

Chapter 6: Climate change mitigation and energy



AIM
London will be a zero carbon city by 2050, with energy efficient buildings, clean transport and clean energy.

INTRODUCTION

If the world continues emitting greenhouse gases (GHGs) at today’s levels, average global temperatures could rise by up to five degrees Celsius by the end of this century.⁶⁶ London, among other global cities, must play a leading role in helping to reduce these emissions.

The Mayor will re-establish London’s position as a leader in tackling climate change by setting a target for London to become zero carbon by 2050. Making London zero carbon will require economy-wide decarbonisation. This will involve changes to the way in which Londoners travel, work and live, including how energy is sourced and generated. Energy efficiency will have to increase dramatically, leading to homes and workplaces being highly insulated. The fossil fuels used for heating and powering buildings, transport, and industry will have to be replaced by renewable electricity and gas. London’s grids will need to become smarter at balancing energy demand with available supply, and low carbon travel will be the default option.

Making London zero carbon can ensure long-term economic growth and new business opportunities, alongside wider environmental benefits, such as improved air quality and a healthier society. The Mayor’s Energy for Londoners programme aims to transform London’s energy system by reducing energy demand and improving the security of supply by ensuring more local energy is produced. This will help keep energy bills fairer, thus protecting the most vulnerable, and reducing carbon emissions.

This change will not be without its challenges. Many of the technologies and fuels needed to achieve this goal already exist, however, more energy infrastructure will be needed to support London’s growing population and this must be low carbon. National government, London boroughs, communities and Londoners themselves must play a part in leading this change.

To fully decarbonise London, GHG emissions will need to be reduced from around 38 megatons today to near zero by 2050. To make this happen, London will require careful but far reaching reforms, which are underpinned by three high-level objectives:

- decarbonise London’s homes and workplaces while protecting the most vulnerable by tackling fuel poverty
- develop clean and smart, integrated energy systems using local and renewable energy resources
- deliver a zero emission transport network by 2050.

LONDON’S ENVIRONMENT NOW

The key evidence to support the Mayor’s ambitions for a zero carbon London by 2050 is summarised below. You can find out more about the evidence behind the policies and proposals in Appendix 2.

The UN Paris Climate Agreement commits to keeping global warming below 2°C. This agreement has shown that cities can work together to plot a path to a lower carbon future. In addition, the 2008 Climate Change Act requires an at least 80 per cent reduction in CO₂ emissions (compared to 1990 levels) for the whole of the UK. For more details on the legislative and policy background see Appendix 4, and for information on the main responsibilities of a range of organisations see Appendix 3.

⁶⁶ IPCC AR5 range for BaU is 2.6 to 4.8 by 2100: <https://www.ipcc.ch/report/ar5/>

London has reduced its emissions despite a growth in population, and has shown that carbon reduction and economic growth can go hand in hand.

Global climate change

There is overwhelming scientific consensus that human activities are causing global climate change, mainly due to the burning of fossil fuels. There is now around 40 per cent more carbon in the atmosphere than there was before the industrial revolution⁶⁷ (see Box 18 for why the focus is on carbon). Such high levels have not been experienced on Earth for at least 800,000 years and in all likelihood not for the last three million years.⁶⁸ Annual average concentrations of GHGs have risen from around 280 parts per million (ppm) in 1900 to a record 400 ppm in 2016. The effects of these GHGs are being felt now. 2016 was the warmest year on record, almost one degree Celsius above the 20th century global average. The five warmest years on record have all occurred since 2010.

BOX 18: WHY CARBON

Carbon dioxide (CO₂) is by far the most common GHG emitted by human activity in terms of quantity released and total impact on global warming. As such, carbon and CO₂ have become the common shorthand terms used when accounting harmful GHGs. London’s carbon accounting is measured where possible in carbon dioxide equivalent or “CO₂e” emissions. This includes the conversion of other GHGs, such as methane from landfill, and nitrous oxide and black carbon from transport emissions, into their equivalent CO₂ emissions based on their relative global warming potential. For consistency with national and international measurement of CO₂e emissions and targets London’s GHG emissions are measured against a 1990 baseline unless stated otherwise.

If London only accounted for the GHG emissions within its boundaries it would ignore all indirect emissions associated with electricity generation outside the

BOX 18: WHY CARBON (CONTINUED)

city, reducing the capital’s total reported emissions by around 40 per cent. Clearly, this would unfairly penalise other areas of the country that generate the energy which London consumes. London’s zero carbon targets therefore include both direct and indirect emissions, as defined in scope 1 and 2 of the Greenhouse Gas Protocol.⁶⁹

Manufactured and purchased goods also have emissions associated with generation at source, most often outside of the city. These ‘scope 3’ emissions are harder to trace quantitatively but are estimated to account for as much as three times the size of direct emissions. The accounting of London’s scope 3 targets are embedded within the principles of a circular approach to London’s waste (see Chapter 7: Waste) and although not included in the pathway to zero carbon, we will continue to measure scope 3 emissions for the city and must avoid merely outsourcing our emissions.

London’s current carbon emissions

In 2014, London’s GHG emissions were estimated at around 38 MtCO₂e (million tonnes of carbon dioxide equivalent), around seven per cent of the UK’s total emissions. London’s emissions are reducing, having fallen by 16 per cent since 1990 (Figure 30), largely due to reduced gas consumption and decarbonisation of the national electricity grid. To achieve the Mayor’s zero carbon target by 2050 the rate of emissions reduction must be increased threefold over progress to date since 1990.

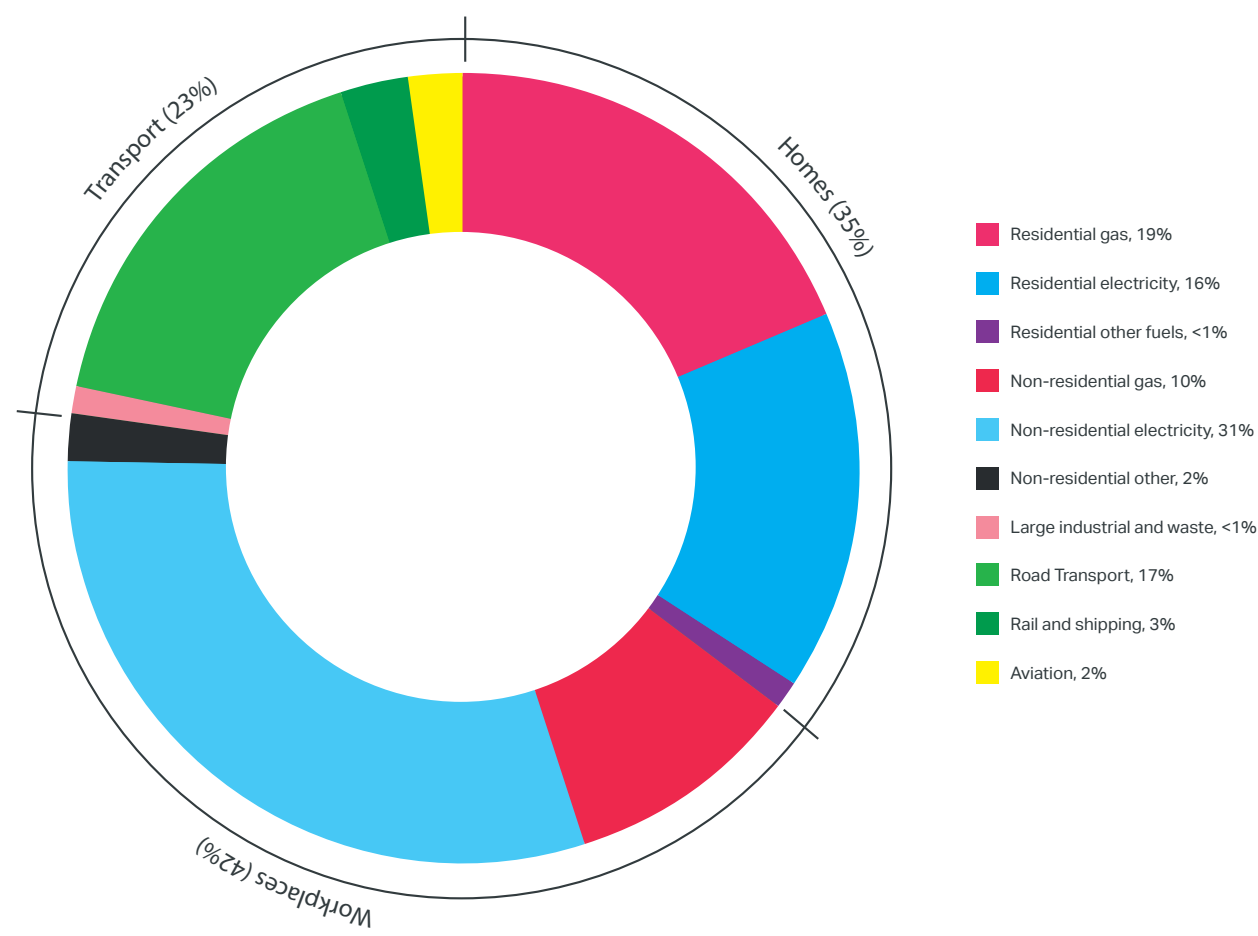
Sources of greenhouse gas emissions in London

London’s GHG emissions are dominated by buildings and transport (Figure 29). In 2014 it is estimated that 35 per cent of emissions were generated from London’s homes, 42 per cent from workplaces and 23 per cent from transport. Decarbonising London will mean taking a targeted approach to each sector. This will include retrofitting existing buildings as well as making sure that new developments are part of the solution towards achieving a zero carbon city.

⁶⁷ Atmospheric CO₂ content based on ice core records from a combination of studies. Eggleton, R. A (2013). A Short Introduction to Climate Change
⁶⁸ Yale School of Forestry & Environment Studies (2017) How the World Passed a Carbon Threshold and Why It Matters, Available at: <http://e360.yale.edu/features/how-the-world-passed-a-carbon-threshold-400ppm-and-why-it-matters> (Accessed: 11/07/2017).

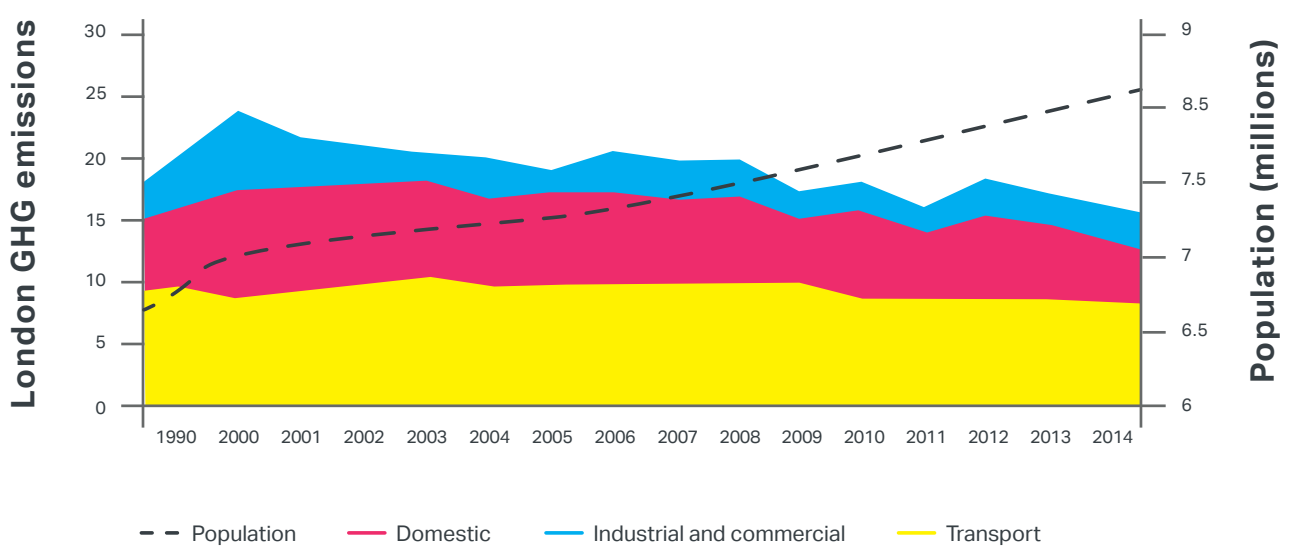
⁶⁹ The Greenhouse Gas Protocol is the worlds most widely used international carbon accounting tool. Details of the protocol and it's standards, guidance and tools are available at: <http://www.ghgprotocol.org/>.

Figure 29: 2014 emissions by sector (LEGGI)



Source: Greater London Authority (2017)

Figure 30: Greenhouse gas emissions by sector and population trends 1990 to 2014



(Note: figures pre-2000 are extrapolated from 1990 and sourced from LEGGI and ONS)
Source: GLA (2017), London Energy and Greenhouse Gas Inventory

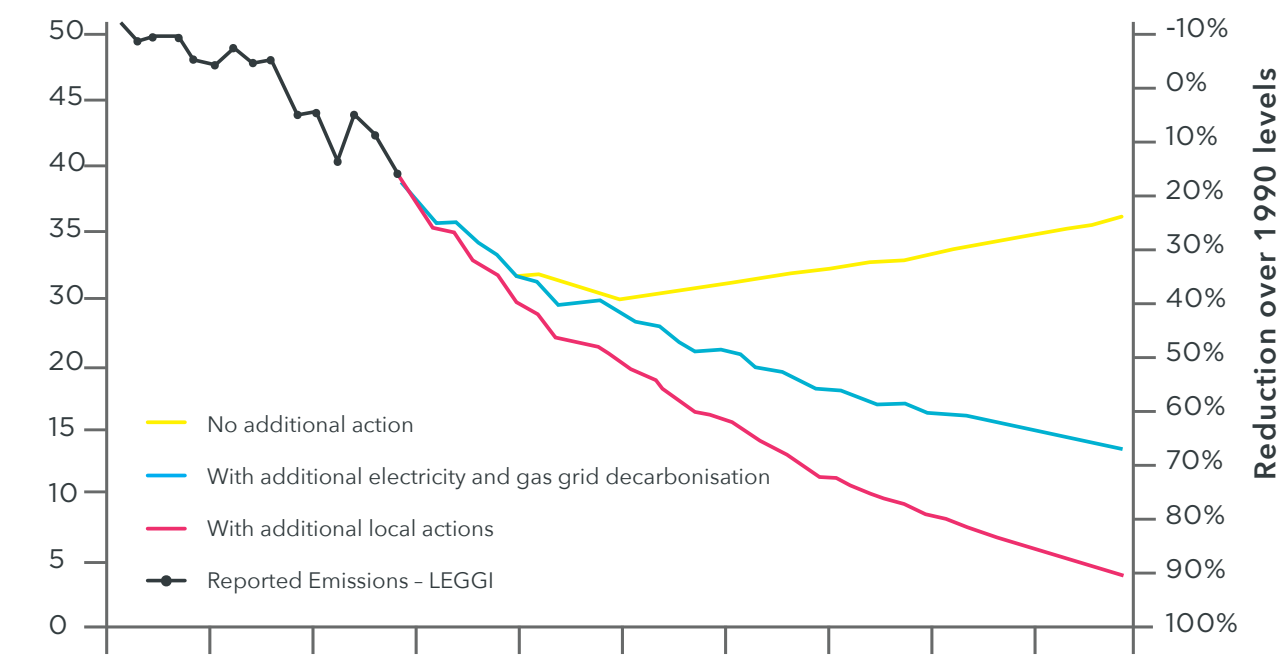
As London’s population continues to grow, existing UK and Mayoral policies alone will not be enough to meet the scale of decarbonisation required. A zero carbon scenario has been modelled for London, which sets the envelope for emissions reduction out to 2050 and is detailed in Appendix 2. The London Zero Carbon Pathways Tool is available at <https://maps.london.gov.uk/zerocarbon>

Under this scenario, existing policies driving emissions reduction at a UK and city level could take London to a 25 per cent reduction on 1990 levels by 2050. To get to zero carbon, the modelling shows an extra 45 per cent can and must be achieved through the decarbonisation of energy grids and other actions at a UK level in line with policies and proposals needed to achieve UK carbon budgets.

The remaining 30 per cent reduction could be met through increased action at a city level. Of this, up to 20 per cent could be achieved by developing and putting in place new policies and enhancing existing policies and programmes for London. However, much of this action is reliant on new powers and funding. Up to ten per cent

of London’s residual emissions will need to be addressed through emissions offsetting or negative emissions technologies (such as carbon capture and storage). This will allow for emissions from energy grids, historic building stock, aviation and industry that cannot be reduced directly (Figure 31).

Figure 31: London’s GHG emissions trajectory to zero carbon



Source: GLA (2017), Modelling including BEIS and Committee on Climate Change datasets



National energy supply

The vast majority of London's energy demand (approximately 94 per cent) is currently sourced from outside of the city. London can never be fully self-sufficient in energy even if energy demand is reduced and more renewable energy is generated within the city boundaries, because of limited space. That's why London's zero carbon scenario is intrinsically linked to the decarbonisation of the UK's electricity and gas grids.

In London, electricity demand accounts for almost half of the total CO₂ emissions. This fraction has been decreasing rapidly in recent years due to decarbonisation of the national electricity grid. Total UK renewable electricity generation has increased to record levels of around 25 per cent in 2015, up from 19 per cent in 2014, while coal generation has reduced from 30 per cent of generation in 2014 to 22 per cent in 2015. There is a proposed national pathway to further decarbonise the electricity grid, with generation from renewable and nuclear energy sources projected to double by the early 2030s.

There is, however, no equivalent pathway towards the decarbonisation of the national gas grid, making gas, and by association heat one of the major challenges in realising a zero carbon future. Gas use in London represents around half of total energy consumption, (contributing 30 per cent of London's total emissions). Most of this gas is used for heating in buildings.

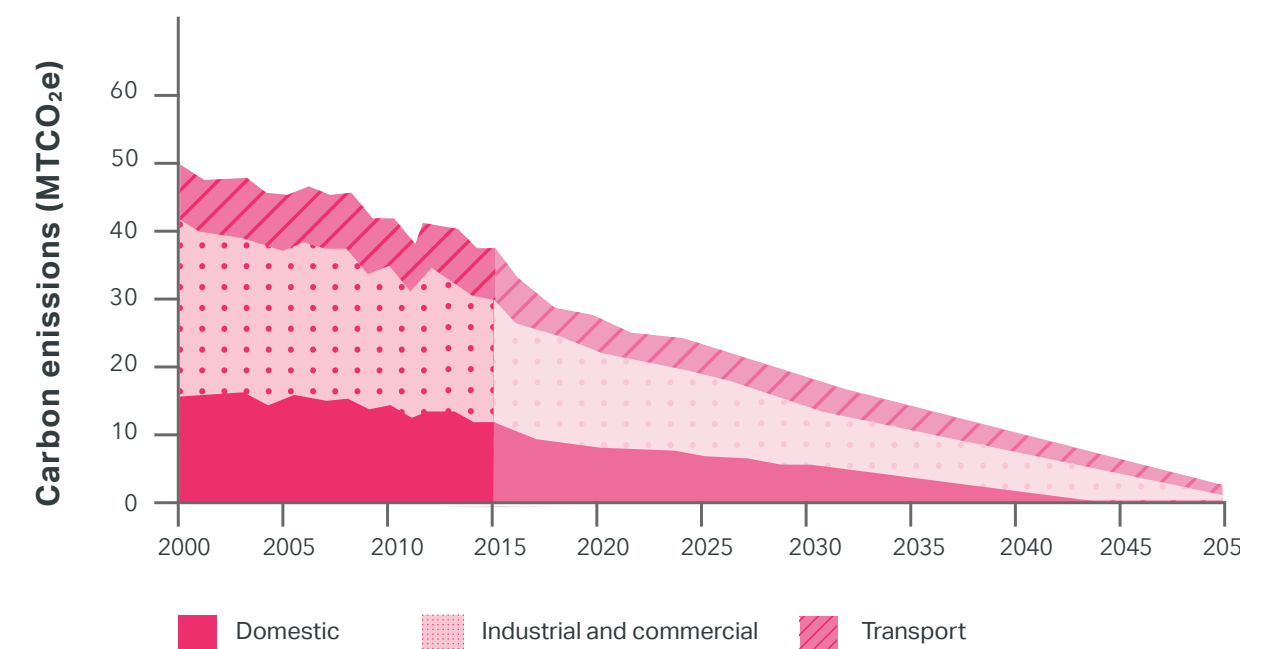
Natural gas will continue to play a valuable role both in the short and medium term for heating and for electricity generation as we make the transition to a low carbon economy. While natural gas is a fossil fuel, there are some opportunities to decarbonise the gas grid such as significant uptake of biogas or conversion of the gas grid to use hydrogen. However a lack of clear government strategy on the future of gas has led to uncertainty on the wider approach to the long term decarbonisation of heat. For this reason, London must develop a flexible and more decentralised energy supply system. This is one that can adapt to future changes and avoid lock-in to technologies that may become defunct in future decades.

A key way to support decarbonisation of both electricity and gas grids in London is by increasing the proportion of renewable and local decentralised energy. Local energy generation and communal heating networks currently supply the equivalent of six per cent of London's energy, with approximately a quarter of this from renewable generation including solar and wind power.

London's potential carbon roadmap

Action across all sectors is required to keep London on track to 2050. We have developed scenarios to 2050 for the ten main sectors that contribute to London's emissions (see Appendix 2) based on forecasts of likely future demand, technological change and changes in supply. Figure 32 summarises these trajectories for the three main sectors.

Figure 32: Zero carbon sector trajectories



Source: GLA (2017), Modelling including TfL datasets.

The pathway to meet this ambition can be broadly split into short, medium and long-term objectives. Leaving actions to future generations or later decades would risk unprecedented, and potentially unachievable, rates of decarbonisation in the 2030s and 2040s.

In the next five years a large part of carbon reduction can be met through decarbonisation of the national power grid, increased energy efficiency, and zero carbon new development.

Over the next two decades, dependence on natural gas must be reduced by increasing the use of low carbon heating (harnessing energy from water, ground and air using heat pumps) as well as capturing more of the heat wasted from our buildings and infrastructure and using heat networks in the densest areas of the city to distribute it to our homes and workplaces. We must continue to improve the energy efficiency of our existing buildings and scale up low emission vehicles.

Demand on the electricity grid will likely increase due to the growing population and electrification of heat and transport. Smart technology (Box 19) will need to become an increasingly important part

of managing London's energy system, helping to balance more intermittent supply of energy from renewables with more variable electricity demand from electric cars, or electric heating. Added strain on the electricity grid can partially be managed through the use of storage, such as hot water cylinders to store heat, or batteries to store electricity generated off-peak.

These balancing mechanisms, collectively known as demand-side response, will also allow consumers to use energy when it is cheaper, such as overnight. This will reduce the peak demand on the national grid, most associated with high-carbon generation, and help avoid bottlenecks in grid capacity.

By 2030 at the latest the UK government must also confirm its approach for the long-term role of gas to allow for the full decarbonisation of London's heating systems by 2050. With a clear view on what the energy content of gas and electricity should be in 2050, this would then allow a minimum 20 year period to move to new zero carbon heat supply. By 2040 the majority of public transport will be zero emission.

By 2050 the vast majority of London's building stock will need to have been retrofitted with measures to deliver high levels of energy efficiency. Remaining demand will need to be met by clean energy systems, dominated by the supply of renewable electricity and gas

to London's buildings and vehicles. A smart and integrated approach (see Box 19) will need to optimise these systems, removing the need for fossil fuels through storing renewable energy at times of high generation for use at times of high demand.

BOX 19: A SMART ENERGY FUTURE

In the context of energy, a smart city is one that optimises its supply and use of energy. Energy consumption and emissions can be minimised, the use of renewables maximised and the supply to consumers done so at the least cost. Advanced process control is able to predict demand and control energy systems to meet specific objectives such as to avoid energy peaks. Increased use of smart metering (see proposal 10.1.1d) will empower consumers to engage more with their energy use and enable the market to develop solutions to help them reduce their energy bills and use less primary energy.

In a more connected city every supermarket freezer, every washing machine and every electric car could

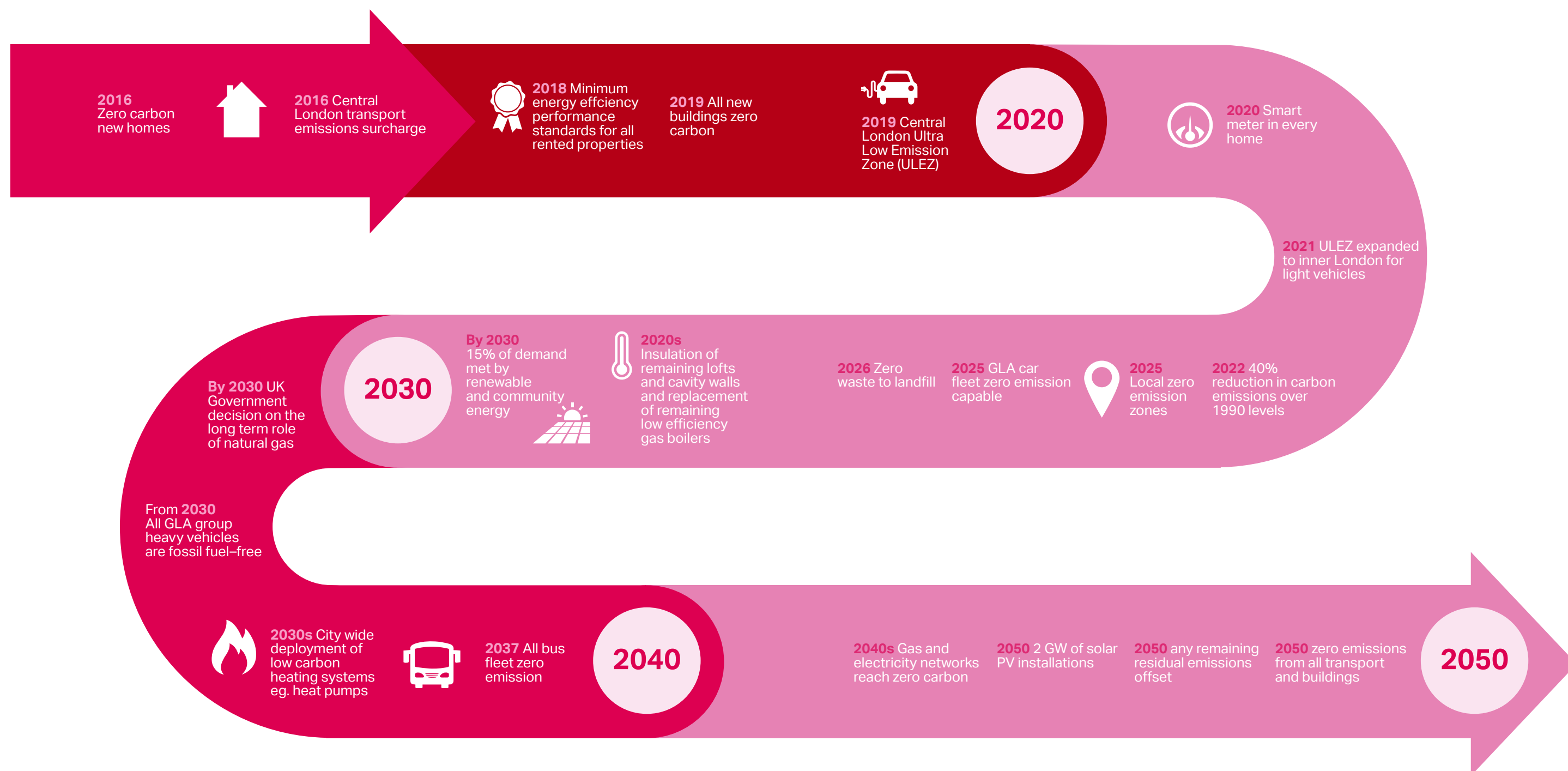
intelligently programme their time of operation, optimising demand when renewable generation is available. This will become increasingly important as more intermittent energy such as solar and wind is deployed in the UK.

Where renewable generation cannot be used instantaneously, storage will play an important role, capturing this energy for times when it is needed, rather than using more carbon-intensive fuels and technologies.

Over time a smart and flexible energy system could reduce London's peak demand by one gigawatt, a saving that could avoid investment in future energy networks by up to billions of pounds, passing these savings on to the consumer.

Figure 33 shows the key actions that are required to put London on track to zero carbon by 2050. Government, business and Londoners will need to help put these actions into practice.

Figure 33: What is needed to put London on track to zero carbon by 2050



Managing the pathway to 2050

The pathway to London becoming zero carbon by 2050 is challenging. In particular, the trajectory for reaching the 2050 target is likely to become increasingly challenging after the early 2020s. National policies and actions that needed to be in place now to set London on an ambitious trajectory, such as the Green Deal and a progressive feed-in-tariff for small scale renewable energy generation, have not materialised. Indeed, the support through these programmes has either reduced significantly or stopped entirely.

The previous London Climate Change Mitigation and Energy Strategy had projected that London would need to have reduced its CO₂ emissions by 60 per cent by 2025 to be on track to reducing London's CO₂ emissions by 80 per cent by 2050. Without a significant increase in ambition in national policy, or devolution of powers to the Mayor to enable him to catalyse action, this trajectory looks increasingly unlikely.

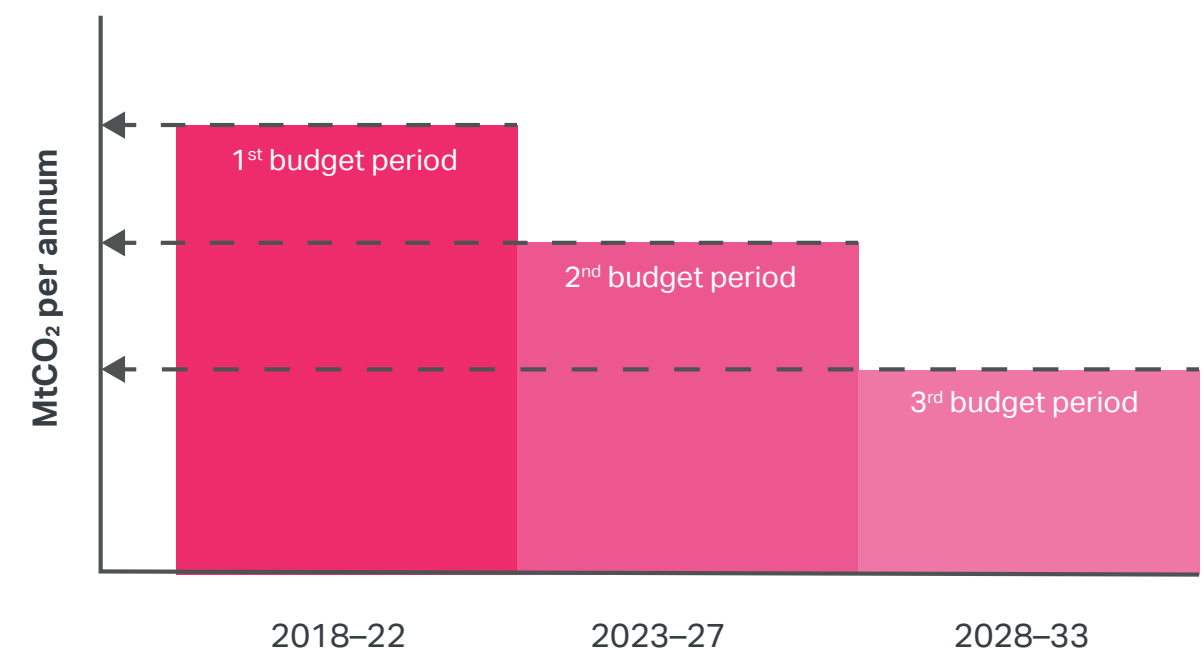
It is therefore critical that London is put back on a zero carbon pathway. The Mayor is proposing to adopt a trajectory that is both ambitious and realistic. It is important that this trajectory takes a view across all sectors to focus on the most cost effective interventions

which can be rolled out quickly without compromising future options. This is the best method of ensuring that emissions reductions occur continuously, with the avoidance of costly one-off reductions.

The Mayor is considering introducing a system of five-year carbon budgets to create an emissions pathway to 2050 that can be adapted as circumstances or technologies change. The concept of carbon budgets is not new; the UK government adopted statutory carbon budgets through the 2008 Climate Change Act. Carbon budgets for London, if adopted, would align with the UK carbon budget periods, with the first starting in 2018 - 22.

Carbon budgets would provide greater clarity and certainty for London (and the UK) to effectively plan for and invest in a low carbon economy. It would also offer the flexibility necessary to respond to factors outside our control (such as the weather and global fuel and energy prices). This flexibility means they also have the benefit of reducing the risk of 'lock in' to carbon intensive patterns of production and consumption.

Figure 34: Carbon budgets illustrative chart for London



Source: GLA (2017)

Modelling suggests that within the first carbon budget period (2018-2022) London can achieve a 40 per cent reduction in carbon dioxide emissions on 1990 levels. This is more than national carbon budgets over the same period. The Mayor intends to use his powers and programmes to put London on this track, but to achieve the target requires government to deliver early action to meet UK electricity grid decarbonisation projections out to 2022 and urgently clarify its policy and support through its upcoming emissions reduction plan and through the Levy Control Framework.

Without decarbonisation at a national level, London is expected to achieve only a 34 per cent reduction during this budget period.

In the absence of this long-overdue policy clarity from national government, final carbon budget levels will be defined as an outcome of this strategy consultation. The Mayor will be undertaking a more detailed 'bottom-up' analysis over the coming months to more accurately project what emissions reductions are realistically achievable over the carbon budget periods.

Energy for Londoners
Existing climate change and energy programmes in London achieved a reduction of 670 ktCO₂e in 2015; a threefold increase on 2011 levels. While this is significant in terms of the savings at a building level, this represents only two per cent of London's energy demand.

The Mayor's new Energy for Londoners programme will help speed up work to decarbonise London's homes and workplaces and develop clean energy systems (Box 20).

BOX 20: ENERGY FOR LONDONERS

- To place London on track to a zero carbon city Energy for Londoners will:
- accelerate the retrofitting of buildings, while encouraging energy demand reduction and energy management practices, smart meter roll-out and demand side management
 - decarbonise London's energy supply by developing and delivering decentralised energy, renewable generation, especially solar, community energy programmes
 - protect the most vulnerable and tackle fuel poverty
 - tender for the delivery of an energy supply company, aiming to offer fairer energy bills to Londoners as soon as possible
 - attract finance for energy efficiency and renewable energy

| ENERGY FOR LONDONERS | |
|--|---|
| Objective 1 Reduce emissions of London's homes and workplaces while protecting the most vulnerable by tackling fuel poverty | Objective 2 Develop clean and smart integrated energy systems utilising local and renewable energy resources |
| Fair tariffs | Decentralised energy |
| Energy efficiency | Solar generation and community energy |
| Fuel poverty support | A smarter grid with demand side management |

London’s new buildings

As London grows in population, new buildings will be built to meet the increasing demand for housing, associated facilities such as schools, and places of work. New developments have an important role to play in reducing GHG emissions and harmful pollutants.

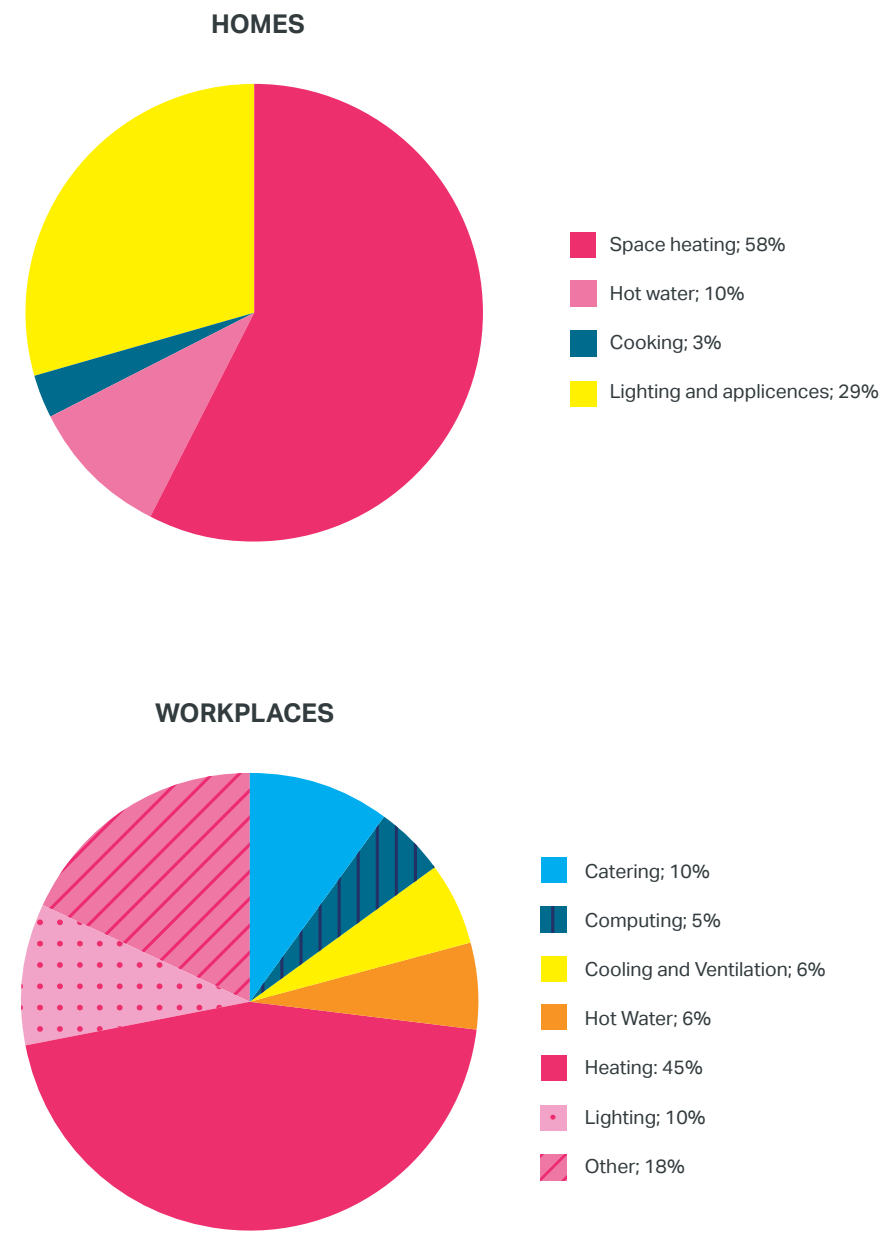
New zero carbon buildings standards, pioneered in the London Plan, mean that a home or workplace built today requires a much smaller amount of energy than an older building. But between now and 2050, building codes must continue to tighten to guide new building construction to achieve far higher efficiency standards and greater renewable energy production. Where high building standards cannot be achieved onsite, offsetting schemes should be available to developers and implemented by boroughs. This will ensure carbon savings can be maximised across London.

London’s existing buildings

London’s buildings have been built over hundreds of years, and their energy efficiency varies considerably (Figure 35). We now use more energy to heat and power our buildings in London than for anything else. Buildings are responsible for around four-fifths of London’s total GHG emissions and 70 per cent of final energy use. This year, over £7bn will be spent on heating and powering our buildings across London.

By 2050 the emissions footprint of London’s buildings will need to be close to zero. Some will even need to be climate positive, that is, they will need to generate more clean energy than they consume. By 2050 some 1.3 million new homes and over ten million square metres of new schools, hospitals and workplaces are needed. This will lock in emission patterns for 60-120 years (the average building and infrastructure lifespan). These buildings will have to reduce their energy. This will be through better insulation and using more energy efficient products. They must also get their heat and power (including increasingly for cooling) from local and renewable energy sources enabled by efficient systems such as heat networks.

Figure 35: Typical energy use breakdown



Source: BEIS (2016), Digest of UK Energy Statistics (DUKES)



Credit: Smart Energy GB



Credit: Fraser Brown Mackenna Architects

Emissions and energy use in London's existing homes

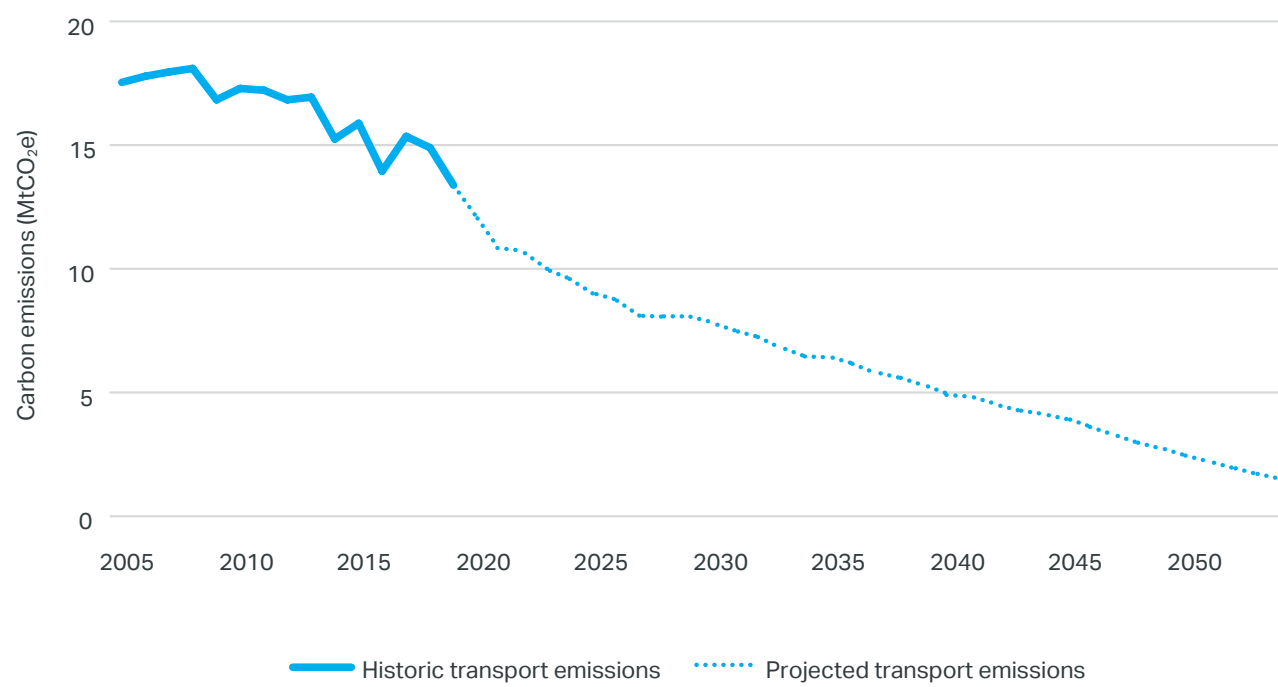
London's 3.4 million homes are responsible for around one third of London's total GHG emissions. Nearly three quarters of the energy we use in our homes is for heating and hot water. Ninety per cent of this is currently met using gas-fired boilers that contribute directly to climate change, and air pollution in the capital. The cost can also be difficult for some households to afford. Our continued use of gas exposes us to energy security issues and price volatility, as UK reserves decline.

The poor energy efficiency of London's homes is a major contributor to our GHG emissions. A quarter of London's homes that have been given an Energy Performance Certificate since 2009 have the worst energy ratings of E, F or G. As such, they are wasting a large proportion

of their energy and contributing significantly to London's GHG emissions. This year, Londoners will spend over £3.9bn on heating and powering their homes. Over 10 per cent of London's households were in fuel poverty in 2015.

By 2050 the emissions from London's homes will need to reduce to around 1.0 MtCO₂e a year from 12.2 MtCO₂e today (Figure 36). This implies over an average of 100,000 homes being retrofitted with energy efficiency improvements and renewable technologies each year, to 2050. Since 2009, programmes such as RE:NEW and the London Boiler Cashback Scheme have treated 134,000 homes. Many of these of these homes require further improvements to maximise energy efficiency and carbon savings. A step-change in the scale and pace of our energy efficiency retrofitting needs to start now.

Figure 36: Emissions and required reductions required from London’s homes



Source: GLA (2017)

The physical challenges of London’s homes can make delivering energy efficiency measures more difficult and expensive than in other parts of the country, as well as involving disruption and cost (Box 21). Moreover, the UK government has reduced funding for energy efficiency and cancelled the

national zero carbon homes policy. As noted by the Committee on Climate Change, progress improving the energy efficiency of buildings has stalled since 2012: annual rates of cavity wall and loft insulation nationally in 2013-2015 were 60 per cent down and 90 per cent down respectively on annual rates in 2008-2012.

BOX 21: THE CHALLENGE OF RETROFITTING LONDON’S HOMES

London is different to the rest of the country, making it harder to retrofit homes with energy efficiency measures and low carbon supply. London’s homes are far more likely to be:

- **solid walled** – sixty per cent of all London’s homes (a fifth of England’s total). This makes them more expensive and physically challenging to retrofit than homes with cavity walls. This is due to the higher costs of the external and internal solid wall insulation and the disruption caused from the installation, for example the need to redecorate rooms and some loss of room area
- **flats** – fifty per cent of all London’s homes (compared with 16 per cent in the rest of England). Flats are harder to retrofit than a single dwelling with measures such as external wall insulation and energy efficient glazing often needing to be installed in all dwellings within a building at the same time. This requires agreement from tenants,

leaseholders and freeholders. Flats also have more limited roof space and can cause overshadowing, which reduces the potential for solar PV

- **privately rented** – around 28 per cent of all London’s homes (compared with 18 per cent in the rest of England). London has the highest proportion of private rented sector homes in the UK. Landlords often have little incentive to improve the energy efficiency of their properties as they do not receive any benefit from the savings on energy bills
- **in a conservation area** – half of England’s total. Certain types of glazing, solid wall insulation and low carbon technologies may be deemed less suitable or incur further costs to install. Planning requirements can also act as a barrier for making some of these improvements and even outside conservation areas, permitted development rights, for example for external wall insulation, are not applied consistently

The impacts of climate change also present challenges to London’s homes (existing and new). For example, temperatures in London are predicted to increase over the next few decades regardless of the action to reduce emissions (Chapter 8: Adapting to climate change). Homes will need to reduce the requirement for energy-intensive air conditioning without inadvertently causing overheating that adversely affects their occupants.

Fuel poverty

In 2015 there were 335,201 households living in fuel poverty in London which equates to 10.1 per cent of all households.⁷⁰ Fuel poverty in England is measured using the Low Income High Costs indicator. Under this indicator, a household is considered to be fuel poor if it:

- has an income below the poverty line (including if meeting its required energy bill would push it below the poverty line) and
- has high than typical energy costs⁷¹

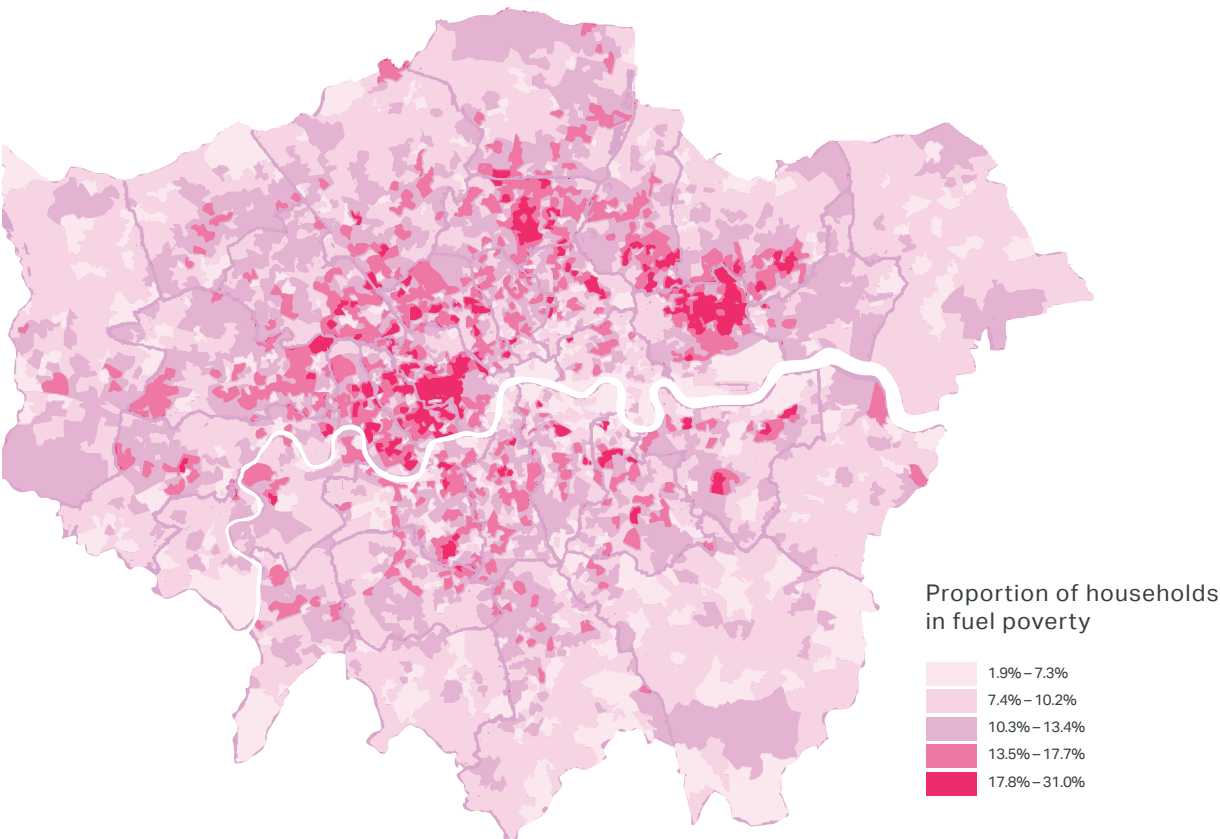
There is increasing evidence that living in a cold home is associated with poor health outcomes and an increased risk of morbidity and mortality for all age groups. The physical impacts of living in a cold home are causing acute suffering for many Londoners. Children living in cold, damp and mouldy homes are almost three times more likely to suffer from respiratory illnesses. Evidence on both poor indoor and outdoor air quality highlights that infants living in cold conditions have a 30 per cent greater risk of admission to hospital or primary care facilities.

This can have a big impact on how children perform at school. Examples include increased school absence due to illness or children being unable to find a quiet and warm place to study. In addition, it is estimated that between 2011 and 2016 there have been 13,390 excess winter deaths in London.⁷² Estimates suggest that some 10 per cent of excess winter deaths are directly attributable to fuel poverty⁷³ and 21.5 per cent of excess winter deaths are attributable to the coldest 25 per cent of homes.⁷⁴ A World Health Organisation report states that as many as 30 per cent of excess winter deaths can be attributed to cold housing.

In London it is estimated that:

- around 82,000 privately rented properties are associated with excess cold (a hazard resulting from threats to health from cold indoor temperatures), and the cost to the NHS of not improving them is £18.9m per year⁷⁵
- if homes do not reach the government’s fuel poverty target of Energy Performance Certificate band C by 2030, the cost to the health service in treating associated illness in London’s homes could be more than £4bn over the next 14 years

Figure 37: Proportion of households in fuel poverty at LSOA level (2014)⁷⁶



Source: BEIS (2016), Fuel poverty sub-regional statistics

⁷⁰ BEIS (2017), Sub-regional fuel poverty England statistics 2015. Accessed from: <https://www.gov.uk/government/collections/fuel-poverty-sub-regional-statistics>
⁷¹ Further detail on how these thresholds are derived can be found here: www.gov.uk/government/collections/fuel-poverty-statistics
⁷² Office of National Statistics, 2016, Statistical bulletin: Excess winter mortality in England and Wales: 2015/16 (provisional) and 2014/15 (final).
⁷³ UCL Institute of Health Inequality, 2014, Local action on health inequalities: Fuel poverty and cold home-related deaths
⁷⁴ Rudge, 2011, Indoor cold and mortality. In Environmental Burden of Disease Associated with Inadequate Housing, (Bonn: World Health Organisation (Regional office for Europe)), p. 81.

⁷⁵ BRE (2011), The Health Costs of Cold Dwellings
⁷⁶ The statistics shown should be interpreted as a modelled estimation of fuel poverty in local areas and the actual situation (i.e. numbers of fuel poor households) may vary from these statistics in some locations.

Tackling fuel poverty will require a number of challenges to be addressed from income levels to the type of home. Energy efficiency is a key component in reducing rates of fuel poverty. But energy efficiency is not the only solution. The predominant cause of the increase in fuel poverty in London is low incomes. There is therefore a need to maximise incomes, alongside ensuring the fuel poor are able to access cheaper energy tariffs more easily. The Mayor's draft Fuel Poverty Action Plan sets out his plan for tackling this problem in London, and a summary of the actions can be found in Proposal 6.1.2a.

London's existing workplaces

The energy used for heating and powering our workplaces is responsible for over 40 per cent of London's emissions. Three quarters come from private businesses, with the remainder from public buildings (Figure 38). Electricity use for lighting and cooling is more significant than for residential buildings.

By 2050, emissions from workplaces will need to be reduced to keep the financial impact on businesses to a minimum, as well as help them capitalise on future opportunities that will come through the move to a low carbon economy. Currently, 37 per cent of non-residential buildings given an Energy Performance Certificate since 2009 have energy ratings of E, F or G. This means they are wasting energy and money. This year, over £3.1bn will be spent on heating and powering London's workplaces.

Many barriers to reducing emissions in workplaces have limited the roll-out of energy efficiency measures. Key problems are:

- complex relationships between freeholders, leaseholders and tenants which has meant difficulty in getting schemes off the ground
- a lack of low-cost financing for energy efficiency measures. These barriers are particularly relevant for SMEs employing fewer than 250 people. These small companies comprise over 90 per cent of businesses in London
- lack of financial incentive or imperative to retrofit energy efficiency measures as energy costs are a relatively small proportion of operational costs – especially when compared to, for example, staff payrolls.

Figure 38: Emissions and required reductions required from London's workplaces and industry

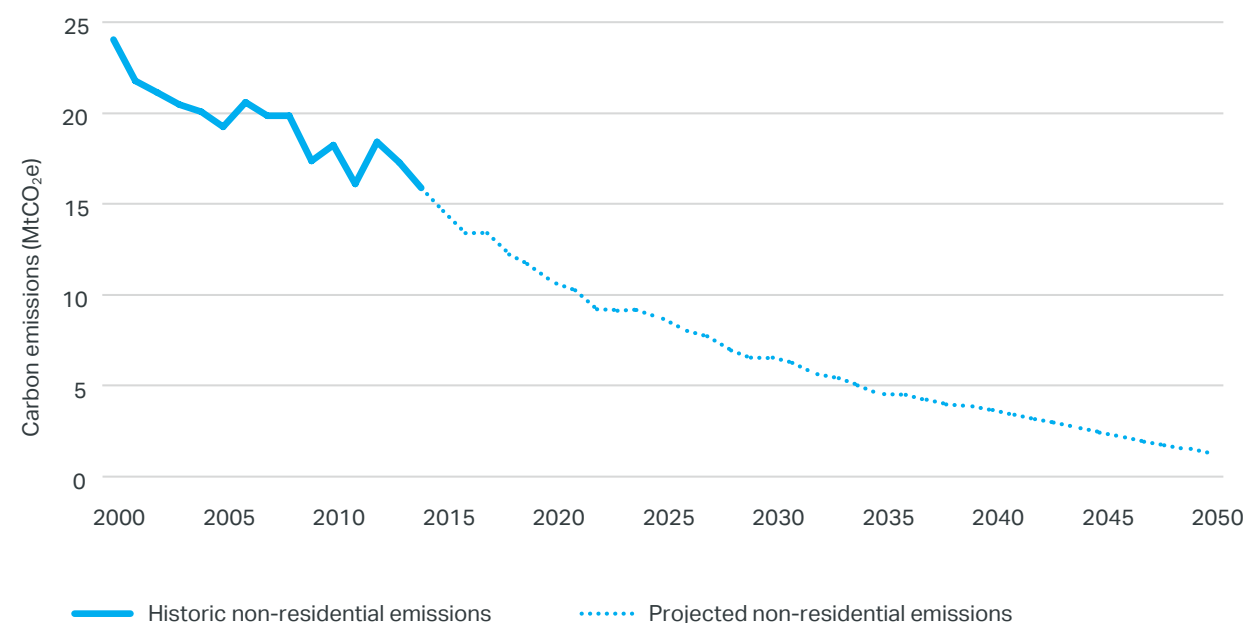
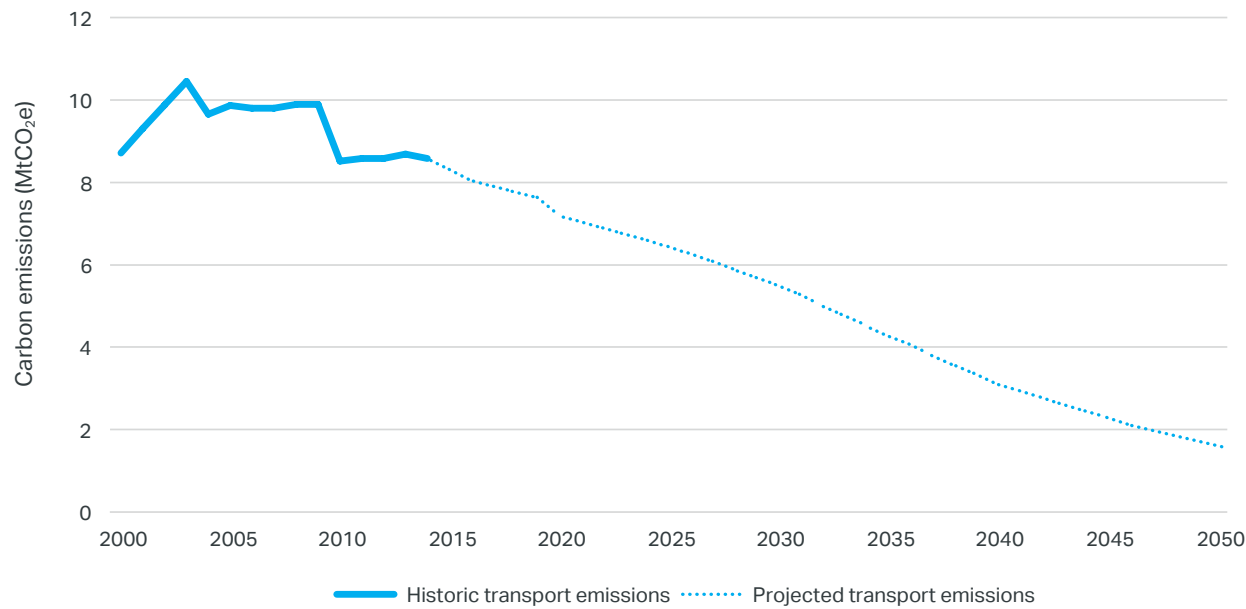


Figure 39: Emission reductions required from transport



Source: GLA (2017)

Transport

Transport accounts for around one fifth of London’s greenhouse-gas emissions, the vast majority from road transport. GHG emissions from transport must reduce from around 8.6 MtCO₂e a year to 1.5 MtCO₂e a year by 2050 (Figure 39).

Policies to reduce GHG emissions from transport in London in this strategy are consistent with those in the draft Mayor’s Transport Strategy. Measures set out in the draft Mayor’s Transport Strategy will reduce CO₂ emissions from road, rail and shipping in London by 72 per cent by 2041. This will set London’s transport emissions on a clear trajectory to reach the Mayor’s ambition of a zero carbon London by 2050.

Aviation is covered in Proposal 4.2.2b. It is perhaps the most difficult transport sector to decarbonise. At present, it contributes to around two and a half per cent of London’s monitored GHG emissions under the London Energy and Greenhouse Gas Inventory. This is around 950,000 tCO₂e a year (for airport operations and take-off and landings).⁷⁷ If unmanaged, emissions from the proposed Heathrow expansion are likely to increase by around a third.

GHG emissions from waste

Direct GHG emissions from London’s waste activities represent 0.2 per cent of London’s total emissions. Accounting of waste emissions is discrete from

other emissions accounting in this chapter as full lifecycle emissions are considered (scope 1, 2 and 3). London has developed two methodologies, estimating both the total emissions from London’s waste activities as well as the carbon intensity of energy generated from residual waste. Actions to address both direct and indirect emissions from the management of London’s waste are set out in chapter 7.

Roles and legal duties

The Mayor has a legal duty to set out policies and proposals in this strategy for mitigating climate change, as well as a duty to take action on adapting to climate change.

Although the Mayor has no direct powers to encourage building retrofit for greater energy efficiency, except for major refurbishments requiring planning consent, the London Plan sets the standard that new developments should achieve.

The Mayor also has no direct powers in the energy market. A fully functioning smart energy system is likely to require an overhaul of commercial and regulatory relationships between distribution, supply, generation and transmission companies.

⁷⁷ GHG emissions from aviation are defined as emissions from aviation sources up to 1km above the ground

INSIDE THE ZERO CARBON HOME

Solar panels:

Convert sunlight into renewable electricity and heat

Green roof:

To manage rainwater and increase biodiversity

Efficient building materials:

Triple glazing, solar shading and insulation to reduce energy demand

Smart appliances and energy storage:

Batteries, high efficiency lighting, smart electronic devices and white goods allow flexible use of electricity to optimise consumption and reduce costs

Zero carbon electricity:

Renewable generation provides clean energy from the grid

Low-flow water fixtures:

Reduce water usage

Home energy manager:

A control panel inside the home that allows homeowners to manage energy consumption

Heating and cooling system:

Highly efficient low carbon energy supply through district heating or individual building heat pumps

Water harvesting:

Greywater harvesting for toilet flushing and rainwater collection for irrigation



“Alleviating fuel poverty is a key element of the Mayor’s ambition to become a zero carbon city.”

Objectives, policies and proposals

OBJECTIVE 6.1 REDUCE EMISSIONS OF LONDON’S HOMES AND WORKPLACES WHILE PROTECTING THE MOST VULNERABLE BY TACKLING FUEL POVERTY

Approximately 80 per cent of the buildings today will still be standing in 2050. By 2050 some 1.3 million new homes and over ten million square metres of new schools, hospitals and workplaces are needed, which will increase the amount of energy required. Energy efficiency is the first and best fuel, and is often the most cost-effective way to decarbonise buildings. It also saves households and businesses money on their energy bills. That makes it one of the key ways to help ensure that the poorest and most vulnerable households are able to heat their homes affordably.

Emissions will need to be reduced from new and existing buildings. Through the London Plan, the Mayor will ensure greater planning standards for new developments so new buildings are highly efficient and incorporate renewable energy where appropriate.

For existing buildings the Mayor has identified a number of actions that are required to reduce emissions. These include:

- helping Londoners improve the energy efficiency of their homes and workplaces through technical advice, support and funding
- piloting new approaches to retrofitting which make existing homes zero energy and eradicate energy bills
- lobbying government for financial support and regulatory change to speed up the retrofitting of homes
- support the roll out of smart meters to provide Londoners with the information they need to make better low carbon choices
- tendering for the delivery of an energy supply company, aiming to offer fairer energy bills to Londoners as soon as possible
- scrapping of the most polluting boilers from workplaces.

Alleviating fuel poverty is a key element of the Mayor’s ambition to become a zero carbon city. The Mayor’s Fuel Poverty Action Plan aims to:

1. boost the incomes of people in fuel poverty
2. increase the energy efficiency of London’s homes
3. ensure Londoners in fuel poverty can access fairer and more affordable energy tariffs

Policy 6.1.1 Policy 6.1.1 Improve the energy efficiency of London’s homes and support the transition to low carbon heating and power through Energy for Londoners

Proposal 6.1.1a Contribute to helping Londoners improve the energy efficiency of their homes, where appropriate, by providing technical assistance, support and funding

Many energy efficiency measures such as loft and cavity wall insulation are cost effective, and help people save money on their bills. There is some support available from the government to help roll-out these measures. But the pace and scale of the change needed to retrofit London’s homes and to overcome the barriers that London faces requires more effort from all involved.

The Mayor will build on current initiatives (Box 22) to design and roll-out a world-class homes energy efficiency programme as part of Energy for Londoners. This includes the introduction of a successor to the current RE:NEW programme. The aim is to continue to support boroughs and housing providers but extend the service to private landlords, where possible, across London to retrofit more homes with enhanced energy efficiency measures. The Mayor will consider how technical assistance and advice could:

- mobilise the action required to achieve the easier measures including replacing the 750,000 inefficient boilers and insulating the remaining lofts and cavity walls needed to get to zero carbon by 2050
- enable deep home energy efficiency projects, maximising the carbon savings delivered in each retrofit

- help boroughs to maximise the use of funds collected through carbon offsetting from new zero carbon development, to increase the investment in existing homes
- aggregate demand and connect project funding, including through the Mayor’s Energy Efficiency Fund
- develop projects with boroughs to achieve positive health outcomes
- help the replacement of inefficient communal boilers, and the connection to existing low temperature heat networks
- enable innovative area-based energy efficiency retrofit approaches, recognising the mix of tenure in London, so that owner occupiers, social landlords and private sector landlords can better benefit from funding opportunities, economies of scale and streamlined planning.

BOX 22: CURRENT PROGRAMMES AND INITIATIVES

RE:NEW Programme – helps boroughs and social housing providers overcome these challenges, and make their housing stock more energy efficient by giving them technical support. Since 2009 alone the RE:NEW programme has helped improve over 130,205 of London’s homes, saving around 46,000 tCO₂ a year and almost £8.85m in annual energy bill savings. Coupled with wider market delivery, around 603,000 homes in London have been retrofitted. It has also supported an estimated 48,000 fuel poor homes.

London Boiler Cashback Scheme – the first of its kind at a city level, has replaced around 3,692 inefficient boilers, delivering annual savings of around 5,500 tCO₂ and over £1.24m per year off Londoners’ fuel bills. It has at the same time reduced the risk of carbon monoxide poisoning in London’s homes and improved air quality.

The Mayor wants to help Londoners reduce their energy demand and generate their own heat and electricity in low carbon ways, where appropriate. While energy efficiency measures typically save carbon and money they can be more expensive to install, and so some financial support is necessary to support the up-front costs. To help finance energy efficiency improvements and cleaner and low carbon generation the Mayor will investigate new finance arrangements. This includes revolving loans, incentives or grants, which do not rely on government subsidy, to enable more Londoners to improve their homes.

Proposal 6.1.1b Pilot state of the art methods to implement the stronger energy retrofitting needed

In the medium to longer term, the potential for cheap and easier measures such as loft insulation and filling cavity walls will be exhausted. That means continuing to meet London’s zero carbon aspirations will require more major changes to existing homes, such as solid wall insulation and new low carbon sources of heat supply and electricity. To achieve this, additional steps will be needed to overcome greater challenges such as higher costs and disruption for householders.

“The Mayor’s Energy Leap Project will deliver some of the first whole house zero energy retrofits in London and the UK.”

Through Energy for Londoners the Mayor will help build a strong and expanding market for deeper energy efficiency retrofitting so each home improvement can include all suitable measures available. By increasing demand for home improvements, energy efficiency measures and low carbon supply technologies (like heat pumps and solar PV) will become a cheaper option. That way they will be able to compete with fossil fuels.

To help achieve this, the Mayor’s Energy Leap Project will deliver some of the first whole house zero energy retrofits in London and the UK. It will trial payment mechanisms including the ability to recoup some or all of the capital cost of the refurbishment work through savings on energy bills, maintenance and energy performance guarantees. This project will also improve the look and feel of the home and bring greater awareness to home energy use.

The Energy Leap project will act as a first pilot to prove the concept. If successful, it will allow a larger demonstrator to happen. This will help overcome other key challenges including more complex building typologies and mixed-tenure properties.

The installation of rooftop solar PV coupled with batteries is likely to be a key part of this pilot. Energy Leap will also try to establish the ‘value up-lift’ that comes from installing solar, through post-retrofit valuations. If successful, Energy Leap will lead to a bigger project looking to overcome other key challenges including more complex building types and mixed-tenure housing.

In addition to Energy Leap, the Mayor will explore alternative approaches to deeper and whole-house retrofitting which could help make radical reductions in household carbon emissions and energy bills.

Proposal 6.1.1c Make the case to government to introduce the long-term regulatory and financial framework to support and speed up the rate of energy efficiency

The Mayor’s programmes alone cannot deliver the necessary energy efficiency measures in homes to meet the zero carbon target, it will also require supportive policy and funding from national government.

There have been several government policies to support home energy efficiency. However many have been subject to continual change and intermittent and inadequate funding, creating uncertainty in the market and stalling implementation. To help provide the energy efficiency measures required in London, the Mayor will advocate to government the need for the following national and regional action:

National actions

- accelerating implementation of the new ECO scheme with an enhanced ambition and introduce a successor to the Green Deal to ensure that existing housing stock is quickly made more energy efficient
- extending, promoting and improving mandatory home energy efficiency standards, for example extending the minimum standards in the Private Rented Sector Energy Efficiency Regulations to apply to social housing and market sales
- developing fiscal incentives to increase uptake of solid wall insulation and low carbon heating power, for example reductions in VAT (which could be

done following UK's exit from the EU), voucher schemes and low or zero interest rate loans

- issuing planning guidance on external wall insulation to increase boroughs' understanding and awareness of the technology and help householders and social housing providers prepare good quality applications

Regional actions

- setting regional targets for energy supplier obligations, such as the ECO, and other government-mandated support schemes in order to ensure that London receives its fair share of support

Local actions

- raising awareness by private landlords of the need to comply with Private Rented Sector Energy Efficiency Regulations
- working with local authority trading standards teams to enforce Private Rented Sector Energy Efficiency Regulations, including provision of appropriate training.

The Mayor will also offer to work with national government to:

- pilot revenue-neutral incentives which, subject to further scoping, might include incorporating Energy Performance Certificate rating in the way Stamp Duty Land Tax is calculated. This would act as a 'trigger' at the point of purchase and enable home owners to claim rebates when they improve the efficiency of their home
- implement the recommendations of Each Home Counts (the Bonfield Review) in London. This includes using evidence from London's retrofit projects to help develop and implement a quality mark and installer Code of Conduct for the residential retrofit sector

Proposal 6.1.1d Improve the way energy is managed in London including through supporting the roll out of smart meters and advocating time of day tariffs

Individual actions and choices within homes can have an important impact on energy use. To enable householders

to make positive changes to their home that will help cut energy bills and demand and contribute towards reducing carbon emissions, they need timely, impartial, and accurate information and advice.

Smart meters will have a critical role in building the foundations for a zero carbon energy system for London. The first step is the installation of smart meters alongside the use of flexible energy tariffs and more energy efficient appliances.

The rollout of smart meters has multiple benefits:

- they give near real time information on energy use – expressed in pounds and pence
- enable people to better understand and manage energy use, helping to them move to cheaper time of day tariffs to reduce energy bills
- bring an end to estimated billing – consumers will only be billed for the energy actually used, helping people to budget better

- easier switching – smoother and faster to switch suppliers to get the best deals

The government has committed to mandating the offer of smart meters to every London household and small business, and delivering meters to all homes by the end of 2020. But the roll out is behind schedule.

The Mayor will encourage all new developments to install smart meters. Through Energy for Londoners, greater awareness of energy management will be promoted such as identifying the most energy efficient appliances, guidance on selecting the best energy tariffs and supporting 'switch off' campaigns and competitions. The Mayor will work with energy suppliers and Smart Energy GB to establish smart meter roll-out campaigns and include their installation as a measure through energy efficiency programmes.

⁷⁸ The Energy Company Obligation was previously focused on reducing carbon emissions from homes through the installation of energy efficiency measures. Part of ECO was ring-fenced for low income households to ensure that it was not regressive, given all households pay through their energy bills. However, successive governments have reduced to overall ambition, and therefore level of investment, of ECO, leaving a much smaller programme. Government decided that it would focus this smaller pot almost exclusively on low income households to alleviate fuel poverty. The current phase of ECO runs from April 2017 to October 2018 and is being treated as a transition from the changing focus from carbon emissions reduction to fuel poverty alleviation

⁷⁹ Survey by London Association of Local Energy Officers (ALEO), 2016

Policy 6.1.2 Tackle fuel poverty in London and protect the most vulnerable through the Mayor’s Fuel Poverty Action Plan

Proposal 6.1.2a The Mayor will work with partners to help alleviate fuel poverty in London through implementing the recommendations of the Fuel Poverty Action Plan

Historically, central government and the boroughs have taken the lead in providing fuel poverty support programmes. However, central government has reduced its support for fuel poverty alleviation since 2012. Remaining support is in the form of the Warm Home Discount⁷⁸ and the ECO, which is now focused largely on energy efficiency measures for low income households.

Many boroughs, given the financial pressures they are under, have not been able to maintain support for many of their fuel poverty support programmes. 46 per cent of boroughs do not have any officer responsible for fuel poverty alleviation, and a further 46 per cent have fuel poverty as only part of an officer’s role.⁷⁹ This leaves significant gaps in the provision of support for households struggling to keep their homes warm and pay for their energy bills.

To help reduce fuel poverty, the Mayor has already introduced the Better Boilers pilot scheme⁸⁰ which targeted homeowners receiving benefits (as a proxy for fuel poverty), and has helped replace and repair 307 boilers, and install new heating controls.

In addition to this scheme, the Mayor has published a draft Fuel Poverty Action Plan which will sets the actions required to further alleviate fuel poverty in London. The Mayor’s ambition is to reduce both the prevalence of fuel poverty in London and the ‘depth’ of fuel poverty that Londoners experience. Actions include:

- investing directly in energy efficiency programmes targeting carbon reduction and tackling fuel poverty
- providing funding to support and create local advice and referral networks as a way of helping to improve the living conditions of fuel poor households signposting the fuel poor to more affordable energy tariffs and offering fairer energy through Energy for Londoners
- implementing a programme to help Londoners get access to all of the income support they are entitled to

- providing guidance and support to boroughs on how they can use data to identify households in fuel poverty
- establishing a high-profile cross-sectoral Fuel Poverty Partnership to coordinate action in London
- calling on government to develop fiscal incentives for solid wall insulation and review the Minimum Energy Efficiency Standard to remove exemptions and increase the number of properties treated.

Further details are in the draft Fuel Poverty Action Plan and the Mayor welcomes feedback on this Plan during the period of the consultation on this strategy.

Proposal 6.1.2b Tender for the delivery of an energy supply company, aiming to offer fairer energy bills to Londoners and encourage Londoners to switch and move away from pre-payment meters

The UK energy market is currently dysfunctional and most customers pay too much for their electricity and gas. This national problem is particularly acute in London. The Competition and Markets Authority’s (CMA) 2014-16

“As part of Energy for Londoners the Mayor will introduce ambitious programmes to make London’s workplaces more energy efficient and low carbon.”

⁸⁰ Better Boilers has also removed harmful asbestos from many fuel poor homes (which causes around 5000 deaths every year in the UK), which had previously insulated old pipes and heating systems. The scheme also provided important learnings in relation to delivering fuel poverty support in London and the type of support vulnerable people need, which is helping to inform the development of new initiatives under Energy for Londoners.

Energy Market Investigation identified that 70 per cent of domestic customers could save as much as £300 per year by switching supplier, but that 56 per cent of consumers have never switched energy supplier or did not realise that this was possible. A fifth of Londoners are on pre-payment meters, which tends to mean higher tariffs and less access to good deals. There is no incentive for the energy market to help customers move from the most expensive tariffs. London has the lowest levels of switching of all regions in the UK for gas and is below the national average for electricity. Recent proposals for a cap may help reduce costs for some. The risk is that, although the differential between the highest and lowest prices narrows, many people will still pay too much.

The Mayor will tender for the delivery of an energy supply company. The Mayor will issue a tender with the aim of procuring a scheme to offer fairer energy bills for Londoners. In light of changing market conditions and uncertainty in national policy, the Mayor aims to start a scheme using an existing supplier. This will allow Londoners to have fairer energy bills sooner. The option to move to a fully licensed supply company will kept under review in light of changes in the market and clarification of national policy, as well as the progression of the Licence Lite project.

While it is being established the Mayor will encourage people to switch energy supplier to seek a better deal. Previous experience, such as that of the Big London Energy Switch, demonstrates that this kind of engagement can deliver significant energy savings, but there is a need to go further by engaging groups identified by the CMA as being less inclined to switch.

The Mayor will work with London boroughs, community energy groups and charities to help engage harder-to-reach groups of customers and those who could soon become fuel poor.

Policy 6.1.3 Improve the energy efficiency of London's workplaces and support the transition to low carbon heating and power

Proposal 6.1.3a Provide direct technical support and assistance to help reduce CO₂ emissions and energy within the public sector, including leading by example in the GLA group estate

London's workplaces are diverse, hosting a plethora of organisations from the public, private and third sectors which include banks, retailers, manufacturers, government, charities, schools and hospitals. Workplaces which include both commercial and some light industry are responsible for around 42 per cent of London's GHG emissions from powering the technology, lighting,

heating and cooling. To achieve the Mayor's zero carbon ambition by 2050 the emissions footprint of London's workplaces will need to account for only 1.6 MtCO₂e reducing from around 16.6 MtCO₂e. This implies around 15,000 workplaces being retrofitted with energy efficiency improvements and renewable technologies each year to 2050.

As part of Energy for Londoners the Mayor will introduce ambitious programmes to make London's workplaces more energy efficient and low carbon.

The Mayor will support the public sector to retrofit their buildings with carbon and energy reduction measures through an improved Energy for Londoners programme building on the current RE:FIT programme. Launched in spring 2016, this phase of the programme will run until August 2019. The programme will support London's public-sector building managers to reduce energy demand and carbon emissions, improve air quality, and deliver large guaranteed energy savings for the public sector. RE:FIT addresses the lack of technical expertise and (increasingly) capacity within many public-sector organisations by providing free-of-charge expert support to public sector bodies (including London boroughs, NHS bodies, schools, universities and colleges, central government departments and cultural and heritage organisations).

The framework of 16 suppliers enables organisations to procure suppliers quickly, efficiently and economically to deliver energy saving measures, and guarantee energy savings.

The scope of RE:FIT has been extended to offer support to more organisations, bringing a greater focus on solar energy, and expanding its scope to include the retrofit of non-building assets, such as LED street lighting and electric vehicle charging infrastructure, and the promotion of district heating (see Box 23 for a case study). By 2020 the programme aims to have reduced emissions by nearly 25,000 tCO₂e pa, saved at least 68 GWh of energy and retrofitted over 400 buildings from a range of public sector bodies.

We will lead by example on the GLA group's own estate and activities. The GLA group has reduced emissions from its fleet and operations from 189 ktCO₂e in 2012/13 to 160 ktCO₂e in 2015/16 and is committed to a 60 per cent reduction on 1990 levels by 2025. More can be done to reduce energy use and CO₂ emissions, and utilise renewable electricity and low carbon heat sources. The Mayor's zero carbon target will be taken into account across City Hall and the rest of the GLA group including when making major investment decisions and providing funding for building regeneration or retrofit projects.

BOX 23: CASE STUDY: LYRIC HAMMERSMITH

The Lyric has demonstrated that it is committed to reducing its impact on the environment, and this is enshrined in their mission and business plan. They actively promote this throughout the theatre to visitors, in all their marketing materials and online. They encourage their audiences, staff, acting companies, creative teams and young people to consider their effects on the environment. They have a long standing staff Green Team with representatives from every department who run an electricity switch off campaign and issue Lyric-branded water bottles to all new staff, creative teams and young people. They recycle 100 per cent of their waste, run paperless finance and administrative systems, 100 per cent of their public lighting is LED and their energy comes from renewable sources. Recently they launched the public '#LyricLent' campaign over 7 weeks encouraging people to give up

something to help the environment, such as car journeys, or plastic packaging – which resulted in over 100 individual and collective actions.

In April 2015, the Lyric opened its new Reuben Foundation Wing which added a variety of new studio and workshop spaces, making the Lyric the largest creative hub in West London. Despite this substantial expansion, the Lyric achieved a 73 per cent reduction in relative energy use, thanks to the sustainable design which made natural light a key feature, used air source heat pumps and introduced a new green sedum roof which contributes to local biodiversity. The Lyric's building has since been awarded a BREEAM rating of Excellent, putting the Lyric in the top 10 per cent of sustainable UK buildings. Recycled and reclaimed materials were used where possible for fixtures and fittings, with office desks made from scaffolding boards.



Proposal 6.1.3b Supporting reducing emissions and energy within the commercial sector including through improved building management, energy efficiency and reporting

Commercial buildings are estimated to be responsible for 32 per cent of London’s carbon emissions. There has been some limited government action to reduce emissions from this sector in the past. This is a missed opportunity, with significant energy bill savings to be made by businesses across the capital, which would contribute to their competitiveness.

In light of this, the Mayor will deliver a three-year (2017/18 – 2019/20) commercial boiler scrappage scheme to incentivise the installation of more efficient gas and renewable heating systems, such as heat pumps. Installing an efficient boiler or renewable heating technology can be a cost-effective way to cut CO₂ emissions, energy bills, while making London’s air cleaner. The scheme will provide financial support to businesses to replace working low-efficiency commercial boilers with new efficient gas boilers or renewable heating generation.

The Mayor will also investigate what further technical support can be provided to businesses, in particular SMEs, including how to create new

business opportunities that will cut down the amount of energy and other resources used, potentially saving businesses millions of pounds (see Box 24 for an example of how this can be done in practice). This could include:

- expanding the Mayor’s RE:FIT Programme to the commercial sector to help reduce emissions and energy use
- providing guidance on what benefits increasing energy efficiency can bring to businesses (for example through a series of sector by sector guides)
- sharing best practice, for example by encouraging businesses to measure and disclose emissions from their supply chains, in line with existing schemes such as the Carbon Disclosure Project and standards established in government guidance on Measuring and Reporting Greenhouse Gas Emissions
- for larger commercial landlords in particular the Mayor will work with networks of businesses to take up opportunities to improve buildings as part of refurbishment projects.

BOX 24: LONDON THEATRE CONSORTIUM

The London Theatre Consortium is a network of 14 leading producing theatres in London set up in 2010. They recently announced the latest results of its collaborative environmental sustainability programme. These are:

- six years of collaborative success for London’s major producing theatres
- an estimated £383,000 of savings on energy bills
- 20 per cent reduction in carbon emissions
- 1,862 tonnes of CO₂ avoided
- 71 per cent of London Theatre Consortium venues achieving a 4 star Creative Green certification

The consortium has worked closely with Julie’s Bicycle⁸¹, which supports the creative community to act on climate change and environmental sustainability.

Policy 6.1.4 Ensure that new developments are zero carbon

Proposal 6.1.4a Through the London Plan the Mayor will consider policies to support the delivery of zero carbon development

London already has ambitious zero carbon targets for constructing new housing development in the capital (Box 25). All such developments in London are currently expected to achieve at least a 35 per cent onsite reduction in GHG emissions above and beyond national government’s standards (the 2013 Building Regulations). Where the target cannot be met onsite, developers are able to offset emissions through other carbon reduction measures offsite.

⁸¹ Julie’s Bicycle (n.d.), Homepage. Accessed from: www.juliesbicycle.com

BOX 25: IMPLEMENTING LONDON PLAN POLICIES

In 2016, planning applications considered by the Mayor will be expected to achieve reductions in regulated CO₂ emission of 36 per cent above Part L requirements of 2013 Building Regulations. This is estimated to save over 48,000 tonnes CO₂ per annum against the Part L baseline and deliver over £150m investment in heat network infrastructure, £12m in solar PV panels and additional investment in other energy technologies to assist the transition to zero carbon, most notably heat pumps.

The approach that developers are expected to follow – the energy hierarchy – is set out in the London Plan. This expects development proposals to minimise carbon dioxide emissions from construction and future operation of the building as well as its annual and peak energy demand.

To achieve the Mayor's zero carbon development target, the energy hierarchy wording will be updated to:

1. be lean: use less energy and manage demand during construction and operation
2. be clean: exploit local energy resources (such as secondary heat) and supply energy efficiently and cleanly
3. be green: generate, store and use renewable energy onsite

Developers will be expected to manage energy demand from construction as well as the operation of the development as the emissions from embedded carbon become a greater part of a development's carbon footprint. Developers will also be expected to prioritise local energy sources, where available, and ensure that air quality is a key consideration in determining energy supply to the development. Finally,

developers should investigate generating and storing renewable energy onsite, as well as using it onsite, to contribute to London's security of energy supply.

Developers will be expected to commit to delivering against the energy hierarchy in their energy strategies and the Mayor will report annually on the estimated emissions saved from strategic developments.

In 2016, new developments reported an average carbon reduction of seven per cent beyond Part L of the Building Regulations from energy efficiency measures (the 'be lean' element of the energy hierarchy). Reducing energy demand not only saves energy and carbon emissions, but also reduces energy bills and so the Mayor intends to investigate measures to encourage further carbon savings from the 'be lean' element of the hierarchy, including the possibility of introducing an energy efficiency target.

Alongside this policy for homes, the Mayor is intending to introduce a zero carbon standard for non-residential buildings in the London Plan from 2019 to ensure that all new major development in London contributes to the Mayor's zero carbon city ambition.

Unabated climate change presents a major environmental and health hazard, and decarbonising our energy supply is important. At the same time, London is currently failing to meet legally binding air quality standards, and public health is suffering as a result. Tackling this is the priority so the energy hierarchy will be structured so it also contributes towards improving air quality.

In particular, while Combined Heat and Power systems (CHP) can have benefits in terms of carbon emissions, gas engine CHP plant usually gives rise to higher emissions of NO_x and/or PM₁₀ emissions than ultra-low NO_x gas boilers, even when abatement equipment is used. Therefore in preparing his London Plan, the Mayor will consider whether, in areas which exceed legal air quality limits, the policy should prevent emissions from energy production plant, including from CHP, that would exceed those of an ultra-low NO_x gas boiler. Energy production plant used in other areas should meet all relevant emission standards (which may require abatement equipment) as considered by the new London Plan, as well as not causing unacceptable local impacts on air quality.

Offset funds

While the Mayor intends to maximise onsite emissions reductions from new development, offsetting funds have a role to play where onsite measures are not technically feasible or cost effective. These funds could raise considerable funding to enable energy efficiency measures to be installed in local buildings, and be prioritised to tackle local issues including fuel poverty.

As part of the Mayor’s 2016 zero carbon homes policy developers are able to meet their obligations by supporting offsite carbon abatement measures. This can either be by paying into carbon offset funds collected by the Local Planning Authority (LPA), or delivered offsite via a carbon saving project agreed between the LPA and the developer.

The majority of London’s LPAs have now set up offset funds and the Mayor is working with boroughs to monitor progress. If all LPAs were to establish offset funds and if the proceeds were used more strategically (for example, part or all of the offset funds were to be pooled) then this could be used to help improve the energy efficiency of the existing building stock and help tackle fuel poverty.

The Mayor’s energy efficiency programmes could provide technical support to boroughs to help ensure that offsetting funds are being used effectively to reduce carbon whilst encouraging a holistic approach to retrofitting buildings.

The Mayor will publish guidance to LPAs on the allocation and use of offsetting payments and review the current carbon price⁸² to determine the most effective level to deliver carbon offsetting projects and the option of pooling funds.

Proposal 6.1.4b Support the design of effective methods to ensure the energy and carbon performance of new developments meet their agreed designed standards

There have recently been observed gaps in the designed energy performance and the operational performance of new developments, mainly due to materials and components not meeting specification and lack of knowledge and skills of those making decisions within the construction process.⁸³

The energy strategies developers commit to must be delivered in practice, and any potential performance gap between design and construction must be minimised. This requires accurate methods for measuring performance once the developments are operational as well as good enforcement. However, boroughs have limited resources to enforce planning conditions and developers’ interest or involvement is likely to have ceased.

To address these challenges the Mayor will review the potential for applying other more effective methods of estimating building energy and carbon performance. The Mayor will also work with boroughs and developers to design more effective arrangements for monitoring the operational energy performance of new buildings, and provide guidance through supplementary documents to the London Plan.

Proposal 6.1.4c Encourage the reduction of whole lifecycle building emissions (embodied carbon)

As onsite emissions continue to reduce, embodied carbon (those emissions associated with the production of

building materials) will form a greater part of a development’s total carbon footprint. In order to reduce these emissions, accurate measurement methodologies are needed. A survey conducted to inform the assessment of city-wide carbon footprints found no consistency in the data sources, tools or methodologies used to calculate embodied emissions.⁸⁴ Ninety per cent of construction industry professionals responded to a survey stating that they would benefit from better guidance and support.

As a step towards reducing embodied carbon emissions, the Mayor will support the work of BREEAM and RICS to develop a new British Standard to estimate whole life cycle building emissions.

In addition, the Mayor will work through the London Waste and Recycling Board to assess how a circular economy approach can help contribute to reducing embodied carbon by, for example, re-using materials or for new major developments to achieve a specified BREEAM credit for Responsible Sourcing of Materials.⁸⁵

⁸² Most boroughs use £60 per tonne
⁸³ Zero Carbon Hub (2013), Closing the Gap Between Design and As-Built Performance. Accessed from: http://webcache.googleusercontent.com/search?q=cache:dDSCfVrwoyQJ:www.zerocarbonhub.org/sites/default/files/resources/reports/Closing_the_Gap_Between_Design_and_As-Built_Performance_Interim_Report.pdf+&cd=1&hl=en&ct=clnk&gl=uk

⁸⁴ Mayor of London (2014), Application of PAS 2070: London case study. Accessed from: <https://data.london.gov.uk/dataset/application-pas-2070-london-case-study>
⁸⁵ BREEAM is a widely used sustainability assessment method for master planning projects, infrastructure and buildings. It addresses several lifecycle stages such as new construction, refurbishment and operation. The Responsible Sourcing of Materials component of the BREEAM assessment recognises and encourages the specification of responsibly sourced materials for key building elements.

Policy 6.1.5 Monitor and report on London's emissions regularly to track London's progress

Proposal 6.1.5a Publish the London Energy and Greenhouse Gas Inventory on an annual basis

To assess the impacts of actions taken by the Mayor and others undertaken to tackle climate change London's emissions must be monitored. The London Energy and Greenhouse Gas Inventory will be published on an annual basis, making data available to the public, and report London's GHG emissions and activities to mitigate climate change annually through a global web platform.

London has a long history of leadership in understanding and reporting on its emissions. With the British Standards Institute it produced the UK's first standard on wider city-level (scope 3) emissions.⁸⁶ This provided an assessment of all the emissions from London's production and consumption activities and provided the first city case study of its kind internationally. The Mayor will publish indirect emission estimates to develop a trend of scope 3 emissions.

The results are not a formal measurement of London's emissions and do not assign responsibility for emissions but provide an understanding of London's wider carbon footprint and ensure that decisions on policies for London recognise the potential to export rather than deal with emissions.

Proposal 6.1.5b Work with other global city leaders through the C40 to support the implementation of the Paris Climate Agreement

London has a track record of leading by example. London founded the C40 Cities Climate Leadership Group in 2005, was the first city to create a comprehensive GHG monitoring system, first city to measure GHG emissions of waste management using a carbon based approach with set targets for waste activities and is now the first city to develop a comprehensive zero carbon scenario modelling tool.

Despite the challenges London faces the Mayor is adamant that London will continue to lead global megacities in the battle against global warming by reducing GHG emissions.

London is not alone in wanting to take regional action to tackle climate change. Through the C40, a network of the world's megacities committed to addressing climate change, London will work with other cities to collaborate effectively, share knowledge and drive meaningful, measurable and sustainable action on climate change.

The Mayor is the European representative and Vice Chair of C40 and has an important role in helping to set the ambition, priorities and direction of cities globally. Through hosting global C40 events and working closely with other international networks such as the ICLEI we will continue to share London's experience and work with other cities to reduce GHG emissions.

Working with C40 the Mayor will develop a climate action plan consistent with the goals of the Paris Agreement which aligns with his commitment for London to be a zero carbon city by 2050. The action plan will set out in more detail some of the key barriers and opportunities to delivering this goal. As one of the most advanced cities in its approach to climate planning, London will work with other C40 member cities to develop a plan that can be learnt from and translated, setting the goalposts for action across the globe.

"London will continue to lead global megacities in the battle against global warming by reducing GHG emissions."

⁸⁶ BSI (2014), PAS 2070 Specification for the assessment of greenhouse gas emissions of a city. Accessed from: <http://shop.bsigroup.com/Browse-By-Subject/Environmental-Management-and-Sustainability/PAS-2070-2013/>

“The Mayor will work to increase delivery of decentralised energy in London and identify and map the opportunities to create a smart, flexible energy system.”

OBJECTIVE 6.2 DEVELOP CLEAN AND SMART, INTEGRATED ENERGY SYSTEMS UTILISING LOCAL AND RENEWABLE ENERGY RESOURCES

In addition to reducing the energy use of buildings in London there is a need to transform the energy system so that power and heat for buildings and transport is generated from clean, low carbon and renewable sources, such as solar and waste heat.

Energy infrastructure will need to be transformed so that it is smarter and more effective. This will enable supply and demand of energy to be better matched, reduce consumption and enable people to take advantage of cheaper electricity, sold during low demand periods such as overnight, or high supply periods such as on sunny and windy days.

While this is a national issue, in London the supply of more local, decentralised, low carbon energy can be maximised. Decentralised energy ranges from small production, such as electricity from solar PV panels, to larger scale systems based

on local energy resources utilising heat pumps that supply communal or district heating (or cooling) through a network of underground pipes connecting it to homes and buildings. For London to become zero carbon by 2050, the energy system will need to move away from using natural gas to being fuelled more from municipal waste, renewable energy and the heat that is wasted from industrial and commercial processes.

The changing nature of energy supply will mean that the way energy is used, and the infrastructure that supports supply, will need to become more flexible integrating different types of energy and responding to demand at different times of the day. A smart approach is therefore required which uses real-time data and technologies such as smart meters to ensure that the energy system can operate in a way that will reduce system peaks. Combined with the increasing use of energy storage and balancing electricity, heat and cooling demand with the available supply, a smart system will deliver the optimum cost savings, reduce resource consumption and promote environmental benefits.

The Mayor will work to increase delivery of decentralised energy in London and identify and map the opportunities to create a smart, flexible energy system.

Policy 6.2.1 Delivering more decentralised energy in London

Proposal 6.2.1a Help implement large scale decentralised and low carbon energy projects, including stimulating demand from the GLA group

District heating networks and renewable energy supply account for approximately half of London’s decentralised energy systems, delivering the equivalent of two per cent of total demand. There is the opportunity to increase this type of energy supply to 15 per cent of demand by 2030. There are a number of opportunities for further decentralised energy projects including large-scale solar PV installations and heat networks utilising technologies such as heat pumps in combination with secondary heat sources.

To facilitate implementation the Mayor will provide support to boroughs and the private sector through the Decentralised Energy Enabling Project (DEEP)⁸⁷. Over the next two years, this programme will help implement large-scale decentralised energy projects in London, which the market is currently failing to develop. DEEP will provide technical, commercial, financial and other support services to assist public and private sectors to develop, procure and bring into operation these large scale projects.

⁸⁷ DEEP will provide technical, commercial, financial and other advisory and support services to assist public and private energy suppliers to develop, procure and bring into operation larger-scale DE schemes that deliver significant greenhouse-gas emission reductions at market-competitive prices. It will deliver CO₂ reductions of 17,400 tonnes per annum by September 2019 through projects it directly supports, and aims to enable 90 MW of capacity installed by 2023. It will prioritise key locations where the feasibility is most suitable.

The Mayor can potentially have a more direct role in the delivery of heat networks, significantly increasing the rate of their development in London. The Mayor will therefore consider the establishment of a District Heating Network Delivery Body for London that secures funding, and in partnership with London Boroughs, develops and builds district heating networks. For such a model to work it is likely that central government will need to create a level playing field for the treatment of district heating networks compared to other statutory utilities regarding access rights and business rates.

The Mayor wants to stimulate demand for further decentralised energy supply in London. This will include developing affordably-priced markets for locally generated electricity. Licence Lite, will look to purchase electricity from low and zero carbon generators in London, under a power purchase agreement, and sell it to GLA group members and public sector organisations to use in their buildings (Box 26). The Mayor will evaluate the success of an initial Licence Lite trial with TfL and look to develop a business case for signing up other GLA group members and public sector organisations to purchase local low carbon power.

Implementation of large scale decentralised and low carbon energy projects will be undertaken in a coordinated way so they also contribute towards improving air quality as well as reducing carbon emissions. This will include meeting any relevant air quality standards and emission requirements set out in the London Plan.

BOX 26: LICENCE LITE

The Licence Lite project will deliver the Mayoral manifesto commitment to 'buy clean energy generated across the city, using it to power GLA and TfL facilities'. The project will acquire an Ofgem junior electricity supply licence to buy locally generated low carbon electricity at a higher price than they would otherwise receive from the wholesale market and sell to GLA group facilities. Licence Lite aims to be operational by autumn 2017.

Proposal 6.2.1b Increase the amount of solar generation in London including through community energy projects and on GLA group buildings

The Mayor wants to see a solar revolution in London with more heat and electricity generated from renewable solar sources. The draft Solar Action Plan, the first of its kind for London, sets out how the Mayor will seize the opportunity for solar energy in the capital and increase deployment in the coming years.

By 2030, the Mayor's programmes will lead to an extra 100 megawatts (MW) of installed solar energy generation in London. That will more than double the city's current solar energy generation capacity (95 MW). The Mayor thinks London can, and should, go further than this. To meet the zero carbon target, London will require around ten times more solar energy generation to be installed – two gigawatts (GW) by 2050. This can't be done through the Mayor's leadership and programmes alone. It will need strong and supportive policy from national government and the support of local government, the private sector, charities and individuals.

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Box 27 summarises the Mayor’s proposed approach and headline actions to increase the amount of solar generation installed in London. These include leading by example by maximising solar energy technologies on GLA group buildings and land. In

addition to continuing to encourage solar energy through the planning system, the Mayor will also encourage Londoners to retrofit solar on their homes. This will be achieved by producing an interactive map for Londoners with guidance and information on installing solar, and piloting a new solar reverse auction scheme to reduce installation costs for Londoners. To support communities, the Mayor will also introduce a community energy support scheme to help get solar projects up and running.

The Mayor would welcome feedback on the draft Solar Action plan during the consultation of this strategy.

BOX 27: THE MAYOR’S DRAFT SOLAR ACTION PLAN

The actions in this draft plan will put London on track to realising the potential of solar energy. In addition, it will maximise the contribution of solar to the Mayor’s zero carbon city ambition.

Mayoral actions:

1. Lead by example by maximising solar energy technologies on GLA group buildings and land

- map the full potential for solar energy generation on the GLA group estate in 2018 and

BOX 27: THE MAYOR’S DRAFT SOLAR ACTION PLAN (CONTINUED)

maximise installation on the GLA group’s buildings and land

2. Encourage solar energy installations through the planning system

- ensure that new developments include solar, where feasible, and work with boroughs to ensure planning policies don’t necessarily restrict solar installation on existing properties

3. Help Londoners to retrofit solar energy technologies on their homes and workplaces through the Mayor’s programmes and funding

- pilot a new ‘solar reverse auction’ scheme to reduce installation costs for Londoners
- develop a grants scheme to help solar energy projects get off the ground
- encourage public sector organisations and providers of social housing to retrofit solar energy technologies on buildings. This will include promoting technical help programmes like the Mayor’s RE:FIT programme

and the introduction of a successor to the RE:NEW programme

- support projects that promote energy storage

4. Help Londoners to make informed decisions about investing in solar energy technologies

- produce an interactive map for Londoners to identify solar energy generation potential and promote it through Mayoral programmes
- provide clear guidance and information on installing solar energy technologies

Further government action:

5. Call on government to set a national policy framework to help London realise its solar energy potential

- call on government to ensure national policy is introduced to support higher levels of solar energy deployment in London as part of a package of national government policy measures that enable London to meet its ambitious zero carbon target by 2050

Policy 6.2.2 Planning for London's new smart energy infrastructure

Proposal 6.2.2a Encourage the identification and planning of decentralised energy in priority areas

In order to maximise the supply of more local, decentralised, low carbon energy in London, it is important to identify the most appropriate areas, energy systems and technologies. To understand the suitability and location of decentralised energy opportunities, the London Heat Map will be maintained to include data for decentralised energy development – including secondary heat sources. The Mayor will continue to support all London boroughs to produce Energy Master Plans and use them to identify areas where the most appropriate energy systems should be considered.

The boroughs can play an important role in identifying these suitable areas for decentralised, low carbon energy and support the development and installation, including through new developments. Once suitable sites have been identified, the Mayor will, through DEEP, work with stakeholders to support the planning of decentralised energy by providing support to carry out heat mapping and energy masterplans. This will include the potential to recover

low-temperature waste heat and the implications of supplying heat to connected building heating systems.

Heat networks provide infrastructure for decentralised energy and are one of the main opportunities for the supply of low carbon heat in London. At present, most heat networks are built as part of new developments. However, to meet the Mayor's zero carbon ambitions, it is likely that some of London's existing housing will also need to be supplied by heat networks. To enable this, the Mayor will support the identification of areas where existing buildings could be retrofitted for connection to local heat networks, with an aim of developing the business case for a pilot project that retrofits heating systems in a number of existing buildings so that they can be connected to a local heat network.

The Mayor will encourage industry to ensure that heat networks that are developed in London are of the highest standards so they operate efficiently, effectively and reliably once in operation. As heating systems and their associated networks are currently largely unregulated it is critical that industry standards (or equivalents) are developed, such as the Heat Trust standard for customer service and the



Credit: London Borough of Islington

heat networks Code of Practice for the design, specification and operation of heat networks are of a high and relevant standard. The Mayor will work with all stakeholders to update London's guidance on design and specifications for heat networks and consumer standards in light of latest standards and feedback from Londoners.

Storage of energy will also be important to balance supply and demand at the building, district and national levels. Battery storage is likely to become increasingly important, and thermal storage could enable surplus electricity generation from renewables (e.g. solar PV in the summer), to be converted to and stored as heat for later use in district heating. London's potential for inter-seasonal thermal storage has yet to be explored, but if feasible, excess summertime energy could be captured for wintertime heating.

City subsurface temperatures are known to have increased due to the urban heat island (UHI) effect (see Chapter 8: Adapting to Climate Change) causing increased aquifer temperatures. The Mayor will investigate the potential for London's geology to provide thermal storage and heat source as a consequence of the UHI effect, in conjunction with future low temperature heat networks.

National government will also need to decide on whether the UK moves to a hydrogen economy, which would see gas networks adapt the system to transport hydrogen for heating, cooking, homes and transportation in a similar way to the supply of natural gas today. The Mayor will work with national government to identify research opportunities to pilot zero carbon hydrogen heat projects working with the London Hydrogen Partnership.

Proposal 6.2.2b Undertake demonstration project and trials to improve London's energy systems

To ensure that London is at the forefront of developing smart and integrated energy systems, the Mayor will support demonstrations and trials of advanced approaches to optimise London's energy systems, sharing findings across London, nationally and internationally.

For example, the Mayor has supported CELSIUS, an EU Smart Cities Demonstration Project with five European partner cities: Gothenburg (lead partner), London and Islington Council, Cologne, Genoa and Rotterdam, which runs until December 2017. It investigates the role of waste heat in district heating networks and the role of district heat networks in the wider

energy system. Phase 2 of Islington Council's Bunhill Heat and Power Heat Network is the London demonstrator. It is integrating waste heat from the Tube into the network and using smart controls to operate the energy centre.

The Mayor is also supporting, Sharing Cities, a €25m smart city demonstrator programme in partnership with Greenwich, Milan, Lisbon, Bordeaux, Burgas and Warsaw. The programme aims to use data and digital approaches to 'connect up' existing and new building, transport and energy infrastructure, to reduce energy demand, bills and emissions, and achieve integrated city infrastructures that meet citizens' needs.

Through Sharing Cities the Mayor will work with Greenwich to apply retrofitting solutions to residential five non-residential properties, including integrating low carbon energy supply, improvements to the physical fabric of buildings to make them more energy efficient, and the installation of smart digital heating and electricity controls in individual apartments. The Mayor will also support the implementation of a sustainable energy management system that will integrate city infrastructures, optimise energy supply, and use

data analytics and predictive control techniques to create energy services that Londoners want. Scaled up across London, a sustainable energy management system has the potential to reduce energy consumption by up to 20 per cent, cut energy bills and emissions. The Mayor will deliver a comprehensive quantitative evaluation of the performance of the measures across the Greenwich demonstrator and share this learning across London, nationally and internationally.

Proposal 6.2.2c Investigate the potential for further smart, flexible energy system demonstrators and pilots where Londoners can help manage demand

The Mayor has assessed the impact on the national electricity system resulting from the electrification of heating to achieve zero carbon. It considered the system reinforcement investment and Londoner's energy bills for a high DE scenario compared with a low scenario. It concluded that the former would cost the national system £20bn less, and Londoner's bills would be 40 per cent lower.

London therefore plays an important role within the national energy system and the Mayor will work with central government, the Grid Operator and other key stakeholders (including Ofgem, National Grid and Distribution Network Operator Companies) to investigate the approach to the planning of city energy systems that will lead to smart, flexible city systems operating as part of the national system and allow Londoners to participate in the demand side response market. This includes:

- demand side response initiatives and the impact of electrification upon the grid
- the potential role of a zero carbon gas supply for London and the role of district heating networks in an integrated energy system
- and, most importantly, the flexibility potential of London’s demand side response could offer

The Mayor will investigate future demonstrators and pilots including:

- innovations that flexibly match changing energy supply and demand profiles of the future
- incorporating storage or advanced management and optimisation of multiple energy supply to boost use and efficiency
- removing barriers to innovative SMEs accessing energy markets, offering customers better energy services and creating new value for London’s tech businesses

Proposal 6.2.2d The Mayor will oppose fracking in London

The Mayor has been clear that he opposes fracking in London and through the new London Plan he will consider policies to ensure that fracking is prevented in London. If any fracking applications were made in London in the Green Belt or on Metropolitan Open Land the current London Plan contains strong policies for their protection, however the Mayor will look to strengthen this policy further.

OBJECTIVE 6.3 A ZERO EMISSION TRANSPORT NETWORK BY 2050

The Mayor’s ambition is to have a zero emission transport network by 2050. This will be achieved through an integrated approach to reducing carbon emissions and air pollutants from transport. The policies and proposals to reduce London’s carbon emissions from transport have therefore been combined with policies and proposals under the air quality chapter of this strategy. Please see Chapter 4 for full air quality policies and proposals.

Q

CONSULTATION QUESTIONS: CLIMATE CHANGE MITIGATION AND ENERGY

1. Do you agree that the policies and proposals outlined will meet the Mayor’s ambition to make London a zero carbon city by 2050? Is the proposed approach and pace realistic and achievable?
2. To achieve the Mayor’s zero carbon ambition we estimate (between now and 2050), up to 100,000 homes will need to be retrofitted every year with energy efficiency measures. Do you agree with the Mayor’s

policies and proposals to achieve his contribution to this? What more can central government and others do to achieve this?

3. Which policies or programmes would most motivate businesses to reduce energy use and carbon emissions?
4. Please provide any further comments on the policies and programmes mentioned in this chapter, including those in the draft solar action plan and draft fuel poverty action plan that accompany this strategy.