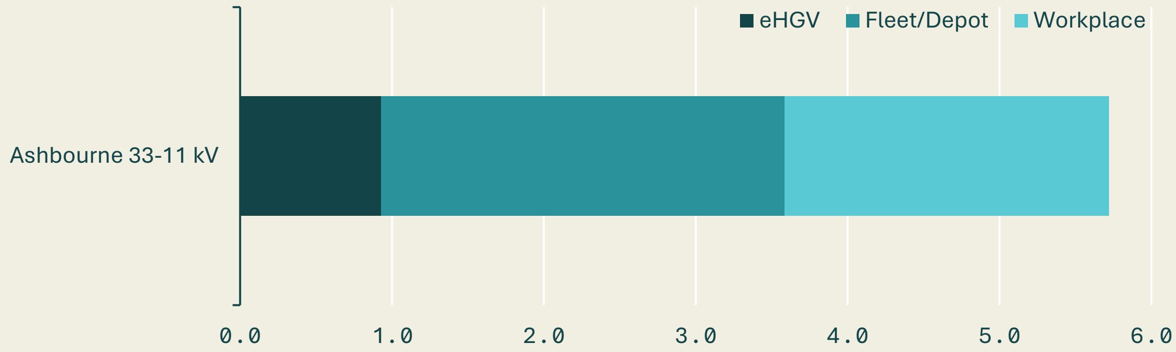

Figure 19: eHGV, fleet, depot and workplace charging capacities for the Ashbourne primary substation. Distribution Future Energy Scenarios, NGED, 2025

A high-level sensitivity analysis has been developed to conceptualise HGV charging requirements against these DFES projections. This analysis is intended to explore the impact of key variables rather than provide a forecast. Charger requirements vary with numerous variables, including:

- **Total annual energy delivered to HGVs** on-site. This is a variable in our sensitivity analysis. It can be influenced by several factors, including:

- Total vehicle mileage for the HGVs based at the cluster. An average annual HGV mileage of 28,000 miles has been applied as a central estimate[15]
    - The proportion of charging undertaken on-site versus off-site
    - The charging requirements and behaviour of visiting HGVs
- **Charger utilisation rate,** defined as the average proportion of installed capacity used. We use this as the second variable in our sensitivity analysis.
- **Charging window** for peak charging requirements, representing the average time available for charging each day. This may range from overnight depot-based charging to shorter charging during loading/unloading turnaround periods. Site evidence suggests a mix of both permanently based fleet vehicles and high volumes of through-traffic with variable dwell times.
- **HGV efficiency,** assumed to be 1.1 kWh/mile, as stated in NGED DFES for 2050.

Charger utilisation rate and the available charging window are closely related, but distinct, factors. Both influence how much energy can be delivered over time and, therefore, the required peak capacity. The charging window reflects the time vehicles are available to charge (e.g. constrained by time spent on the road), while the utilisation rate reflects how effectively installed charging capacity is used within that window (e.g. due to operational or technical constraints). They are considered separately here to capture these different real-world limitations.

The resulting sensitivity range shows that the peak capacity varies materially depending on annual energy demand and average utilisation rate of peak charging capacity. Across the modelled range, estimated charging capacity requirements span approximately from 0.5 MW to 2.5 MW.

[15] Regen analysis based on 'Table TRA89', Traffic data by local authority, DfT.

Table 1: Regen sensitivity analysis of eHGV DFES charging projections. Key assumptions: East Midlands licence area average HGV annual mileage = 28,000 (DfT Table TRA89, Regen analysis). HGV efficiency = 1.1 kWh/mile (National Grid Future Energy Scenarios). Charging window = 8 hours.

MW HGV EV charging sensitivity analysis		Annual cluster HGV energy (MWh)*					
		1,000	1,250	1,500	1,750	2,000	2,250
Average utilisation rate (%)	30%	1.1	1.4	1.7	2.0	2.3	2.6
	40%	0.9	1.1	1.3	1.5	1.7	1.9
	50%	0.7	0.9	1.0	1.2	1.4	1.5
	60%	0.6	0.7	0.9	1.0	1.1	1.3
	70%	0.5	0.6	0.7	0.9	1.0	1.1
	80%	0.4	0.5	0.6	0.7	0.9	1.0
	90%	0.4	0.5	0.6	0.7	0.8	0.9

Modelling peak HGV charging capacity (MW)

**The number of HGVs based on-site or visiting the site is unknown. However, using the mileage and efficiency assumptions listed above, an average HGV could require in the order of 30 MWh per year. Therefore, 2,000 MWh equates to the total annual energy for nearly 70 HGVs.*

As shown, lower utilisation rates and higher energy consumption drive significantly higher peak capacity requirements. Conversely, higher utilisation can materially reduce peak demand. This analysis highlights that site-specific operational characteristics will be a key determinant of future infrastructure requirements. Key uncertainties include:

- The proportion of fleet electrification occurring at depot locations versus public charging hubs
- The pace and timing of electrification uptake
- Future vehicle battery capacities and charging power requirements
- Operational charging strategies (e.g. opportunistic versus scheduled charging, or longer charge period overnight vs en-route shorter time period charging)

Overall, DFES projections appear to be higher than the assumptions explored here, though both approaches are high-level and subject to significant behavioural and technological uncertainty. Charging infrastructure requires strategic planning from within supply chains to ensure it supports their operational requirements.

3.5. Next steps for Ashbourne Airfield

The Airfield cluster has an energy profile with large demands from manufacturing processes, as well as space heating across all sectors, which is likely the single biggest source of emissions. These both offer opportunities for electrification, primarily through heat pumps. For this to happen, there must be a clear investment case, which will require the high cost of electricity to be addressed in many cases.

The large volume of process heat which the analysis is generated by manufacturers may also offer the potential to develop a local heat network where waste manufacturing heat can be utilised by commercial properties for space heating. This could also serve, along with further development of on-site renewables, to minimise the network impact as electrification occurs.

Current headroom for new demand looks to be limited, so businesses should engage with the DNO well ahead of developing electrification plans to better understand the specific constraints that may impact their business and options for mitigating this through some of the approaches described in Section 2.3.

There will be significant capacity requirements from HGV electrification that are broadly similar to the headroom available at the cluster's primary substation. Quantifying this more precisely requires detailed analysis of specific supply chains in collaboration with the cluster's fleet operators.

Top 3 priorities for Ashbourne Airfield

1. Engage with the DNO to better understand demand connection constraints and options to overcome them in the short term
2. Electrify low-efficiency space heating systems
3. Commission a detailed analysis of decarbonisation options for specific manufacturing processes and HGV fleets.

Section 4:

Wardentree Lane

Cluster report for this industrial estate in Spalding, a key part of UK Food Valley's South Lincolnshire food cluster.

4.1. **Cluster profile**

The Wardentree Lane cluster forms part of Spalding's principal commercial area, situated between Spalding and Pinchbeck. The site saw significant expansion from the early 2000s, with many of the first units constructed in 2004, but some that predate this. The estate has since grown extensively and is now occupied by firms across a range of sectors, including logistics, warehousing, retail and wholesale trade. The cluster contains a mix of large-scale distribution facilities and smaller starter units.

Figure 20: Map of the Wardentree Lane cluster and surrounding context

4.1.1. Cluster-specific data and engagement

One-to-one engagement with sites in the Wardentree Lane cluster was not possible due to the size of the site. However, a questionnaire was sent via a local business network to gather key information. Two organisations responded, both of which were major wholesalers of food within the cluster. These responses highlighted energy use from temperature-controlled facilities as a major energy use for these facilities and informed HGV analysis.

4.1.2. Major employers and sectors

The Wardentee Lane cluster covers a variety of industries, as shown in Figure 21. There are a number of businesses involved in the food and drink sector, such as Greencore, FreshLinc, and Worldwide Fruit and Nationwide Produce. In addition to these sites, there are a number of smaller engineering firms and manufacturers. The large volume of wholesale and retail traders is due to the mixed-use nature of the cluster and the wide area covered by this study.

The Wardentree Lane cluster hosts a wide variety of sectors

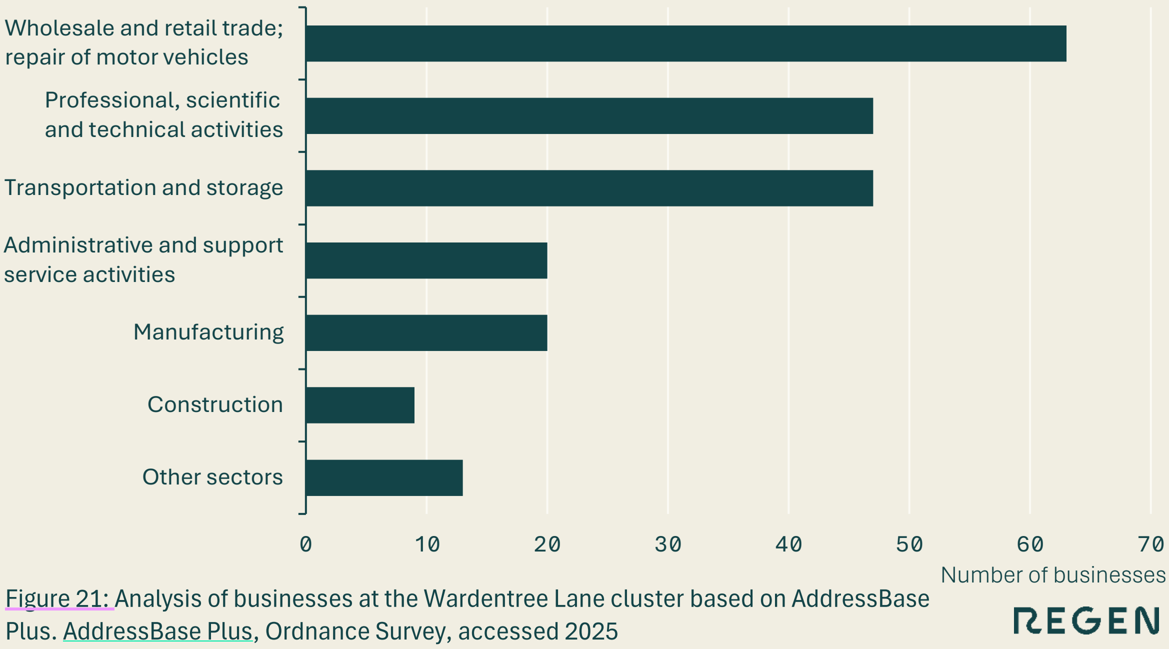

Figure 21: Analysis of businesses at the Wardentree Lane cluster based on AddressBase Plus. AddressBase Plus, Ordnance Survey, accessed 2025

Business sector was identified from ABP data.[16] For the 70% of sites with a recorded ‘organisation name’, public data from Companies House was used to attribute the sector. The classification field was used for the remaining sites.

[16] AddressBase Plus, Ordnance Survey, accessed 2025.

4.2. Current energy profile

Understanding the cluster's energy use from open data requires analysing several data sources together, as no source gives a complete picture. We examined:

1. Non-domestic energy performance certificates (EPCs) to understand the range of fuels used for heating
2. Sectoral analysis to understand how industrial activity may impact energy use
3. Area-based metered energy statistics to correlate gas and electricity demand to the sectoral estimates.

EPC data shows widespread use of both gas and electricity for space heating.

A sectoral analysis reveals that the transportation and storage sector is the main energy consumer in the cluster. This estimate suggests an annual energy use of just under 150 GWh across all sectors, based on sector-wide averages. These may overstate actual consumption since it relies on national averages of energy use by standard industrial classification (SIC) sectors, which are skewed to sites with larger energy demand.

This estimate can be compared with energy use data from metered electricity and gas, totalling 62.7 GWh for the entire cluster. However, there is considerable uncertainty in these allocations because they depend on distributing energy consumption between the Wardentree Lane cluster and nearby addresses. While the data indicates higher gas usage compared to electricity, EPC data suggests that electricity is the primary heating fuel for units within the cluster.

Taking these sources together gives a more complete picture of energy demand at the cluster, though the disparity between the sectoral and metered analysis shows that this is an indicative process. More accurate baselining requires measured data from the businesses being studied.

4.2.1. Energy performance certificates

Analysis of EPC data shows that 42% of units with a recorded EPC utilise fossil fuel heating and 54% use electricity. The off-gas postcode register indicates that several postcodes within the Wardentree Lane are classified as off-gas. Out of the 173 certificates identified within the cluster, 64 are within off-gas postcodes, 60 of which utilise non-gas heating sources. Approximately 20% of these sites utilise fossil heating. The average EPC age is similar across fossil and non-fossil heating fuels.

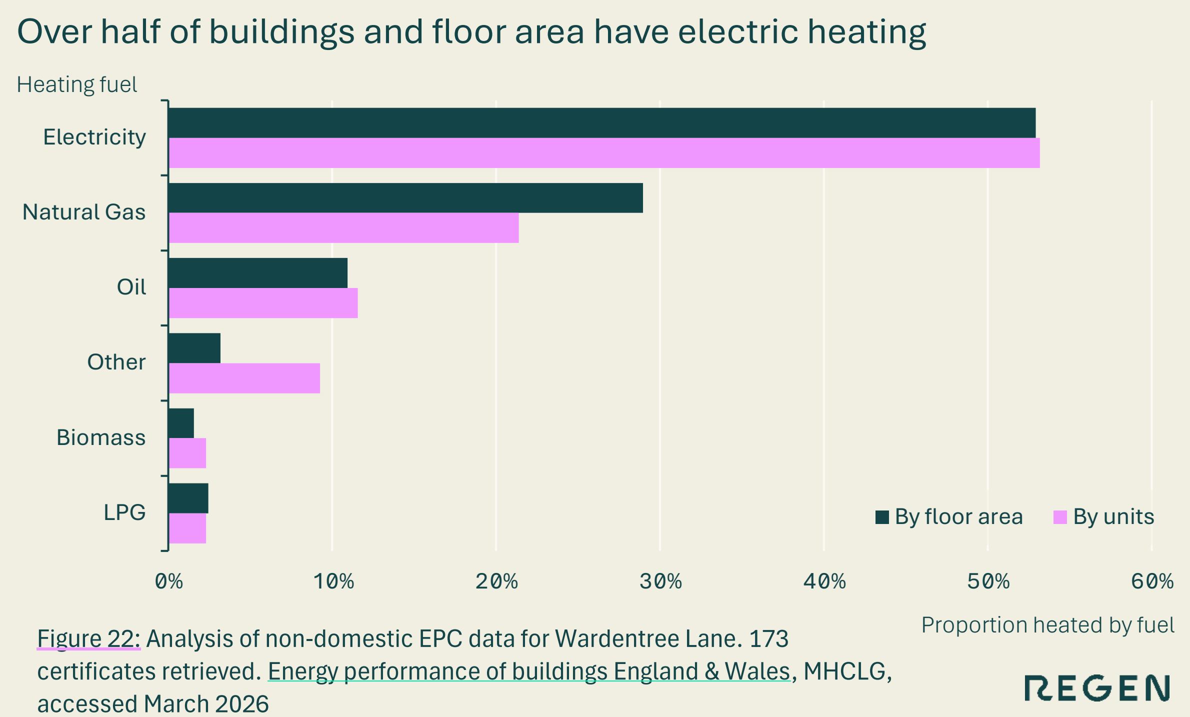

Figure 22: Analysis of non-domestic EPC data for Wardentree Lane. 173 certificates retrieved. Energy performance of buildings England & Wales, MHCLG, accessed March 2026

Using the property type category from the EPC data indicates that this split between fuels is not consistent across building usage. Figure 23 shows this data split by building type category for both the proportion of units and the proportion of floor area. As with buildings across the country, decarbonising space heating is a major challenge for many of Wardentree Lane's businesses.

Non-metered heating fuels are most common in industrial units

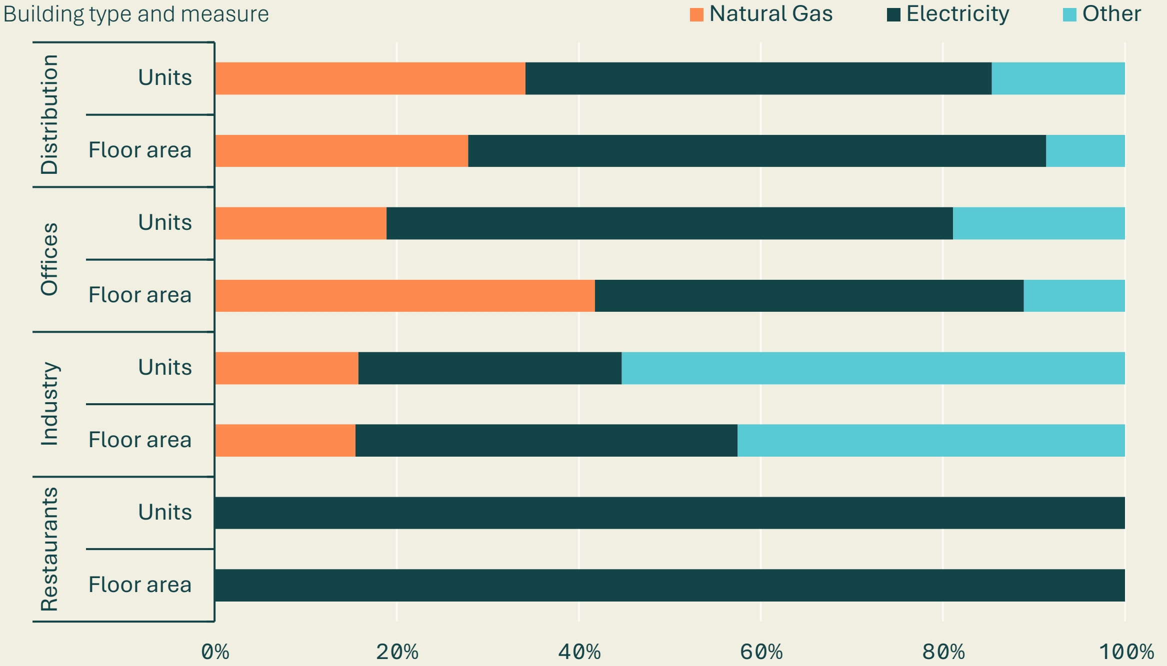

Figure 23: Analysis of non-domestic EPC data for Wardentree Lane. 173 certificates retrieved. Energy performance of buildings England & Wales, MHCLG, accessed March 2026

Figure 23 accounts for 41 distribution-sites, 90 offices, 38 industry buildings, and 4 restaurants. For office buildings, the data indicates a preference for natural gas when heating larger floor areas. Industry sites also have a significant percentage of sites heated with non-electric/gas sources, which includes oil, biomass and 'other'. The available EPC records lack further information on what 'other' fuels are in these cases.

4.2.2. Sectoral analysis

By linking information on sector and headcount to GB-wide usage data across different SIC sectors, we can model energy use at the Wardentree Lane cluster by industry. These results are plotted in Figure 10 and estimate a total energy consumption of roughly 185 GWh, 50% of which is from the transportation and storage sector. This aligns with the fact that Spalding is a major distribution hub with 30% of all national food freight passing through South Lincolnshire.[17]

The sectoral analysis assumes energy use is in line with the average energy use by employees for each industry, or, in the case of manufacturing sites where public data on employment was not available, the average energy use by businesses for the relevant subsector.

[17] South Lincolnshire food processing cluster, UK Food Valley, accessed April 2026

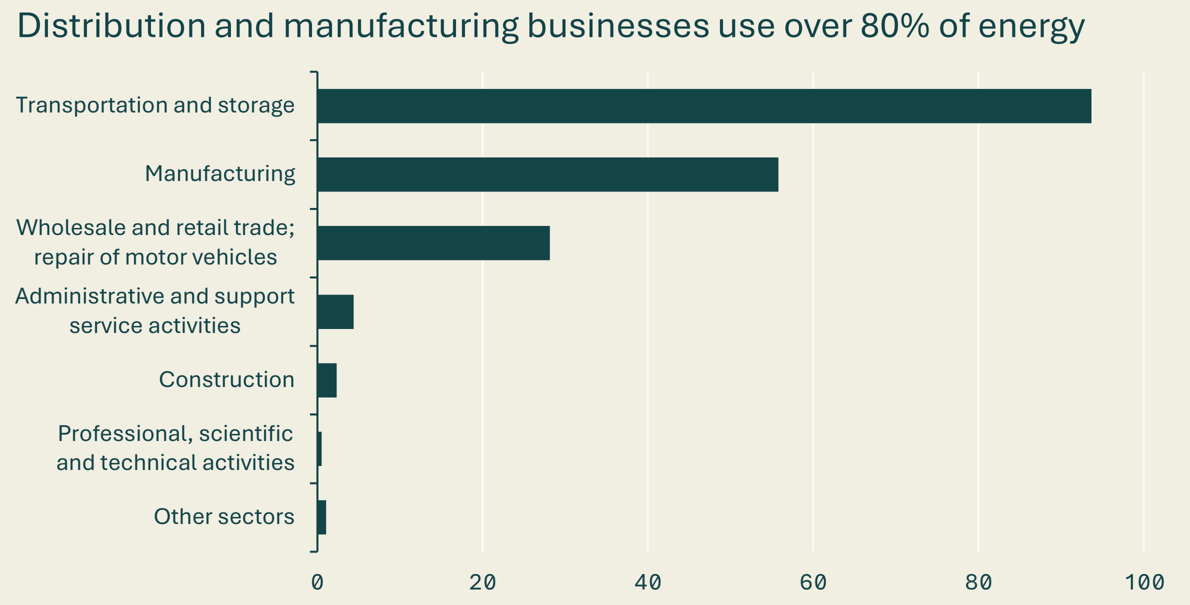

Figure 24: Modelled energy use by industrial sector for Wardentree Lane. UK Business Counts - local units by industry and employment size band, ONS, 2025, Energy consumption by industry, ONS, 2025, Energy consumption in the UK: End use data tables, DESNZ, 2025

We were able to conduct more detailed sub-sectoral analysis for the manufacturing sector by using the robust 'two-digit SIC code' data obtained for the majority of businesses through matching ABP organisation names to Companies House records and then to national energy statistics by subsector.[18] This enables more specific activities, such as 'manufacture of food products', to be analysed, as well as linking to the split between activities. It should be noted that this is still reliant on linking specific sites to industry-wide averages but is likely to give a more nuanced indication of energy use.

This analysis indicates that food manufacturing makes up 80% of the manufacturing energy demand in the cluster, almost all of which is used by Greencore, which operates a major food manufacturing site at the cluster. Greencore's website indicates that their Spalding site "produces coleslaw, potato salad, cous cous and grains".[19] Job postings on the website imply that the site operates 24/7, which would increase energy usage.

Within food manufacturing, 64% of energy use is for 'low temperature processes'. The SIC data does not define temperature thresholds, but this category is likely to include all cooking processes, with high-temperature processes relating to processes such as smelting and glass furnaces. 'Other manufacturing' is a significant contributor to energy demand. The accuracy of

[18] Energy consumption in the UK: End use data tables, DESNZ, 2025
Sites without organisation names, whose AddressBase Plus class is either 'factory/manufacturing' or 'workshop/light industrial' were assumed to fit under the 'other manufacturing' category.

[19] Greencore Spalding, Greencore, accessed April 2026

the energy assignment to this subcategory is hard to ascertain due to the wide-ranging nature of the activities within it, from watchmakers to aluminium processers.

Food is the highest energy consuming sector within manufacturing

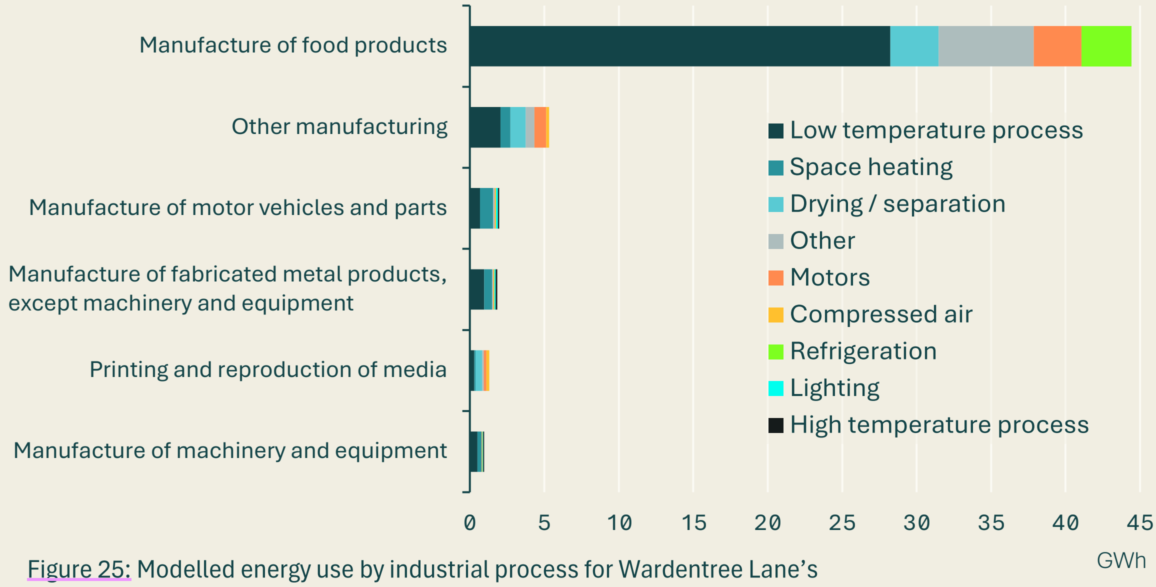

Figure 25: Modelled energy use by industrial process for Wardentree Lane's manufacturing industries. AddressBase Plus, Ordnance Survey, accessed 2025, Energy consumption in the UK: End use data tables, DESNZ, 2025

60% of manufacturing energy usage is from low temperature processes

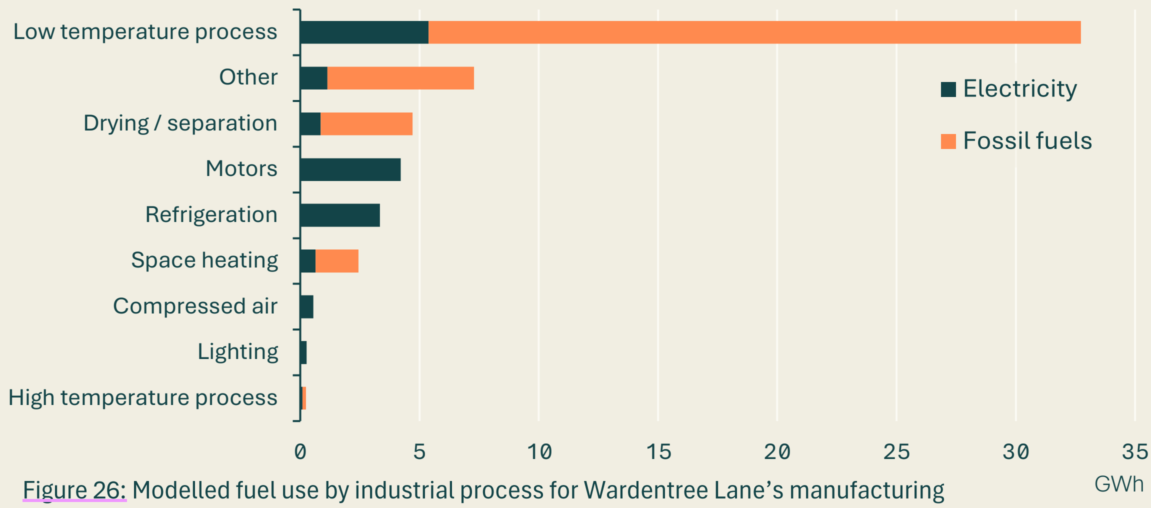

Figure 26: Modelled fuel use by industrial process for Wardentree Lane's manufacturing industries. AddressBase Plus, Ordnance Survey, accessed 2025, Energy consumption in the UK: End use data tables, DESNZ, 2025

The manufacturing process data includes details on fuel use by process, as shown in Figure 26. This indicates that roughly 70% of manufacturing process energy is supplied by fossil fuels. Within fossil fuel demand, 84% is from low temperature processes, drying/separation or space heating. These processes are likely to be decarbonised predominantly through electrification.

4.2.3. Freight

As logistics and food distribution activities are prominent across the Wardentree Lane cluster, HGV movements represent a significant component of future energy demand as freight decarbonises. At present, these movements are almost entirely reliant on internal combustion engine vehicles. While some occupiers have installed EV charging infrastructure, this is primarily for staff vehicles, with limited evidence of decarbonisation strategies for HGV fleets. The transition to electric HGVs will require substantial grid capacity upgrades and coordinated planning across operators, given the scale and intensity of vehicle movements observed.

One of the largest logistics operators on the cluster has a license for up to 175 tractor units to be based at Wardentree Lane. This indicates a high-throughput logistics operation with significant fleet turnover. This site also has a large volume of HGVs passing through the site that are not based there, with approximately 380 HGV movements recorded over a typical 24-hour period. Dwell times are described as highly variable, suggesting a mix of rapid turnaround operations and longer stays associated with warehousing and distribution activities.

A second major occupier, operating a food production and ripening facility, experiences lower but still material HGV activity, with up to 40 HGVs visiting the site per day. These vehicles typically remain on-site for up to two hours. Unlike the logistics operator, no tractor units are understood to be permanently based on-site, indicating a fully third-party logistics model.

Across both sites, dwell time emerges as a key factor in assessing future electrification infrastructure requirements, alongside how daily charging behaviours are planned into daily HGV activity. The details gathered from just these two sites outline the huge variability in fleet behaviour between and within sites, which has a significant impact on charging requirements.

4.2.4. Metered energy use

As a benchmark for the sectoral energy analysis, subnational metered energy consumption data was also analysed. This is available at the MSOA level for metered gas and non-half-hourly metered electricity, and at local authority level for half-hourly metered electricity.[20] Note that these data determine 'domestic' and 'non-domestic' gas consumption based on the total demand of a meter point. This means that gas consumption from some smaller gas users is categorised as 'domestic' and therefore excluded from our analysis. This is not the case for electricity, where meters are classified as domestic or non-domestic directly.[21]

[20] Sub-national final energy demand, DESNZ, July 2025.

[21] Sub-national consumption statistics methodology and guidance booklet, DESNZ, December 2025, Table 1.

Our estimates of how these values might be allocated to the Wardentree Lane cluster are shown in Figure 27, which indicates that gas usage is nearly double that of electricity. This contrasts with the EPC evidence that the majority of units in the cluster use electricity for heat.

These metered energy values are three times lower than the energy use modelled through sectoral analysis, shown in Figure 24. This can be partly explained by the analysis shown in Figure 23, which indicates that a large number of industry buildings utilise non-metered fuels not included in the analysed subnational data as their main heating fuels. There may also be a portion of electricity demand met by on-site renewables, which is not shown in meter consumption. This is discussed in the following section. Finally, both sources have limited accuracy and will differ from the true data. Neither source gives a complete, accurate picture of energy consumption, but reviewing them together allows a more accurate assessment of the energy baseline, which informs decarbonisation options discussed in Section 4.4.

Metered gas usage is nearly double electricity usage

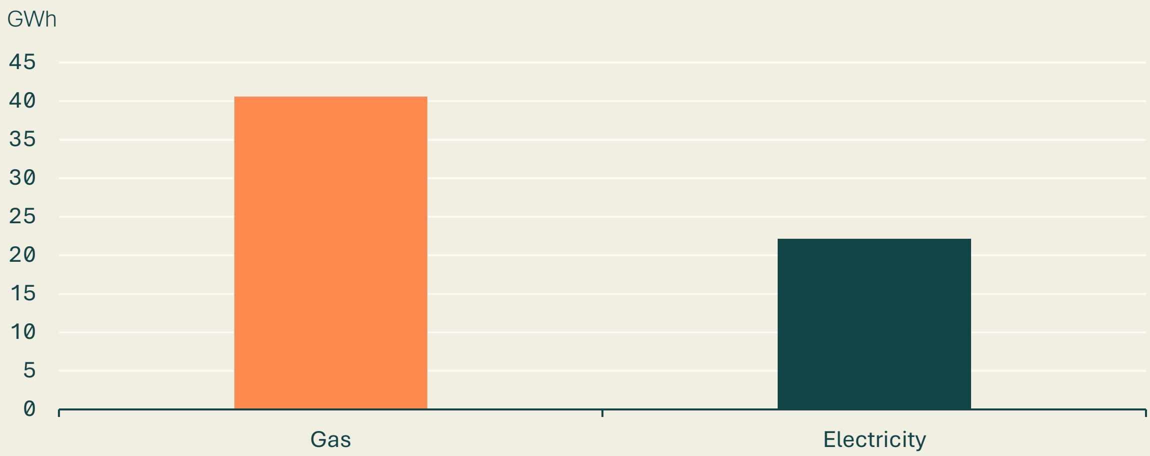

Figure 27: Allocation of metered gas and electricity usage at Wardentree Lane. AddressBase Plus, Ordnance Survey, accessed 2025; MSOA non-domestic electricity 2010 to 2024, MSOA non-domestic gas 2010 to 2024, DESNZ, 2025. Note: Half-hourly electricity meters within Wardentree Lane were assigned in proportion to the number of half-hourly meters across the wider local authority

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4.2.5. On-site power generation

This cluster is not centrally managed, so there is no single entity with responsibility or oversight of on-site generation. A review of satellite imagery of the cluster indicates that several units have installed rooftop solar PV. Major distributors on-site have indicated through our engagement efforts that they have significant volumes of solar PV and are considering expanding this capacity in the future. As energy demand is electrified, the business case for wider PV deployment is strengthened, as it allows greater self-consumption.

4.2.6. Summary of baseline energy usage

We have analysed building performance data, metered energy usage and engagement data for the Wardentree Lane cluster. Taken together, they give us a picture of how energy is used and inform decarbonisation pathways. We have found that:

- Low temperature processes and drying and separation are the main fossil fuel demands for the cluster, driven by a large manufacturing base within the cluster, specifically from one food manufacturer
- Electrification of space heating is already common, especially in areas of the site with no gas network
- There are considerable opportunities for on-site generation, but these may be constrained by the electricity network's ability to accept additional exports.

Due to the likely high volume of unmetered fuel use in the largest demand sector, manufacturing, the baseline energy usage within the cluster is assumed to be closer to the sectoral analysis value than the metered analysis.

For this cluster, we have defined the total baseline energy demand from the sectoral analysis. This is because there is significant usage of unmetered fuel, which suggests that the metered data would be an underestimate. This total is then allocated between sectors from the sectoral and sub-sectoral analysis. The proportion of energy use between fuels is not defined in the sectoral data, so this proportion is derived from the metered energy use and is the same across all sectors.

Commercial buildings and the food sector use 93% of metered energy

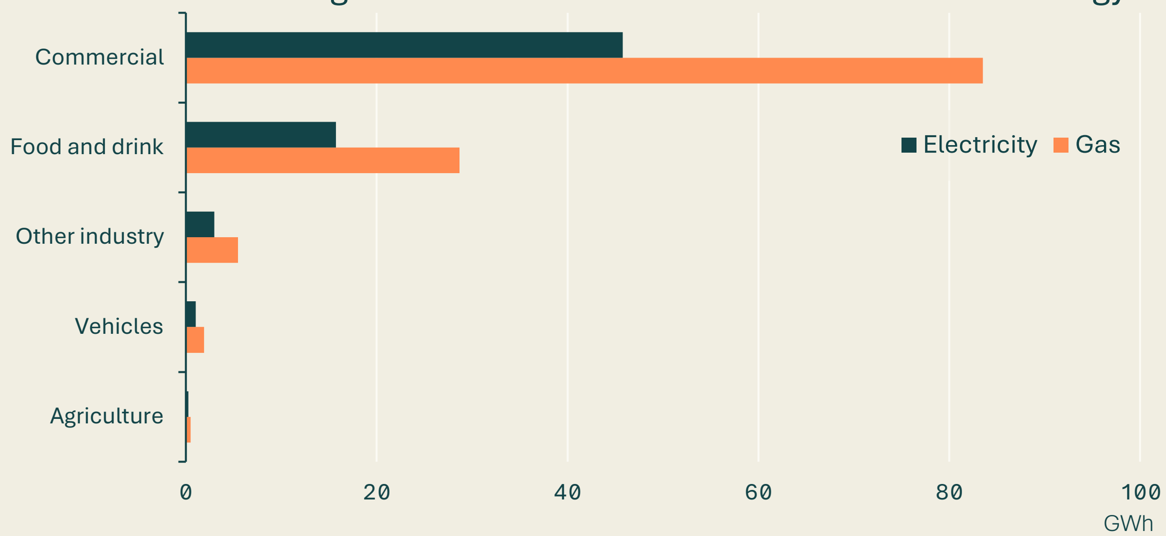

Figure 28: Baseline energy use for the Wardentree Lane cluster by CCC subsector.

Figure 28 shows this baseline energy use assigned to the subsectors used by the Climate Change Committee (CCC) in their analysis. These data form the basis of our decarbonisation pathway modelling, presented in 4.4.1. Despite the food sector dominating the analysis within the manufacturing industry, the very high number of businesses in logistics and other sectors means that 'commercial buildings' have the largest energy demand by CCC-defined sector. This is dominated by space heating.

4.3. **Geographic context**

4.3.1. Known development projects

There are expansion opportunities available across the cluster. The north side of Wardentree Lane includes undeveloped greenfield land allocated for employment uses within the South East Lincolnshire Local Plan (2019), with options for freehold plot sales and design-and-build packages to support new commercial development. There does not appear to be any formal plans to expand the cluster currently.

4.3.2. Electricity network

The Wardentree Lane cluster is located within National Grid Electricity Distribution's (NGED) licence area, and falls within the areas supplied by the Spalding Park Road and Wardentree Lane 33-11 kV primary substations. Analysis of the available network capacity at the substations indicates that both substations have significant volumes of capacity for demand projects, but only Spalding Park Road has capacity for new generation to connect.

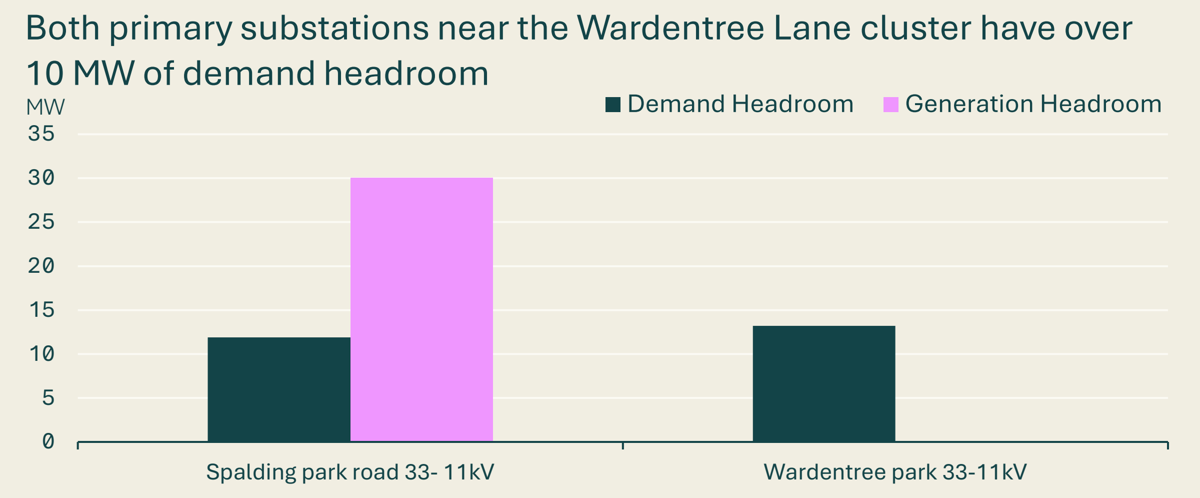

Figure 29: Headroom of primary substations near the Wardentree Lane cluster. Network Opportunity Map Headroom, National Grid Electricity Distribution 2025

Figure 30 shows a map of the ESA along with the boundary for the cluster, which shows that much of the existing industrial cluster lies within the Wardentree Park ESA. This could pose a challenge to the development of more solar PV for much of the cluster.

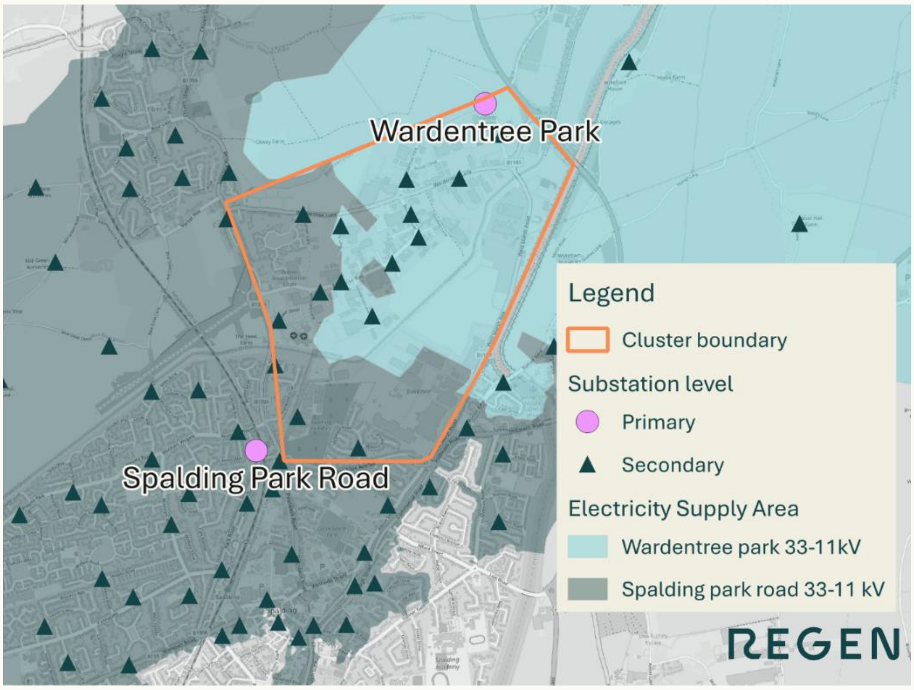

Figure 30: Wardentree Lane industrial cluster and surrounding primary and secondary substations. Network Opportunity Map Headroom, East Midlands Primary, National Grid Electricity Distribution 2025; Map data from OpenStreetMap

4.3.3. Hydrogen network

The proposed network of the East Coast Hydrogen project is 24 miles away from the Wardentree Lane cluster at its closest point, as shown in Figure 17. For this reason, and those outlined in section 3.3.3, our analysis sees no role for hydrogen in the Wardentree Lane cluster.

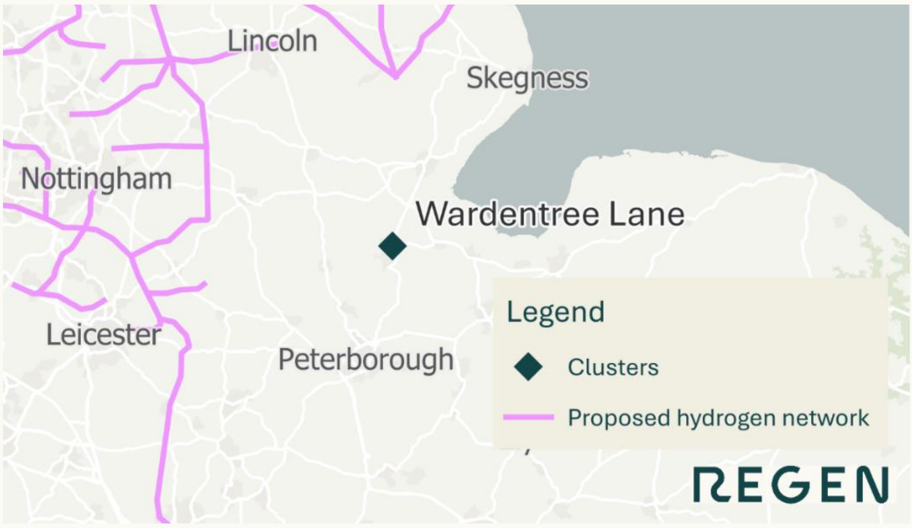

Figure 31: Map showing the Wardentree Lane cluster against the proposed hydrogen transmission network from the East Coast Hydrogen project. East Coast Hydrogen – Pipeline North Phase 1 NZASP Re-opener, Cadent Gas, 2024; Map data from OpenStreetMap.

4.4. Decarbonising Wardentree Lane

4.4.1. Decarbonisation pathway

Based on our analysis of the cluster's baseline energy consumption, combined with subsector-specific energy decarbonisation pathways from the CCC's seventh carbon budget, we have produced an indicative energy pathway for the Wardentree Lane cluster, shown in Figure 32. This applies sector-wide assumptions to the baseline energy use. A more accurate and bespoke pathway would require detailed engagement and analysis with individual businesses within the cluster.

The pathway indicates that there is no gas usage in the Wardentree Lane cluster by 2050, but that the cluster may see a doubling of electricity demand. The overall energy usage of the site declines significantly; this is a result of the efficiency gains of using electricity, as compared to fossil fuels. In particular, the much higher efficiency of heat pumps, as compared to boilers.

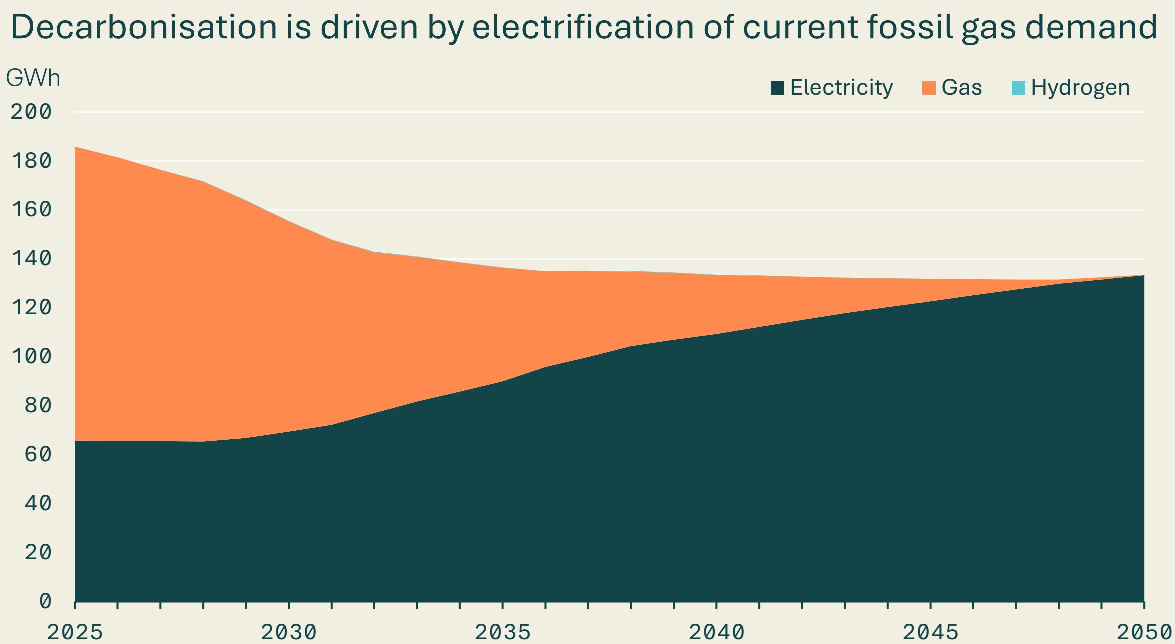

Figure 32: Wardentree Lane industrial cluster decarbonisation pathway, based on CCC seventh carbon budget industry and non-residential subsector pathways.

4.4.2. Electrification of HGVs

The electrification of HGVs at Wardentree Lane could significantly increase electricity demand at the cluster. To understand how key variables could affect potential demand, we compared projections from NGED's DFES against a high-level sensitivity analysis based on desktop research and insights from two large site operators.

NGED's DFES provides scenario-based projections of EV charger capacity, disaggregated to 11 kV substation level. Wardentree Lane sits at the boundary between two 11 kV Electricity Supply Areas (ESAs): Spalding Park Road substation and Wardentree Park substation, see Figure 30.

The relevant charger categories within the DFES projections are:

- **eHGV chargers:** Dedicated chargers for HGVs at service stations and public sites
- **Workplace chargers:** Commuter parking at places of employment
- **Fleet/depot chargers:** Charging infrastructure for vehicles returning to base.

These projections are shown in Figure 33 for the 'Electric Engagement' scenario – the scenario with the most ambitious electrification pathway. Given Wardentree Lane's role as a distribution hub for the food industry, the most relevant categories are eHGV chargers and fleet/depot charging.

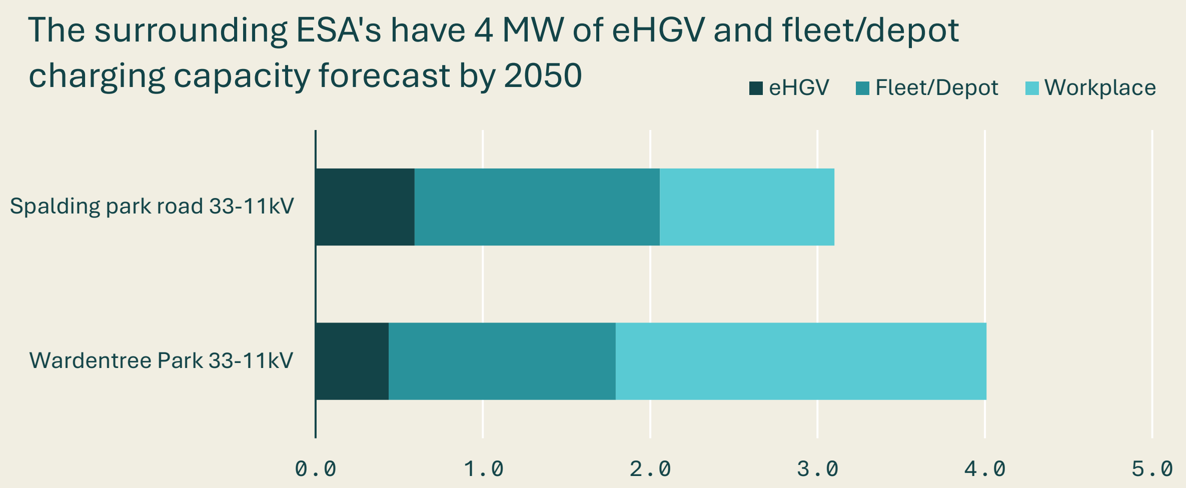

Figure 33: eHGV, fleet, depot and workplace charging capacities for the Wardentree Lane primary substations. Distribution Future Energy Scenarios, NGED, 2025

Using the site insights explored in section 4.2.3 together with regional evidence and assumptions, we have developed a high-level sensitivity analysis to benchmark potential HGV charging requirements against DFES projections. While some operational data has been obtained from site stakeholders, several factors remain highly uncertain. As such, this analysis is intended to explore the impact of key variables rather than provide a definitive forecast. Charger requirements vary with numerous variables, including:

- **Total annual energy delivered to HGVs** on-site. This is a variable in our sensitivity analysis. It can be influenced by several factors, including:
    - For the HGVs based at the cluster, their total vehicle mileage. An average annual HGV mileage of 28,000 miles has been applied as a central estimate[22]

[22] Regen analysis based on 'Table TRA89', Traffic data by local authority, DfT.

- The proportion of charging undertaken on-site versus off-site
- The charging requirements and behaviour of visiting HGVs

- **Charger utilisation rate,** defined as the average proportion of installed capacity used. We use this as the second variable in our sensitivity analysis.
- **Charging window** for peak charging requirements, representing the average time available for charging each day. This may range from overnight depot-based charging to shorter charging during loading/unloading turnaround periods. Site evidence suggests a mix of both permanently based fleet vehicles and high volumes of through-traffic with variable dwell times.
- **HGV efficiency,** assumed to be 1.1 kWh/mile, as stated in NGED DFES for 2050.

Charger utilisation rate and the available charging window are closely related, but distinct, factors. Both influence how much energy can be delivered over time and, therefore, the required peak capacity. The charging window reflects the time vehicles are available to charge (e.g. constrained by time spent on the road), while the utilisation rate reflects how effectively installed charging capacity is used within that window (e.g. due to operational or technical constraints). They are considered separately here to capture these different real-world limitations.

The resulting sensitivity range shows that the required peak capacity varies materially depending on annual energy demand and average utilisation rate of peak charging capacity. Across the modelled range, estimated charging capacity requirements range approximately from 2 MW to 11 MW.

Table 2: Regen sensitivity analysis of eHGV DFES charging projections. Key assumptions: East Midlands licence area average HGV annual mileage = 28,000 (DfT Table TRA89, Regen analysis). HGV efficiency = 1.1 kWh/mile (National Grid Future Energy Scenarios). Charging window = 8 hours.

MW HGV EV charging sensitivity analysis		Annual cluster HGV energy (MWh)*					
		5,000	6,000	7,000	8,000	9,000	10,000
Average utilisation rate (%)	30%	5.7	6.8	8.0	9.1	10.3	11.4
	40%	4.3	5.1	6.0	6.8	7.7	8.6
	50%	3.4	4.1	4.8	5.5	6.2	6.8
	60%	2.9	3.4	4.0	4.6	5.1	5.7
	70%	2.4	2.9	3.4	3.9	4.4	4.9
	80%	2.1	2.6	3.0	3.4	3.9	4.3
	90%	1.9	2.3	2.7	3.0	3.4	3.8

Modelling peak HGV charging capacity (MW)

**The number of HGVs based on-site or visiting the site remains uncertain. However, using the mileage and efficiency assumptions listed above, an average HGV could require in the order of 30 MWh per year. Therefore, 10,000 MWh equates to the total annual energy for over 300 HGVs.*

As shown, lower utilisation rates and higher energy consumption drive significantly higher peak capacity requirements. Conversely, higher utilisation can materially reduce peak demand. This analysis highlights that site-specific operational characteristics will be a key determinant of future infrastructure requirements. Key uncertainties include:

- The proportion of fleet electrification occurring at depot locations versus public charging hubs
- The pace and timing of electrification uptake
- Future vehicle battery capacities and charging power requirements
- Operational charging strategies (e.g. opportunistic versus scheduled charging, or longer charge period overnight vs en-route shorter time period charging)

Incorporating site-specific fleet data suggests that peak capacity requirements could exceed DFES projections for eHGV and fleet charging within the relevant ESAs. However, this comparison remains highly uncertain due to the sensitivity of assumptions and the variation in requirements between sites. Overall, DFES projections appear to be similar to plausible site-level demand, but both approaches are high-level and subject to significant behavioural and technological uncertainty.

More detailed modelling and engagement with occupiers would be required to refine coincidence factors and charging profiles across the day, as well as additional factors including the potential for managed charging or flexibility, and phasing of infrastructure investment.

HGV charging strategy uncertainty

Charging strategy is a critical driver of infrastructure requirements, often as influential as total energy demand. Sensitivity analysis shows that shorter turnaround times and low utilisation rates can drive substantially higher peak capacity needs, while longer charging windows and higher utilisation can materially reduce them.

At Wardentree Lane, the mix of depot-based fleets and high-throughput HGV movements introduces significant uncertainty in both utilisation and available charging windows. This suggests that unmanaged or opportunistic charging could lead to inefficient over-provision of capacity, whereas coordinated charging strategies may offer substantial reductions in required network reinforcement.

4.5. Next steps for Wardentree Lane

Wardentree Lane is a diverse industrial estate with a wide range of sectors represented. The principal energy demand for the site, which spans all sectors, is space heating requirements. Decarbonising this through the deployment of heat pumps is the primary requirement to decarbonise all buildings across the cluster. There are many that use oil and LPG heating, which should be prioritised for this transition as they will be higher cost and carbon.

Logistics is a core component of the site and there are significant HGV movements associated with the cluster. Our sensitivity analysis highlights that the electrification capacity could be as high as 10 MW, which is similar to the total headroom of each of the two primary substations supplying the cluster. A specific charging strategy is required for the electrification of specific supply chains in order to ensure that investment and grid capacity are well used. This requires detailed engagement with hauliers to understand their requirements.

There is a significant manufacturing base at the site, principally food manufacturing. Decarbonising these processes is predominantly reliant on the electrification of cooking processes and the production of steam. Our phase 1 cluster study of SmartParc demonstrated how this could be done for a large, bespoke food production site, using a heat network that provided efficient heating, cooking and refrigeration. It is more challenging for an existing site, which is bound by its current building and may be harder to justify investment in. The first step is to audit energy use and identify opportunities for improving efficiency and replacement of older equipment with electrified alternatives, which can begin this transition.

Top 3 priorities for Wardentree Lane

1. Electrify existing space heating across the cluster using efficient heat pump systems and prioritising the least efficient systems
2. Develop electrification plans for specific supply chains to deploy HGV chargers strategically
3. Identify the opportunities in electrifying key manufacturing processes that can improve efficiency and align with replacement cycles.

Section 5:

Wider roll-out

Descriptions of the methods and findings of this project, framed to support wider delivery of similar industrial cluster studies.

Across the two phases of this project, we have delivered six cluster-level studies of industrial energy. Here we outline how our approach could support other clusters in decarbonising, highlight its strengths, weaknesses and capabilities, and recommend how it could be embedded into wider decarbonisation plans.

Our approach offers a flexible method that can be deployed with limited engagement from the cluster, while still making space to leverage engagement data whenever it is available. A summary of the five stages of the process is shown in Figure 34; each of these steps is described in greater detail in the following sections.

1. Continuous engagement

- Continuous engagement supports all stages
- Informs the cluster definition, modelling results and recommendations

2. Characterise the cluster

- Understand the sectors present
- Characterise size, processes and needs

3. Energy baseline

- Estimate the baseline energy usage and any on-site generation
- Understand how different fuels are being used

4. Geographic context

- Understand the specific opportunities and limitations of the cluster
- Assess electricity network constraints for demand and generation

5. Pathway and next steps

- Identify the key changes required and barriers to achieving them
- Generate pathways that guide the cluster to accelerate the transition

Figure 34: Framework of our approach to assessing the energy demand of a cluster.

5.1. Continuous engagement

We have sought to engage the clusters and businesses themselves throughout all stages of the cluster studies we have undertaken. Engagement is an overarching theme that informs and strengthens our approach throughout. Engaging directly with a cluster can provide more accurate or detailed information on the nature of the site than is available publicly. It also provided an opportunity to understand the attitudes and barriers to the energy transition that were being faced on the ground.

Some examples of helpful engagement from the clusters we have studied in Phase 1

- **Receiving a site plan for Markham Vale allowed us to more accurately represent the full range of businesses on-site**
- **Discussions with SmartParc allowed us to understand the details and trade-offs of their heat network design**
- **Provision of energy bills from the National Space Centre gave us an accurate measure of current energy usage.**

Getting meaningful engagement is hard, especially when resources for developing on-site relationships are limited and there is not direct buy-in from all businesses being studied. Our approach has therefore been designed to generate useful results with no engagement, but to allow for detailed responses to strengthen the work throughout. This gives a flexible method that can be deployed for a wide range of clusters. Our methods to engage followed two approaches, based on the nature of the cluster.

5.1.1. Structured clusters

Three of our six clusters, all from phase 1, can be described as 'structured' in that there was a structure that defined the cluster and represented it in some way. This could be through ownership (Mira Tech Park), development (SmartParc), or through a formalised collaboration between a small number of parties (Space City). For each of these three clusters, we were able to conduct direct engagement with one or two individuals.

We were able to discuss cluster-wide energy plans and design with SmartParc employees without the need to engage individual tenants. This was particularly easy in this case, as the cluster is still under development and energy was a novel and key part of the design, meaning that there was considerable expertise within their team.

In the case of Space City, we were able to connect directly with staff at each of the three stakeholders (the University of Leicester, Leicester City Council and the National Space Centre). There was variation in what detail these were able to provide, but all had detailed knowledge of the activity, size and energy use of their site. This was only possible within the project resource because of the relatively small number and the strong buy-in to the project from all three parties. Where a cluster has an overarching structure with institutional buy-in to the study, the engagement can be easy, detailed and valuable.

5.1.2. Informal or dispersed clusters

For the other three clusters we have studied (Markham Vale from phase 1 and Ashbourne Airfield and Wardentree Lane from phase 2), there was no individual or organisation that could meaningfully describe or understand how energy is used across the cluster. In these cases, it is necessary to directly contact the constituent organisations.

Here, we sent a short email questionnaire to businesses within the cluster. These asked basic questions about the operations of the business at that cluster that could directly inform our modelling assumptions, as well as some energy-focused questions. An example email is in the box below. It was designed to be quick and easy to complete, while allowing respondents free rein to add the details they wanted to.

Example questionnaire to organisations within a cluster

About your site

1. Approximately how many people FTE do you employ onsite? (feel free to give a range or an estimate)
2. What industrial sector is your business in? E.g. logistics, food production, etc.
3. What type of site is your building? E.g. Office, Warehouse, Factory, etc.
4. Can you describe HGV movements at your site (if relevant). In particular:
    a. How many HGV tractor units are based at the site?
    b. How many HGV tractor units visit the site on a typical weekday?
    c. On average, how much time does a HGV tractor unit spend on-site in a 24-hr period?

About your energy use

1. Do you have any processes at Ashbourne that use large amounts of energy, such as freezers, industrial boilers, furnaces etc? If so, please describe.
2. Are there any ways in which energy demand is currently constraining your business? E.g. the cost of a larger grid connection.
3. Have you already made any investments plans relevant to energy use at Ashbourne? E.g. solar generation, storage, EV charging, etc.

In reality, the number of respondents was low for all clusters. Even one or two responses can be very valuable to the process. For example, the two responses received for Wardentree Lane underpin our assessment of HGV electrification. Without these, we would have had very little local data to assess the cluster in a meaningful way. The best response rate was at Markham Vale, where we had an engaged site manager who was able to leverage her strong relationship with occupants to encourage responses. We also sent bespoke messages to a few key sites across these clusters, with mixed results. Having or being able to develop on the ground relationships with the organisations within the cluster can dramatically improve engagement.

5.2. **Cluster characteristics**

The first stage of our process is to characterise the cluster in terms of the size, activities and broad nature of the cluster. We found that gaining a full understanding of what the cluster is like in the broadest terms enabled the further stages to be grounded in the specific situation

For each cluster, we aimed to understand:

- The size, history and location of the cluster
- The nature and number of businesses present in terms of size, sector, activities and behaviour
- The structure of ownership or collaboration of the cluster itself
- Opportunities and plans for further development
- The geographic location and proximity to transport links and other industrial sites.

The starting place for this process was to get an overview of the cluster from our key contact. We also requested GIS files, site plans, lists of companies and any other material they may have to help define the cluster. We then used this to guide our research to quantify the activities on-site. Finally, we verified this data through engagement with the main contact or specific companies, as is most valuable. This process is summarised in Figure 35.

Definition — Primary engagement and research

- An interview with the main contact gives an overview and a basis for defining it.
- Identifying the cluster area is a key early step, by receiving or agreeing a shape file.
- Understand the range of sectors and activities taking place and the structure of any cluster-wide organisations and ownership.
- Ask for key documents, such as site plans, company lists, employment numbers, etc.

Quantification — Analysis of public records and shared data

- ABP data provides a basis for the buildings that are present on-site with classifications to indicate the sector.
- Determining sector of each site using details from the engagement, companies house data, wider web searches and review of map, satellite and street view data.
- Assess planning records to understand the extent of development plans where relevant.

Verification — Focused engagement and review

- Share results back with the key contact to verify and check assumptions.
- Identify the missing datapoints that are likely to have a significant impact on energy use.
- Engage directly with key businesses where possible and appropriate, e.g. where there is a dominant business, or one with a high energy process.

Figure 35: Summary of the stages involved in the characterisation process.

Much of this stage is developing a qualitative understanding of the cluster, which then gives context and informs decision-making throughout the modelling process. There are also key quantitative data points that form the basis of subsequent analysis. Specifically, producing a list of sites within the cluster with an indication of sector, activity and size.

We used ABP data, as well as engagement with clusters and analysis of public satellite imagery, to establish the number of businesses by sector in each cluster.[23] Where clusters overlapped multiple MSOAs, we used geospatial analysis to estimate how many of those businesses fell within each MSOA. This was combined with an estimate of the average number of employees per business in each MSOA and the average energy use per employee per sector to model the energy use in each cluster. In order to assign a SIC code to each address we matched the 'organisation name' within ABP to Companies House records. Where 'organisation name' was blank we used the 'classification' field to give a more approximate SIC match. This dataset forms the input to the energy baselining process.

5.3. **Energy baseline**

In order to understand the barriers and opportunities for the cluster in engaging with the energy transition, it is important to understand how much energy is used for different purposes and through which fuels. We have developed several methods for characterising this, based on different data sources.

Each of these approaches has different strengths and weaknesses, so it was useful to perform all of them and then derive an overall baseline. If there was a strong level of detailed engagement across a cluster, then all of these could be replaced by direct energy consumption data and building records, which would be significantly more accurate. Without this level of engagement, results are purely indicative.

1. Energy Performance Certificates

Indicates the fuel mix across the cluster

2. Sectoral analysis

Estimates energy use based on sectors. Can indicate energy use by process and fuel

3. Metered energy data

Estimates energy use based on regional statistics of metered gas and electricity demand

[23] AddressBase Plus, Ordnance Survey, accessed 2025

5.3.1. Energy Performance Certificate analysis

EPCs are produced for commercial buildings when they are built, sold, rented or at other points in a building's lifecycle.[24] They are based on a standard assessment of the energy use of the building and benchmarked based on the building's use. The public record for non-domestic EPCs provides a limited view of energy performance. For our purposes, we used these only to give an indication of fuel usage across the cluster. This informed the degree of electrification and the proportion of alternative fuels in the case of off-grid sites, such as Mira Technology Park.

5.3.2. Sectoral analysis

Energy use varies significantly by industry type. We undertook a sectoral analysis using SIC data to link the activity within each cluster to expected patterns of energy demand. Sectoral analysis for each of the clusters is based on a combination of business counts by size band from the ONS and energy consumption by industry as recorded by Ricardo Energy and the ONS.[25] The employment size band in the business count data is used to estimate the number of employees in each SIC sector. This is then combined with the energy use in each sector to estimate the energy use per employee in that sector. The same business count and employment size band data were used to estimate the average employment per sector in each MSOA.

The same methodology was applied at the two-digit SIC level using the industry categories available in the UK energy end-use tables.[26] Business counts and employment size bands were mapped to the corresponding two-digit SIC codes, allowing us to estimate the number of employees in each category. These employee estimates were then combined with the energy consumption values by fuel and process reported for each two-digit SIC code to derive average energy use per employee for these manufacturing sectors. The UK-wide business counts were also used to estimate the energy use by fuel and process per business.

The fundamental weakness of this approach is that it relies on applying average energy patterns within sectors to specific sites. In reality, sites vary hugely in terms of size, fuel availability and processes. It therefore must always be taken as an indicator of behaviour and reviewed in the context of what is known about the cluster qualitatively.

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[24] Energy performance of buildings England & Wales, MHCLG, accessed February 2026

[25] UK Business Counts - local units by industry and employment size band, ONS, 2025. Energy consumption by industry, ONS, 2025

[26] Energy consumption in the UK: End use data tables, DESNZ, 2025

5.3.3. Metered energy analysis

We used UK subnational non-residential meter data for gas and electricity to estimate an energy use baseline in each cluster. For gas, we identified potential meter points using ABP, satellite imagery and cluster engagement and estimated how many of these sites were likely to have gas connections based on their SIC sector and the wider MSOA context. These meter counts were multiplied by the mean non-domestic gas consumption per meter. For electricity, we assumed all identified sites had an electricity meter. High-energy-use sectors and sites with greater potential for flexibility were treated as having half-hourly meters. This data is published at the local authority area, so we used the mean from that dataset. The remainder were classed as non-half-hourly, which were assigned the mean non-domestic consumption for the MSOA. Mean values were used to reflect the higher consumption typical of industrial clusters.[27]

This approach is valuable, as it is based on measured data at the given location, but there is uncertainty around the allocation of energy use to within and outside the cluster. This is exacerbated when a cluster covers multiple MSOAs, such as Markham Vale. If a cluster were aligned to a whole MSOA, there would be significantly less uncertainty for this dataset. This would often compromise on defining relevant clusters but would be a useful approach to providing a wider regional analysis.

5.3.4. Creating one indicative baseline

We create an indicative baseline energy demand by combining the three datasets described above, as well as introducing any available engagement data. This process is a compromise between the strengths and weaknesses of the available data and is subject to significant uncertainty.

The approach we took was to prioritise a meaningful baseline, in terms of the overall characteristics, rather than a set approach for all clusters. Understanding the approximate mix of different fuels is a key strategic insight for planning decarbonisation priorities. For example, it was important in the case of Mira Technology Park to understand that oil is being used for space heating and highlighting this as a key priority for electrification, as a high-cost and high-emissions fuel.

[27] Subnational consumption statistics methodology and guidance booklet, DESNZ, December 2025.

5.4. Geographic context

Each cluster has a unique context that will impact the energy transition. Most obviously, the specific availability of energy infrastructure may constrain development, but we also considered factors such as neighbouring sites, opportunities for renewables and development plans. This section principally provides a qualitative understanding that informs the development of next steps and an energy pathway.

5.4.1. Energy infrastructure

To establish the infrastructure available across the EMCCA and L&L area, geospatial analysis was undertaken using data available through the region's distribution network operator (DNO), alongside individual cluster boundaries. Electricity network infrastructure was taken from National Grid Electricity Distribution's (NGED) open data portal. Substation headroom was assessed using NGED's Network Opportunity Map and combined with Electricity Supply Area (ESA) boundaries to identify which ESAs and substations served each cluster.[28] Similar tools are available from other DNOs. This allowed us to understand the existing network capacity and the points at which clusters interface with the wider electricity system. Nearby renewable project data was analysed using the renewable energy planning database (REPD). This analysis could then be related directly to each cluster.

5.4.2. New developments

Several clusters were in the midst of significant development. We used planning records from relevant authorities, as well as details from the cluster itself, to understand the scale, purpose and energy performance of these developments. The approach is bespoke to each cluster, and sources are described in the relevant section. Primarily, this relied on engagement and planning data.

[28] Network Opportunity Map Headroom, East Midlands Primary, National Grid Electricity Distribution, 2025

5.5. Decarbonisation pathways

We developed decarbonisation pathways using the Climate Change Committee's Balanced Pathway from the Seventh Carbon Budget.[29] Baseline energy use for 2025 was taken directly from step 3 and then distributed among the businesses in that cluster based on either floor area or employment count, depending on data availability. We derived proportional annual growth or reduction factors from each relevant CCC sub-sector pathway, using 2025 as the baseline year. Each industry in each cluster was then matched to a relevant subsector decarbonisation pathway, where the proportional change to the baseline was applied.

A key limitation of this method is that it applies UK-wide average sector trends to individual clusters. The biggest impact of this is seen for fuels such as hydrogen, where the CCC expect demand to be concentrated around key industrial sites. Our analysis spreads this demand proportionally between all sites within that sector. This means that all relevant clusters (such as Airfield) have a small proportion of hydrogen, rather than most sites having no hydrogen and a small number of industrial sites having a significant hydrogen demand.

We have discussed this in each cluster section, as relevant. A further improvement would be to use the output from our standardised process as the basis for more bespoke analysis. This would require converting hydrogen demand into other fuels for each year of the pathway.

5.5.1. HGVs

The lack of HGV data to form a complete baseline led us to detach this from the pathways process and develop a different approach. We used projections from NGED's Distribution Future Energy Scenarios (DFES) for the roll-out of electric vehicle charging.[30] We have reviewed this data in the context of our more detailed engagement with the two clusters with significant HGV activity. Using a sensitivity analysis approach, we estimated the degree of electricity capacity required for the clusters. This was informed by a literature review to find evidence of the approximate scale of charging capacity required for a given level of HGV usage.

This approach was followed even where we had meaningful engagement data, as there is significant uncertainty around many factors that are key to determining the charging requirements. Energy planning must effectively incorporate electrification requirements from transport, alongside those from buildings and industrial use. Siloed datasets and policy approaches must be better co-ordinated in order to achieve this. Detailed analysis of specific supply chains is required to develop an optimised, strategic approach.

[29] The Seventh Carbon Budget, Climate Change Committee, 2025

[30] Distribution Future Energy Scenarios, NGED, 2025.

5.6. **Conclusions**

The method presented here is flexible and scalable to inform wider industrial decarbonisation studies. Although it has been designed for medium-scale, mixed use clusters, it could be adapted for any non-domestic sites. The key finding is that without meaningful engagement from businesses on the ground, and the resources to support them in understanding their energy requirements, results are purely indicative. Nevertheless, this can provide useful insights as to the scale and nature of the challenges faced by industry, as well as being a way to relate wider energy trends and policy more clearly to individual businesses.

These methods would also scale well to provide a more detailed understanding of industrial energy use at a regional level, for local authorities, DNOs or other stakeholders. This would use the wide range of data sources that can be analysed at MSOA level without the need to disaggregate them, which creates additional uncertainty. This would also allow direct linking between data sources, such that metered energy use could be used to scale values from sectoral analysis.

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