London Borough of Tower Hamlets

Isle of Dogs, South Poplar and Leaside

Local Area Energy Plan

April 2023

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This Plan was prepared by Arup on behalf of the London Borough of Tower Hamlets and with support from the Greater London Authority.

Executive summary

This plan's proposal is to develop an equitable and resilient energy system to drive sustainable growth.

This Local Area Energy Plan for the Isle of Dogs, South Poplar and Leaside (the LAEP area) sets out a vision for what a zero carbon energy system could look like and describes key recommendations for immediate actions that will support the Council's journey in delivering their 2045 net zero target.

The proposal for the Isle of Dogs, South Poplar and Leaside's future local energy system is:

To develop an equitable and resilient energy system to drive sustainable growth.

The modelling presented in the report shows the radical change which is necessary to create a net zero local energy system for the Isle of Dogs, South Poplar, and Leaside.

For the analysis, a variety of future whole energy systems scenarios for 2045 were identified, to help understand the choices and possible pathways for a net zero local energy system.

Priority intervention areas for the local energy system were identified, considering the uncertainties about the future. This plan sets out key recommended actions for the initial phases of implementation. Progress towards key outputs will also need to be monitored.

Support from a wide range of stakeholders and partners will be needed to deliver this ambitious plan.

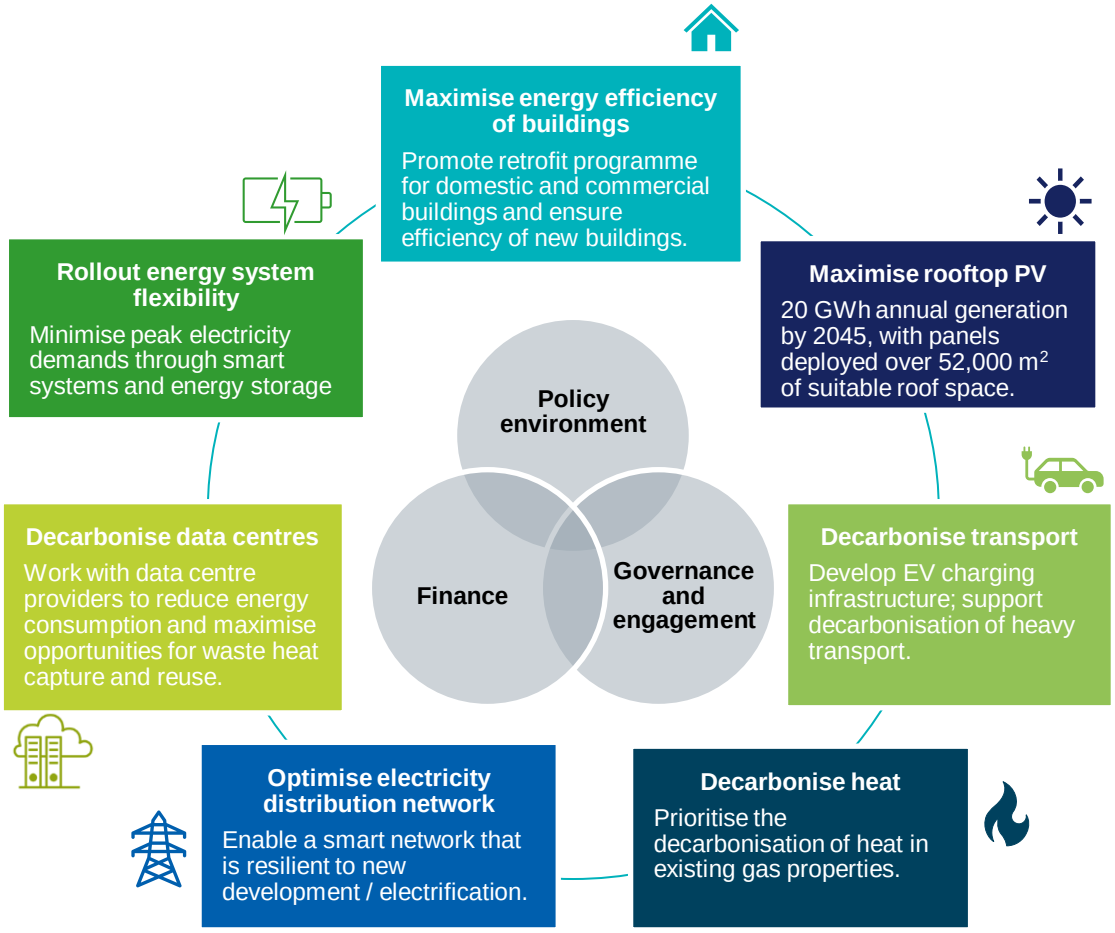


Figure 0.1: Priority intervention areas in the Isle of Dogs, South Poplar and Leaside

Executive summary

Radical energy system changes are required to successfully meet decarbonisation targets.

The LAEP area is unique in many ways, with vast amounts of upcoming new development, and the majority of its electricity usage dominated by large heat-emitting data centres. The area presents distinct opportunities, challenges, and uncertainties.

The LAEP attempts to consider these factors through the exploration of a series of potential pathways for the area's energy transition, examining how the LAEP area's energy system and emissions could change between 2022 and 2045. The pathways are presented in Figure 0.2. The emissions performance, social impact, affordability and deliverability of these were reviewed with stakeholders, and a recommended pathway for the LAEP was identified.

This process determined that the 'Do nothing' and 'Business as usual' pathways are not acceptable options for the LAEP, given their significant cumulative and residual emissions. The area is also poorly suited for a transition to hydrogen heating.

Instead, the LAEP suggests a pathway which leverages the area's unique suitability for heat networks by using such networks to supply heat to developments where it is the most cost-effective option for consumers, in the more dense parts of the LAEP area. Elsewhere, decentralised heat pumps should be deployed. Potential future implementation of Heat Network Zoning policy would significantly support this vision.

The LAEP envisions further measures across all the other priority intervention areas identified. In the context of a highly constrained local electricity network experiencing increasing pressure, these actions will be crucial to support the timely delivery of new development.

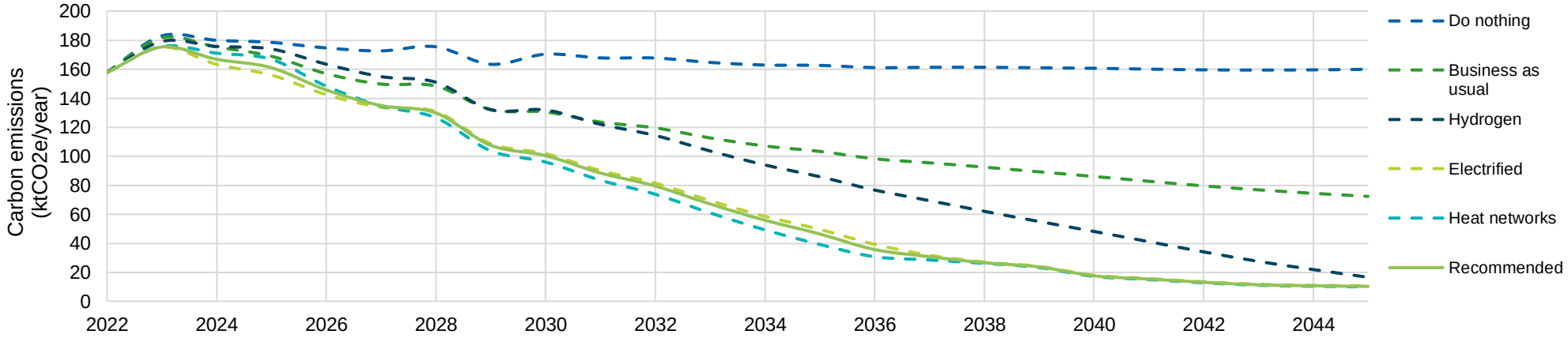


Figure 0.2: Carbon emissions pathways

Glossary of terms

Term	Definition
Batteries	Store electrical energy to be used at a later time
BEIS	HM Government Department for Business, Energy and Industrial Strategy (now DESNZ)
Data Centres	Buildings densely packed with computing hardware, servers and storage systems
Distribution Network Operator (DNO)	Company that operates the power distribution network infrastructure in a specific area
Electricity substation	Part of an electricity distribution system, substations transform voltage distributed across electricity transmission systems to higher or lower voltages.
Greater London Authority (GLA)	Regional governance body of Greater London.
Heat network	Heat networks supply heat from a central source to consumers through a network of pipes which carry hot water
Heat pump	Use a heat exchange system to take heat from air or ground and increase the temperature to heat buildings
Hydrogen	A flammable gas that can be burned, like natural gas, to generate heat or power vehicles. The by-product is water

Term	Definition
LAEP	This is used interchangeably for "Local Area Energy Planning" and "Local Area Energy Plan."
LBTH	The London Borough of Tower Hamlets – used to refer to the Council
Resistance heating	Generate heat by passing electrical currents through wires
RIIO-ED	Framework by Ofgem to ensure that DNO's provide a allocate funding responsibly and deliver reliable services
Solar PV	Converts solar radiation into electricity using photo-voltaic (PV) cells
Smart EV charging	Electric vehicle charging at times when demand for electricity is lower, to reduce peak demands on the electricity network.
Time-of-use tarrifs	Flexible electricity tariffs which differ between times of the day based on energy availability and generation
ULEV	Ultra low emission vehicles
Vehicle-to-grid	Technology which enables energy stored in EVs to be fed back in to the electricity network

1. Introduction

1. Introduction

This plan sets out a proposal for the area's future energy system and the steps that need to taken to get there.

Overview

Introduction

In March 2019, Tower Hamlets became one of the first councils to declare a Climate Emergency and committed to become a net zero carbon borough by 2045 or sooner. They are currently implementing their Net Zero Carbon Action Plan, which sets out their goals and commitment to tackling the climate emergency and outlines how they aim to meet local, regional, and national climate targets on the way to London and the UK being net zero economies by 2030 and 2050, respectively.[1,2]

Tower Hamlets recognises global, national and local climate change trends and are taking measured action now through the preparation of a Local Area Energy Plan (LAEP) for two growth areas within the borough: the Isle of Dogs and South Poplar Opportunity Area (OA) and the Leaside Area Action Plan (AAP) Areas.

The scale of economic and housing growth planned for these two areas poses a considerable challenge for the supply of energy for heating, electricity and transport to meet a significant increase in demand in the area in a manner which aligns with Tower Hamlets' climate ambitions.

This plan therefore not only contributes to the decarbonisation of the rapidly growing area, but also sets the standard and provides an evidence base for local net zero energy planning in the London Borough of Tower Hamlets (LBTH), wider London, and across the UK.

Note that this work feeds into a wider programme of coordinated infrastructure planning for the Isle of Dogs and South Poplar, including the preparation of strategies for the water, waste, and digital sectors in addition to energy. This will make LBTH the first London borough to have a complete set of strategies developed in collaboration with utilities for a high growth area.

What is a LAEP?

This Local Area Energy Plan (LAEP) provides an understanding of the nature, scale, rate, and timings of changes needed for the transition to a net zero energy system within the Isle of Dogs & South Poplar OA and Leaside AAP areas.*

Following Ofgem's methodology, the LAEP process combines robust technical analysis with comprehensive stakeholder engagement to create a routemap for delivering decarbonisation as effectively as possible, identifying key actions for groups including local and national government, energy providers, regulators, and residents.

This process aims to account for the local and national wider conditions to achieve net zero, considering how cooperation with adjacent areas can help to bring success to decarbonising the wider area.

This plan also aims to facilitate increased local stakeholder awareness in Tower Hamlets, resulting in more widespread and meaningful consent for the changes required and credible commitments to deliver the plan.

Accompanying this report is a Technical Report which includes additional detail about the methodology followed, the analysis completed and further results.

**Note that throughout this report, the combined area of the Isle of Dogs & South Poplar OA and Leaside AAP areas will be referred to as the 'LAEP area'.*

1. Introduction

The plan has three main sections: context and baseline; future energy system vision; and recommended action plan.

Plan contents

This LAEP presents the vision for a net zero local energy system in the LAEP area, with a routemap to get there, including a set of actions for LBTH, whilst recognising the role of other key actors in government, the energy sector and across the community.

Plan structure

This plan is structured in three main topic areas:

1. Where Tower Hamlets is now - Description of the area's existing energy system, projected growth, and relevant policies and objectives.
2. Tower Hamlets' vision for the future energy system - Presentation of future scenarios for a net zero local energy system, including risks and "low regrets" measures, which are very likely to be part of the future energy system regardless of uncertainty around certain aspects of the future.
3. Recommended action plan- A routemap and action plan to drive the local energy system transition in the area, including what needs to happen and what Tower Hamlets would need to do.

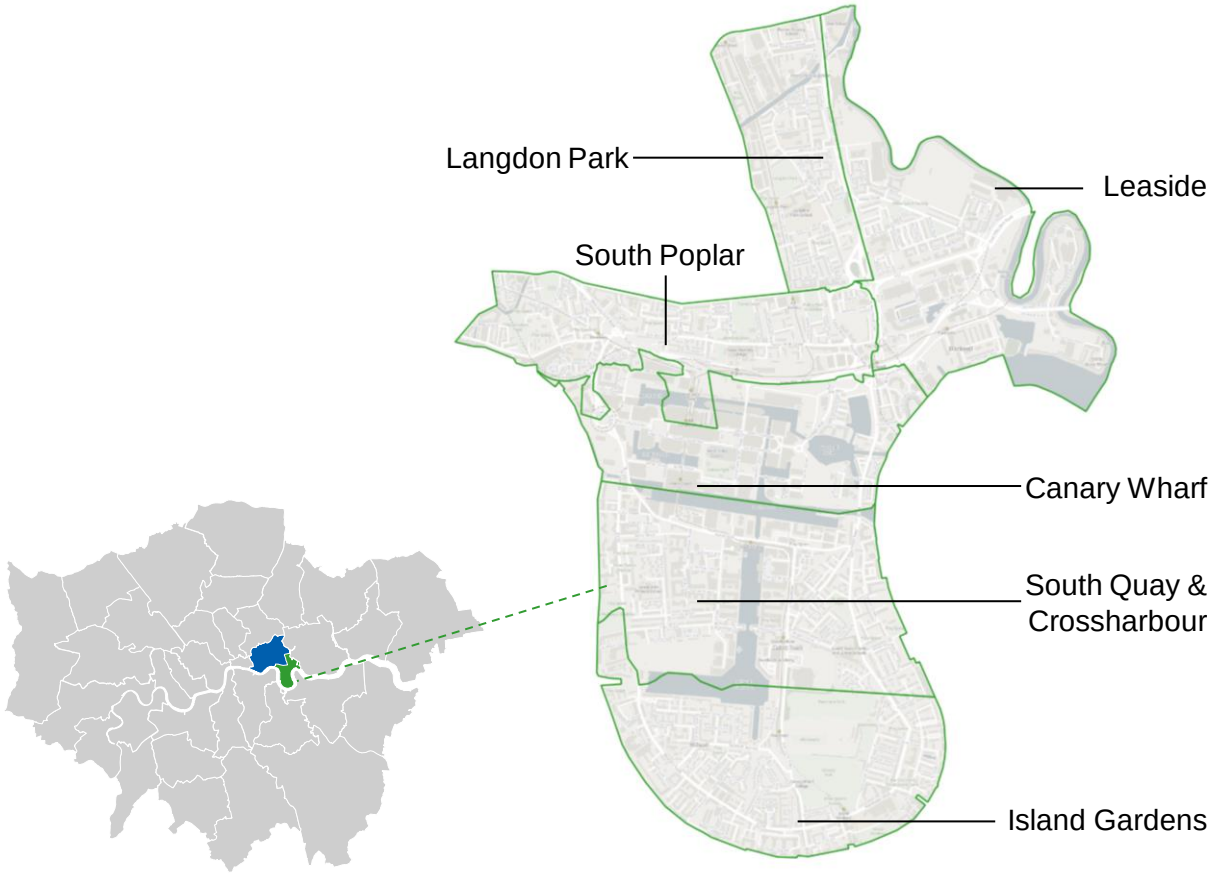


Figure 1.1: Left: Location of Tower Hamlets (blue and green) and the LAEP area (green) in London, Right: The LAEP area divided into the zones considered for this LAEP.

2. Context and Baseline

2. Context and baseline

The area's energy system will need to transition in an equitable way for its diverse range of residents and businesses.

Socio-economic context of the LAEP area

History

The LAEP area has a rich history, developing from a rural marshland to a key location for the country's naval trade. The area served as an industrial site housing factories and workshops and their workers until late in the 20th century. In the 1980s, a significant redevelopment programme was launched, with the development of the Docklands Light Railway (DLR) and Canary Wharf. Since then, the area has significantly grown with new businesses and people moving into the area.

Demographic baseline

Population: As of 2019, the population of the LAEP area is estimated to be 75,000 people. This accounts for about 23% of the population of Tower Hamlets. With a population density of 122 people per hectare, the LAEP area is less dense than average in Tower Hamlets, but considerably denser than London as a whole.[3]

Ethnicity: At the time of the 2021 census, the largest ethnic group in the area was White (~42%), closely followed by Asian (~41%). The area is home to a greater proportion of ethnic minority residents than the rest of London.[4]

Deprivation: Based on the 2019 Indices of Multiple Deprivation (IMD), a measure of the relative level of deprivation of an area, the LAEP area has significant variations in deprivation levels. While more than a third of the area is within the top 20% most deprived places in the country, the LAEP area also contains some of the least deprived neighbourhoods in the country.[5] As of 2020, 13% of households in the LAEP area were estimated to live in fuel poverty.[6] This number is expected to have risen significantly considering rising energy prices.

Housing

Over 60% of buildings in the area were built after 1983, primarily due to the rapid growth in the area in conjunction with the development of the DLR and Canary Wharf. As a result, more than 82% of domestic properties have an EPC rating of C or above, which is significantly higher than London (41%). Over 75% of residential properties are flats. Houses are primarily concentrated in the south of the area, in Island Gardens.

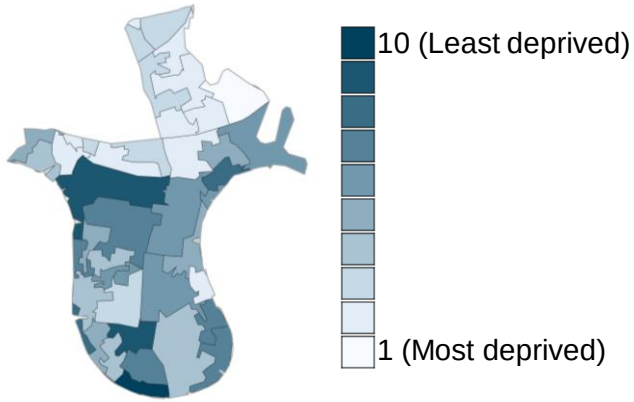


Figure 2.1: IMD deciles in the LAEP area

Description	Information
Area	620 hectares
Population (2020)	75,000
Population density	High
Character	Urban
Non-gas heated properties	35%
Fuel poverty (2020)	13% of households

Table 2.1: LAEP area profile – key statistics

2. Context and baseline

The LAEP area is set for major growth. Tower Hamlets has committed to be a net zero carbon borough by 2045.

LAEP area policy context

Isle of Dogs and South Poplar Opportunity Area Planning Framework

Opportunity Areas (OAs) are identified in the London Plan as areas with significant development opportunities for homes, jobs, and infrastructure. The Isle of Dogs and South Poplar OA was designated as part of the London Plan in 2004, and in 2019 an Opportunity Area Planning Framework (OAPF) was developed for the area.[7] The OAPF sets out the potential for growth in homes and jobs, alongside the area's strategies and opportunities. These include:

- 31,000 – 49,000 new homes by 2041.
- 110,000 new jobs by 2041.

The OAPF also highlights the infrastructure needed to deliver this growth, while making sure that development in the area is sustainable, well-coordinated and benefits the existing local community. The OAPF identifies the need for a comprehensive energy plan for the area.[7]

Leaside Area Action Plan

Area Action Plans (AAPs) are planning documents which provided specific guidance and policy for key areas of development.

The Leaside AAP sets out a strategy for growth and regeneration up to 2031, including:

- The regeneration and redevelopment of industrial areas along the River Lea.
- Development of new green transport links, targeting 89% of journeys in the AAP to be taken by active or public transport.
- Delivering new housing, employment and business opportunities in the area.

The consultation draft was published in November 2021, and includes a chapter on Environment and Sustainability, recognising that the AAP area is particularly at risk of the effects of climate change, and setting out policies to achieve net zero carbon development in the area.[3] The Leaside AAP area also contains the Poplar Riverside OA, designated in The London Plan in 2021.

Tower Hamlets

The current Tower Hamlets local plan was adopted in 2020 and sets out the spatial development strategy to guide and manage sustainable development within the borough.[8]

Tower Hamlets are currently updating the plan, which is due to be adopted in 2025. This LAEP will form part of the supporting evidence base.

2020 also saw the Tower Hamlets Net Zero Carbon Plan published, setting out ambitions to become a net zero carbon borough by 2045.[9] This is at odds with the Greater London Authority, which has a 2030 target.[2] It is unclear who will be responsible for carbon offsetting during the period between 2030 – 2045. The plan includes a quantification of the borough's carbon emissions by use type, as well as an assessment of the influence and control the Council has over reducing emissions in each sector. The plan recognises that energy consumption (heat, transport and electricity) dominates the contribution to annual greenhouse gas emissions and sets out strategic actions to achieve significant reductions by 2045. These include:

- Net zero new buildings from 2025.
- 90% of Tower Hamlet owned assets retrofitted by 2030.

The scale of the challenge in meeting these targets is significant and will require action from stakeholders across the energy system.

2. Context and baseline

The London Plan mandates high levels of energy efficiency in new buildings. The GLA has a 2030 net zero target.

Greater London policy context

Greater London

The London Plan 2021 sets out the overarching framework of how London will develop over the next 25 years.[10] It sets out significant strategy, actions and targets across sectors on addressing the climate emergency. These include:

- The development of an energy hierarchy (Figure 2.2) to inform the design, construction and operation of new buildings, targeting an emissions reduction significantly beyond the standard Building Regulation requirements.
- The identification of Heat Network Priority Areas, where new buildings must be designed to facilitate a future connection to a heat network.

Alongside the London Plan, a report produced for the Greater London Authority in 2022 outlines the possible pathways for London to become net-zero carbon by 2030.[11] The report sets out the high level of ambition and accelerated action that will be necessary to reduce emissions across sectors, including targets such as:

- A 37% reduction in heat demand from 2020 baseline delivered through retrofit interventions by 2030.
- 60% of domestic heat demand to be met by low carbon systems by 2030.
- A 27% reduction in car travel by 2030.

The GLA is responsible for guiding decarbonization actions towards achieving net-zero carbon emissions by 2030, and part of this responsibility includes providing guidance on the potential carbon compensation consequences that may arise if the net-zero target is not met.

Further GLA documents, strategies and studies relevant to this LAEP are:

- The London Solar Action Plan (2018) setting out strategies to accelerate the deployment of solar energy in London.[12.]
- The Mayor's Transport Strategy (2018), setting out how London's roads and transport networks should develop to reduce emissions and encourage active travel.[13.]
- The FlexLondon study (2018-2020), investigating the potential to accelerate flexible low carbon energy in the capital.[14]

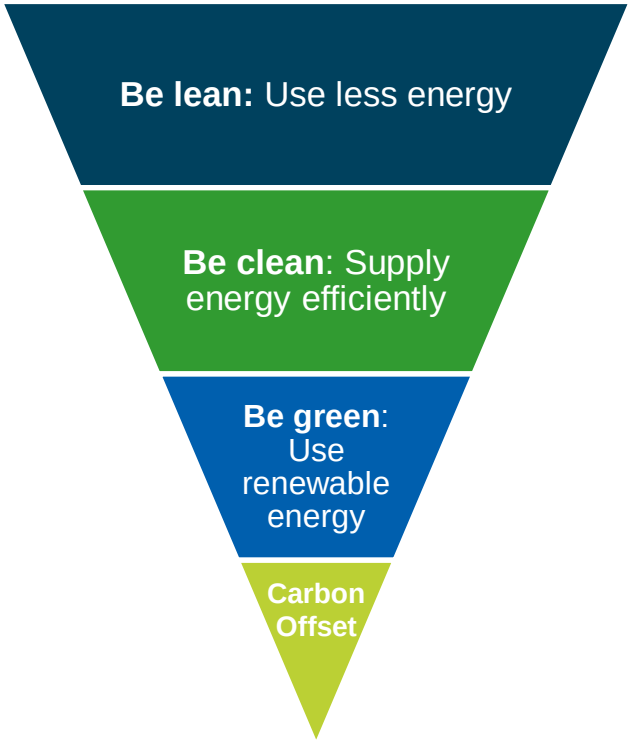


Figure 2.2. The energy hierarchy as set out in the London Plan (Source: Greater London Authority)

2. Context and baseline

The UK Government has set a 2050 net zero target. Several national decarbonisation strategies have been published.

National policy context

In 2019, the UK Government made a commitment to a net zero carbon target by 2050.[15] A range of legislation and strategies have been adopted across sectors. These have been considered during the preparation of this LAEP.

UK Net Zero Strategy: Build Back Greener (October 2021)

The UK Net Zero Strategy outlines details of the policies and proposals in place for decarbonising all sectors of the UK in order to achieve the government's net zero target by 2050.[16] The strategy explores a number of illustrative net zero scenarios, assessing possible energy and technology solution pathways in which net zero can be delivered by 2050.

The document also sets an indicative delivery pathway to 2035, targeting a reduction of 78% of emissions against a 1990 baseline. The greatest expected emissions reduction is in the power sector, with the strategy outlining that by 2035, all of the UK's electricity will need to be supplied by low carbon sources.

UK Heat and Buildings Strategy (October 2021)

The UK Heat and Buildings Strategy sets out the UK Government's strategy for decarbonising the country's buildings in line with net zero targets.[17]

The report includes ambitions for market conditions to enable a consumer transition to low carbon heating, as well as targets to phase-out the installation of fossil fuel heating systems. The strategy also outlines funding opportunities to improve the energy efficiency of buildings and to support the deployment of heat networks.

Selected targets and plans include:

- 600k heat pump installations nationally per year by 2028
- Taking a major strategic decision on the future role of hydrogen for heating by 2026
- Consulting on ending new connections to the gas grid from 2025
- Consulting on Heat Network Zoning proposals, which may give local authorities powers to introduce zones and mandate the connection of certain buildings and heat sources to heat networks (see page 37).

Decarbonising Transport (July 2021)

The UK Department for Transport has published a document outlining the commitments and actions needed to decarbonise the transport sector across the UK.[18]

This includes ambitions to increase active travel, setting the target that by 2030, 50% of journeys in urban areas are met by walking or cycling. The plan further sets out that all new produced cars and motorcycles are zero-emissions by 2035, as well as committing to a shift to zero-emission public transport by 2050.

The strategy also outlines actions to support the development of a charging infrastructure network to meet growing need as transport becomes increasingly electrified, as well as ensuring that changepoints have smart capability to reduce the impact of EV charging on the reinforcement of existing electricity distribution infrastructure.

Heat Networks Regulator appointment (December 2021)

Customers served by heat networks are not currently protected by consumer regulation. The UK Government has addressed this by appointing Ofgem as the Heat Networks Regulator for Great Britain from 2024 onward.[19]

TOWER HAMLETS

2. Context and baseline

A diverse range of stakeholders play various roles in the LAEP area's energy system.

Selected stakeholders in the LAEP area's energy system – 1/2

Department for Business, Energy & Industrial Strategy

Role:	UK government department for energy
Action areas:	BEIS plays a role across all action areas

Engaged for LAEP

Cadent – Your Gas Network

Role:	Gas network operator
Action areas:	- Heat decarbonisation - Transport decarbonisation

Engaged for LAEP

Canary Wharf Group PLC

Role:	Owner & developer of Canary Wharf
Action areas:	- Energy efficiency - Flexibility - Rooftop PV - Heat/transport decarb

Engaged for LAEP

LBTH Community Development Panel

Role:	Local consultative group of community members
Action areas:	- Energy efficiency - Flexibility - Rooftop PV - Heat/transport decarb

Engaged for LAEP

EDF

Role:	Commissioned until 2025 as operator of the Barkantine heat network
Action areas:	- Heat decarbonisation - Data centres - Flexibility

Engaged for LAEP

E.ON

Role:	Operator of Aberfeldy and Blackwall Reach heat networks
Action areas:	- Heat decarbonisation - Data centres

Engaged for LAEP

Greater London Authority

Role:	Greater London's governance body; powers over planning
Action areas:	The GLA plays a role across all action areas

Global Switch

Role:	Major data centre operator
Action areas:	- Data centres - Electricity network - Flexibility

2. Context and baseline

A diverse range of stakeholders play various roles in the LAEP area's energy system.

Selected stakeholders in the LAEP area's energy system – 2/2

Marsh Wall Construction Forum (Engaged for LAEP)

Role:	Local consultative group of developers
Action areas:	Marsh Wall Construction Forum plays a role across all areas

nationalgridESO (Engaged for LAEP)

Role:	Electricity transmission network operator
Action areas:	- Electricity network - Data centres - Flexibility - Heat/transport decarb

ofgem (Engaged for LAEP)

Role:	Government regulator for energy markets
Action areas:	- Electricity network - Data centres - Flexibility - Heat/transport decarb

One Housing

Role:	Major housing association
Action areas:	- Energy efficiency - Flexibility - Rooftop PV - Heat/transport decarb

Poplar HARCA (Engaged for LAEP)

Role:	Major housing association
Action areas:	- Energy efficiency - Flexibility - Rooftop PV - Heat/transport decarb

Transport for London (Engaged for LAEP)

Role:	Public transport operator
Action areas:	- Transport decarb - Electricity network - Flexibility

Tower Hamlets Homes

Role:	Body responsible for LBTH-owned housing
Action areas:	- Energy efficiency - Flexibility - Rooftop PV - Heat/transport decarb

UK Power Networks (Engaged for LAEP)

Role:	Electricity distribution network operator
Action areas:	- Electricity network - Data centres - Flexibility - Heat/transport decarb

2. Context and baseline

A new substation is required to address network constraints. Data centres are the area's largest electricity consumers.

Electricity infrastructure and key loads in the LAEP area

Electricity network

Electricity is distributed to homes and businesses in the LAEP area by a distribution network operated by UK Power Networks (UKPN). The distribution network takes electricity from the National Grid at 132kV from two Grid Supply Points (GSPs) – West Ham and New Cross. Network voltage is stepped down to 11kV at primary substations to serve buildings and other electrical loads via a secondary power network.[20]

The routing of new electrical supplies in the area is spatially constrained. Given the high levels of growth in the area, with new developments requiring connections and a general shift to an electrified energy system, this is a key concern.

To address these concerns, UKPN has completed a study into the network constraints: the Isle of Dogs Connection Study. This study concluded that a new primary substation will be required in the centre of the Isle of Dogs by 2030. Further new substations and upstream reinforcement, at the West Ham GSP, may also be required.

Data centres

Data centres are buildings densely packed with computing hardware, servers and storage systems. These buildings are by far the largest electricity consumers in the LAEP area, using over twice as much electricity as all other users.

The scale and potential growth of data centre electricity consumption prompts concern as it may impact the electricity network capacity available for other development. However, usage of data centres' waste heat can provide opportunities for low carbon district heating, while data centres provide valuable IT services for London's businesses and residents.

Data centre developers and operators are attracted to the LAEP area due to the presence of the London Internet Exchange (LINX) in Leaside.[21] As shown in Figure 2.3, most data centres are located close to LINX, or in the South Quay and Crossharbour area.

Local renewable generation

Due to its dense, urban context, local electricity generation in the LAEP area is limited to a small number of existing rooftop PV installations. These total just over 1 MW installed capacity.

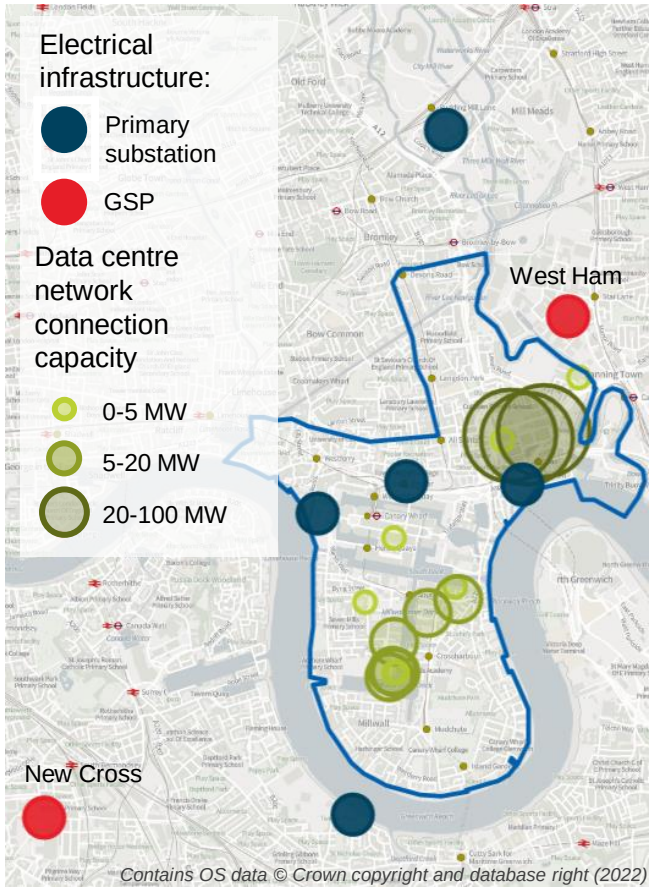


Figure 2.3: Primary substations and GSPs serving the LAEP area, and data centres within the area

2. Context and baseline

Several heat networks exist in the LAEP area. Most homes are gas heated, but a significant minority use electricity.

Heating infrastructure in the LAEP area

Existing heat networks

The LAEP area contains several heat networks powered by gas combined heat and power (CHP) engines. These networks supply approximately 4% of the area's heat.

The largest of these networks, which serves the Barkantine Estate, is owned by LBTH. The Barkantine network is approaching the end of the concession contract led to operate the network (currently awarded to EDF) in 2025. Due to the timing issue of contract discussion, there is uncertainty surrounding future connected loads and the proposal to decarbonise the network.

Two other significant schemes in the LAEP area are operated by E.ON at the Blackwall Reach and Aberfeldy Village developments. Neither of these developments are fully built-out, with future phases underway. E.ON is considering to heat future phases at Aberfeldy (with potential to expand to other new developments) using waste heat from a nearby data centre.

Smaller communal systems, heating individual buildings rather than networks which connect a number of buildings, also exist in the LAEP area.

London Plan Policy SI 3 requires new development to use low temperature communal heating; given the expected growth in the area, these systems are expected to prevail.[10]

Gas network and hydrogen projects

Cadent operates the gas network in the area, which currently supplies approximately 65% of properties. The other 35% use electricity for heating (including both heat pump systems and older resistance heating systems). This proportion of gas heating is below the London average, with the significant amount of electrical heating due to the high number of offices and the relatively low average age of the area's building stock.

Currently, there are no major hydrogen projects planned in the area. However, Cadent's East London Hydrogen Pipeline project, which aims to transport hydrogen from production sites in the Thames Estuary to large users in East London, is planned to reach as far as the Excel Centre in Newham by the early 2030s. Any future large scale hydrogen usage in the area would likely be supplied by further expansion of this pipeline. However, this is currently considered unlikely, given the area's lack of suitable industrial sites.

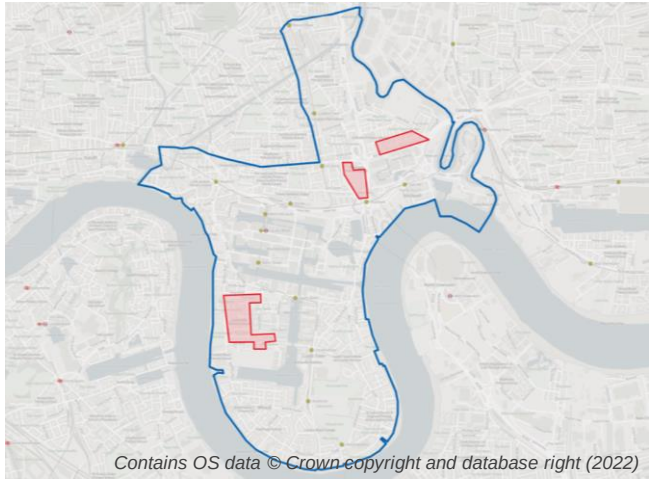


Figure 2.4: Existing heat network locations in the LAEP area

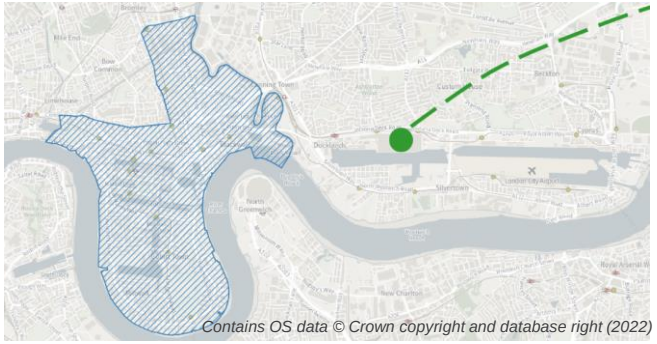


Figure 2.5: Proposed route of Cadent East London Hydrogen Pipeline relative to the LAEP area

2. Context and baseline

The LAEP area is well connected but much of the rail-based energy infrastructure will remain independent.

Transport infrastructure in the area

Public transportation

The LAEP area is well served by public transportation links operated by Transport for London (TfL). This includes buses, the London Underground and the DLR, as well as the Thames Clipper boat service. Canary Wharf forms the primary public transport hub in the area, with stations supplying access to the DLR, Elizabeth and Jubilee lines. These rail-based transport assets contribute to a significant amount of energy consumption in the area. However, TfL has it's own energy supply and distribution infrastructure, serving both stations and the networks themselves and as such energy demand linked to public transportation is not considered for the LAEP.

Road and active travel network

The majority of the LAEP area is located on the Isle of Dogs peninsula, formed by a large meander in the River Thames. The Isle of Dogs is separated from Poplar and the rest of the study area by the A1261, running east to west across the northern end of the area. The Blackwall Tunnel, at the end of the A12, is located to the East of the LAEP area and is the only vehicle river crossing in the vicinity of the Isle. As such, vehicle access to the Isle of Dogs is significantly constrained. The Greenwich pedestrian tunnel at the southern tip of the isle provides access for active travellers. A TfL cycle superhighway (CS3) runs across the north of the LAEP area, providing connections to central London in the west and Canning Town and Barking in the east. The area also has a significant number of Santander Cycles docking stations. The network of docks in the Isle of Dogs poses further connectivity challenges for pedestrians, cyclists and vehicles travelling through the area.

EV infrastructure

There are public electric car charging points dispersed across the LAEP area. These are primarily slow chargers (3-6 kW) and are more present in residential areas such as Cubitt Town, Poplar, and Island Gardens. Charging points are a mix of commercial chargers provided by businesses and lamppost chargers provided by the London Borough of Tower Hamlets. Council charge points are currently provided through a concessionaire model, but Tower Hamlets are assessing the feasibility to own and operate their own network of EV charging infrastructure, as discussed in the Tower Hamlets EV strategy.[21]

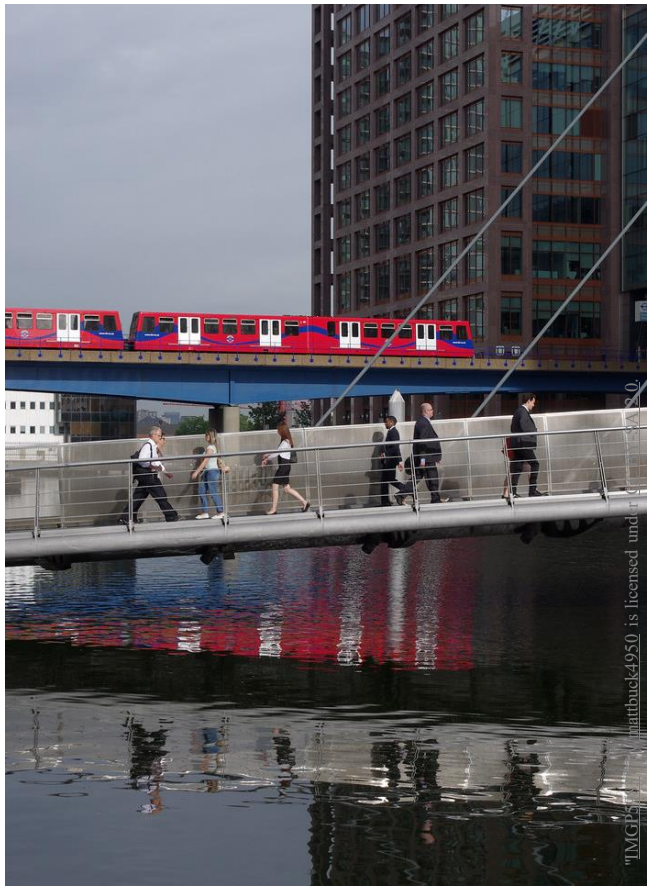


Figure 2.6: Energy demands for TfL services like the DLR (pictured above) are out of the LAEP's scope as they are provided by TfL's separate electricity network

2. Context and baseline

Three mainly separate systems provide the LAEP area's energy. Decarbonisation will see these systems integrate.

Understanding the energy system in 2022

The LAEP area's current energy system comprises three mainly separate systems for electricity, heating, and transportation. Figure 2.7 provides a Sankey diagram which shows how different energy sources meet various types of demand via energy vectors or conversion technologies.

Data centres are the most significant energy users, consuming more energy than all other users combined. Distributed electricity generation is very limited in the LAEP area, with almost all electricity imported via the distribution network from Grid Supply Points outside of the study area, except small amounts produced from rooftop solar PV and CHP engines.

Heating is mostly supplied by gas through individual boilers and heat networks. A significant amount, albeit a minority, of heat is supplied by electrical technologies.

Almost all road transport demand is currently met by petrol and diesel. Electrified road transport demand is excluded from this diagram because it is too small to show.

The challenge for the area is transitioning away from use of gas, diesel and petrol, while supporting vast amounts of growth in an equitable, deliverable, and efficient way.

Note: Some energy uses are excluded from demand estimates here as they are out of the LAEP's scope or were not included in available data. These are detailed in the following pages.

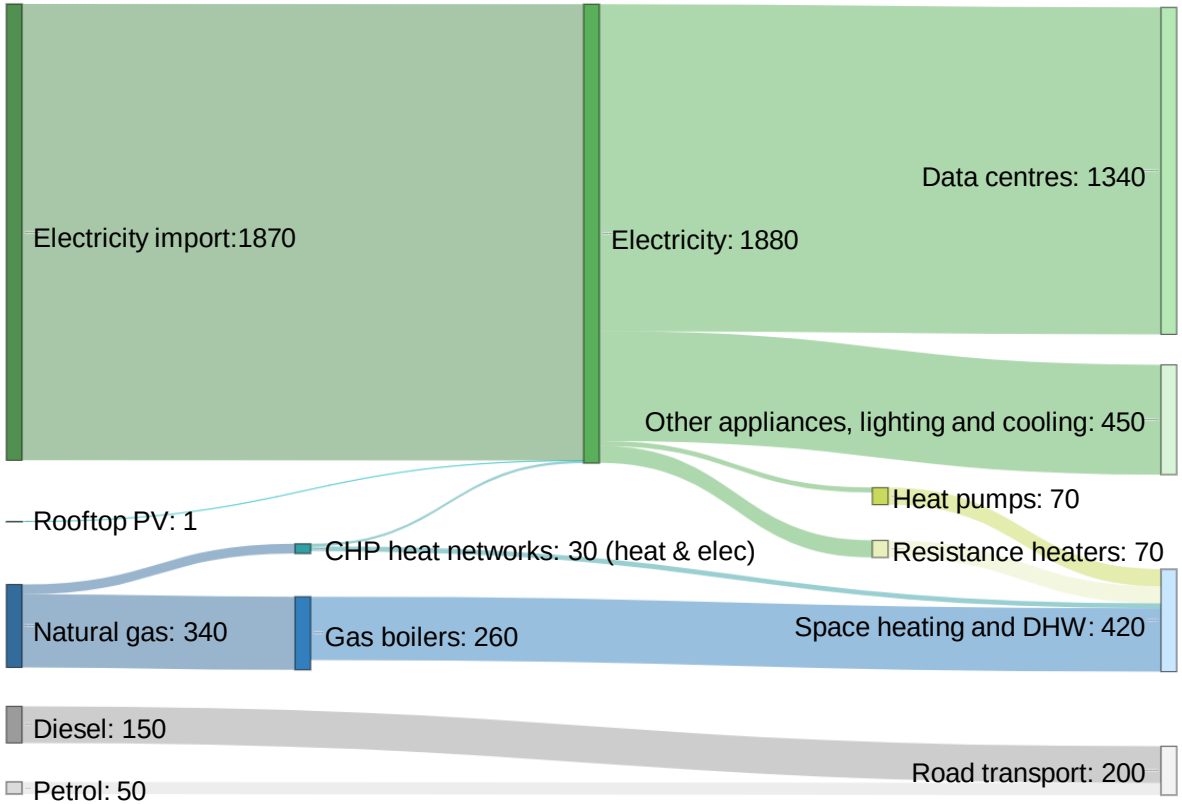


Figure 2.7: Sankey diagram of annual energy flows in the LAEP area in 2022 (GWh/year)

2. Context and baseline

Electricity usage is highest in areas with data centres. After data centres, offices are the largest users of electricity.

Current electricity demand for appliances, lighting and cooling

As of 2022, the LAEP area's total annual demand for buildings' appliances (including IT equipment), lighting and cooling is approximately 1,790 GWh. These demands can only be met by electricity.

As outlined previously, data centres dominate electricity usage in the LAEP area. Offices are the second largest users of electricity for appliances, lighting and cooling, followed by homes. As shown in Figure 2.9, the areas containing the most data centres (South Quay & Crossharbour and Leaside), have the highest electricity demand for appliances, lighting and cooling.

The areas without data centres or large amounts of office floorspace (Langdon Park, South Poplar, and Island Gardens), consume notably less electricity for appliances, lighting and cooling.

Note: some (negligible) energy uses are not included in these estimates. For example, construction machinery and street lighting.

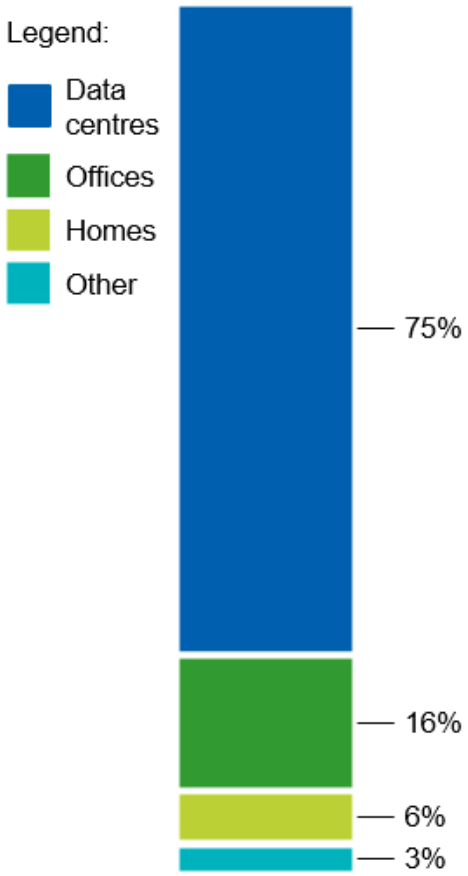


Figure 2.8: Share of 2022 appliances, lighting and cooling electricity demand by building type

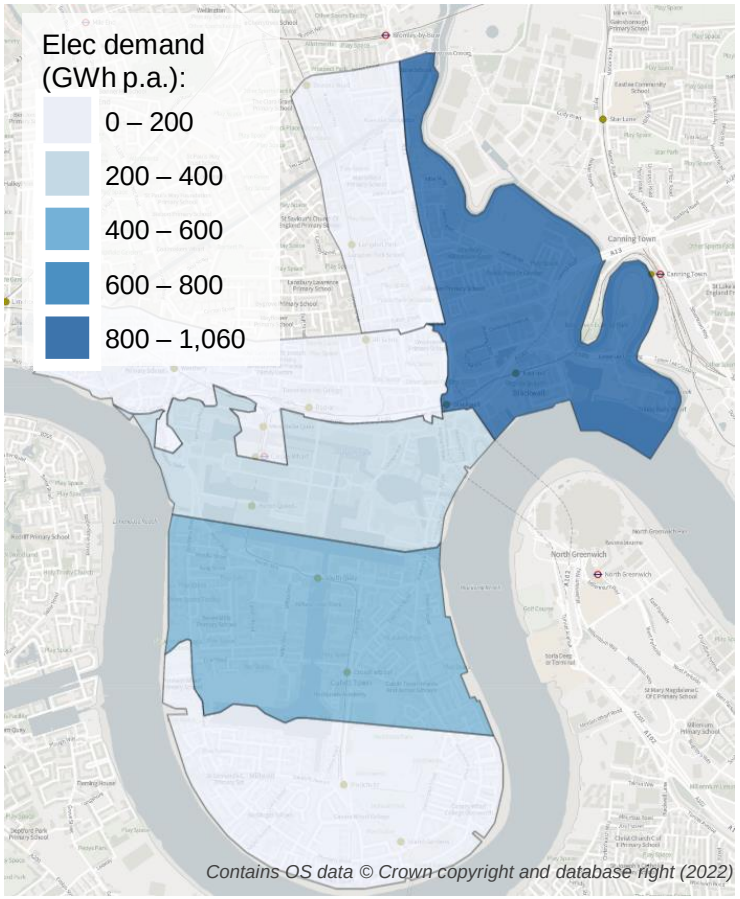


Figure 2.9: 2022 appliances, lighting and cooling electricity demand by zone

2. Context and baseline

Homes are the largest users of heat. Areas south of Poplar meet a smaller portion of their heat demand using gas.

Current heat demand

Annual space heating and domestic hot water (DHW) demand for the LAEP area in 2022 is approximately 410 GWh. This is currently met by either electricity or gas. In future, this demand for heat may be met additionally with heat networks and/or hydrogen.

As shown in Figure 2.11, the zones in the centre of the LAEP area (Canary Wharf and South Quay & Crossharbour), with large numbers of high-rise buildings and high floorspace density, consume the largest amounts of heat.

Zones on the Isle of Dogs (Canary Wharf, South Quay & Crossharbour, and Island Gardens) meet a smaller proportion of their heat demand using gas than the zones to the north of the LAEP area, around Poplar. This is due to the average age of building stock in these areas; newer buildings on the Isle of Dogs are more likely to use electricity for heating (e.g. with a heat pump).

Homes consume the majority of the area's heat (64%), followed by offices (27%). Despite their very large electricity demands for IT and cooling, data centres' demand for space heating and hot water is negligible.

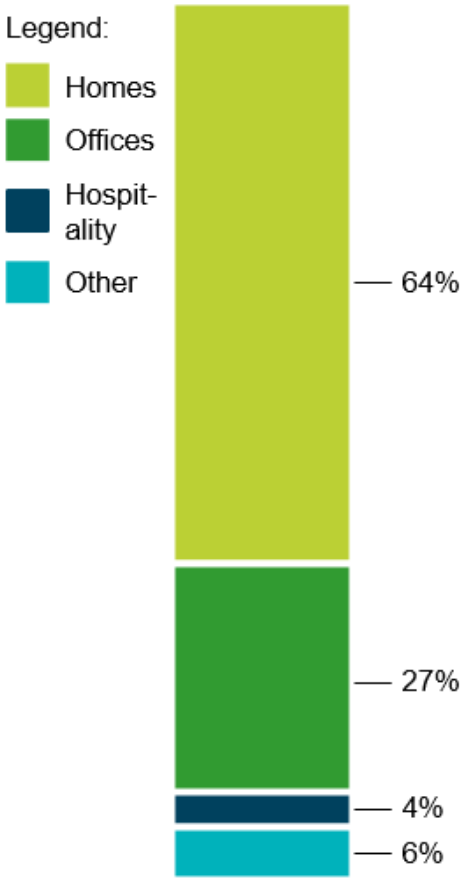


Figure 2.10: Share of 2022 space heating and DHW demand by building type

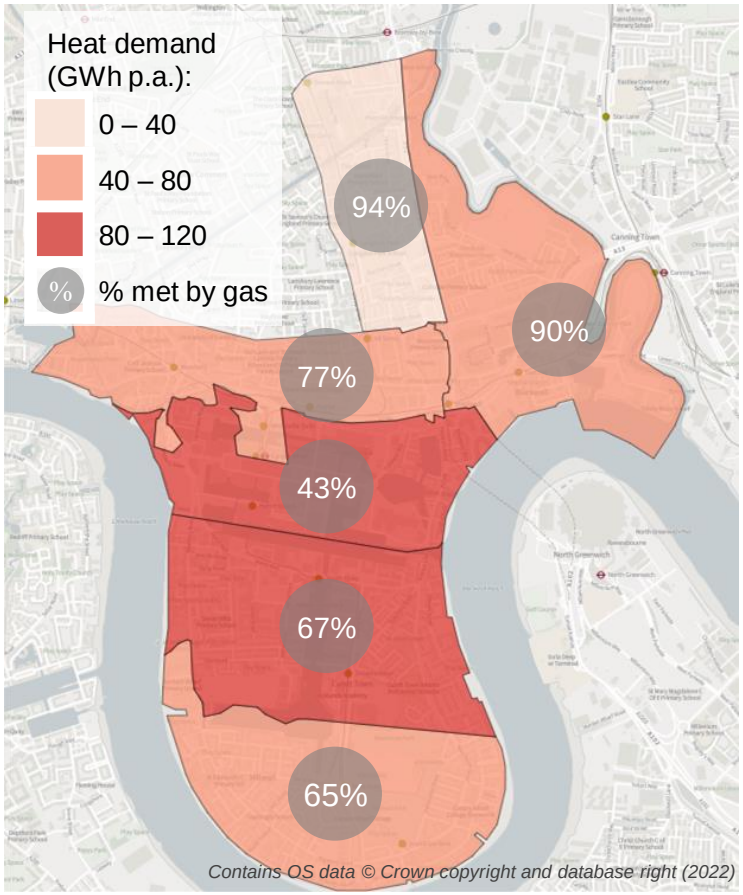


Figure 2.11: 2022 space heating and DHW demand by zone and percentage met by gas

2. Context and baseline

Cars are the largest road transport demand in the area. Vehicle ownership is concentrated in more residential zones.

Current road transport demand

Currently, approximately 180 million miles are driven by vehicles in the LAEP area per year. As shown in Figure 2.12, cars comprise the majority of this mileage (75% of miles), followed by Light Commercial Vehicles (LCVs). Figure 2.14 shows the distribution of cars and LCVs across the LAEP area, with vehicles concentrated in more residential zones like Island Gardens.

While Heavy Goods Vehicles (HGVs) drive relatively few miles, they require significantly more fuel per mile than cars or vans. Therefore, as shown in Figure 2.13, HGVs comprise a larger proportion of transport energy demand than they do mileage. Currently these demands are met almost entirely by petrol and diesel.

As mentioned previously, TfL Underground and DLR energy demands are not included in the LAEP because they do not use the local power distribution network; TfL supplies underground and DLR services with its own separate electricity network. Additionally, there are no bus depots in the LAEP area so it has been assumed that no electric buses would recharge there either.

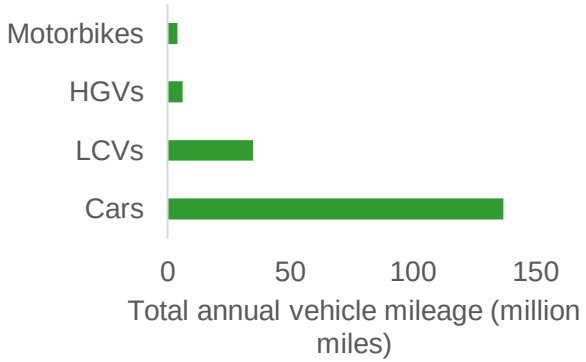


Figure 2.12: Annual mileage by vehicle type in the LAEP area

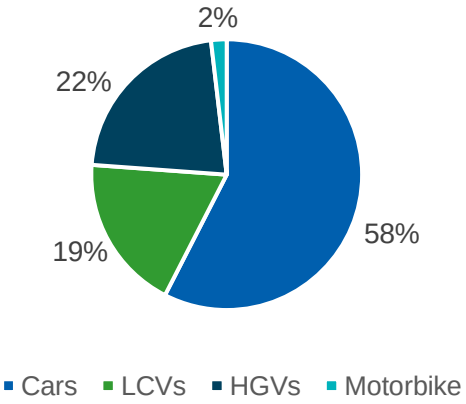


Figure 2.13: Share of road transport fuel demand (kWh) by vehicle type

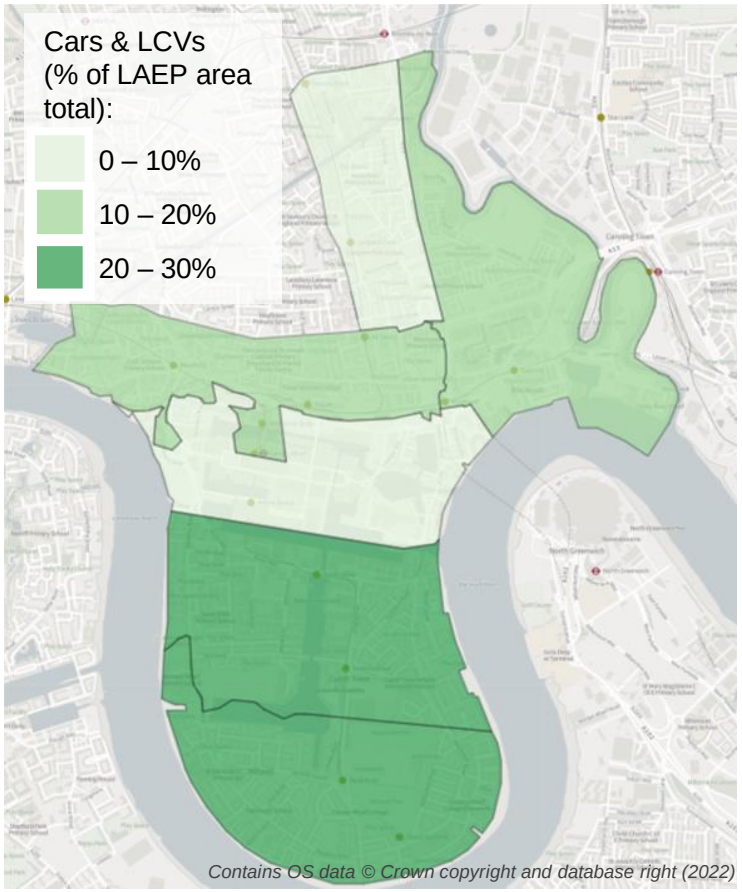


Figure 2.14: Distribution of ownership of all cars and LCVs in the LAEP area (based on 2011 census data)

2. Context and baseline

Tower Hamlets' emissions have been steadily decreasing but accelerated action is required to meet net zero targets.

Historic greenhouse gas emissions

Tower Hamlets' greenhouse gas emissions have been decreasing over the past 15 years, following the trend of the wider UK emissions. Figure 2.15 shows the council's historic emissions, presented by sector as a percentage of total emissions in 2005, the first year of data, based on data published by the UK Government.[23]

The historic trend is largely driven by the decarbonisation of the electricity grid, leading to reductions across most sectors, with the greatest percentage reduction seen in the commercial sector.

Figure 2.16 shows the percentage split of emissions in the LAEP area alone for 2022. to the significant presence of data centres, alongside the high density of office developments in Canary Wharf, the commercial sector has the greatest contribution to emissions, significantly larger compared to Tower Hamlets as a whole (Figure 2.15) and will have to play a significant role in delivering a net zero energy system in the LAEP area.

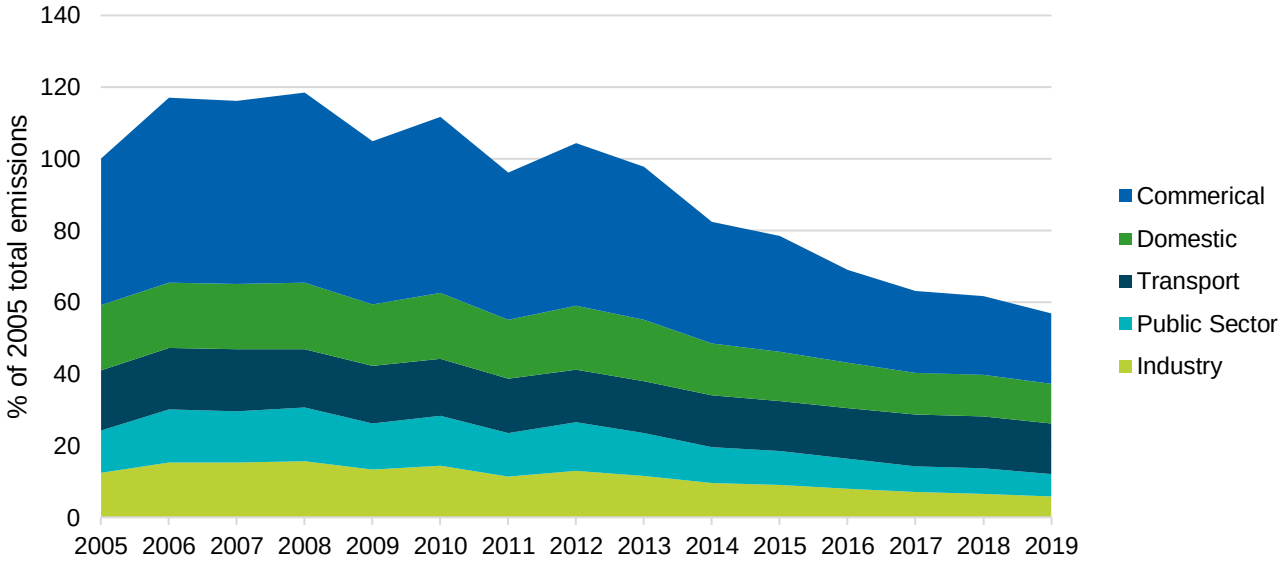


Figure 2.15: Tower Hamlets' greenhouse gas emissions 2005-2019 by sector

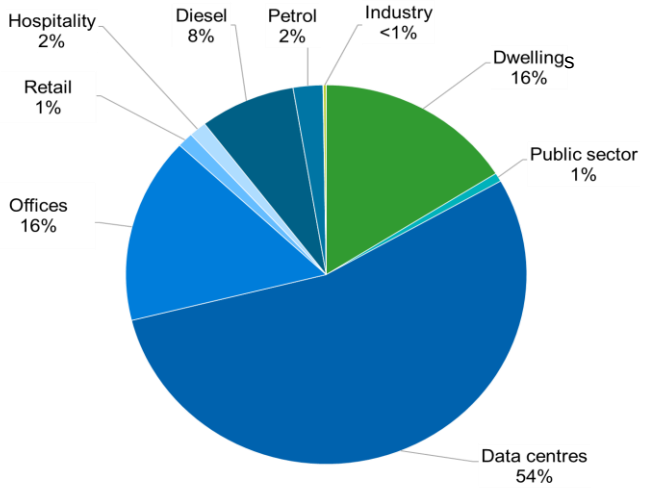


Figure 2.16: Carbon emissions (2022) in the LAEP area by sector

2. Context and baseline

Large levels of growth are anticipated in the LAEP area. Two growth scenarios are analysed in this plan.

Future growth projections

Residential and commercial growth

The Isle of Dogs and South Poplar's potential for delivering new homes and jobs saw it assigned as one of London's largest Opportunity Areas in the London Plan. Consequently, the LAEP area is under intense development pressure.

The Isle of Dogs and South Poplar OAPF, published in 2019, sets out three potential scenarios for new development growth in the Opportunity Area. These varied between 31,000 – 49,000 new homes between 2019 and 2042.

LBTH's experience of development in the area has seen growth consistently exceed expectations. Therefore, the LAEP's main growth projections centre around the largest OAPF growth scenario. Including the Leaside AAP Areas, and information from Tower Hamlets' planning database, it has been projected that 50,900 new homes and 1,600,000 m^2 of non-domestic floorspace will be delivered in the LAEP area between 2022 and 2045 for the LAEP's 'OAPF growth' scenario.

A 'max growth' scenario has also been examined in which development continues at very high current growth rates consistently to 2045. This sees 82,400 new homes and 3,000,000 m^2 of non-domestic floorspace delivered.

Data centre growth

Similarly, further data centre growth is expected in the LAEP area.

Until 2030, data centre growth projections have been aligned with LBTH planning data and high-level upcoming capacity information provided through correspondence from UKPN. These new installations are expected to be similar to those existing in the area; large centralised facilities, but with higher power consumption per m^2 of floorspace.

Looking beyond 2030, significant uncertainty exists over how future data centre demand will develop. New computing technologies could reduce consumption, or there could be a transition to smaller distributed 'edge' facilities located closer to where data is produced and used, moving demand away from the area. However, the LAEP assumes a conservative continuation of the status quo - further delivery of higher power density, centralised facilities.

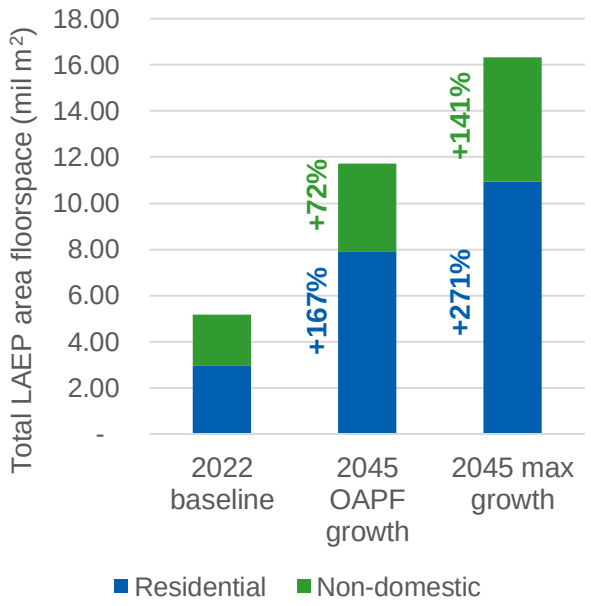


Figure 2.17: Total LAEP area floorspace – baseline vs growth scenarios and % increase compared to 2022

	OAPF growth	Max growth
Data Centre capacity growth (MW)	500	1,500

Table 2.2: Data centre growth projections – new capacity delivered between 2022-2045

2. Context and baseline

Growth is concentrated in the South Quay & Crossharbour, Canary Wharf, and Leaside zones

Future energy demand projections (OAPF growth scenario)

The high levels of growth are reflected in large increases in expected energy demands by 2045, with heat and electricity demands expected to increase dramatically in comparison to the 2022 baseline. Conversely, a decrease in road transport demand has been assumed to capture mode shift to public and active transport in line with the GLA's London transport strategy.

Given the London Plan's stringent energy efficiency requirements for new developments, it has been assumed that new development consumes less energy than existing buildings.

As shown in Figures 2.18 and 2.19, growth is set to be concentrated in the Leaside, Canary Wharf, and South Quay & Crossharbour zones.

LAEP area total growth in energy demands by 2045 in OAPF growth scenario, relative to 2022:

+160% | Appliances, lighting, cooling

+95% | Space heating and DHW

-21% | Road transport mileage

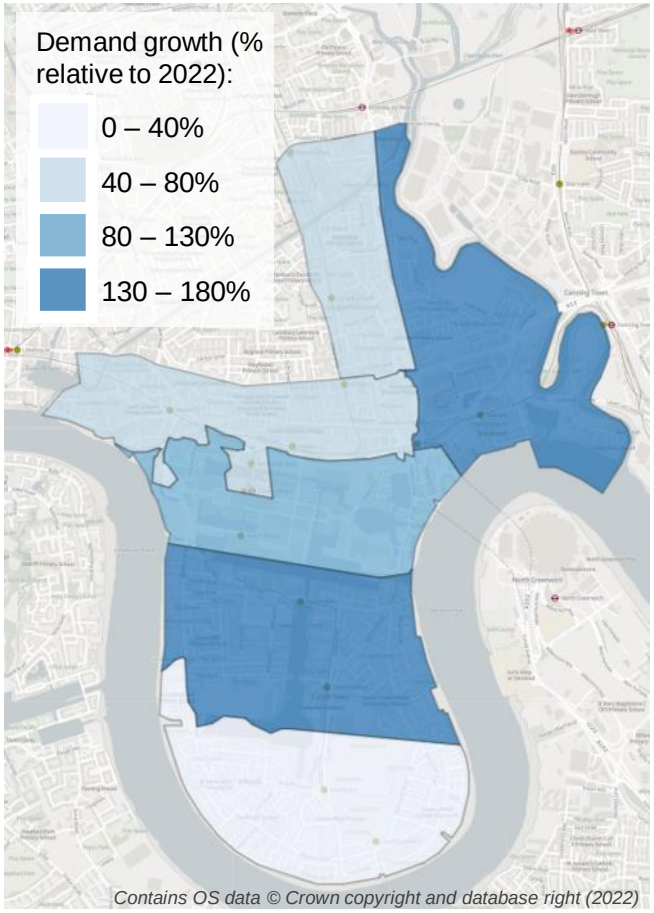


Figure 2.18: Growth in electricity demand for appliances, lighting and cooling by 2045 in OAPF growth scenario

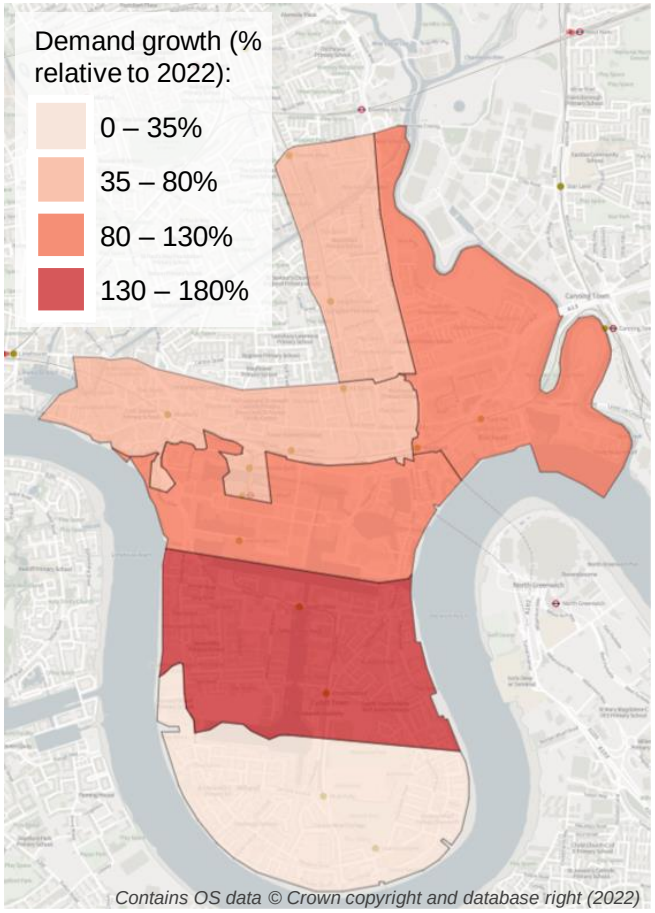


Figure 2.19: Growth in space heating and DHW demand by 2045 in OAPF growth scenario

3. Future energy system vision

3. Future energy system vision

An equitable and resilient energy system will drive sustainable growth in the LAEP area.

Future energy system vision

Tower Hamlets will have an equitable and resilient energy system to drive sustainable growth in the Isle of Dogs, South Poplar and Leaside areas.

Objectives of the plan

1. *To set a pathway to an energy system which is capable of meeting future energy demand and of being resilient to climate change.*
2. *To engage with and empower local residents and businesses to take the steps necessary to deliver this LAEP.*
3. *To identify actions which enable local ownership and participation in investments for a net zero energy system.*
4. *To deliver affordable solutions for all, reducing fuel poverty.*
5. *To facilitate innovation to support UK decarbonisation.*

Developing the vision and objectives

This vision and plan objectives have been developed in collaboration with a range of stakeholders in the LAEP area's energy system.

Understanding the future energy system

The LAEP area's energy system needs to transition to net zero by 2045, while also supporting the ambitious growth of new development and delivery of affordable housing.

However, there are multiple plausible and attractive future energy systems for the area, depending on a range of factors. This includes how the cost of technologies might change over time, as well as wider policy decisions that will be made by the UK Government. These factors will influence the role of heat networks in the area, or the scale of uptake of hydrogen, for example.

In order to inform the plan, a range of scenarios and pathways were modelled, including:

2045 system scenarios: examining options for the area's energy system in the target year 2045 based on different uncertainties; hourly modelling was performed over the year to optimise each scenario against cost and carbon.

Transition pathways: examining how to reach the 2045 energy system and exploring the rate and scale of change required between now and 2045.

The details of these scenarios are presented across the following pages.

Through analysis and comparison of these scenarios with stakeholders, a recommended pathway for the area's transition was identified to best meet the plan's objectives. Key actions have been identified across the area's energy system to support and enable this vision, while maintaining resilience to uncertainty around certain aspects of the future.

These actions can – and must – be taken now to set the area on track to a net zero carbon future and to deliver the plan's objectives and vision.

Note: the 2045 system scenarios should not be considered as exact predictions for the future of the area but are rather designed to test the impact of different strategic decisions and technologies on the whole energy system of the area.

3. Future energy system vision

A range of scenarios were modelled to test key uncertainties and inform the selection of a recommended pathway.

2045 system scenarios, transition pathways and future heating technologies

2045 system scenarios

Key uncertainties considered by the LAEP's 2045 system scenarios include:

- The growth of new development and data centres (OAPF or max)
- The level of retrofit delivered to existing buildings (deep or shallow)
- The technology options for the decarbonisation of heat (three options considered: decentralised heat pumps, heat networks or hydrogen)

As most uncertainty exists over the future costs and policy environment for the three different heating technologies, this drives the definition of three of the four 2045 system scenarios. These three technologies and their benefits and challenges are described on this and the following page, starting with heat pumps in the adjacent paragraph. One scenario ('Current trends') explores a different rate of growth and level of retrofit to the other scenarios. The scenarios are outlined fully on page 30.

Transition pathways

Transition pathways for each 2045 system scenario were developed using the growth assumptions presented on page 24, and deployment rates based on policies, targets, trends, and additional actions to reach the 2045 target. The pathways are shown on page 36 and show the rate and scale of changes, and their impact on the energy system. Two counterfactual pathways were developed in addition to those for the four 2045 system scenarios:

- Do nothing: following existing market trends with limited energy transition interventions.
- Business as usual (BAU): based on only existing policies and trends.

Heat pumps

Heat pumps use electricity to draw heat from the air, ground, water or another heat source to heat water in a building's heating system.

Benefits:

Heat pumps are a proven technology, ready to deploy at scale. They are highly efficient, providing multiple units of heat for each unit of electricity consumed. Decarbonisation of the electricity grid will also decarbonise future heat pump heating. Air source heat pumps (ASHPs) are 'location agnostic' and can be deployed in almost any area.

Challenges:

For higher efficiencies, reducing running costs and loads on the grid, heat pumps need their output temperatures to be as low as possible. This requires well insulated buildings and means that some buildings may require significant changes to their heating systems to switch to a heat pump. These challenges are less acute for higher temperature sources than air (such as ground or waste heat), but these may not be available or suitable in all locations.

Relevance to the LAEP area:

Given their technological readiness and location agnostic nature, decentralised ASHPs (including systems supplying multiple units within the same building) are the most 'ready-to-go' option for decarbonising the area's heating by 2045. Future heat networks present opportunities for using heat pumps with other heat sources in the area.

3. Future energy system vision

Three options exist for decarbonisation of the area's heating: decentralised heat pumps, heat networks and hydrogen.

Future heating technologies

Heat Networks

Heat networks deliver heat to multiple buildings from a centralised source through large hot water pipes. Existing networks typically use gas heating, but centralised heat pumps represent a low carbon alternative.

Benefits:

Future networks could deliver heat from higher temperature location-specific heat sources to buildings that are not immediately adjacent, increasing efficiency (and reducing operational costs and system impacts) compared to using decentralised ASHPs. Heat networks can also provide large thermal stores with their centralised equipment; leveraging this flexibility can further reduce costs and system impacts. Centralised equipment can also be less expensive to maintain and repair.

Challenges:

Heat networks can be complex and expensive to deliver. The current policy environment does not provide sufficient certainty for large project development, but BEIS zoning policies could change this. Consumers served by heat networks do not have a choice of heat supplier and are currently not protected by regulation, but this will be addressed by Ofgem's appointment as Heat Networks regulator from 2024.

Relevance to the LAEP area:

The LAEP area is uniquely well suited to heat networks, given the high density of development and many heat sources available.

Hydrogen

Hydrogen represents a potential low carbon alternative to natural gas, with no CO_2 released when it is burned. Hydrogen heating systems would be very similar to current gas systems, with boilers and hot water tanks. Gas boilers could be made 'hydrogen ready' for a future fuel switch.

Benefits:

Hydrogen systems would be very familiar for consumers, while hydrogen might be able to be distributed using the existing natural gas network, leveraging existing assets and avoiding additional load on electricity distribution networks.

Challenges:

Hydrogen is the least technologically mature future heating option, with significant uncertainty existing over its future production costs, carbon intensity, availability, and network conversion costs. Waiting for production scale up and gas network conversion risks delaying decarbonisation and increasing costs and cumulative emissions.

Relevance to the LAEP area:

Large industrial anchor loads are anticipated to be the most likely future users of hydrogen in buildings. Given the lack of industrial sites in the area, hydrogen is not anticipated to play a role in the area's heating. A strong UK government decision to support hydrogen for heating in 2026 could lead to usage in the area, and this should be monitored.[25]

3. Future energy system vision

The LAEP's 2045 system scenarios are presented here. Choice of heating technology is the primary driver.

2045 system scenarios

Current trends

Heating technology: Mostly decentralised heat pumps

Growth scenario: Max growth

Retrofit level: Shallow

Examines the continuation of current trends to 2045; growth continues at very high rates, energy efficiency retrofit of existing buildings is limited, and there are no major policy or techno-economic developments to cause widespread uptake of heat networks or hydrogen usage for heating. As a proven technology, ready to deploy at scale, decentralised ASHPs are the decarbonisation of heat mechanism modelled in the 'Current trends' scenario.

Heat networks

Heating technology: All demand met by electrified heat networks

Growth scenario: OAPF growth

Retrofit level: Deep

The 'Heat networks' scenario examines a future in which all the LAEP area's buildings are served by heat networks, based on OAPF growth assumptions. The heat networks are assumed to use heat pumps utilising waste heat.

Note that further analysis is presented later in this document (pages 38-39) to examine, in more detail, which areas would be the most suitable for heat networks.

Electrified

Heating technology: Mostly decentralised heat pumps

Growth scenario: OAPF growth

Retrofit level: Deep

This scenario applies the OAPF growth assumptions, which are considered more realistic, and assume a deep level of energy efficiency retrofit of existing buildings. Similar to the 'Current trends' scenario, the 'Electrified' scenario assumes that decentralised ASHPs provide the vast majority of heat demand in the LAEP area and that existing heat networks' heat sources convert to heat pumps utilising waste heat.

Hydrogen

Heating technology: Mostly hydrogen boilers

Growth scenario: OAPF growth

Retrofit level: Deep

The 'Hydrogen' scenario explores the potential impacts of a strong strategic decision by the UK Government in 2026 for the use of hydrogen for heating.[25] It is assumed that all development delivered post-2026 is served by hydrogen-ready gas boilers and the gas network converts to hydrogen by 2045. A limited amount of heat pump deployment occurs prior to 2026 and existing heat networks convert to waste heat sources.

3. Future energy system vision

All 2045 system scenarios result in a more integrated energy system with more reliance on the electricity network.

2045 system scenario optimisation modelling results

Based on hourly optimisation modelling, the Sankey diagrams on the following pages (Figures 3.1-3.4) show the mix of energy sources and vectors that most optimally meet projected demands over 2045, given the conditions set in each 2045 system scenario.

Comparison of all scenarios with the baseline highlights a fundamental change in the energy system: moving from three semi-isolated systems for heat, electricity and transport to a single integrated energy system which depends on the interconnections between energy vectors, as large parts of heat and transport energy demand electrify. This will require reinforcements to the area's electricity network. Flexibility services and technologies will become key to ensure network resilience and to guarantee reliable and affordable supply to consumers. The future system will rely heavily on the decarbonisation of grid electricity.

Building retrofit will be crucial to enable switching to low temperature heating systems like heat pumps. Together with transport mode shift, it will also be key for minimising overall energy requirements and costs.

	Current trends	Electrified	Heat Networks	Hydrogen
Transport demand	Demand reduction from modal shift and active transport			
Transport fuel	Transition from fossil fuel vehicles to EVs	• Transition from fossil fuel vehicles to EVs • Flexibility through smart charging and vehicle-to-grid		Both electric and hydrogen fuel cell vehicles considered
Space heating and DHW demand	• Demand increase in line with current growth rates seen in the area • Limited reduction from retrofit	• Demand increase in line with growth set out in OAPF • Moderate reduction from retrofit		
Appliances, lighting and cooling demand	• Demand increase in line with current growth rates seen in the area • Limited reduction from retrofit	• Demand increase in line with growth set out in OAPF, with moderate reduction from retrofit • Peak demand load shifting as a result of Time-of-use tariffs (TOUTs) and smart appliances		
Heat generation	All heat demand met through heat pumps		All heat demand met through heat networks	Existing gas heating demand met through decentralised hydrogen boilers in the home, rest heat pumps
Local renewables	• At least 20x current capacity • Rooftop PV is the only local energy generation resource			
Electricity network	~ 5x electricity requirements compared to current system	3x electricity requirements compared to current system	3x electricity requirements compared to current system	3x electricity requirements compared to current system

Table 3.1: Key changes in 2045 scenarios compared to baseline

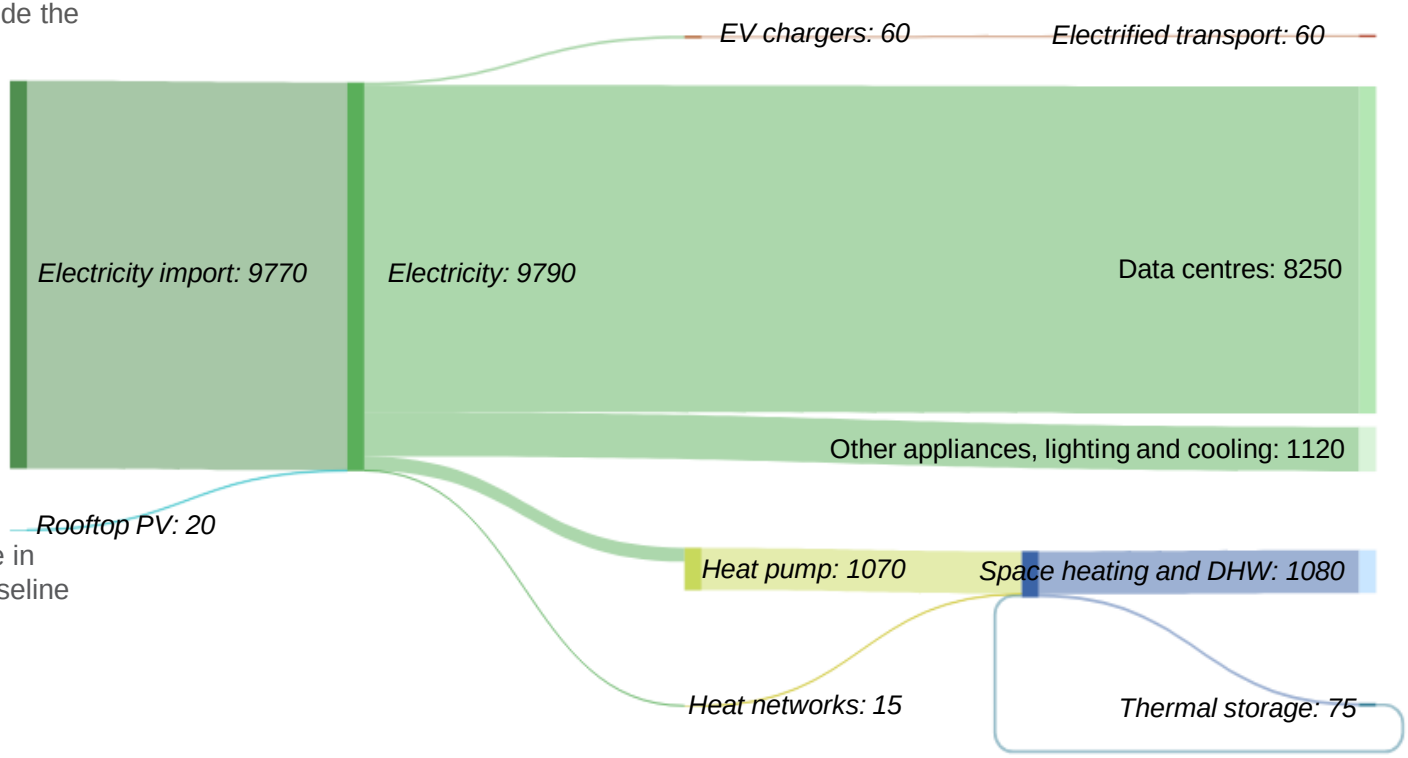
3. Future energy system vision

‘Current trends’ scenario

5x electricity system compared to baseline

~ 8000GWh/year of total energy demand increase from baseline

Majority of electricity imported from outside the area



Significant increase in rooftop PV from baseline

Electrification of transport

21% of transport is assumed to become active

Electricity demand increased through high level of development (max growth scenario)

Heat demand increased through high level of growth, low retrofit measures included

Heat demand met entirely through heat pumps and existing heat network

Thermal storage in homes deployed as key flexibility mechanism. Higher heat demands lead to greater thermal storage requirements

Text in red shows differences between scenarios

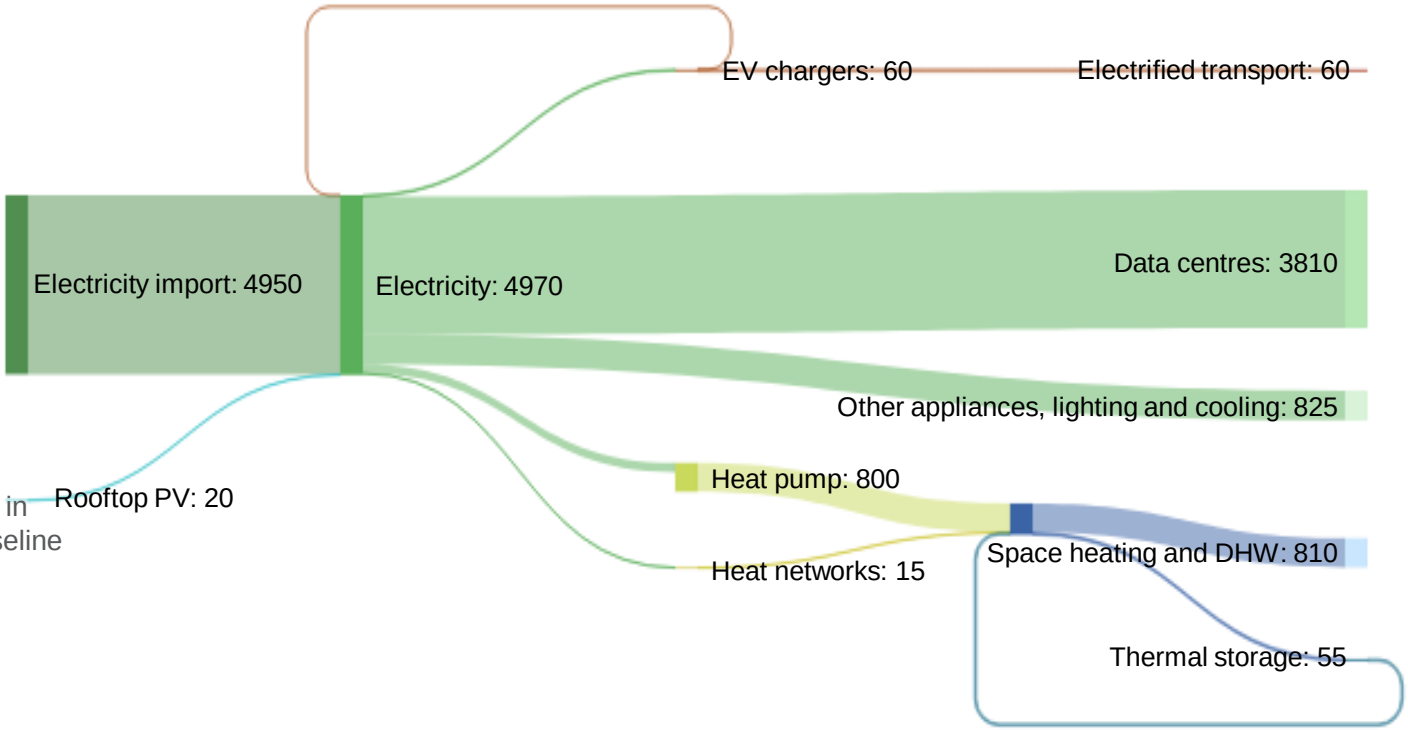
Figure 3.1: Energy flows in the 2045 ‘Current trends’ scenario (GWh/year)

3. Future energy system vision
‘Electrified’ scenario

3x electricity system compared to baseline

~ 3000GWh/year of total energy demand increase from baseline

Majority of electricity imported from outside the area



Significant increase in rooftop PV from baseline

Electrification of transport

21% of transport is assumed to become active

Flexibility measures such as vehicle-to-grid and smart charging reducing peak electricity demands

Electricity demand increased through development (OAPF growth scenario)

Heat demand increased through growth
Moderate retrofit measures included

Heat demand met entirely through heat pumps

Thermal storage in homes deployed as key flexibility mechanism

Text in red shows differences between scenarios

Figure 3.2: Energy flows in the 2045 ‘Electrified’ scenario (GWh/year)

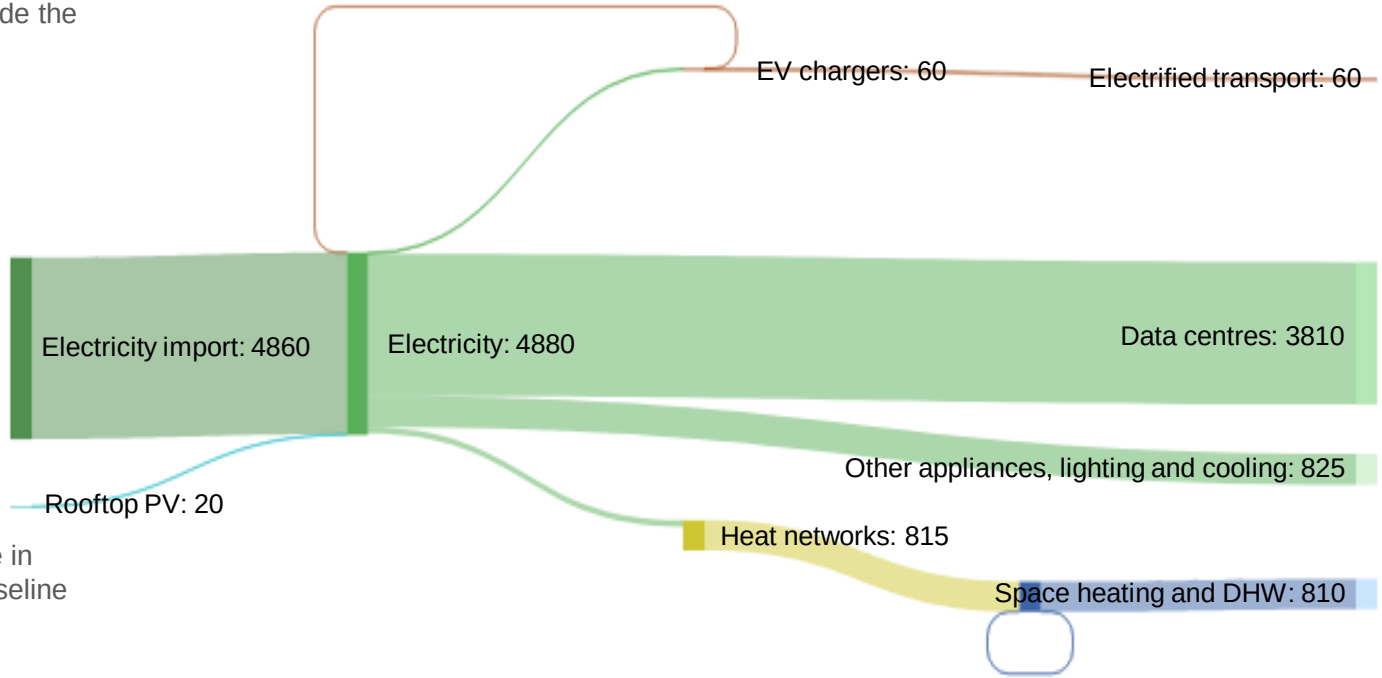
3. Future energy system vision

‘Heat networks’ scenario

Majority of electricity imported from outside the area

3x electricity system compared to baseline

~ 3000GWh/year of total energy demand increase from baseline



Significant increase in rooftop PV from baseline

Electrification of transport

21% of transport is assumed to become active

Flexibility measures such as vehicle-to-grid and smart charging reducing peak electricity demands

Electricity demand increased through development (OAPF growth scenario)

Heat demand increased through growth
Moderate retrofit measures included

Heat demand met entirely through heat networks served by a centralized heat source with integrated thermal storage

Text in red shows differences between scenarios

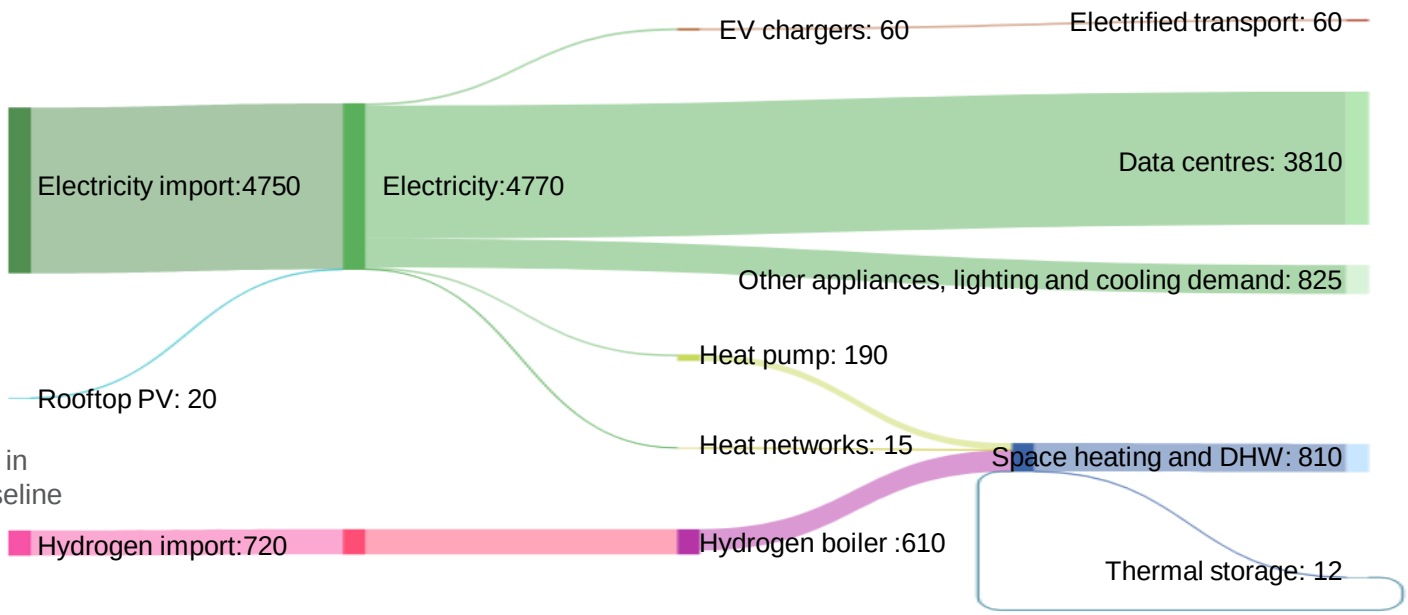
Figure 3.3: Energy flows in the 2045 ‘Heat networks’ scenario (GWh/year)

3. Future energy system vision
‘Hydrogen’ scenario

3x electricity system compared to baseline

~ 3000GWh/year of total energy demand increase from baseline

Majority of electricity imported from outside the area



Electrification of transport

21% of transport is assumed to become active

Electricity demand increased through development (OAPF growth scenario)

Significant increase in rooftop PV from baseline

Heat demand increased through growth Moderate retrofit measures included

Hydrogen imported from outside the LAEP area

Heat demand met mainly through hydrogen boilers

Thermal storage in homes deployed as key flexibility mechanism

Text in red shows differences between scenarios

Figure 3.4: Energy flows in the 2045 ‘Hydrogen’ scenario (GWh/year)

3. Future energy system vision

Transition pathways examine routes to the 2045 system scenarios. Electrification can accelerate decarbonisation.

Transition pathway modelling results

A series of pathways were developed, shown in Figure 3.5, to show how the LAEP area's carbon emissions could change between 2022 and 2045 for each of the 2045 system scenarios modelled for this LAEP. These were compared against two counterfactual pathways as explained on page 28.

The 'Do nothing' pathway shows almost no change in emissions from the baseline, with emissions related to demand growth being balanced by the expected decarbonisation of the electricity grid. As minimal changes are made to the energy system, this pathway retains a high dependency on fossil fuels for both heating and transport. The 'Business as usual' pathway shows a trajectory which implements existing local and national policies, but does not go further to implement radical changes to the energy system, which in turn falls short of ambitious carbon reductions, with residual emissions around four times larger than the optimised system scenarios.

The carbon trajectories for the 'Hydrogen', 'Electrified' and 'Heat networks' pathways end at a similar point in 2045, but the rate of change varies. This is primarily due to uncertainties in the policy levers and deliverability of the 'Hydrogen' and 'Heat networks' pathways, which are more dependent on new government-level policies (i.e. Heat Network Zoning and the 2026 UK government decision on hydrogen's role for heating) to be implemented to accelerate the use of these technologies for heating.[24, 25]

The 'Heat networks' and 'Electrified' scenarios result in the lowest residual emissions in 2045, with heat networks performing slightly better due to their increased efficiency by utilising waste heat from data centres. The benefits offered by the 'Heat networks' scenario are further discussed on the following page.

For all pathways, the energy system becomes more reliant on electricity, and the final carbon trajectory is significantly influenced by projected grid carbon emissions, highlighting that alongside delivering local changes, significant national efforts will be relied upon to shift to renewable energy sources to achieve carbon reduction targets.[26]

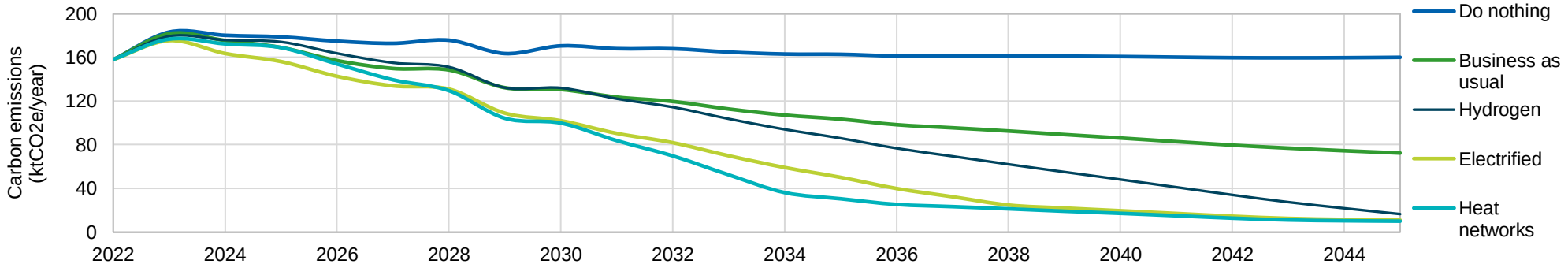


Figure 3.5: Projected annual carbon emissions based on trajectory to tested future energy scenarios (GWh/year*). Note: Data centre energy consumption is not captured in the above graph*

3. Future energy system vision

The benefits of heat networks could be unlocked through implementation of Heat Network Zoning post-2025.

Heat networks' benefits and overcoming the barriers through heat network zoning

The 'Heat networks' scenario offers several advantages over other scenarios. By leveraging waste and renewable heat sources, very high efficiencies are achieved for supplying heat pumps, reducing running costs and electricity loads. Heat networks' large thermal stores also offer a vital source of flexibility to limit peak electricity loads and help to balance the electricity network; centralised in one place, these thermal stores are much easier to control and leverage than more distributed flexibility. The LAEP area is also uniquely well suited to heat networks due to:

- The presence of heat-producing data centres; existing and immediately upcoming data centres could supply 88% of 2045 heat demand (plans are already being developed for a data centre heat network around Aberfeldy)
- The high density of development; as heat demand density is high, less pipework - and expenditure - is required to deliver heat to buildings
- The large levels of upcoming new development; as the London Plan mandates new developments to use low temperature communal heating systems that can easily connect to networks, it is much less expensive for new developments to connect than retrofitting older buildings

However, networks are complex and expensive projects to deliver, with significant uncertainty and risks making it challenging for developers to drive forward the large ambitious projects needed to unlock the full potential of heat networks. These issues could be mitigated after the potential implementation of UK Government Heat Network Zoning policies in 2025, which aim to bring certainty to developers and de-risk heat network projects. The Policy, currently in development, is described here.[24]

What is Heat Network Zoning?

The Government's proposed policy would define zones across England where heat networks are assessed to provide the lowest cost low-carbon solution for decarbonising heating. Certain types of new developments and existing buildings within a zone would be mandated to connect to networks.[24]

What does it aim to achieve?

By driving development of networks where most appropriate, the policy aims to ensure consumers have access to the lowest cost future heating solution. Designating zones provides greater certainty to project developers, and mitigates common risks associated with network development such as security of demand, scaling opportunities, and ownership models.

How will this affect the LAEP area?

Given the LAEP area's unique suitability to networks, it is likely that some (if not all) of the LAEP area will be within a designated zone.

What will LBTH's role be?

The role of Local Zoning Coordinator (LZC) is intended to be undertaken by local government with support from a central national body. The LZC will oversee the zoning process, carrying out data collection, stakeholder engagement, zone designation, delivery model assignment, and monitoring of network development & operation. Specifics are still being established, but it is likely that LBTH will have a role to play, whether as LZC or supporting in a wider coordinator role.

3. Future energy system vision

The area is uniquely suitable for heat networks. Data centres produce enough heat to supply most future demand.

What if? Imagining a heat network future for the Isle of Dogs – 1/2

To examine potential future heat networks in the LAEP area in more detail, analysis was performed using Arup's proprietary HeatNet tool. Given information on heat sources and heat demands, the tool selects the optimal routes for pipework and the optimal developments to connect for a network. Using input from the GLA, the tool varied the cost of routing pipework down different types of roads to plan a network which reduced road disruption and cost. More detail on the tool's methodology and the impact of considering disruption is provided in the accompanying technical report.

The analysis examined what rollout of an area-wide, data centre-heated network could look like in 2045. Both existing and new buildings delivered by 2045 under the OAPF growth scenario were considered. All existing and immediately upcoming (before 2030) data centres were also considered. Two types of networks were examined – a network which utilises all waste heat from the data centres, and a network that optimises economic return.

Utilising all data centre waste heat

Figure 3.6 shows an optimised network to utilise all available heat from existing and immediately upcoming data centres. The low density Island Gardens zone is entirely excluded by the tool, indicating that this area is not a priority area for heat networks. Instead, the network focuses on high density areas around the centre of the LAEP area. Even under potential heat network zoning policies, delivering such a network, and securing supply from all data centres, would be very challenging. This large network is also not suggested to be the economically optimal option. Nevertheless, the network illustrates the vast scale of the opportunity.

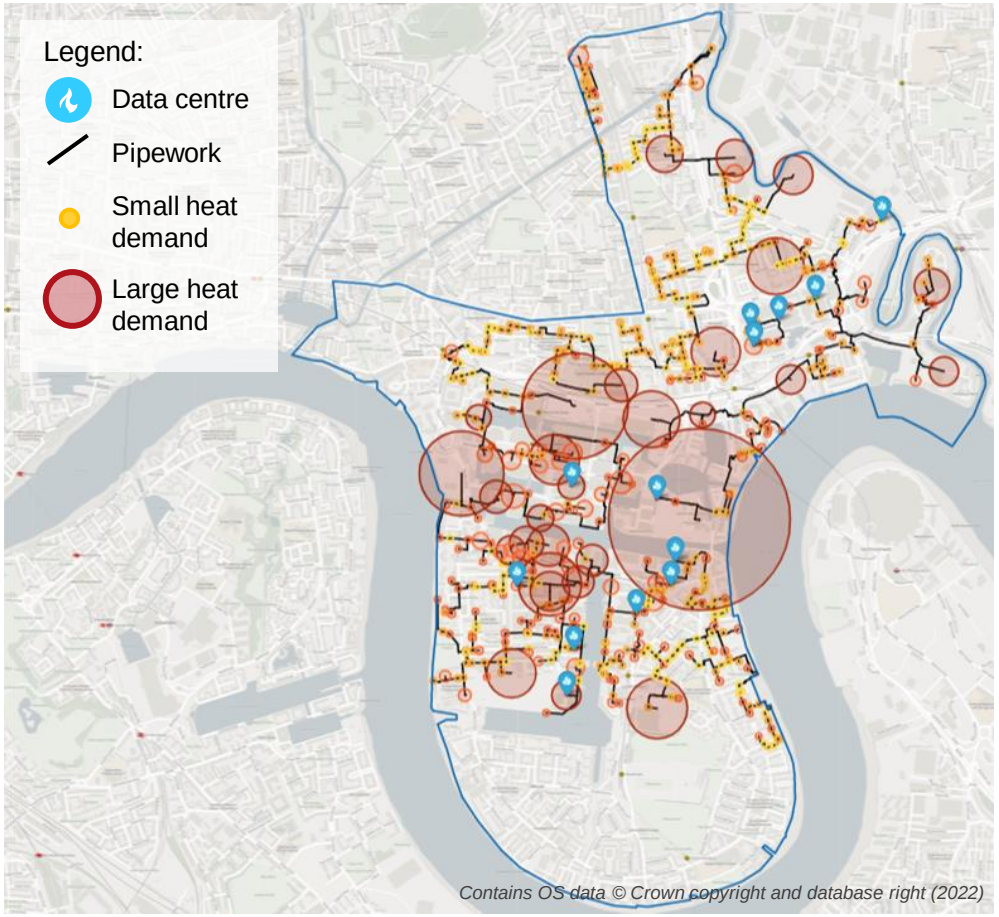


Figure 3.6: Suggested optimal network to maximise heat offtake to the LAEP area's buildings in 2045 from existing and immediately upcoming data centres

3. Future energy system vision

Large new developments around Marsh Wall and Canary Wharf are key opportunities for future heat networks.

What if? Imagining a heat network future for the Isle of Dogs – 2/2

An optimised data centre heat network

The HeatNet tool's analysis suggests that a smaller scheme (shown in Figure 3.7), focusing on large developments around Marsh Wall and Canary Wharf, could be the most economically optimal option. New developments in these areas, such as Wood Wharf and North Quay, should be seen as key opportunities. This represents a more realistic idea of what a future area-wide scheme could look like after the implementation of heat network zoning and the actions of this plan to mandate future data centres to be heat offtake enabled. The optimised network would only require around half of the data centres engaging (although all remain shown connecting in Figure 3.7).

Other secondary heat sources

While data centres are a key low carbon heating opportunity, many other secondary heat sources exist in the area (also shown in Figure 3.7). Any future area-wide network should seek to utilise a diverse range of heat sources to provide resilience and healthy competition between heat sources to drive down the price of heat offtake and deliver savings to residential and commercial end users.

Beyond the LAEP area

Large scale heat network development could also provide opportunities beyond the area's borders. For example, potentially supplying heat to new developments in the neighbouring Royal Docks Opportunity Area in Newham (where another very large data centre is due to be delivered soon), or even eventually connecting to the Stratford Olympic Park network.

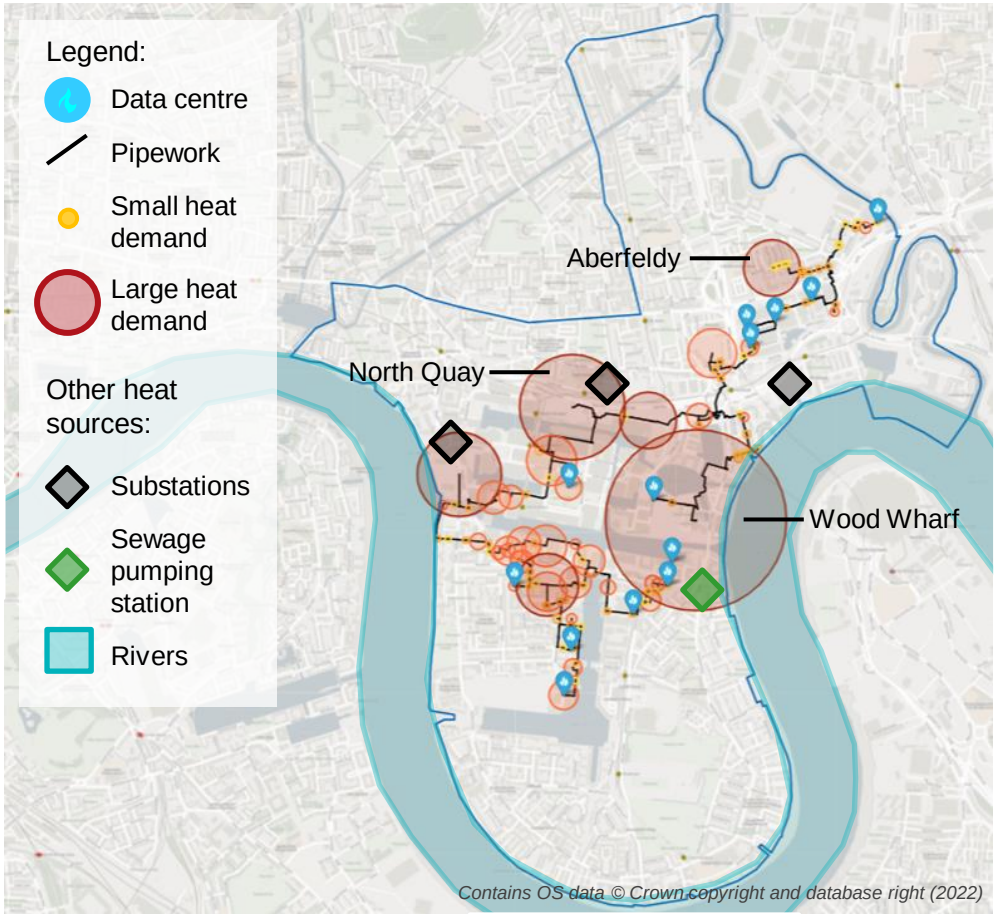


Figure 3.7: Suggested economically optimal data centre-heated network, and other secondary heat sources (not connected to displayed network) in the area

3. Future energy system vision

The LAEP's recommended pathway combines heat networks, where most effective, with heat pumps for other buildings.

A recommended pathway for the transition of the LAEP area's energy system – 1/2

Several potential pathways have been examined for the LAEP area's energy transition. These pathways present both opportunities and challenges for meeting the plan's objectives. These were considered in depth, and a recommended pathway for the LAEP was identified which combines the benefits of heat networks, discussed on the preceding pages, with decentralised heat pumps where heat networks are less appropriate.

Unsuitable pathways

The 'Do nothing' pathway's failure to change emissions from the 2022 baseline means that it cannot be an option for the LAEP area and it is entirely excluded from consideration.

The BAU pathway is also undesirable for the LAEP area; while it offers some reductions to the area's emissions by 2045, these are not nearly significant enough. BAU would also put timely delivery of new development and affordable housing in the area at significant risk; developers may experience long waits and significant costs for electricity connections, as limits to efficiency and flexibility rollout would see more pressure than any other pathway on the local electricity network as heat and transport electrifies.

The 'Hydrogen' pathway presents more opportunities, particularly around reducing disruption, increasing system resilience, and easing pressure on the electricity network. However, the lack of industrial sites in the vicinity of the area (which are required as crucial anchor loads for cost-effective hydrogen rollout), make it poorly suited for hydrogen transition. This means that there is no immediately available funding for hydrogen projects in the area, and even in the event of a strong UK Government decision in 2026 in favour of hydrogen for heating, the area would likely not be prioritised for early gas network conversion, delaying decarbonisation and potentially increasing costs.

A recommended pathway

This leaves the 'Electrified' and 'Heat networks' pathways. The previous pages have presented many of the advantages of heat networks such as their increased efficiency and flexibility. These represent significant benefits to the local electricity network that facilitate more timely and cost-effective connections of new developments compared to blanket rollout of decentralised heat pumps. Heat networks' benefits also offer opportunities for lower fuel costs for residents.

However, as also discussed previously, serving all the LAEP area's buildings with heat networks may be highly challenging and disruptive. It also would likely not be the most cost-effective solution for all consumers. Therefore, the LAEP's preferred vision can be interpreted as a mixture of the 'Electrified' and 'Heat networks' pathways. Heat networks, leveraging local sources of heat, should serve developments where they provide the most cost-effective heating solution for consumers. This will likely be most relevant in the Canary Wharf, Leaside, and South Quay & Crossharbour zones and such a future network could look similar to Figure 3.7 on the previous page. For other buildings, decentralised heat pumps should be prioritised. This pathway will best meet the plan's objectives and vision.

Implementation of Heat Network Zoning post-2025 would provide significant support to this vision and offer levers for LBTH to drive and support delivery of the recommended pathway.[24]

3. Future energy system vision

Multi-criteria analysis was performed to select the recommended pathway that best meets the plan's objectives.

Transition pathway multi-criteria analysis – 2/2

A recommended pathway (continued)

Decarbonisation of heat is one of the most fundamental issues for the LAEP area's transition. However, as set out previously, the various potential pathways must consider actions across all areas of the energy system, such as improving energy efficiency, electrifying transport, rolling out electricity system flexibility, and more. This is no different for the LAEP's recommended pathway; actions across all aspects of the LAEP area's energy system will be required to meet the plan's objectives. Considering the LAEP area's unique opportunities, challenges, and uncertainties, pages 46-49 set out seven overarching priority intervention areas for the LAEP and its recommended pathway.

Considering the economically-optimised heat network presented on page 39 as a high-level indication of where new heat networks may offer the most cost-effective means of decarbonising heating by 2045, page 44 shows what pursuing the recommended pathway could mean for the LAEP area's emissions and deployment of low carbon technologies over time.

Multi-criteria analysis (MCA)

Multi-criteria analysis (MCA) was performed to inform the assessment of the recommended pathway for the LAEP area, developed through collaboration between LBTH, the GLA and Arup. To assess how well each pathway meets the plan's objectives, the analysis focused on four overarching criteria:

- Achieving net zero
- Meeting social objectives
- Affordability
- Deliverability

Each criterion was divided into several sub-criteria for scoring (on a 0-3 scale) for each of the transition pathways. The MCA's legend is shown in Table 3.2. The full MCA assessment is presented on the following page. Detailed justification for each rating is presented in the accompanying technical report.

3	Criterion well fulfilled
2	Criterion mostly fulfilled
1	Criterion somewhat fulfilled
FAIL	Criterion not fulfilled

Table 3.2: MCA legend

3. Future energy system vision

The MCA presented here supports the selection of the LAEP's recommended pathway.

Transition pathway multi-criteria analysis

Criteria	Sub-criteria	BAU	Electrified	Heat Networks	Hydrogen	Recommended
Achieves net zero	Minimises 2045 residual emissions	FAIL	3	3	2	3
	Minimises cumulative 2022-2045 emissions	FAIL	3	3	1	3
	Reduces overall primary energy consumption and increases energy efficiency	FAIL	2	3	1	3
Meets social objectives	Supports timely delivery of new development	FAIL	1	2	1	2
	Reduces disruption in homes and businesses caused by interventions	2	1	1	2	1
	Creates local investment and new local green jobs	1	2	3	1	3
	Improves the local environment	1	3	3	2	3
	Lowers system operating costs, lowering long term energy costs for residents and businesses	FAIL	2	2	1	2
Affordability	Reduces capital costs for delivery	1	1	1	1	3
	Minimises impact on the viability of new developments	1	2	2	2	2
	Current availability of investment for low carbon technologies	1	2	2	FAIL	2
Deliverability	Minimises new local infrastructure and reduces disruption to the public realm	2	2	1	3	2
	Maximises energy security and long term system resilience	2	2	2	3	2
	Maximises LBTH's level of influence to support delivery	1	1	2	FAIL	3
	Supported by current and emerging regulatory environment	1	2	2	1	2
	Technological readiness and leverage of local heat sources	2	2	3	FAIL	3
TOTAL:		**15**	**31**	**35**	**21**	**39**

Table 3.3: LAEP transition pathway MCA – see the previous page for the MCA's legend

3. Future energy system vision

The recommended pathway will deliver low residual emissions for the LAEP area by 2045.

Our vision for reducing emissions in the LAEP area

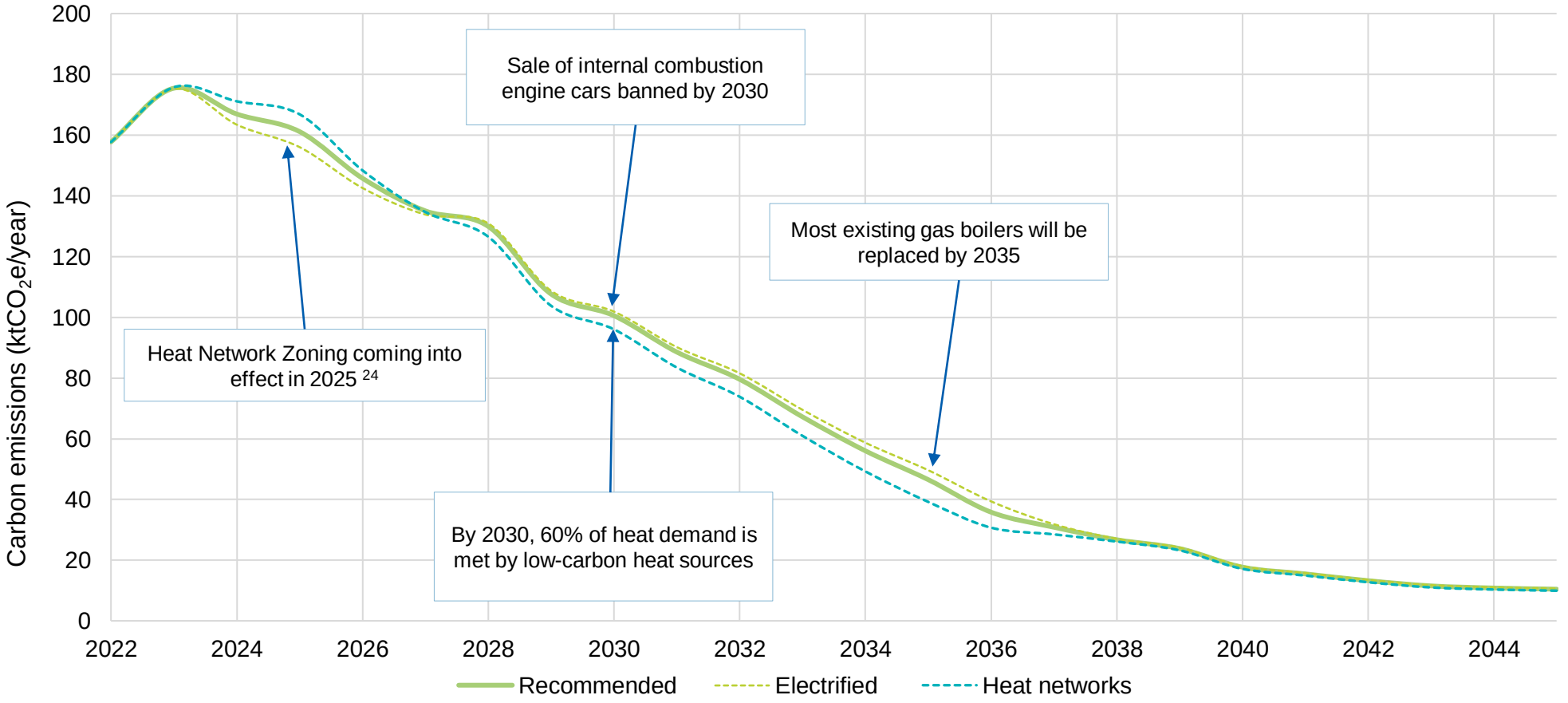


Figure 3.8: Projected annual carbon emissions based on trajectory to recommended future energy system scenario

3. Future energy system vision

What, when, and where? This page presents a spatial and temporal mapping of the LAEP's recommended pathway.

Spatial and temporal mapping of the LAEP's recommended pathway

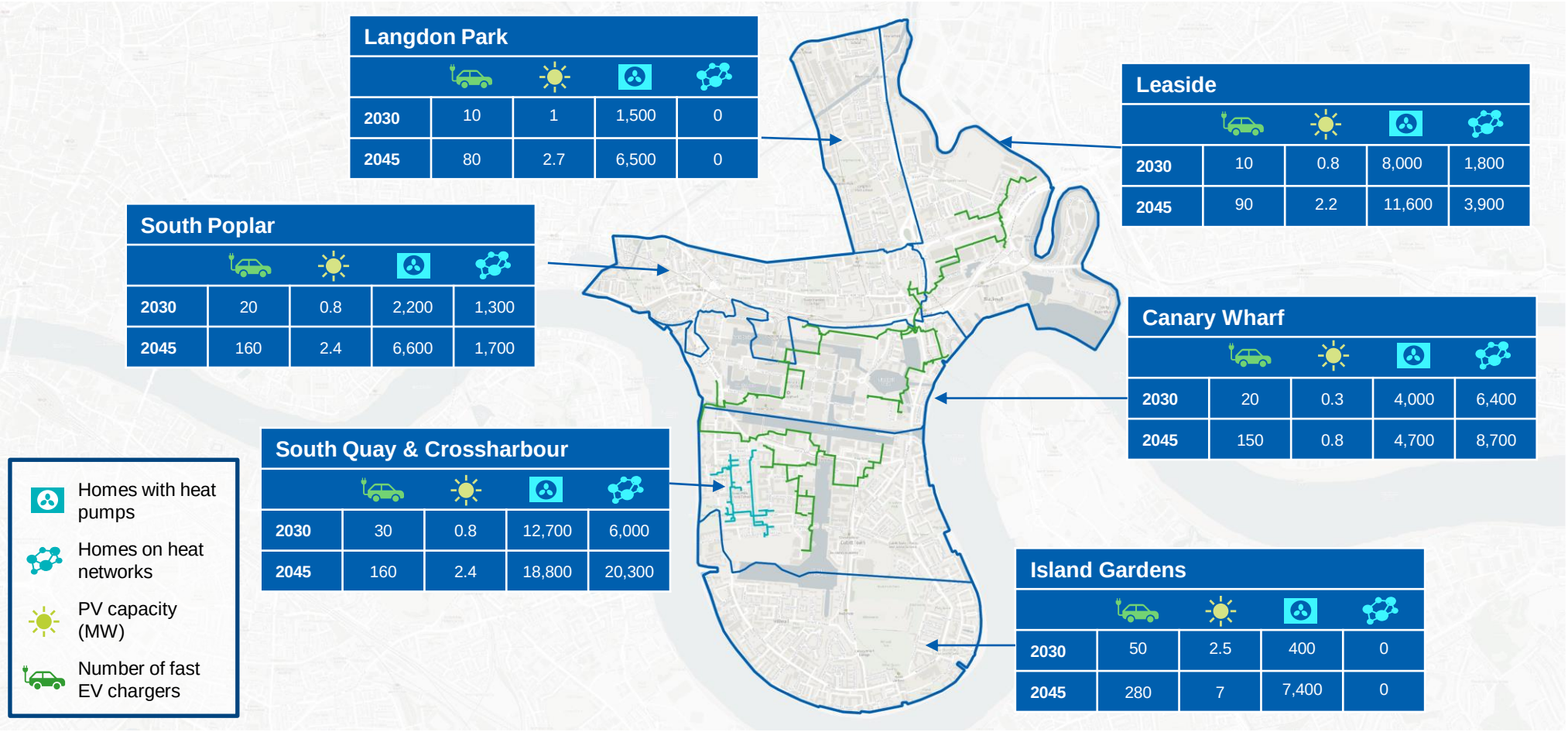


Figure 3.9: Spatial and temporal mapping of the LAEP's recommended pathway

3. Future energy system vision

Residual emissions must be compensated to achieve a net-zero energy system

Dealing with residual emissions

Despite ambitious action, there are residual emissions in 2045 for all pathways, including the recommended pathway. To achieve net zero, these emissions must be balanced either by removing emissions through sequestration or offsetting through supporting emissions reduction activities outside of the LAEP area.

For example, it would take approximately one thousand hectares of forest to absorb the residual emissions in 2045. This equates to an area almost five times as large as the LAEP area.[27]

In the case of the LAEP area, carbon emissions associated with electricity consumption accounts for 100% of residual emissions in 2045 in the electrified and heat network scenarios. Of this, 77% is attributed to data centre power consumption, while the remaining percentage is split out among other sectors such as heat, electricity use in buildings, and transport (as shown in Figure 3.10).

Based on the dense urban nature of the LAEP area, there are limited opportunities for renewable electricity generation. Therefore, it is not possible completely to eliminate electricity emissions solely through investment into renewables within the area. Instead, investments into zero-carbon electricity could be explored outside the LAEP area through Power Purchase Agreements (PPAs). PPAs have been used successfully in the City of London and are being explored for TfL.

However, local authorities and wider government bodies must consider how offsetting is paid for and who is responsible for these payments. Local authorities, developers, and large emitters (such as data centre operators) will all have a responsibility to decarbonise their own activities, and mechanisms such as taxation and offsetting contribution funds for developers may be considered as means to fund offsetting activities.

It is important to engage stakeholders in the LAEP area throughout the delivery of the LAEP and to reach a consensus on the approach to compensate residual emissions. This will require collaboration and cooperation among all stakeholders to ensure a successful transition to a net zero future.

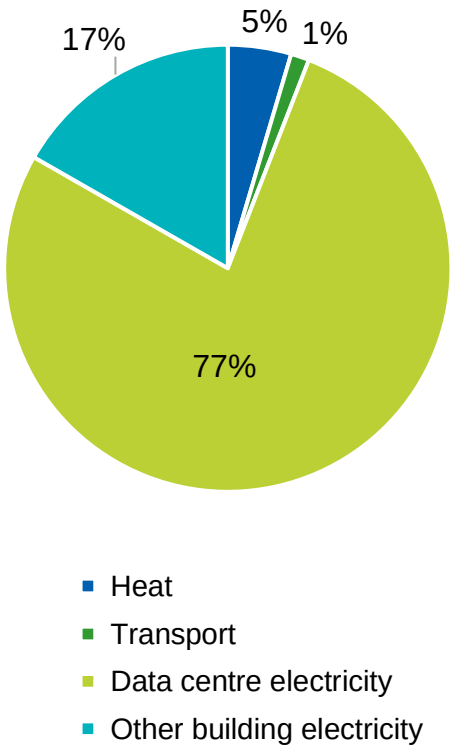


Figure 3.10: Split of residual emissions in the LAEP area by energy demand type and sector

3. Future energy system vision

This plan identifies seven priority intervention areas that must be addressed to meet the plan's objectives and vision.

Priority intervention areas

The modelling presented on the preceding pages shows the radical change which is necessary to create a net zero local energy system for the Isle of Dogs, South Poplar, and Leaside. Across all scenarios, it is concluded that the least cost pathway to net zero for the area will involve significant investment and profound changes to how energy is used. The priority intervention areas to deliver the LAEP's objectives, and its recommended pathway, are set out in Figure 3.11.

These intervention areas span across all aspects of the area's energy system, with numerous interdependencies and interactions between them, as shown on page 48. This highlights the importance of a whole system approach with a coordinated programme of delivery to meet the net zero carbon target by 2045.

Delivery of the wider objectives of the plan will need to be supported by the right governance, engagement, policy environment and financing solutions.

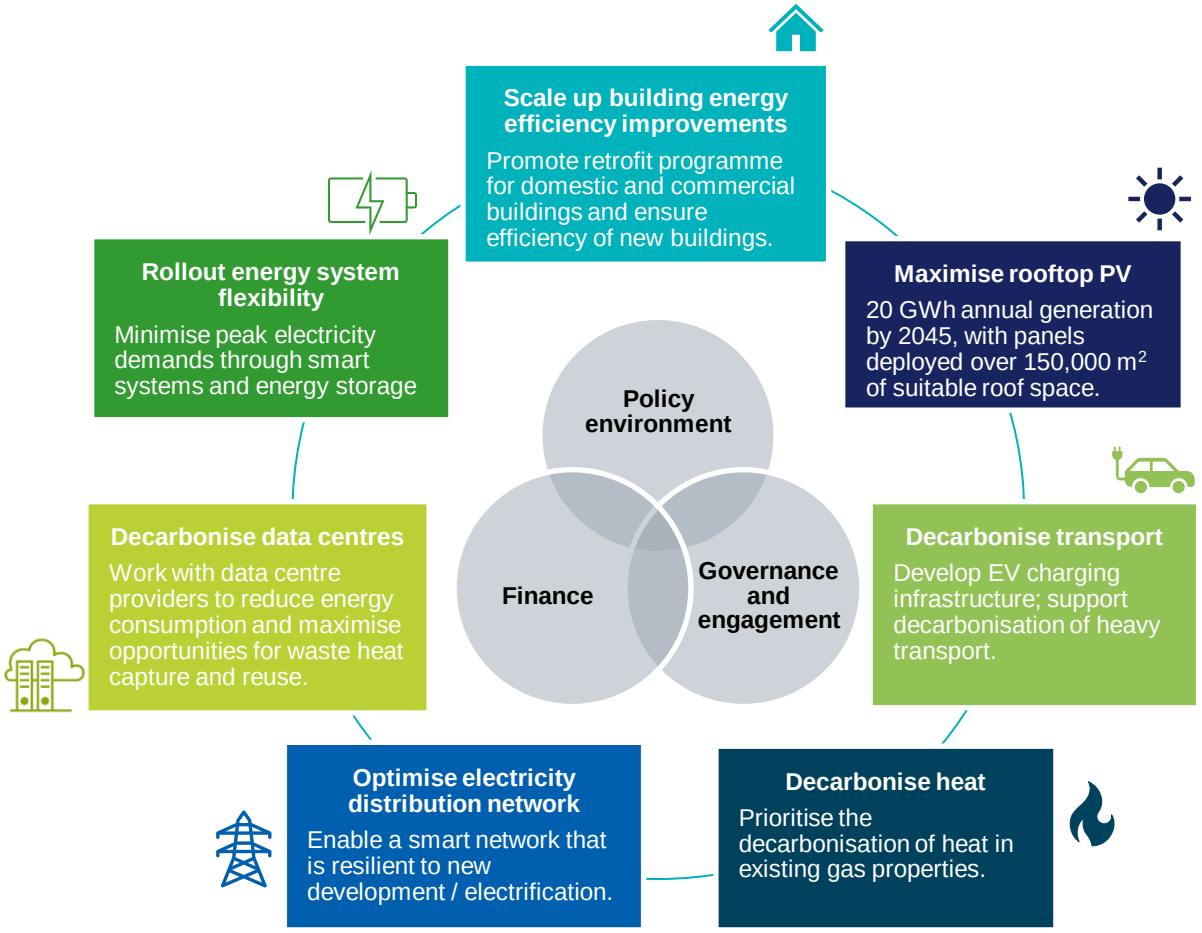


Figure 3.11: Priority intervention areas in Isle of Dogs, South Poplar and Leaside.

3. Future energy system vision

The plan has identified seven priority action areas; energy efficiency, solar PV and transport are described here.

Priority intervention areas

LBTH should aim to deliver actions to support changes to the energy system as follows:

1. Scale up building energy efficiency improvements

Reducing energy demand of buildings through improved energy efficiency reduces the need for potential network reinforcements and will be crucial for facilitating the introduction of highly efficient low temperature heating systems like heat pumps. Reduction in energy demand in the area will also reduce energy bills, which will help support households in the face of rising costs.

There is a need to rollout a programme for energy efficiency retrofit of the council's own building stock, Tower Hamlets Homes stock, and other non-domestic buildings (schools). Through community engagement, government incentives and planning measures, homeowners also need to be encouraged and supported to carry out efficiency upgrades, which includes external, loft and under floor insulation measures, smart metering, window sealing, and double glazing. Properties with low existing EPC ratings and where retrofit is more cost effective will be prioritised.

New developments in the area will be assessed against compliance with energy efficiency requirements set out in the local plan and the London Plan and must clearly demonstrate that designs have been carried out in line with the "Be Lean" step in the London Plan's Energy Hierarchy. This includes the use of highly efficient building fabric (which also minimises overheating), as well as high efficiency lighting, ventilation and appliances.

2. Maximise rooftop PV

Due to the LAEP area's urban context, opportunities for local energy generation are limited. However, the analysis undertaken for this plan communicates that there are still benefits to maximise the rollout of rooftop PV in the area to deliver low-cost, zero carbon energy to local businesses and residents.

LBTH should aim to deploy rooftop PV in all feasible council assets, to be delivered alongside energy efficiency retrofits, and encourage uptake in the able-to-pay sector through engagement and government incentives.

By 2045, at least 20GWh of electricity should be produced through local PV technology annually. This equates to approximately 20MW of installed capacity, or 150,000 m^2 of roof space with PV installed.

3. Decarbonise transport

The London Pathways to Net Zero document published by the GLA in January 2022 outlines a rapid electrification of road transport, which will require a significant rollout of charging infrastructure, with public chargers located at workplaces, destinations and other hubs. The modelling results support the electrification of transport and thus the scaling up of public and private EV charging infrastructure. By 2045, Tower Hamlets should aim to have installed around 12MW of EV charging infrastructure across the LAEP area.

A significant reduction will also need to be seen in vehicle demand, to minimise charging demand, reduce congestion on roads, and to encourage active travel such as walking and cycling. By 2045, Tower Hamlets should aim to have a 27% reduction in total car mileage originating in the area.

3. Future energy system vision

The plan has identified seven priority action areas; heat, power, data centres and flexibility and described here.

Priority intervention areas

4. Decarbonise heat

Most of the existing building stock in the LAEP area is currently heated by natural gas boilers, which will need to switch to a low carbon heat source in order to meet the net zero ambitions by 2045. This is likely to either be through electric heat pumps in properties or using a centralised low carbon heat source (like waste heat from a data centre or substation) serving a heat network. The London Plan has identified the entire LAEP area as a Heat Network Priority Area, where new developments should either connect to nearby heat network schemes or be designed to easily connect to a heat network in the future. Heat network connections with neighboring boroughs such as Hackney, Newham or the City could provide added benefits through sharing low carbon heat sources and minimising infrastructure needs and disruption.

A potential heat network future for the LAEP area has been analysed here, taking into account potential heat sources, whilst minimising infrastructure needs and disruption in the road. Tower Hamlets aims to successfully decarbonise the existing heat networks in the area by 2040. Areas with electricity network headroom and where heat network connections are likely to be less feasible, should be prioritised for air and ground source heat pump installations alongside the rollout of energy efficiency retrofit measures.

5. Optimise electricity distribution network

Network upgrades are a priority intervention to allow new local renewable assets to connect to the electricity grid, as well as meeting the increased electricity demand as a result of growth in the area and a shift to electrified transport and heat demand. Tower Hamlets is already engaging with UKPN to deliver additional substation capacity in the area. The Council's ambition is that new substation infrastructure is heat offtake ready. Additionally, Independent Distribution Network Operators (IDNOs) could serve clusters of buildings in the area (e.g. Canary Wharf), rolling out smart and flexible technologies to reduce the strain on the main network.

6. Decarbonise data centres

Working with data centre providers to reduce operational energy consumption and utilise waste heat in the area is a key priority, since data centres account for a very large proportion of electricity consumption in the LAEP area, and consequently waste significant amounts of heat from their cooling systems. It is likely that the area will continue to play a significant role in data processing and storage, and as such could become a pilot zone to test innovative energy reduction or flexibility interventions and distribution of any waste heat captured.

7. Roll out energy system flexibility

To minimise the need for further grid infrastructure, and to deliver a resilient and low-cost energy system to businesses and residents, the Council will need to support the uptake of smart grids and flexibility technologies such as energy storage and smart EV charging. Tower Hamlets should look to embed flexibility considerations for new developments within their local plan. The Council should also encourage energy stakeholders and local businesses to participate in smart grids or flexibility pilots such as testing smart appliances and TOUTs, which can become replicable use cases for delivering flexibility across London and the rest of the UK.

3. Future energy system vision

Interdependencies exist across all seven of the LAEP's priority actions.

Interdependencies across priority intervention areas

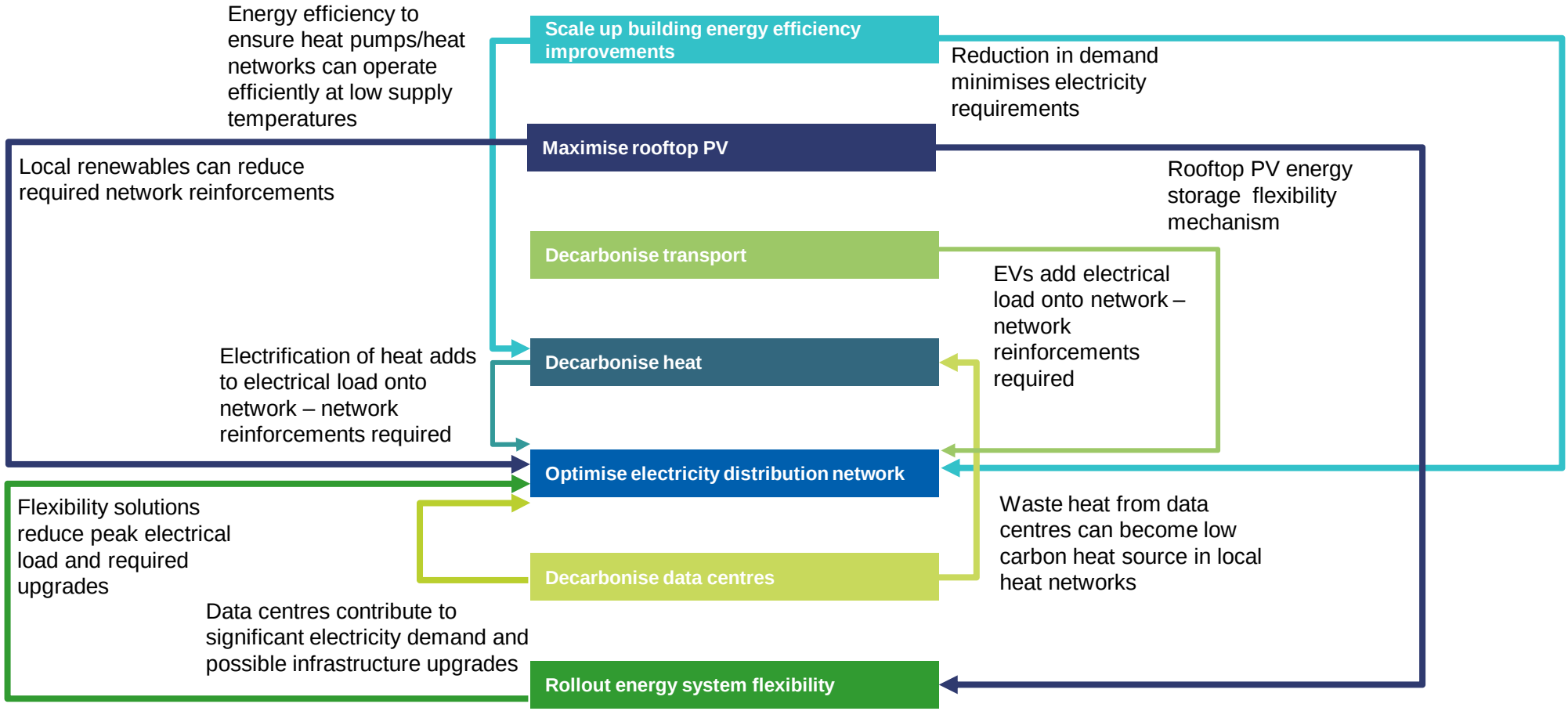


Figure 3.12: Key interdependencies across priority interventions areas.

3. Future energy system vision

A case study has been undertaken on a smaller area to show how these intervention areas play out in reality.

Snapshot: What the LAEP will mean for the neighbourhoods of Poplar Leaside and Blackwall – 1/2

The neighbourhoods of Poplar Leaside and Blackwall are located towards the Northeast of the LAEP area as shown in Figure 3.13. The area has a diverse mix of residential buildings, large commercial data centres and proposed new developments. This area has been chosen to present a case study for the local implications of the intervention areas identified in this LAEP.

In line with the energy efficiency ambitions set out here, the council should continue to explore energy efficiency upgrades for council managed assets (including homes, schools, and leisure centres). For example, the Woolmore and Culloden primary schools would benefit from more efficient heating and cooling systems, as well as the adoption of smart lighting and appliances as a flexibility solution. The council owns high density residential buildings like Glenkerry House and Carradale House in the area. The council should work with the local housing associations, leaseholders, and residents to deliver energy efficiency upgrades in these buildings.

Privately owned homes, particularly the older terraced properties around Oban and Portree Street, where most properties are currently EPC D or below, will also need to undergo a programme of retrofit. Tower Hamlets can work with homeowners through providing grants, support and advice to help improve the energy performance of homes.

Planning Applications for new developments in the area will need to clearly demonstrate that they are in line with the targets and standards set out in the Local and London Plans.

Alongside retrofit, all buildings in the area will need to transition to a zero carbon heating solution by 2045. Older residential building stock in the area which is currently heated by gas boilers is likely to switch to heat pumps.

Pending an in-depth feasibility study, Tower Hamlets should seek to install rooftop PV on all appropriate homes (existing and new) and council owned buildings, equating to an installed generation capacity of at least 2GWh per year.

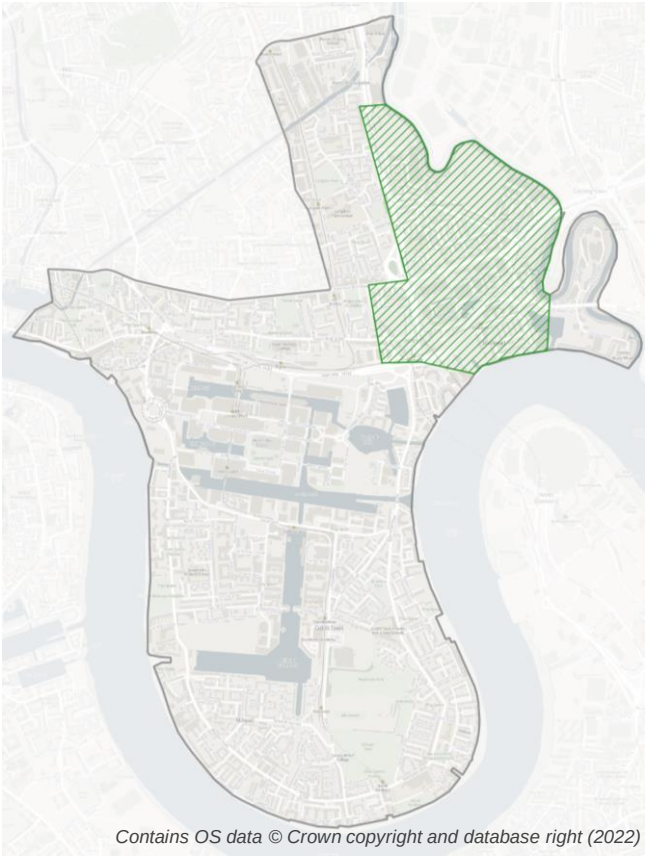


Figure 3.13: The Poplar Leaside and Blackwall neighbourhoods (Green) in the LAEP area

3. Future energy system vision

A case study has been undertaken on a smaller area to show how these intervention areas play out in reality.

Snapshot: What the LAEP will mean for the neighbourhoods of Poplar Leaside and Blackwall – 2/2

The area is home to two existing heat networks, serving the Aberfeldy and Blackwall Reach developments. Through engagement with key stakeholders it may prove viable to expand these networks to new planned developments, and switch to a low carbon heat source through heat offtake opportunities from nearby data centres such as the Global Switch campus (which is already being assessed by E.ON, the operator of the networks). Any new district heating schemes should be served by low carbon heat sources such as heat pumps or waste heat, with any new data centres built in the area mandated to be heat offtake ready.

A high level of planned new development offers opportunities for infrastructure that encourages the reduction of transport demand such as the development of cycle lanes and footpaths. This is already underway at the Leven Road Gasworks development with a new riverside walk for pedestrians and cyclists. In combination with strong existing public transport links (including TfL buses and the DLR), these measures will reduce reliance on private vehicles for local journeys. EV charging infrastructure will be rolled out in new and existing parking spaces.

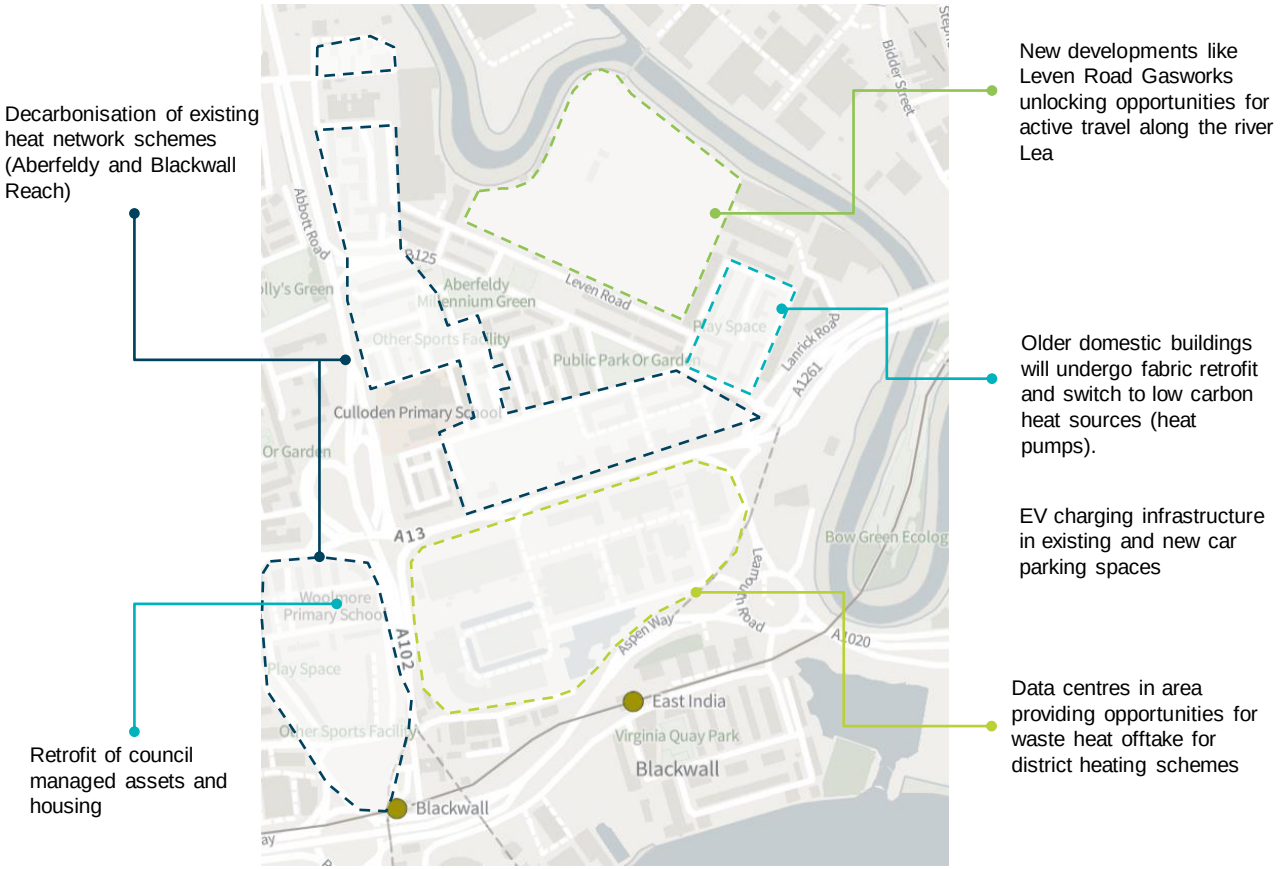


Figure 3.14: Key actions within the Poplar Leaside and Blackwall neighbourhoods (Green) in the LAEP area

4. Recommended action plan

4. Recommended action plan

The LAEP presents several actions to be undertaken under each of the priority intervention areas.

Joined up action and ensuring conditions for success are met

A high level routemap showing actions needing to be undertaken, in the context of London and UK Government targets and decisions, is shown on pages 55-57. This provides an overview of how the LAEP fits in the wider policy context and the direction of travel for energy system decarbonisation.

The actions fall under the following priority interventions areas, as set out in Section 3:

- Enabling actions
- 1. Scale up building energy efficiency improvements
- 2. Maximise rooftop PV
- 3. Decarbonise transport
- 4. Decarbonise heat
- 5. Optimise electricity distribution network
- 6. Decarbonise data centres
- 7. Rollout energy system flexibility

The priority interventions identified sit within this high level routemap. They require joined up but differentiated efforts by the stakeholders identified in this LAEP to deliver the LAEP's objectives and the recommended pathway.

Despite having identified a recommended pathway, uncertainty does exist over the exact form of the decarbonised energy system in 2045. The actions identified here are resilient to this uncertainty and can be taken now to create an enabling environment to maintain the ability to meet the 2045 and interim targets. Future changes will require the plan to adapt and monitoring of the plan will be crucial. Annual reviews and full updates in line with the local plan refresh cycle are recommended.

The routemap provides a focused view of actions that will be taken in the coming decade, while also showing key milestones on the decarbonisation trajectory to 2045.

Each intervention requires four key elements to be successful:

1. Mobilising finance
2. Strong and consistent policy frameworks
3. Delivery owners
4. Community engagement

LBTH's role for each intervention will vary. Some interventions call for council action in the material delivery of programmes, whilst other interventions require the council to act more as a facilitator for market driven change.

The following section provides further detail on each of the actions within each intervention area, as well as the council's key asks of others.

4. Recommended action plan

LBTH's role in the LAEP's actions ranges from direct control to influencing and engaging.

Control and influence

In order to deliver the LAEP and its actions, LBTH will need to decarbonise assets within its direct control, such as council buildings and the council transport fleet. Further, the council will need to drive and influence the decarbonisation of the wider area through policy, incentivising, collaborating, and engaging the community.

The council's sphere of influence in actions might include:

- Budget and finance
- Defining and helping to achieve project outcomes
- Identifying priorities
- Identifying potential risks and monitoring risks
- Monitoring timelines
- Monitoring the quality of the project as it develops

For each of the actions outlined in the following pages, the type of influence the council has over the action has been identified according to the various levels of influence presented in Figure 4.1.

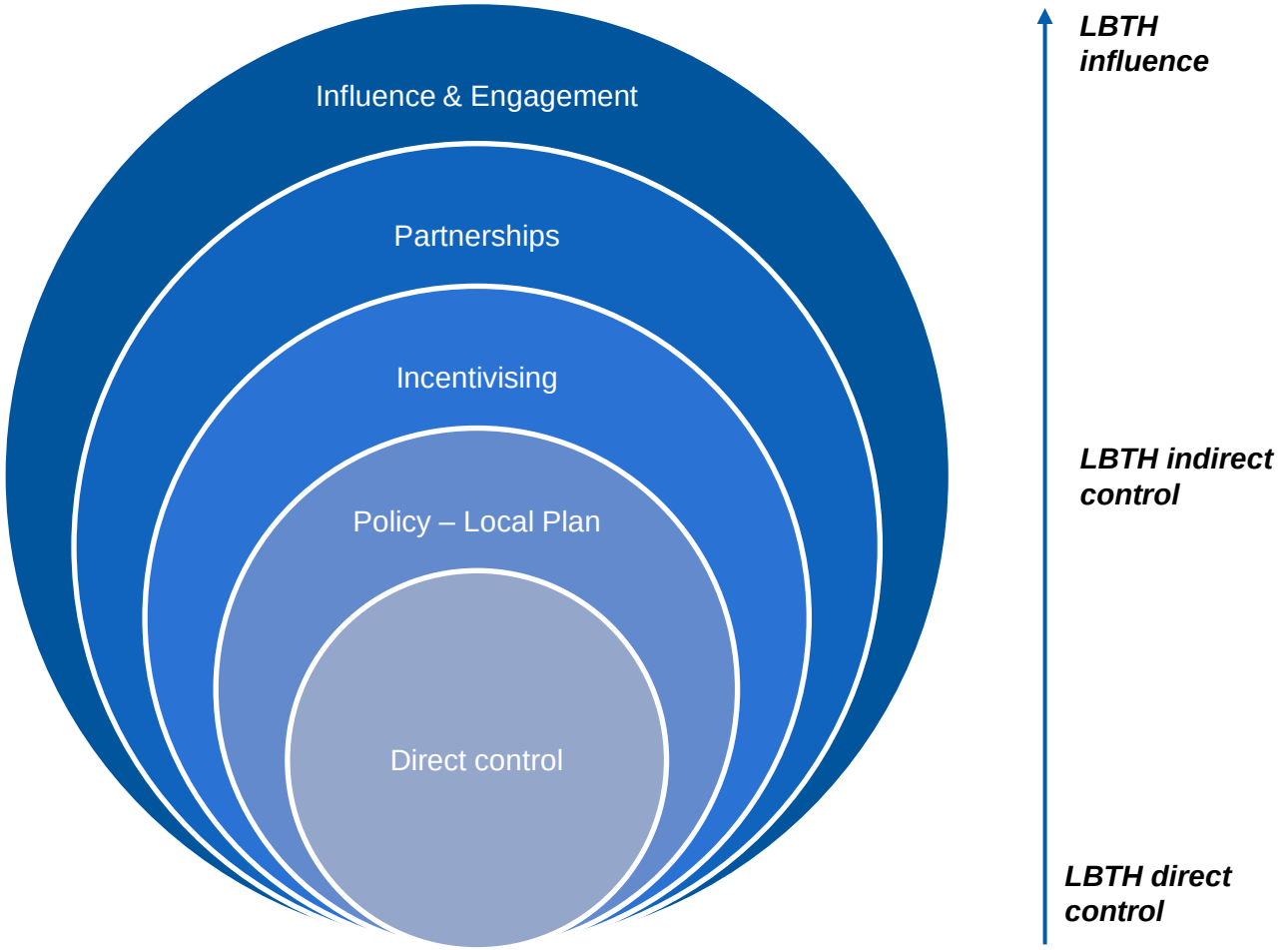


Figure 4.1: Control and influence as a council

4. Recommended action plan

Initial phases of implementation

1st Phase

- **Refine delivery plan**

Establish a LBTH delivery lead and LAEP committee:

- **Identify candidates for dedicated council officers responsible for delivering LAEP**
- **Stakeholders and businesses apply to be part of the LAEP committee**

Establish wider LAEP delivery group from actions:

- **Identify group membership, including members from GLA, UKPN and Cadent**

Begin soft market testing for potential energy delivery partner:

- **Launch Expression of Interest questionnaire**

2nd Phase

- **Confirm and formalise dedicated LBTH LAEP delivery lead governance structure + other LBTH actors**
- **Select stakeholders and businesses that will sit on committee based on applications**
- **Hold initial meeting and establish regular meeting frequency**
- **Await questionnaire responses**

Identify finance mechanisms:

- **Review funding and grant opportunities**
- **Undertake business case appraisals for potential actions regarding skills, staff resource and funding**

Plan community engagement approach:

- **Plan campaign and public engagement approach**

Procure further studies

- **Develop scopes of work, e.g. for council estate retrofit strategy**

3rd Phase

- **Hold initial committee meeting led by delivery lead, establish meeting frequency**
- **Score responses, engage with respondents**
- **Identify opportunities to target in line with delivery plan**
- **Discuss engagement plans in initial LAEP committee meeting**

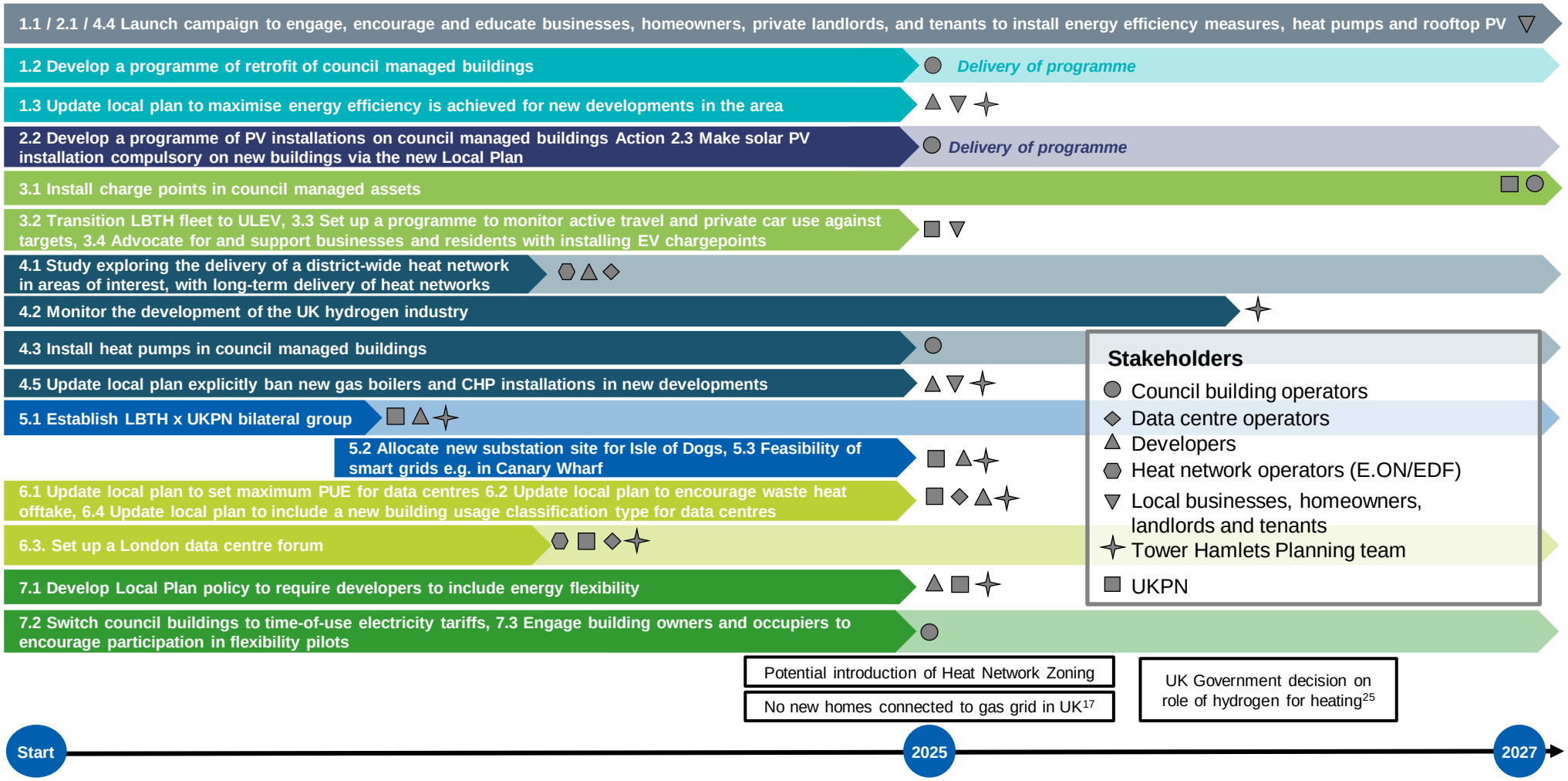
Assign responsibilities and monitor actions:

- **Assign stakeholder responsibility for actions in LAEP committee meeting, track and monitor actions**
- **Appoint consultants to undertake further studies**

4. Recommended action plan

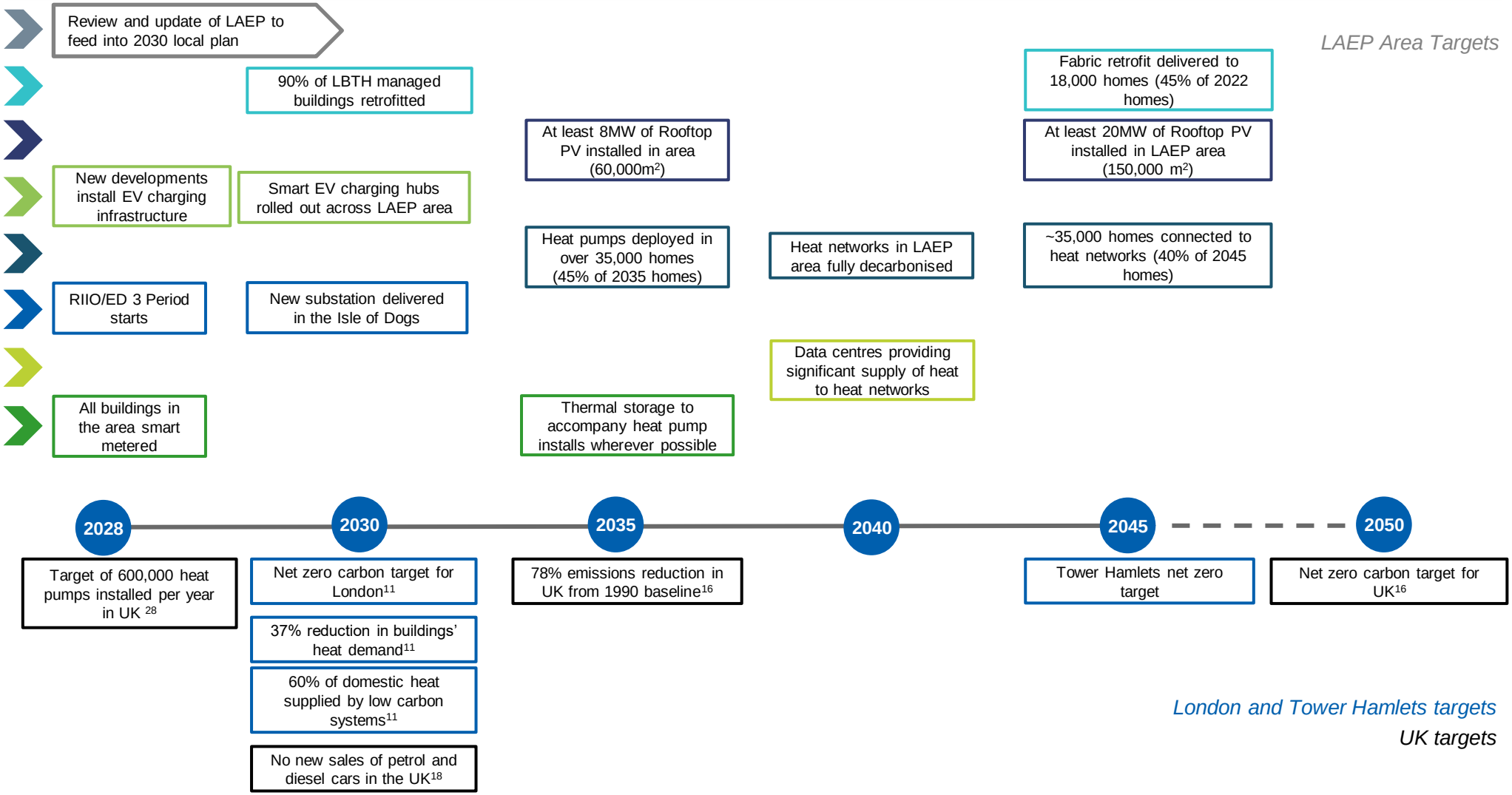
Medium term routemap

Medium-term routemap: click each action's arrow to navigate to the page containing its details



4. Recommended action plan

Long term routemap

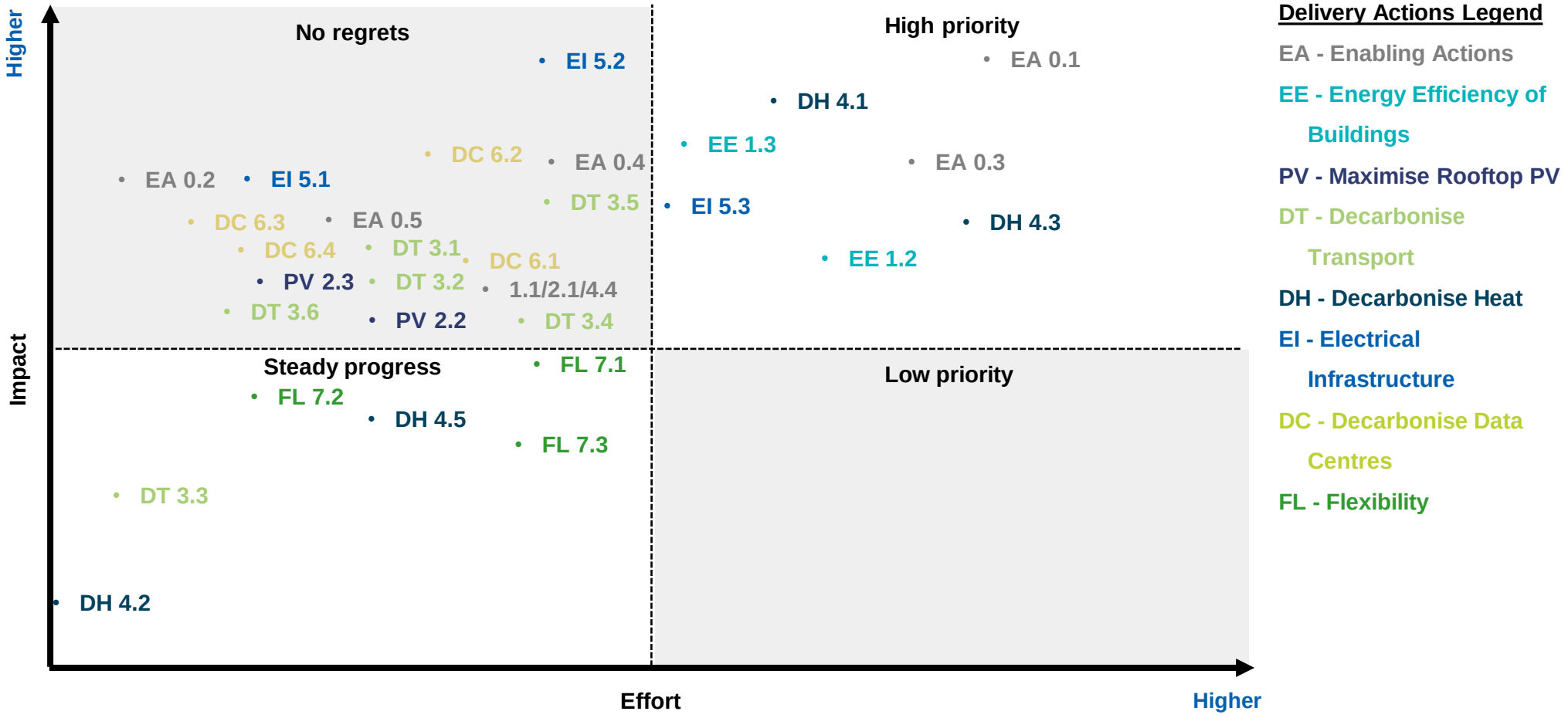


4. Recommended action plan

Action priority matrix

Action priority matrix: click an action to navigate to the page containing its detail

Actions' relative impact and effort to deliver were assessed to identify no regrets and high priority actions. This assessment is presented in the matrix below.



4. Recommended action plan

Recommended council actions and the ask from others

Enabling actions

Return to the routemap | Return to the priority matrix

Action 0.1 Procure a strategic energy partner.

The council should investigate how the procurement of a partner to jointly establish a Special Purpose Vehicle (SPV) could help LBTH to deliver, operate and maintain energy projects throughout the LAEP area. The scope of the strategic partnership could include:

- Following the end of the Barkantine existing concession contract, the partner could take on the responsibility for the network's operation, decarbonisation, and potential expansion
- Assessing the potential for and coordinating efforts to drive forward a district heat network across the areas identified, including delivery and operation of any feasible network opportunities (this would need heat network zoning policy intervention by BEIS).[24]
- A concession agreement allowing the Partner to have first refusal on projects which rollout of Solar PV, energy efficiency retrofit, and heat pump conversion across council buildings, Tower Hamlets Homes stock, and other council non-domestic buildings (schools) (could be through heat/solar as a service to LBTH, or LBTH could pay the partner to deliver the services, or the partner secures required investment via EPC contracts)
- EV charging in council buildings and on-street
- Coordinating other energy activities (e.g. DSR pilots, smart grid infrastructure etc)

This approach has been taken by other Local Authorities - e.g. Bristol City Council (Bristol City Leap), Newcastle and now Coventry.

Action owner: LBTH, circa 1FTE to procure

Council control level: Direct action / partnerships

Benefit: The Strategic Energy Partner would bring funds and expertise, while LBTH would exclusively procure the partner for energy projects. There is great potential for heat networks, rollout of rooftop PV and retrofit of homes; wide strategic scope would be difficult for the council to deliver alone.

Timescale: Immediate start, procurement of partner by early 2024

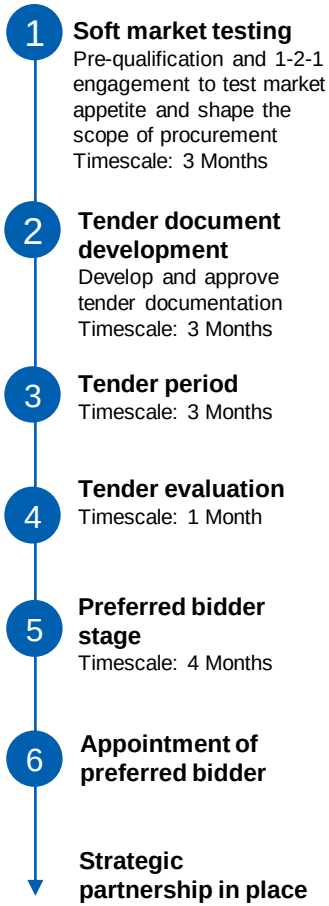


Figure 4.2: Strategic energy partner procurement timeline

4. Recommended action plan

Recommended council actions and the ask from others

Enabling actions

Return to the routemap | Return to the priority matrix

Action 0.2. Establish an Isle of Dogs, South Poplar and Leaside LAEP committee with a mix of councilors, senior officers, and senior influencers and budget holders within the council, as well as business and community representatives, transport, and housing representatives who want to contribute to improving the area and delivering the plan. This committee should be used to track and monitor the plan and help foster ownership of actions. The specific membership of the committee should be determined based on the needs of the area and should be diverse and representative of the community.

Council control level: Direct control/ partnerships

Benefit: Joined up action across stakeholders is key to delivering the LAEP. Members may be incentivised to attend from a Corporate Responsibility perspective. Where an organisation contributes to carbon reduction initiatives, emissions savings could be shared.

Timescale: Immediate start, ongoing.

Barriers: Data sharing and confidentiality, ensuring that committee members are representative.

Action 0.3 Raise finance. LBTH should seek to develop a plan for funding arrangements to support the delivery of a local authority programme of works to enable the delivery of the LAEP. Some of the potential funding mechanisms already identified are listed on page 62.

Council control level: Direct control

Benefit: Funding is required to deliver the plan.

Timescale: Immediate start, full plan to be in place by mid 2026.

Barriers: Private sector funding is difficult to raise and depends on consumers' willingness to spend on decarbonisation. This is particularly challenging for heat pumps and retrofit, however the Boiler Upgrade Scheme goes someway to support heat pumps, and there are community schemes which could support rooftop PV and heat pump delivery.

Action 0.4 Refine the overall delivery programme. The council should refine the overall delivery programme, following a whole systems approach so that initiatives are not siloed. This could potentially be delivered in collaboration with the Strategic Energy Partner outlined in Action 0.1. As part of this, delivery should be coordinated with other utilities to follow a 'dig-once' approach to infrastructure works, minimising cost, embodied carbon, and disruption (for example, laying digital ducting along heat network pipe routes).

Council control level: Direct control / partnerships

Benefit: A coordinated delivery programme to ensure that available funding arrangements are utilised in the most appropriate ways, and that the interdependencies are considered.

Timescale: Immediate start, full plan to be in place by mid 2026

Barriers: Target is not met because of lack of resource and coordination. Continuous monitoring should be undertaken until 2045 to ensure target is met.

4. Recommended action plan

Recommended council actions and the ask from others

Return to the routemap | Return to the priority matrix

Enabling actions

Action 0.5 Collaborate across local authorities, regionally and nationally. The council should work with the GLA and neighbouring boroughs to develop opportunities for investment in energy projects at scale. The council also needs to work with others (including community groups) to provide unbiased advice for energy consumers around energy efficiency and renewables, based on the advice developed at regional or national level.

Benefit: Pooling opportunities across multiple local authorities makes them more attractive to investors. Could also contribute to local employment opportunities.

Timescale: Immediate start, ongoing.

Barriers: Potential for lack of action if relying on someone else.

4. Recommended action plan

Recommended council actions and the ask from others

Opportunities and enablers matrix

	Funding mechanisms and incentives	Tools/Resources/Studies	Other Drivers and Enablers
Cross-cutting	LBTH Carbon offset fund, Community Infrastructure Levy (CIL), Public Sector Decarbonisation Scheme, ECO4	The London Plan Energy Assessment Guidance and Building Regulations, Part L 2021 LBTH Local Plan	Energy cost crisis Reducing fuel poverty
Scale up building energy efficiency improvements	GLA/ERDF Retrofit accelerator, Greater SE Net Zero Hub	Tower Hamlets Local Energy Advice Programme, London Building Stock Model	Energy cost crisis Improving thermal comfort Reducing fuel poverty
Maximise rooftop PV	Smart Export Guarantee, 0% VAT, Green mortgages, ECO4	London Solar Opportunity Map London Solar Action Plan , Green Match, BEIS UK Rooftop Behavioural Research	Community energy organisations, Improved fuel security and resilience
Decarbonise transport	On-street Residential ChargePoint scheme, Workplace Charging Scheme grant, Local EV Infrastructure Fund, Low Emissions Vehicles Plug In grant	The Mayor's Transport Strategy	Free of charge parking for EVs Contributions from developers / infrastructure owners / transport operators.
Decarbonise heat	Boiler Upgrade Scheme, ECO4, Green Heat Network Fund, Greater SE Net Zero Hub	London Heat Map BEIS Heat and Buildings Strategy	Energy cost crisis Heat Networks Zoning Regulation of the heat market (by Ofgem)
Optimise electricity network	UKPN RIIO/ED2 and RIIO/ED3 Price control DNO Funded, with Ofgem approval	UKPN Isle of Dogs electrical connections study	Review of Electricity Market Arrangements (initial consultation only) Developer demand for new connections
Decarbonise data centres	Green Heat Network Fund for heat offtake potential Connection charges to heat network operators Revenues from the sale of heat Operational cost reduction savings	Thames Water Review of Data Centre Water Use Upcoming GLA data centre research study Tech UK data centre resources Bloomberg data centre decarbonisation study	Heat Networks Zoning Policy (under development) may mandate heat suppliers to connect (TBC). Reduction of water consumption
Rollout energy system flexibility	Revenues from participation in the flexibility market. Private sector finance	FlexLondon Study Tower Hamlets Local Energy Advice	Time-of-use tariffs (TOUTS) Increases capacity on the power network

4. Recommended action plan

Recommended council actions and the ask from others

1. Energy efficiency of buildings

Return to the routemap | Return to the priority matrix

Action 1.1 Launch campaign to engage, encourage and educate businesses, homeowners, private landlords, and tenants to install energy efficiency measures. Target leafletting in residential areas where current EPC ratings are low, particularly around Leaside and Island Gardens. Engage with Canary Wharf Group and other property owners directly, focusing initially on small power reduction and controls interventions within commercial offices.

Council control level: Influence & engagement

Benefit: This action will contribute to the council's 80% on-site emissions reduction target on retrofitted buildings across the borough. Energy efficiency improvements will reduce energy costs for residents and businesses.

Action owner: LBTH, residents, local businesses, possible Strategic Energy Partner assistance.

Other stakeholders: Private landlords, tenants, homeowners, housing associations (e.g. Poplar HARCA, One Housing), Canary Wharf Group and other institutional landowners/freeholders and businesses.

Timescale: Immediate start and recurring.

Barriers:

- Investment case can be hard to prove / ensure for retrofit projects.
- Challenging to ensure effectiveness of campaign and targeting of efforts.
- Installation costs and availability of labour for convinced stakeholders.

Action 1.2 Rollout programme for energy efficiency retrofit of council buildings, Tower Hamlets housing stock, and other council non-domestic buildings (e.g. schools). Buildings with poor energy efficiency performance and gas/resistance heating should be prioritised for retrofit so that heating systems can be rolled out in tandem. Smart controls should be rolled out as part of programme. A strategic decarbonisation planning exercise will need to be undertaken across the council's building stock. Where funding is available for Local Authorities to rollout to buildings outside the council's control (e.g. the Home Upgrade Grant), the scope of the programme may be extended to include these buildings.

Council control level: Direct action

Benefit: This action will help achieve the council's target to retrofit 90% of their assets by 2030. Learnings from the programme can also support the delivery of private sector retrofit projects.

Action owner: LBTH, with possible Strategic Energy Partner.

Other stakeholders: Tower Hamlet Homes (THH), schools, retrofit construction companies, residents.

Timescale: Over the next 5 years.

Barriers:

- Competing council budgets and resource.
- Availability of labour.
- Complications navigating wider array of funding and grant schemes available, with varying eligibility, suitability, etc.
- Buildings where LBTH has control are only a small portion of energy consumption so the action has only limited impact on the energy system.

4. Recommended action plan

Recommended council actions and the ask from others

1. Energy efficiency of buildings

Return to the routemap | Return to the priority matrix

Action 1.3 Maximise energy efficiency achieved for new developments in the area.

As LBTH updates its Local Plan for adoption in late 2025, the council will work on policies that help ensure developments in the area meet stringent requirements for energy demand, supply and reporting. This may include policies on the type of calculations expected to be seen in Energy Statements, who will need to prepare Energy Statements, and how energy demand will need to be reported post completion. The council will need to take care with ensuring any adopted policies do not contribute to higher risks of overheating. The council will need to review contributions made by developers to its Carbon Offsetting fund.

Council control level: Policy – Local Plan

Benefit: Keeping resident energy costs down, improving local air quality, reducing the risk of overheating

Action owner: LBTH planning team

Other stakeholders: Developers, housing associations (e.g. Poplar HARCA, One Housing)

Timescale: Immediate start for adoption in 2025.

Barriers: High energy efficiency is hard to achieve in tall buildings; any policies adopted that may reduce building heights need to be balanced off against housing targets. Making it harder for developers to obtain planning permission may slow growth, reducing applications. Further, this policy will need to adopted across the wider borough, requiring political support. It will also need to align with the National Planning Policy Framework, receiving approval from the Planning Inspectorate.

4. Recommended action plan

Recommended council actions and the ask from others

2. Maximise rooftop PV

Return to the routemap | Return to the priority matrix

Action 2.1. Begin campaign to encourage and educate businesses, homeowners, private landlords, and tenants (where applicable) to install rooftop PV. Target areas to the South and North of the LAEP area. Identify installers and local businesses with capacity and skills to offer the relevant services and champion them. Refer landlords and residents to key enablers (e.g. ECO4, Solar Together London)

Council control level: Influence & engagement

Benefit: This action will contribute to the council's the goal of installing rooftop PV across Tower Hamlets as part of the net zero strategy.

Action owner: LBTH with possible Strategic Energy Partner

Other stakeholders: Private landlords; Tenants; Homeowners; Housing associations (Poplar HARCA, One Housing); Canary Wharf Group and other institutional landlords/freeholders; Businesses; PR/marketing consultants

Timescale: Immediate start and recurring

Barriers: Challenging to ensure effectiveness of campaign. Installation costs and availability of labour for convinced stakeholders

Action 2.2 Rollout programme for installation of PV on council buildings, Tower Hamlets Homes stock, and other council non-domestic buildings (schools). Where possible, this should align with other implementation of other retrofit measures to save costs.

Council control level: Direct action

Benefit: This action will support the council's target to install 4.2 MW of PV installations across council assets.

Action owner: LBTH, with possible Strategic Energy Partner.

Other stakeholders: Tower Hamlet Homes (THH), schools, PV installation companies, residents.

Timescale Over the next 5 years.

Barriers: Competing council budgets and resource; availability of labour, complications navigating wider array of funding and grant schemes available, with varying eligibility, suitability, etc; buildings where LBTH has control are only a small portion of energy consumption, so the action has only limited impact on the energy system

Action 2.3 Make solar PV installation compulsory on new buildings via the new Local Plan. This would ensure commercial and residential new developments install a certain level of solar PV, contributing to the borough targets.

Council control level: Policy – local plan

Benefit: new solar installations would contribute to overall borough and London wide targets, and potentially reduce energy bills for residents.

Action owner: LBTH planning team

Other stakeholders: Developers

Timescale: Over the next 2 years.

Barriers: recommendations that put additionally onerous targets on developers can reduce the viability case for new development, particularly for affordable homes. Policy would require Planning Inspectorate approval.

4. Recommended action plan

Recommended council actions and the ask from others

3. Decarbonising transport

Return to the routemap | Return to the priority matrix

Action 3.1 Rollout EV charger installation programme in council assets. Starting rollout with council sites and on council streets using smart charging-capable installations.

Council control level: Direct action

Benefit: This action will support the delivery of Tower Hamlets EV strategy. [22] Charging infrastructure will support the need to have 95% of council cars and vans electrified by 2025. Smart charging infrastructure also offers flexibility to the electricity network.

Action owner: LBTH

Other stakeholders: Tower Hamlets Homes; Schools; Installers; Residents; Strategic Energy Partner; BEIS (grants and funds); EV charging service providers.

Timescale: Over next 5 years

Barriers: Competing council budgets and resource; Lack of EVs on the roads to provide returns on upfront investments; ROI of projects may be low for private sector JV partner; complication navigating wide array of funding and grant schemes available

Action 3.2 Transition LBTH fleet of vehicles to ULEV. In alignment with council net zero strategy for 95% council electrified vans & cars and 30% council LEV lorries.

Council control level: Direct action

Benefit: Leading by example on the decarbonization of transport will inspire action in other vehicle owners, which will contribute to decarbonization targets.

Action owner: LBTH fleet manager

Timescale: By 2025

Barriers: Competing council budgets and resource

Action 3.3 Set up a programme to monitor active travel and private car use against targets. This plan has been developed assuming that there is an overall 27% reduction in car mileage originating in the area by 2045, as people move towards active or public modes of travel. If monitoring this target is to be met, then how the area performs against it between now and then will need to be undertaken.

Council control level: Direct control

Benefit: This will help ensure Tower Hamlets meets the target and to plan the right energy infrastructure required.

Action owner: LBTH Transport Planning Team and/or TfL

Other stakeholders: TfL

Timescale: By 2025

Barriers: Internal resource, hard to measure.

Action 3.4 Advocate for and support businesses and residents with installing EV chargepoints. Tower Hamlets will need to explore possible funding options to help deliver or financially incentivise installation of private EV chargers.

Council control level: Incentivising

Benefit: Will actively assist the local community in contributing to Net Zero targets.

Action owner: LBTH Transport Planning, GLA

Other stakeholders: TfL, Local Businesses, residents, suppliers, private sector

Timescale: By 2025

Barriers: Internal approvals, could be costly to administer scheme.

4. Recommended action plan

Recommended council actions and the ask from others

3. Decarbonising transport

Return to the routemap | Return to the priority matrix

3.5 Enable the private sector to rollout smart EV charging hubs in the area. Identifying areas where smart charging hubs could be located, e.g. on council owned land, and in areas where connection capacity is available. LBTH will need to engage with the private sector to test their appetite for different identified areas, and then find the most viable a route to market for delivery.

Council control level: Incentivising, Influence and engagement

Benefit: As well as decarbonising transport, it will help forward planning for the energy infrastructure required to deliver charging hubs

Action owner: LBTH Transport Planning, GLA, EV chargepoint suppliers, private sector

Other stakeholders: UKPN

Timescale: By 2030

Barriers: During this early phase of the EV market, the economic case for charging hubs can be difficult to prove. Since this action relies on private sector investment, some public sector support may be required in order to improve the business case.

3.6 Investigate whether delivery of EV charging infrastructure could be mandated through planning. Use of S106 planning agreements could require developers to install on street EV charging infrastructure in the vicinity of developments as part of their planning permission. Alternatively, planning policy could require new development to install a certain number of EV chargers per home, on site.

Council control level: Planning - policy

Benefit: This would make owning an EV feel less daunting for existing residents, and attract new residents that may already have an EV. It also takes the burden of investment away from the council.

Action owner: LBTH Planning team

Other stakeholders: UKPN, GLA

Timescale: By 2030

Barriers: interventions which raise the price of development affects viability of new development, particularly for affordable housing. This could make affordable housing targets harder to achieve, and would need a full viability assessment.

4. Recommended action plan

Recommended council actions and the ask from others

4. Decarbonising heat

Return to the routemap | Return to the priority matrix

Action 4.1 Explore the delivery of a district-wide heat network serving the whole area. This would involve engaging with waste heat suppliers (e.g. data centres) to assess their appetite for heat offtake, explore other heat supply options and their viability, engage with developers to understand feasible demand in the area, what future demand there may be, constraints in the road network for pipe routing and the long-term resilience of supply.

Council control level: Direct action

Benefit: This action will be the first step in delivering low carbon heat networks in the area with a diverse range of heat supply sources. The study will allow the council to assess the technical potential for heat networks in the area, which in turn can then help Tower Hamlets identify an appropriate delivery partner to coordinate delivery and operation of the network.

Action owner: LBTH to procure consultant, e.g. through HNDU / LE Framework or could be undertaken by the Strategic Energy Partner if that is the preferred route.

Other stakeholders: External consultants, Developers, Data centre operators, UKPN, other waste heat process owners/operators, residents & businesses, and Cadent.

Timescale: Commission study within the next 12 months, with long-term delivery of viable heat networks

Barriers: Economic and logistic difficulty to deliver heat networks of significant scale, uncertainty over the business and policy environment to facilitate heat network development.

Action 4.2 Monitor the development of the UK Hydrogen industry. Although there are no plans for hydrogen pipelines to serve the LAEP Area currently, this may change in future.

Council control level: Direct control

Benefit: May enable faster decarbonisation in the long run, but Tower Hamlets cannot afford to wait to 2026 for BEIS decision.[26]

Action owner: LBTH

Other stakeholders: Cadent

Timescale: Starting now, decision in 2026

Barriers: There are many barriers to hydrogen in London, but none to monitoring the industry.

4. Recommended action plan

Recommended council actions and the ask from others

4. Decarbonising heat

Return to the routemap | Return to the priority matrix

Action 4.3 Install heat pumps in council buildings, as part of council retrofit programme, prioritising poorly performing buildings with decentralised gas heating.

Council control level: Direct action

Benefit: This action will help the ambition for 95% of current gas heated council buildings across Tower Hamlets to switch to a heat pump system. The learnings from this programme will provide valuable lessons to facilitate the installation of heat pumps in the private sector.

Action owner: LBTH, with potential Strategic Energy Partner

Other stakeholders: Tower Hamlets Homes, schools, heat pump installers, residents, potential JV partner.

Timescale: Over the next 5 years.

Barriers: Competing council budgets and resource; availability of labour; complications navigating wider array of funding and grant schemes available, with varying eligibility, suitability, etc; buildings where LBTH has control are only a small portion of energy consumption, so the action has only limited impact on the energy system.

Action 4.4 Launch campaign to encourage and educate businesses, homeowners, private landlords, and tenants (where applicable) to install heat pumps.

Council control level: Direct action

Benefit: This action will encourage the uptake of electric heating sources and support the ambition to phase-out gas for heating across the borough.

Action owner: LBTH, with potential delivery partner

Other stakeholders: Landlords, tenants, homeowners, housing associations, Canary Wharf Group and other institutional freeholders.

Timescale: Starting now and ongoing.

Barriers: Challenging to ensure campaign is effective and efforts are targeted correctly. Significant upfront costs required for private actors.

Action 4.5 Update the Tower Hamlets Local Plan policy to ban gas boiler and CHP installations in new developments.

Council control level: Policy – Local Plan

Benefit: This action will help deliver net zero carbon development in the borough, and aligns with the "be lean" tier, set out in the London Plan energy hierarchy – removing inefficient and carbon intensive heat supply technologies.

Action owner: LBTH

Other stakeholders: Developers

Timescale: 2025 for new Local Plan adoption

Barriers: Impact of policy may be limited, given the existing emission requirements and energy hierarchy policy in the London Plan. The Planning Inspectorate may be cautious about policies that go beyond what is specified in the London Plan, as they must ensure that local development plans are sound, compliant, and consistent with wider policy.

4. Recommended action plan

Recommended council actions and the ask from others

5. Electricity infrastructure

Return to the routemap | Return to the priority matrix

Action 5.1 Establish a bilateral LBTH x UKPN group. To develop strong ties and communication between the council and the DNO for continuous engagement. Aims of the group would include:

- Sharing of planning data (where possible) to improve UKPN forecasting and modelling in advance of RIIO-ED3 (2028-2033)
- Coordinating with planning team over delivery of potential new substation

Council control level: Influence & engagement

Benefit: Working closely with UKPN will ensure that both organisations can make well informed choices about the timing of growth and planned infrastructure work.

Action owner: LBTH & UKPN

Other stakeholders: National Grid, developers, GLA

Timescale: By end of Phase 3

Barriers: Maintaining communication across organisations can be difficult. A regular meeting pattern should be established even during periods of less activity.

Action 5.2 Identify 3 potential sites for a new substation in the LAEP area. Require developments to provide space for the new substation through planning conditions.

Council control level: Policy – local plan

Benefit: Finding a site for the new substation will facilitate an increased connection capacity in the southern part of the Isle of Dogs, supporting .

Action owner: LBTH infrastructure & planning teams in collaboration with UKPN

Other stakeholders: Developers

Timescale: 2025 local plan update

Barriers: Significant footprint requirement for the substation; suitable sites may be challenging to find and will entail costs for developers, which could put other green/social infrastructure and affordable home delivery at risk. Obtaining planning permission will take time also.

Action 5.3 Engage with IDNOs to understand the feasibility of smart grids in the Isle of Dogs, with particular focus on Canary Wharf. An independent smart grid could be used to connect buildings together and integrate flexibility solutions with other technologies like solar generation and battery storage, to reduce the overall demand on the local network.

Council control level: Incentivising and influence

Benefit: A smart grid could free up capacity on the network, reducing the overall need for reinforcement.

Action owner: Canary Wharf Group, with support from LBTH

Other stakeholders: Developers, building/land owners, building operators, IDNOs

Timescale: Feasibility study by 2025, implementation by 2028

Barriers: Would need agreement from multiple third parties to participate in the scheme, which could be challenging to secure, and difficult to arrange contractually.

4. Recommended action plan

Recommended council actions and the ask from others

6. Data Centres

Return to the routemap | Return to the priority matrix

Action 6.1 In local plan update, introduce a maximum allowable Power Usage Effectiveness (PUE) for data centres to gain planning permission. PUE is a metric of how efficiently a data centre consumes energy, where a PUE of 1 is most efficient. A similar policy has been implemented in the Amsterdam, where data centres must have a PUE lower than 1.2 to gain approval. [29]

Council control level: Policy – local plan

Benefit: By setting a maximum PUE, data centres will need to be designed to minimise peripheral energy use such as cooling and lighting, reducing overall energy consumption and electricity infrastructure requirements.

Action owner: LBTH

Other stakeholders: Data centre developers and operators

Timescale: 2025 local plan update

Barriers: Technical expertise will be required to determine suitable value; Data centres are already designed to minimise PUE to reduce operational costs, so impact of policy may be limited; will require the approval of the Planning Inspectorate

Action 6.2 In local plan update, mandate that any developments producing waste heat must be enabled for heat offtake and prove they have investigated nearby off-takers to gain planning permission. This would primarily apply to new data centres in the area but would also cover other waste heat sources such as electricity substations. The development should be designed with space to accommodate necessary plant such as heat exchangers and identify potential routing off-site to supply a network. The developer should also prove that they have looked for potential nearby off-takers and engaged with them where necessary.

Council control level: Policy – local plan

Benefit Decarbonising heat consumption in the areas around data centres.

Action owner: LBTH

Timescale: 2025 local plan update

Barriers: Impact of policy may be limited, given the existing energy assessment guidance and policy in the London Plan. Policy only applies to new developments and doesn't apply to existing data centres in the area. This would require a national mandate such as heat network zoning.[24]

Action 6.3 Start a London Data Centre forum to facilitate discussion between councils, data centre operators, the GLA and UKPN. Discussion should be centred around improving forecast of future demands, opportunities for waste heat and heat networks, flexibility services, new developments and required electricity network reinforcements.

Council control level: Partnerships/Influence and engagement

Benefits: This action will encourage collaboration across stakeholder bodies to manage demand and infrastructure needs while tapping into opportunities for data centres to deliver low carbon heating in London.

Action owner: GLA

Other stakeholders: Data centre operators, UKPN, heat network operators, developers

Timescale: Begin within next 12 months and ongoing.

Barriers: A reluctance to engage and dedicate resource from stakeholders.

4. Recommended action plan

Recommended council actions and the ask from others

6. Data Centres

Return to the routemap | Return to the priority matrix

Action 6.4 Update the planning application process to include a new building usage classification type for data centres, allowing Tower Hamlets to track more easily which planning applications are data centres.

Council control level: Policy – local plan

Benefit: By tracking the development of data centres in the area, Tower Hamlets can more easily plan the delivery of the infrastructure required to meet their needs.

Action owner: GLA, Department for Levelling Up, Housing, and Communities

Other stakeholders: Data centre developers

Timescale: 2025 local plan update

Barriers: this will rely on data centre developers using the planning application system effectively.

4. Recommended action plan

Recommended council actions and the ask from others

7. Rollout energy system flexibility

Return to the routemap | Return to the priority matrix

Action 7.1 Develop Local Plan policy to require developers to include energy flexibility. LBTH will need to outline the importance of smart systems and energy storage in new developments in the new local plan and make the expectations for planning applications clear. This may align with or build on existing London Plan policy to reduce developments' peak loads.

Council control level: Policy – local plan

Benefit: Flexible energy systems can relieve high peak demands on the electricity grid. Flexibility technologies allow for use of electricity in buildings or for charging EVs at off-peak times, which can also reduce energy bills.

Opportunities and enablers: LBTH Local Plan

Action owner: LBTH planning team

Other stakeholders: Building developers

Timescale: 2025 local plan update

Barriers: Developers could be resistant to this action given they are already required to demonstrate how they will incorporate flexibility to minimise annual and peak energy demands in accordance with the London Plan The Planning Inspectorate may be cautious about policies that go beyond what is specified in the London Plan, as they must ensure that local development plans are sound, compliant, and consistent with wider policy.

Action 7.2 Switch council buildings to time of use electricity tariffs to accompany smart controls and flexibility.

Council control level: Direct Action

Benefit: Time of use tariffs could provide bill savings for council buildings, while leading by example will encourage others to install flexibility technologies that could relieve electricity network pressures and contribute to decarbonisation.

Action owner: LBTH

Other stakeholders: Energy suppliers, council building operators

Timescale: To accompany installation of smart controls over the next few years

Barriers: Need to be careful that switching tariff does not lead to increased costs for the council; need to identify buildings with scope for flexibility to respond to different rates at different times – these will be buildings with loads that are not time-critical, or have some form of energy storage (this could include the inherent thermal inertia of buildings with electrified heating/cooling)

Action 7.3 Engage building owners and occupiers to encourage participation in flexibility pilots.

Council control level: Influence & engagement

Benefit: Encouraging local buildings to trial flexibility measures such as TOUTs, DSR and smart appliances will create an evidence base for taking action in the future. It will also familiarize building residents and operators with the benefits of flexibility and save money on their energy bills.

Action owners: LBTH

Other stakeholders: Community groups, business forums, energy utility companies

Timescale: As soon as possible

Barriers: Stakeholders may be resistant to taking part if they don't know much about what flexibility entails or what the benefits are. The council can help with this through promoting and sharing information about the benefits.

5. Governance, monitoring and review

5. Governance, monitoring and review

Well-planned governance and monitoring procedures will be essential in delivering the LAEP.

Governance

Tower Hamlets Council is responsible for the strategic direction for the LAEP. A council officer could be made responsible for delivering this overall plan (c. 0.5-1FTEs), working alongside a potential delivery partner. They will need to be supported by the correct resources and budgets to transition the energy system to low or zero carbon.

In recognising the different stakeholders who play an important role in delivering the change that will be required to meet the objectives set out in this plan, Tower Hamlets will need to work with partners across London and the energy sector to set up an advisory board to enable wider input into the plan.

Support needed from others

Tower Hamlets Council should seek to grow their sustainability team: to start the transition the council will need a team of at least five technical project managers to integrate with existing teams to implement some of the projects set out in this plan.

Monitoring and review

This plan sets out key actions for the first five years that lay the groundwork to achieve the greater ambitions included in the longer term routemap. The plan needs to be flexible to adapt to changes in the future.

Tower Hamlets will need to produce an annual monitoring report, which will describe progress against the actions set out in this plan, and also against key output metrics as follows:

- Number of homes retrofitted
- Number of non-domestic buildings retrofitted
- Number of EV charging points installed
- MW renewables installed
- Number / MW of heat pumps installed

It is important that targets for the mentioned metrics are determined through a consultative process. These targets should be deliverable and realistic, based on an understanding of Tower Hamlets, as well as the resources and expertise available to support the plan's implementation.

To monitor these metrics, publicly available datasets can be used, such as the Energy Performance Certificate Register and the Micro Generation Certification Scheme.

Tower Hamlets will need to develop a baseline understanding of these metrics based on existing data and monitor changes annually. Carbon emissions reduction should also be tracked, but recognise that available data will lag a few years behind.

The whole plan will be updated at least every five years to tie in with the Local Plan refresh cycle and take account of key factors, including:

- Policy changes at the GLA and UK level
- Changes in costs and effectiveness of technologies
- Progress to date.

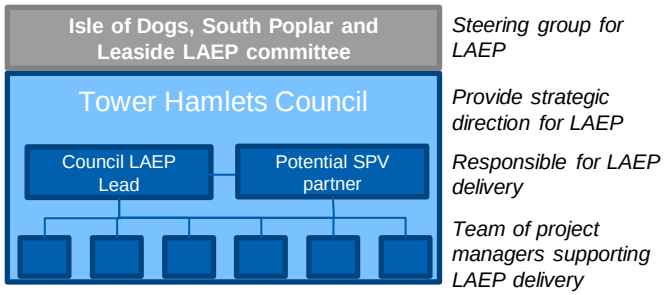


Figure 5.1: Proposed LAEP Delivery structure

6. Conclusions

6. Conclusions
Delivering change in the face of uncertainty

Moving to a complex energy system

The scale of the challenge to reach a net zero carbon energy system in the Isle of Dogs, South Poplar and Leaside by 2045 is significant.

Today's energy system comprises three largely separate systems for heating, electricity and transport. A successful transition will lead to a more complex and interdependent energy system. This means that planning and coordination by stakeholders across the whole system will be critical in order to deliver a net zero system that maintains security of supply and delivery a fair transition for everybody in the LAEP area.

Tower Hamlets declared a Climate Emergency in 2019, and as part of this pledge should enthusiastically adopt the findings of the LAEP; Tower Hamlets Council has a critical role to play in facilitating action across the whole system, whilst also leading on delivery where it has the power and influence to do so.

To achieve the aims of this LAEP, as well as take further action on the climate emergency the Council will need to significantly increase resourcing and budget in these sectors.

Pace of change in an uncertain world

The evidence presented in this report shows the scale and pace of change that will be required to meet net zero ambitions for the LAEP area. From increasing existing solar PV capacity by up to 20 times its current capacity, to enabling the rollout of EV charging infrastructure and exploring the unique potential for heat networks in the area, it is clear that there is a need to build a programme and delivery team to take urgent action now.

This LAEP has presented key uncertainties for the future of the area's energy system. This includes the amount of new development in the area over the coming decades, but also the costs and deployment potential of new and emerging technologies, from new building retrofit systems to hydrogen in the gas network, all of which leave some uncertainty in the longer term.

It is critical, however, that this uncertainty does not prevent action from being taken now; considering the key uncertainties, a recommended pathway has been identified that is expected to best meet the plan's objectives, and the LAEP's routemap has been developed to prioritise no regrets measures where action must be focused in the short term to set this pathway in motion.

The importance of monitoring the progress of the LAEP and updating the plan has been discussed, with the significant national policy decisions that most influence the plan highlighted. In addition, technology breakthroughs and costs should be monitored to enable the Isle of Dogs, South Poplar and Leaside to embrace emerging technologies as the LAEP is updated.

The demands put on developers by some of the plan's actions may appear to contradict the LAEP's requirement to support the delivery of new development and affordable housing. However, in the context of a highly constrained local electricity network experiencing increasing pressure, not taking these actions may drastically increase costs and wait times for new developments' electricity connections. All actions have been developed with the plan's requirements, and affordability for the area's consumers, in mind.

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