

Winchester LAEP: Baseline Report

V2.0

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Overview:

As part of the wider Local Area Energy Plan project, this static report, produced in partnership with Winchester City Council and Scottish and Southern Electricity Networks, offers a detailed snapshot of Winchester's current energy system. It highlights energy demand and consumption trends, outlines existing infrastructure, and provides a sociodemographic profile of the district.

Note: An interactive version of this baseline is available as a data story [here](#) alongside a baseline summary intended for sharing with secondary stakeholders [here](#). A separate assumptions report outlines the data sources, calculations, and analytical assumptions used to derive the findings in this report.

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1 Introduction

The Winchester district spans 250 square miles (661 square kilometres) of central Hampshire, with a substantial part of the district situated within the South Downs National Park. Winchester is one of 11 district and borough councils in Hampshire and serves an estimated population of 136,500 residents spread across the city centre, market towns, and rural villages, creating a unique mix of historical conservation and modern expansion. This dynamic balance presents both opportunities and challenges as Winchester seeks to preserve its rich heritage while transitioning towards a net zero future and facilitating economic growth.

The council declared a climate emergency in 2019 and set an ambitious target for the district to be carbon neutral by 2030. Tackling the climate emergency and becoming greener faster is the overarching priority of the council as set out within the Council Plan 2025-2030.

The council's Carbon Neutrality Action Plan 2023-2030 (CNAP) outlines how the council will work with partners to achieve its carbon neutral target. The council recognises the contribution that decarbonising the local energy system will play in achieving this target, and has identified key pathways and actions to enable the transition of the energy system to carbon neutral including:

- Reducing energy consumption by promoting energy efficiency in buildings and low-carbon heat.
- Developing a low-carbon local transport system by supporting a modal shift towards active travel, public transit, and investing in low carbon modes of transport.
- Increasing renewable energy generation within the Winchester District through investment in domestic, commercial and industrial, and utility-scale solar PV and onshore wind.

The development of a Local Area Energy Plan (LAEP) for the Winchester district is a critical enabler to the decarbonisation of the local energy system and achieving our carbon neutral target. Developing a LAEP is a key strategic priority for the council and a key objective within both our Council Plan and Carbon Neutrality Action Plan.

What is a Local Area Energy Plan (LAEP)?

A LAEP uses a whole-systems approach to produce a high-level plan of how an area's energy system can transition to net zero. The LAEP scope addresses electricity, heat, and gas networks, future potential for hydrogen, the built environment (industrial, domestic and commercial) its fabric and systems, flexibility, energy generation and storage, and providing energy to decarbonised transport e.g. electricity to electric vehicles and charging infrastructure. The results are a fully costed, spatial plan that identifies the changes needed to the local energy system and built environment to achieve our carbon neutral target.

We are working in partnership with Advanced Infrastructure Technology Limited (AITL) and Scottish and Southern Electricity Networks (SSEN) to develop our LAEP for the Winchester district. The LAEP will be

developed in seven stages following the best practice methodology and guidance set out by Energy Systems Catapult (see Figure 1).

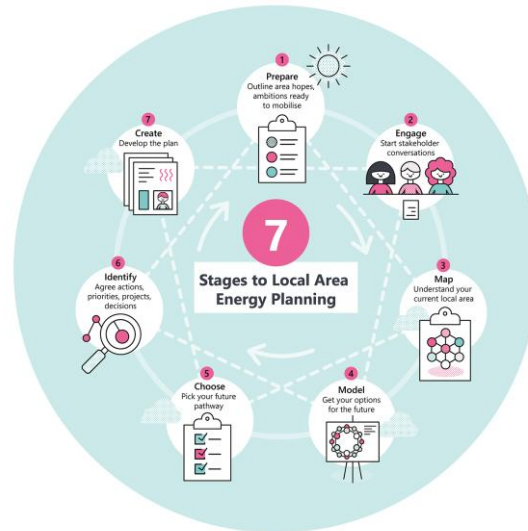


Figure 1: Energy System Catapult's 7 Stages to Local Area Energy Planning.

The purpose of this report is to show our understanding and representation of the current local energy system in Winchester district. This is known as the 'baseline' and has been created as part of the third stage of LAEP development. It captures insights on current energy demand and consumption, an overview of the district's existing energy infrastructure, and sociodemographic analysis. Future stages will build upon the baseline by modelling future scenarios and options, and planning actions across the district to achieve our targets.

2 Buildings

2.1 Existing Domestic Buildings

The Winchester region is predominantly made up of domestic properties, accounting for 86% (62,058) of all documented buildings by Unique Property Reference Number (UPRN). Among these, 58,921 are classified as dwellings, with each dwelling covering an average area of 130.5 m². Examining the distribution of different housing archetypes reveals that 33.5% are detached properties, 24.6% are semi-detached, and 21.7% are terraced homes. Categorising buildings into archetypes is useful, as each building type has distinct energy consumption patterns, retrofit requirements, and carbon reduction potential, all of which will be explored in the following sections. The table and chart below detail the number and proportion of each housing archetype across the district.

Table 1: Distribution of Domestic Properties by Archetype

Tertiary Code Description	Count	Average Area
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Detached	19,748	128.82
Self-Contained Flat (Includes Maisonette / Apartment)	11,129	293.46
Semi-Detached	14,500	72.5
Sheltered Accommodation	55	332.42
Terraced	12,754	59.29
Caravan	698	67.57
Unknown	37	201.76

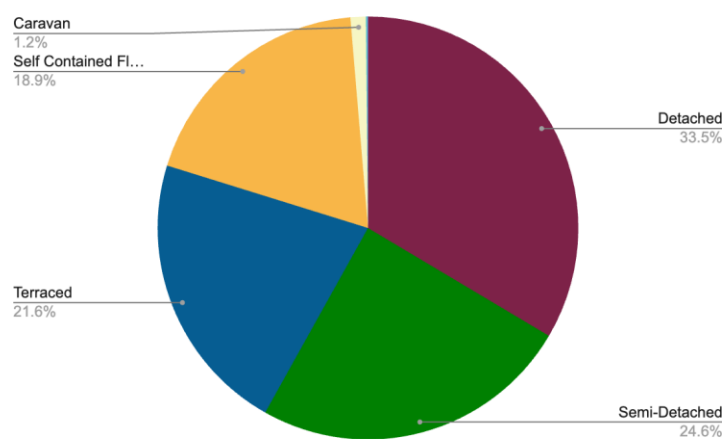


Figure 2: Distribution of domestic building archetypes.

Energy Performance Certificates (EPC) provide a standardised measure of the energy efficiency of a building. Understanding the EPC ratings of domestic buildings across the district plays a crucial role in developing the LAEP as it helps identify and target buildings that require investment to improve their energy efficiency. EPC rating can also be used to forecast future changes in electricity demand, shape future energy scenarios, and inform infrastructure planning and investment to ensure the grid is resilient as more properties transition to electrified heating solutions. According to the latest update of the domestic EPC register, the most common EPC rating among documented domestic buildings in the Winchester district is C (see Figure 2). Currently, 51.8% (29,945) of Winchester's domestic buildings are EPC rated C or above, and 48.2% (27,903) are rated D or below. These figures highlight that further work is required to improve the energy efficiency of the district's domestic buildings through measures such as insulation upgrades and installing low carbon heating systems.

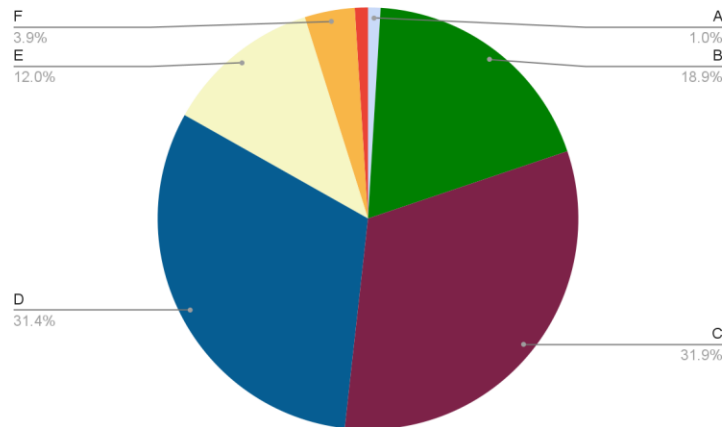


Figure 3: Distribution of domestic EPC ratings.

Beyond EPC ratings, it is important to understand the primary fuel types used in domestic properties. As shown in the chart below, 78% of homes currently rely on gas as their main fuel source, followed by electricity and oil. Establishing a baseline for fuel types is essential for scenario modeling, as it provides a clear reference point to assess shifts in energy use across the district's domestic buildings over time. This approach allows for a more structured analysis of transitions and trends, enabling better forecasting of how different energy vectors may be adopted in alignment with long-term decarbonisation goals.

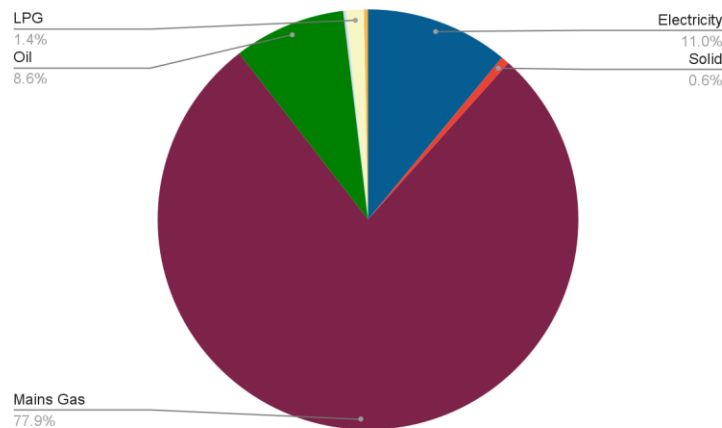


Figure 4: Fuel types used in domestic properties.

2.1 Existing Non-Domestic Buildings

There are 7946 commercial buildings across the Winchester district, with the most common commercial uses including offices, retail spaces, and industrial buildings, each contributing significantly to local energy demand and economic activity.

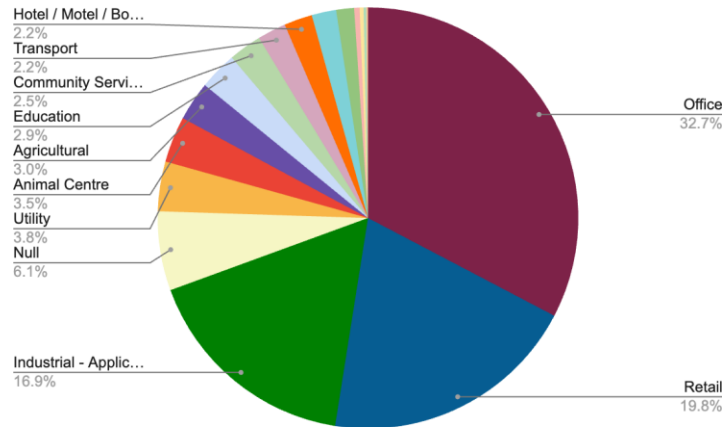


Figure 5: Distribution of non-domestic buildings by secondary code description. Note 'null' represents unknown archetype.

It is important to understand the average size of different types of non-domestic buildings as the size of the building provides a useful indicator of the building's energy consumption, heating demands, and potential feasibility for renewable energy generation. Educational institutions are the largest type of non-domestic property within the Winchester district with an average area of 863m². Office buildings in Winchester average 685 m², while industrial buildings typically span 520 m². Industrial buildings can provide significant opportunities for increasing renewable energy generation as they often have extensive roof space for installing rooftop PV and land for ground-mounted PV systems. Additionally, clusters of industrial buildings create opportunities for shared energy and heat networks, enhancing overall energy efficiency. Currently, the Winchester district has 1345 documented industrial buildings, with their most prevalent operational activities being Workshop/Light Industrial, followed by Warehouse and Storage, with Factory and Manufacturing as the third most common category. The table below displays the distribution of various non-domestic building archetypes and their corresponding average area.

Table 2: Distribution of Non-Domestic Properties by Archetype

Secondary Code Description	Count	Average Area
Agricultural	239	319.93
Ancillary Building	33	382.13
Animal Centre	281	235.47
Community Services	202	347.49
Education	232	863.11
Emergency / Rescue Service	10	358.29
Hotel / Motel / Boarding / Guest House	172	419.02
Industrial - Applicable to manufacturing, engineering, maintenance, storage / wholesale distribution and extraction sites	1345	520.55

Information	17	1185.5
Leisure - Applicable to recreational sites and enterprises	150	560.76
Medical	109	614.81
Office	2597	684.88
Retail	1575	442.61
Storage Land	24	262.89
Transport	174	302.08
Utility	303	269.71
Unknown	483	487.43

The most common EPC rating among non-domestic buildings in the Winchester district is C, representing 33% of properties. Notably, 45% of all registered non-domestic buildings have an EPC rating lower than C, highlighting a significant opportunity for energy efficiency improvements and decarbonisation strategies within Winchester's non-domestic building stock. Notably, 54% of non-domestic buildings in Winchester rely on grid-supplied electricity as their primary fuel source, while 38% depend on natural gas.

3 Current Energy Demand & Consumption

3.1 Current Demand by Energy Vector

To effectively explore future pathways for decarbonising the energy system, it is important to establish a clear understanding of Winchester's current energy demand profile across different energy vectors (i.e., gas, electricity, and heat).

3.1.1 Gas Consumption by Sector

Aggregating gas demand by post outcode reveals a total annual consumption of 3796922.3 MWh. The chart below illustrates total gas consumption across three primary sectors: Domestic (72.6%), Commercial (21.9%), and Industrial (5.5%). The largest consumption of gas is from domestic buildings as these are more prevalent across the district compared to commercial and industrial buildings.

Across the district, the Winchester 013A lower layer super output area (LSOA) has the highest domestic gas demand, totaling 17,622.8 MWh, while the Winchester 007 MSOA (consumption by MSOA is the highest granularity of data available for non-domestic buildings) records the highest non-domestic consumption at 52,128.8 MWh. These two areas are highlighted on the map adjacent, with the MSOA outlined in blue and the LSOA in purple.

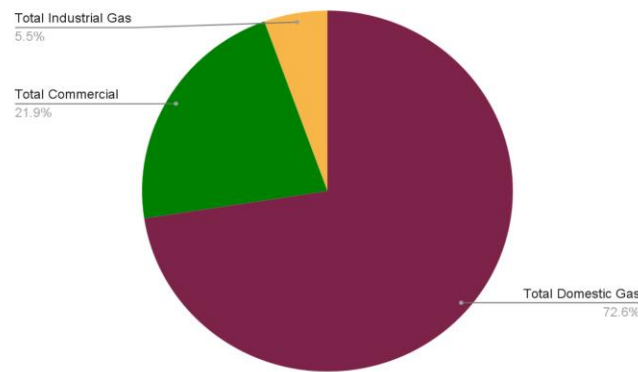


Figure 6: Total gas demand by sector.

3.1.2 Electricity Consumption

Electricity consumption in Winchester follows a similar pattern to gas demand. Aggregating domestic electricity demand by LSOA and non-domestic electricity consumption by MSOA reveals a total annual consumption of 296,959.3 MWh. Domestic electricity demand accounts for 73.6% (218,501.1 MWh) of total consumption, while non-domestic demand represents 26.4% (78,458.2 MWh).

Across the district, the areas with the highest electricity consumption align with the areas with the highest gas consumption. Winchester 013A LSOA exhibits both the highest domestic electricity and gas consumption. Furthermore, MSOA 007 has the highest non-domestic electricity and gas consumption. These highlighted (LSOA and MSOA) regions with the highest electricity demand are situated primary substation supply areas flagged with a Red RAG rating (as shown on the map adjacent), indicating that the electricity infrastructure within this supply area is overloaded by more than 5%. This highlights key areas that may need to be targeted for intervention through infrastructure planning and demand management. The importance of considering primary substation capacity when developing a LAEP is explored further in section 4.4.

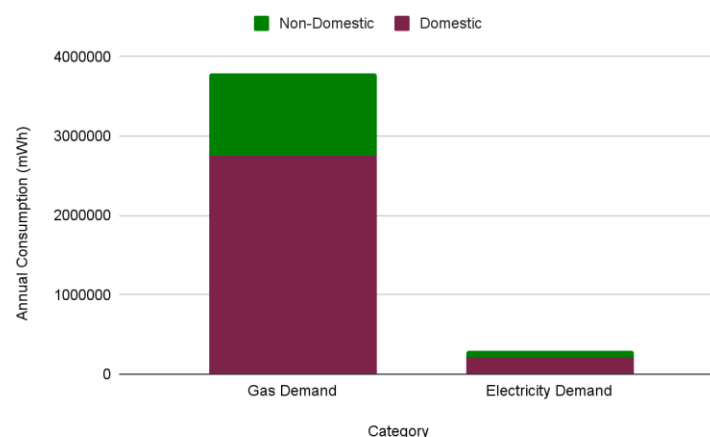


Figure 7: Domestic and non-domestic gas and electricity demand (MWh).

3.1.3 Heat Consumption

Heat demand provides insight into the area's current heating infrastructure, and highlights pathways for decarbonisation through efficiency upgrades, electrification, and heat network deployment.

In the Winchester district, the total annual heat consumption for all domestic buildings is 843,756.9 MWh. The average annual heat demand of each domestic building equates to 14,476.4 kWh which is slightly higher than the UK average of 11,500 kWh. Higher heat demands can be attributed to a range of factors including poor or limited insulation, heating system inefficiency, and the building age and fabric.

In contrast, the total annual heat consumption for all non-domestic buildings is 174,088.7 MWh. The average annual heat demand of a non-domestic building equates to 50,651.3 kWh. This spans various commercial buildings and industrial sites- each of these will exhibit varying consumption profiles based on their operational needs, so it is more difficult to compare the average to a national or aggregated general figure. A comparison of average annual heat demand for non-domestic buildings shows that the three archetypes of non-domestic buildings which require the highest heat demands are hotels, educational buildings and leisure centers (see chart below). These buildings tend to have higher heat demands due being large, shared spaces with high space heating and process heating requirements.

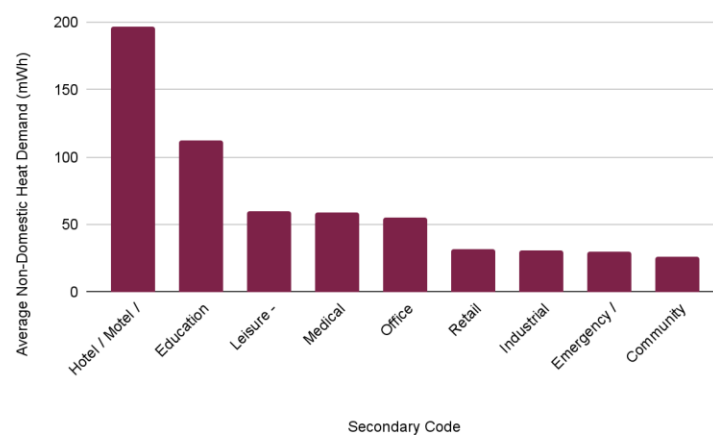


Figure 8: Average non-domestic heat demand (MWh) by sector.

3.2 Current Emissions

Winchester has already taken significant steps to reduce emissions through various initiatives including upgrading energy efficiency in council buildings, installing LED lighting, insulation, and solar panels, and transitioning most fleet vehicles to electric models. Efforts to lower indirect emissions have also been successful, with a 15% decrease since the 2017/18 baseline year and a 40% drop compared to 2022/23, aided by switching waste collection vehicles and buses to low-carbon fuels and securing green electricity supplies for leisure centres.

Winchester's district emissions are calculated annually, using data from the Government's Department for Energy Security and Net Zero (DESNZ). The most recent government data set 2023 shows that the annual greenhouse gas emissions for Winchester district is 768.6k tCO₂e. These emissions stem from a range of sectors, with transport being the largest contributor, accounting for almost half of all district-wide emissions. Emissions from transport are distributed between road transport on motorways (38%), minor roads (32%), and A roads (28%), highlighting the potential for expanding vehicle electrification across the district. Domestic buildings are responsible for 20% of overall district-wide GHG emissions, with domestic gas usage making up 58% of residential emissions, followed by domestic electricity usage at 25%. This is largely due to the district's

reliance on natural gas for heating purposes, with a majority of Winchester's residential areas located within on-gas postcodes. The prevalence of gas-heated homes emphasises the need to transition heating systems in domestic buildings to electrified and low carbon heating sources. Lastly, the agriculture sector accounts for 14.5% of GHG emissions, primarily driven by livestock and soil management practices.

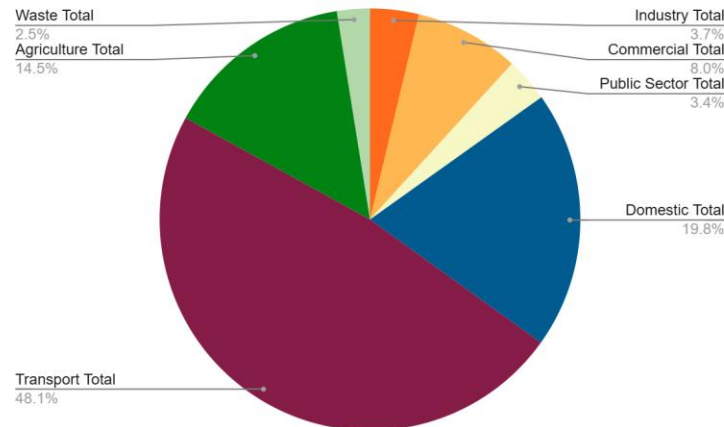


Figure 9: Total greenhouse gas emissions by sector.

4 Existing Energy Infrastructure

The chart below displays the distribution of existing renewable assets in Winchester collated by the Microgeneration Certification Scheme (MCS). There are 7972 registered installations in the region with a combined annual generation capacity of 121,997.26 kW.

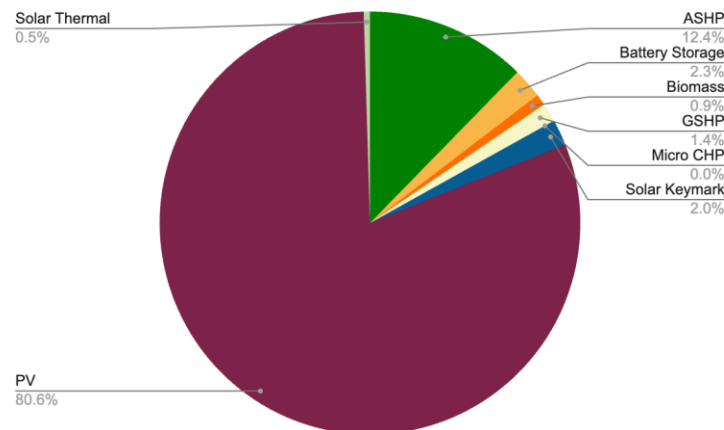


Figure 10: Distribution of existing renewable assets (count).

4.1 Existing Local Generation and Storage

The chart below illustrates the distribution of assets recorded in MCS by capacity. However, data on the capacity of wind turbines, micro CHP, and battery storage in Winchester is unavailable, and these assets are therefore omitted from the chart. Among the recorded assets, Air Source Heat Pumps (ASHP), Photovoltaics

(PV), and biomass energy systems exhibit the highest generation capacities, ASHP and PV are explored further in following sections. Winchester has 68 documented biomass energy assets, with 30 concentrated in the Winchester 001C LSOA in the northern part of the district. The district also hosts two small scale wind turbines with a combined capacity of 36 kW, located in Winchester 003E LSOA, also in the north of the region. Additionally, Winchester has one micro CHP installation, recorded in LSOA Winchester 005B, and 185 battery storage assets, which are distributed relatively evenly across the district. 56 of Winchester's 72 LSOAs contain at least one battery storage unit, though their specific capacities are unreported. There are no known hydropower assets within Winchester.

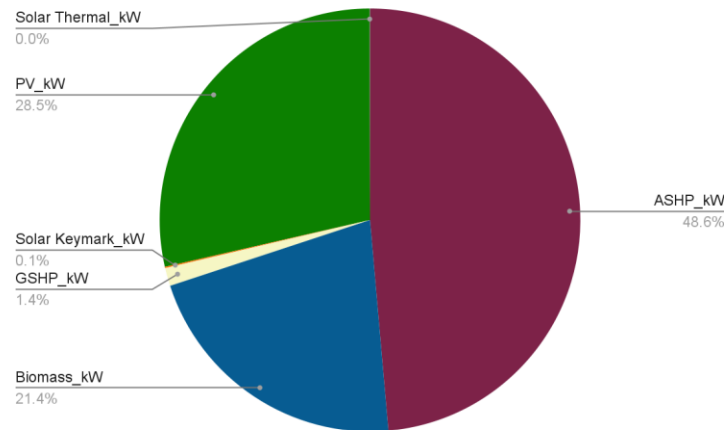


Figure 11: Distribution of the capacity of assets recorded in MCS.

4.2 Existing Rooftop PV

Photovoltaic assets play a crucial role in Winchester's transition to Net Zero; the current rooftop capacity reflects adoption of renewable technologies in the area and potential for further expansion. Existing PV can help decrease dependence on grid-supplied electricity, reducing demand for alternative fuel sources. Analysing the extent and distribution of PV deployment enables more effective future energy infrastructure planning and provides valuable insight into energy demand within the Local Authority.

Winchester has 6,425 recorded rooftop PV installations, with a collective estimated capacity of 34,785.31 kW annually across the region. The highest concentration of existing rooftop PV is within the Bishops Waltham Primary Substation Supply Area, followed by Harestock and St Cross. Bishops Waltham and Harestock both have a Green RAG rating, indicating more than 5% headroom capacity for new connections. However, St Cross has a Red RAG rating, meaning it is already over 95% loaded, which could present challenges for further PV integration. While solar PV helps ease grid pressure, new deployments in Red RAG-rated areas require careful planning to ensure effective integration. In such cases, battery storage or other energy management solutions may be necessary to maximise solar benefits without overloading the local grid.

4.3 Existing Utility-Scale Solar PV

Utility-scale solar refers to large-scale solar photovoltaic (PV) systems that are generally ground-mounted installations exceeding 1 megawatt (MW) in capacity. The latest data available indicates that there are 93MW of operational solar farms within the Winchester district (see Table below). According to the DESNZ Renewable Energy Planning Database, there is a further pipeline of 155MW solar farms across the Winchester district.

Table 3: Large-scale Solar Photovoltaic systems in the Winchester district

Address	Parish	Operator	Operational	Capacity (MW)
Raglington Farm, Botley Road	Shedfield	Raglington Farm Solar, owned by Next Energy Solar Fund	2013	5
Whitehill Lane, Alresford	Bishops Sutton	Malwine Solar SPV 1, owned by Renewable Energy Income Partnership	2014	10
Southwick Estate, Belney Lane	Southwick	Welborne Energy, owned by Bluefield Solar Income Fund	2015	40
Field House Farm, Hursley	Hursley	Field House Solar, owned by Foresight Solar Fund	2015	5
Winchester Road, Bishops Waltham	Bishop's Waltham	Bishop's Waltham Renewables Ltd, owned by Solafields	2017	5 (Phase 1 only. Approval was granted for 11.4MW)
Forest Farm, Winchester Road, Waltham Chase	Bishop's Waltham	Next Energy Solar Fund	2017	3

Three Maids Hill, Winchester	Headbourne Worthy	Three Maids Renewable Energy, owned by Sedgwick Solar 3	2023	25
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4.4 Existing Heat Pumps

Heat pumps are a key component of Winchester's transition to Net Zero, providing a low-carbon alternative to conventional heating systems. By reducing reliance on gas-based heating, they contribute to lower emissions and enhanced energy efficiency across the region. A major advantage of heat pumps over other electrically powered heat sources is their ability to generate more heat energy than the electricity required to operate them, making them a highly efficient solution. This section primarily considers two types: Ground Source Heat Pumps and Air Source Heat Pumps.

There are 985 air source heat pumps deployed in the Winchester district, with a combined capacity of 59,297.96 kW. Additionally, 114 ground source heat pumps have been installed, contributing 1,688.85 kW. Currently, no exhaust air heat pumps are recorded in Winchester, according to the Microgeneration Certification Scheme. Together, this brings the total number of installed heat pumps to 1,099, with a combined capacity of 60,986.81 kW.

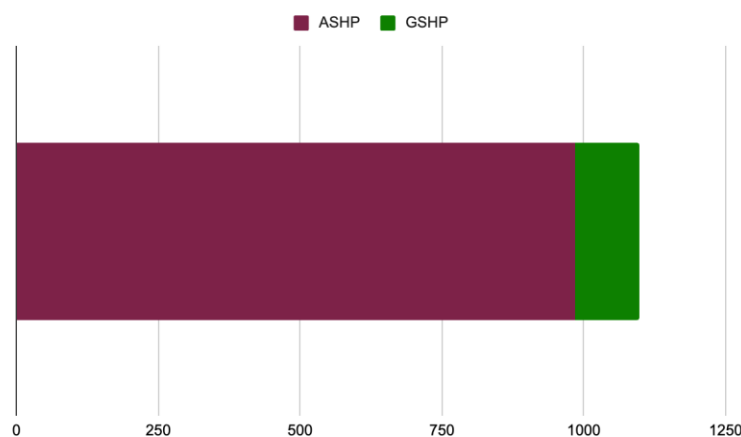


Figure 12: Count of existing air source and ground source heat pumps in Winchester

4.5 Existing EV Charging Infrastructure

Electric Vehicle (EV) charge points are essential in supporting Winchester's shift toward Net Zero. Adequate charging facilities support the adoption of EVs by mitigating range anxiety and promoting convenience for drivers. Installing appropriately sized charge points in optimal locations is a crucial part of strategic local energy planning to ensure sufficient usage and efficient spending for the council. Identifying the existing EV

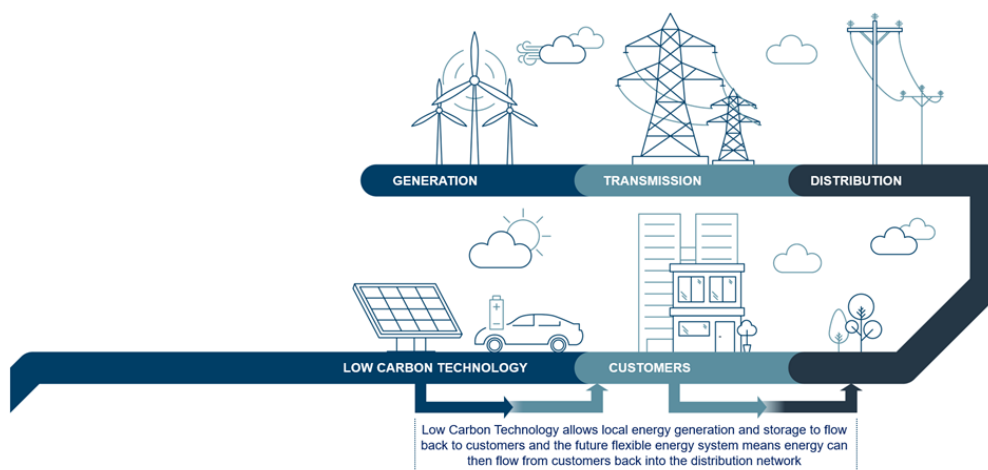
infrastructure provides insights into Winchester's current sustainable transport system and highlights areas which will require development to meet future demand.

There are currently 216 public EV charging stations in the Winchester area, representing approximately 0.2% of the United Kingdom's total charge points. This is about 166 charging stations per 100,000 residents, compared to the UK average of 113 per 100,000 people. These stations fall into three primary categories based on charger size and typical usage.

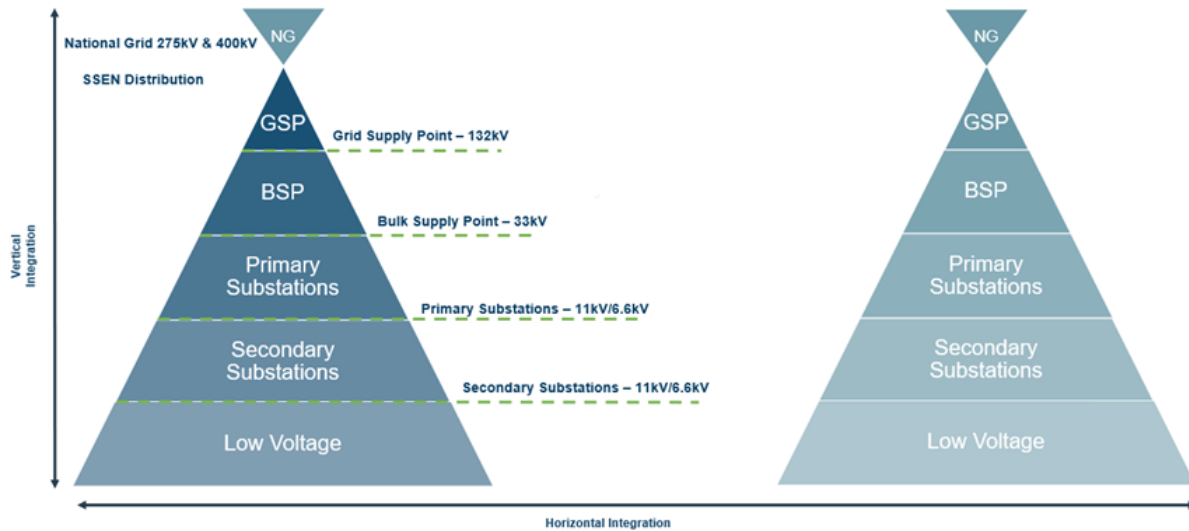
- On-street charging stations are usually located within residential areas, allowing residents to utilise on-street parking and charge their vehicles overnight. They generally feature slow chargers (up to 7kW), as there is little need for rapid charging.
- Destination charging stations are installed at commercial sites where drivers are likely to park for extended periods, such as supermarkets, shopping centres, and sports facilities. These locations offer fast (7-22kW) or rapid (50kW) chargers, enabling vehicles to recharge within a couple of hours or less.
- En-route charging stations are situated in locations where drivers stop briefly, such as motorway service areas, and are equipped with rapid chargers. Currently, 39% of Winchester's EV charging stations offer rapid chargepoints. Data from a sampled set of 41 chargers operated by Winchester Council and Mer indicates an average annual usage of approximately 6,537.79kWh per fast charger and 19,704.5kWh per rapid charger.

4.6 Existing Electricity Network Infrastructure

Scottish and Southern Electricity Networks (SSEN) is a Distribution Network Operator (DNO) that delivers power to over 3.9 million homes and businesses across the diverse and unique geographies of the north of Scotland and central southern England, including the Winchester district. As one of six DNOs in Great Britain, their role in the energy system is to distribute electricity from the high voltage transmission grid to industrial, commercial and domestic users via a network of cables and poles.



The distribution network operates at various voltage levels, including 132 kV, 66 kV, 33 kV and 22 kV (EHV – Extra High Voltage), 11. kV and 6.6 kV (HV – High Voltage) and 230/400 V (LV – Low Voltage). These voltages are progressively stepped down through a series of substations and transformers to match the needs of end users, ensuring a stable and secure power supply across diverse and varied geographical areas.



4.7 Existing Capacity within the Electricity Network

Assessing the capacity of primary and secondary substations is essential when considering suitable sites for installing low carbon technologies. Winchester is currently served by 1,673 secondary substations. Of these, 1,302 are RAG-rated as green, indicating sufficient demand headroom for additional load (more than 5% headroom). A further 15 are rated amber (5% overloaded-5% headroom), 74 are red (more than 5% overloaded), and 282 are null (due to an inability to anonymise energy consumption data). Across all secondary substations, the average demand headroom stands at 63.56%.

Locations with green-rated secondary substations are well-placed to accommodate new electrical connections, such as electric vehicle (EV) charge points and heat pump retrofits. When considering the project feasibility,

the exact demand headroom values (in MVA) at relevant substations should be considered to ensure there is sufficient capacity to support the proposed demand.

Areas with red-rated substations are good candidates for generation projects. In these more constrained locations, domestic and non-domestic solar photovoltaic (PV) deployment should be considered to help meet future energy demand. Generative technologies can support the uptake of technologies such as EVs and heat pumps without placing additional stress on the network. Substations rated amber or red indicate a need for early engagement with Winchester Council and SSEN. Where low carbon technologies are being planned in these areas, proactive conversations with SSEN will help influence potential network reinforcements and may facilitate other solutions to accommodate increased future demand.

At the primary level, Winchester is served by 30 substations. Of these, 22 are rated green, 1 is amber, 5 are red, and 2 are null. Primary substation capacity is important to consider when planning larger-scale decarbonisation efforts. These include infrastructure such as large EV charging hubs, bus depots, new housing developments, and commercial heat pump rollouts. The average demand headroom across these primary substations is significantly lower than at the secondary level, at 34.6%. Large-scale generation schemes, such as ground-mount PV, must also assess generation headroom to ensure sufficient capacity is available. Across Winchester's primary substations, the average generation headroom is 25.01 MVA.

Primary substation supply areas with limited capacity often correspond with areas of higher energy consumption. The most constrained substation in Winchester is North Baddesley, which has exceeded its capacity by 50.5%. This substation serves the LSOA Winchester 009A, which ranks 7th out of 72 for annual domestic electricity consumption. The LSOA with the highest domestic consumption, Winchester 013A, falls within the supply area of Netley Common substation, which is the third-most constrained in Winchester, operating 50.09% over capacity. Constraints also align with non-domestic demand patterns. Winchester 007, the MSOA with the highest non-domestic electricity consumption, is primarily supplied by the St Cross substation. St Cross is the second-most constrained primary substation in the area, which has exceeded its capacity by 50.55%.

4.8 Existing Gas Network

The Winchester district consists of 3,857 postcodes, of which 2,786 (72.2%) are currently connected to the gas network. Within these areas, 45,019 domestic properties rely on gas as their primary fuel source. The remaining 27.8% of postcodes are classified as off-gas, primarily situated in Winchester's rural regions, comprised of ancient woodlands and conservation areas, where residential and non-domestic buildings are sparse.

Gas-supplied postcodes are supported by a mix of pipeline materials, including polyethylene, cast iron, ductile iron, spun iron, and steel. Under the Iron Mains Replacement Programme, all metal mains will transition to hydrogen- or biomethane-ready polyethylene pipes by 2032, modernising infrastructure for long-term resilience. Currently, 84% of Winchester's gas mains (which includes intermediate pressure (IP), medium pressure (MP), and low pressure (LP) networks) have already been transitioned to polyethylene. The remaining 16% still rely on iron or steel. In terms of distribution, the majority of gas mains are low pressure (84.9%), followed by medium pressure (13.2%), and intermediate pressure (1.3%) - this is quite standard and likely a result of Winchester's building stock being predominantly domestic, where a lower pressure is sufficient for household gas appliances that operate efficiently at relatively low levels.

Given Winchester's existing polyethylene gas network, the region is well-positioned for a transition to hydrogen or biomethane as an energy vector. Next steps would involve assessing the cost per meter to replace the remaining iron and steel infrastructure and facilitating the deployment of hydrogen-ready boilers for heating, along with other necessary hydrogen-compatible appliances. While polyethylene pipes are generally suitable for hydrogen transport, additional upgrades may be needed to support higher-pressure hydrogen distribution - a consideration that remains dependent on governmental policy and regulatory frameworks governing the rollout of hydrogen infrastructure.

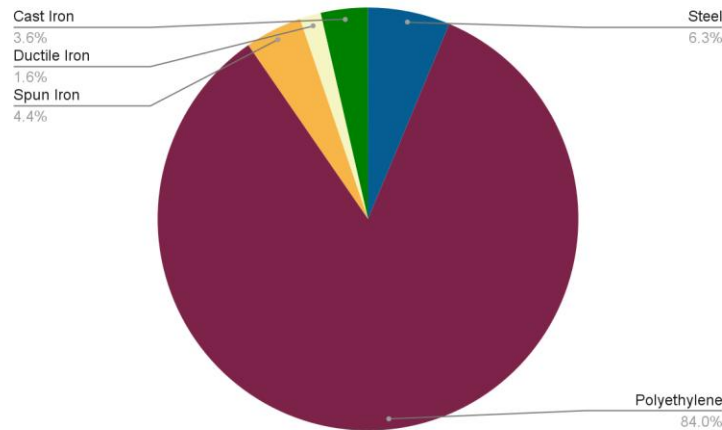


Figure 13: Distribution of Pipe Material across IP, MP and LP.

4.9 Existing Heat Networks

There are currently no known existing heat networks in the Winchester area, with only one recorded data point documented in the Heat Networks Planning Database, located south of the Winchester district. Heat networks can provide valuable insights for a baseline by identifying opportunities for efficient heat distribution, reducing reliance on individual heating systems, and supporting low-carbon energy solutions. In the absence of existing networks, heat network potential will be assessed to explore future decarbonisation pathways within scenario modelling.

5 Renewable Potential

5.1 Rooftop PV Potential

Approximately 76% of Winchester's domestic building stock is suitable for rooftop PV installation, based on factors such as roof surface area, orientation, tilt, shading, material, and structural integrity. For non-domestic buildings, around 74% also meet the criteria for rooftop PV deployment. Excluding the contribution of existing PV installations, the maximum annual generation capacity based solely on feasible rooftop potential across both domestic and non-domestic buildings is 357,530.4 MWh. This presents a significant opportunity for expansion and a key avenue for further exploration within the Local Area Energy Plan.

5.2 Heat Pump Potential

Considering all domestic buildings in Winchester, not just those with existing ASHP installations, approximately 56.4% are suitable for air source heat pumps (ASHP), while 32.3% are viable for ground source heat pumps

(GSHP). This assessment is based on modelling heat pump suitability, factoring in characteristics such as building size, garden space, and proximity to neighboring properties. A similar trend is observed in non-domestic properties, where the proportion suitable for ASHP (60.3%) exceeds that of GSHP (54.3%), highlighting differences in feasibility across property types.

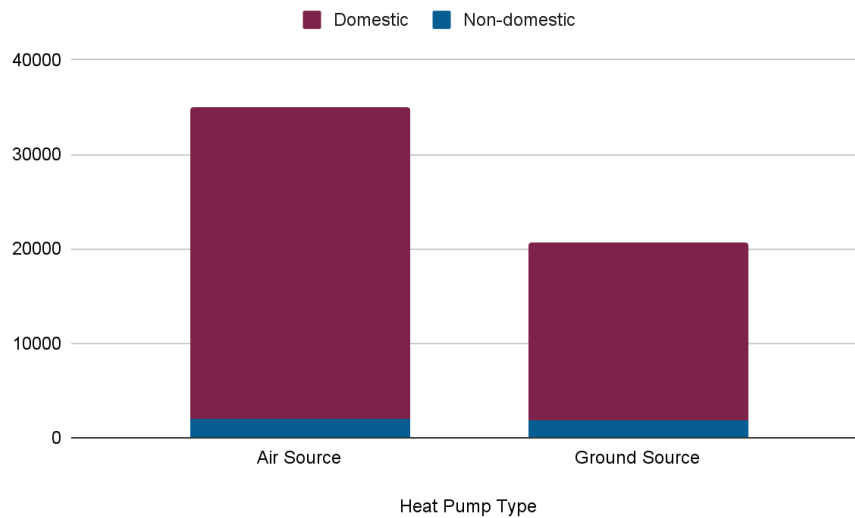


Figure 14: Suitable buildings for air source and ground source heat pumps.

5.3 Land for Other Renewable Generation

The suitability of land parcels for ground-mount PV can be assessed by evaluating constraints such as land availability, risks, and planning restrictions. Across the Winchester District, approximately 56 km² of land meets these suitability criteria. Of the 4,956 land parcels considered for ground-mount PV deployment, 24% are fully suitable, while 7% are partially suitable (see chart below). The combined generation potential of these parcels is 1,613.8 MWh, highlighting significant potential, should Winchester pursue large-scale deployment of ground-mount solar PV and offshore wind energy.

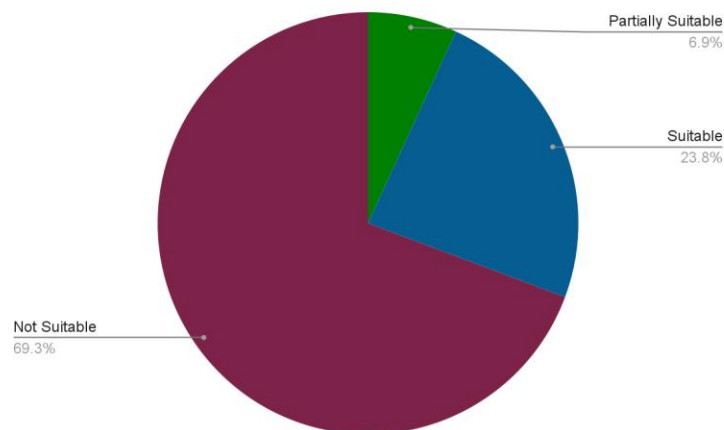


Figure 15: Suitability of land parcels in Winchester for ground-mount PV installation

Brownfield sites also offer valuable opportunities for renewable energy infrastructure, as these previously developed but unused plots of land often retain grid connections, making them ideal for decarbonisation infrastructure like solar farms. Winchester currently has 77 documented brownfield sites, covering a total area of 55 hectares (54,845 square meters). Many of these sites are concentrated in close proximity to Winchester City Centre, with the Gordon Road primary substation supply area hosting the most sites, followed by St Cross and Harestock. This distribution underscores the potential for renewable energy projects, while also alleviating pressure on the grid.

Table 4: Brownfield Sites by Primary Substation Supply Area

Primary Substation	Brownfield Site Count
Gordon Road	33
St Cross	25
Harestock	21
Bishops Waltham	16
Waterlooville	14
Alresford	12
Silkstead	5
Whiteley	2
Titchfield	2
Barton Stacey	1

6 Sociodemographic Overview

Winchester is among the least deprived local authorities in the UK. According to the 2019 Index of Multiple Deprivation, Winchester ranks 295th out of 316 local authorities in England for income deprivation, with a median deprivation index of 9 and a standard deviation of 1.9. The chart below displays the count (number of) LSOAs by decile, where 1 is the most deprived 10% of the English population and 10 is representative of the 10% least deprived. Identifying areas of deprivation and fuel poverty is essential for developing a

comprehensive Local Area Energy Plan, as lower-income and deprived areas often face energy insecurity. The map shown opposite illustrates subregional fuel poverty within Winchester across small areas. Areas indicated in blue represent those with the lowest proportion of households experiencing fuel poverty, while red polygons indicate areas with higher proportions. It should be noted that within this dataset, the highest proportion of fuel-poor households does not exceed 24.4%.

Residents in these more vulnerable areas may require additional support from the council to ensure they don't fall behind in the energy transition. This support may be delivered through funding and incentive schemes designed to assist households to install energy efficiency measures and renewable technologies. Examples of existing schemes include Solar Together and the Home Upgrade Grant. Out of 3,700 postcodes in the Winchester area, 55 postcodes qualified for Phase 2 of the Home Upgrade Grant.

Additionally, it is important to consider areas with higher household incomes, as these residents typically possess the financial capacity, or are 'able to pay', for adopting low-carbon technologies such as heat pumps, rooftop PV, and EV charge points. According to a 2020 dataset from the Office for National Statistics, the average annual net household income estimate for small areas in Winchester was approximately £40,306. Engaging residents through targeted awareness campaigns can help educate the public about the energy transition and drive residents to upgrade to renewable technologies where possible.

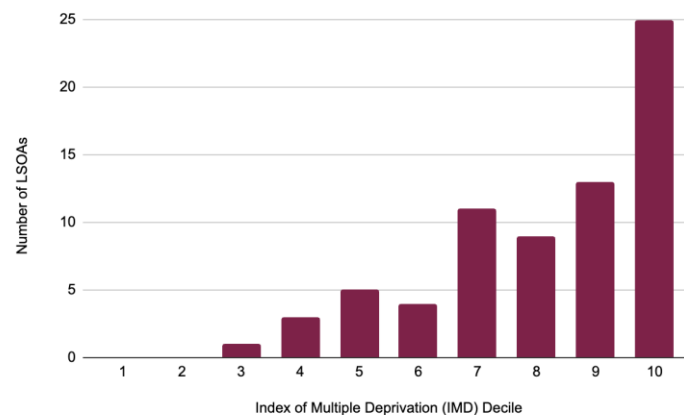


Figure 16: Count of LSOAs by Index of Multiple Deprivation decile

7 Planning and Development Constraints

7.1 Planning Constraints

There are a range of land and environmental factors across the Winchester area which must be considered when developing a Local Area Energy Plan. These factors can constrain development in specific areas due to environmental risk, protected landscapes, or heritage assets.

Flood risk should be a key consideration. Flooding poses a risk for electrical connections, and therefore flood risk zones may not be suitable for new EV chargepoints or battery storage. Installing these technologies in flood-prone areas may cause service disruption or infrastructure damage.

For larger-scale generation projects, such as wind turbines or ground-mount PV, protected land may restrict site availability. Sites of Special Scientific Interest (SSSIs), ancient woodland, and conservation areas should typically be excluded from consideration due to their ecological or heritage importance.

Listed buildings must also be considered, as they often present specific constraints. Retrofitting these structures with insulation, PV, or heat pumps, whilst preserving their architectural and historic character, may be complicated. The accompanying map displays the distribution of key constraints in Winchester, including flood risk zones, conservation areas, ancient woodland, SSSI zones, and listed buildings.

7.2 Committed Future Plans

Winchester Council has several existing initiatives and funded programmes that demonstrate a clear and growing commitment to decarbonisation. These plans cover a wide range of sectors including domestic retrofit, renewable energy generation, sustainable transport, and spatial planning. Collectively they will play a significant role in shaping the future local energy system and must be considered when developing a LAEP. There are two domestic retrofit schemes that are particularly relevant. The Home Upgrade Grant (HUG2, 2022-2024), and the Warm Homes Grant (2025-2028). The HUG2 supported improvements to energy-inefficient, off-gas-grid homes. Although the application window has closed, installations remain ongoing and this has made a major impact. As of May 2025, a total of 37 properties had been retrofitted with technologies including solar PV, air source heat pumps, and a variety of insulation measures. The Warm Homes Grant will have an even broader reach. Winchester is part of the Portsmouth consortium, which aims to retrofit up to 1,785 homes. This scheme supports both on- and off-gas homes with a focus on vulnerable and low-income residents.

The Solar Together scheme, which enables residents to install solar panels and battery storage, reflects an increasing focus on decentralised generation. The scheme contributes to energy demand management by reducing household reliance on the grid and increasing local storage capacity. This can help reduce energy bills for local residents, and free up grid capacity to allow for more connections to be installed. From 2021 to 2025, the scheme delivered 1.4 MW of solar PV and 282 battery systems across 328 installations.

In terms of existing transport plans, there are three to consider. Hampshire County Council's Local Transport Plan from 2024 and Winchester's Movement Strategy both prioritise decarbonising transport. Key points from both plans include increasing park-and-ride options, infrastructure upgrades to improve bus reliability, and the promotion of walking, cycling, and EV usage. Winchester's Local Cycling and Walking Infrastructure Plan details a cycling and walking network to facilitate a healthier population and reduction in carbon emissions caused by travel.

Finally, Winchester's Local Plan runs through to 2040 and mandates new developments should incorporate renewable energy technologies and efficient designs. The plan also includes a commitment to deliver 5,640 new homes by 2040, with an emphasis on previously developed land and sustainable design. These homes are expected to include low-carbon technologies and will need to be factored into future energy system modelling and grid capacity assessments.