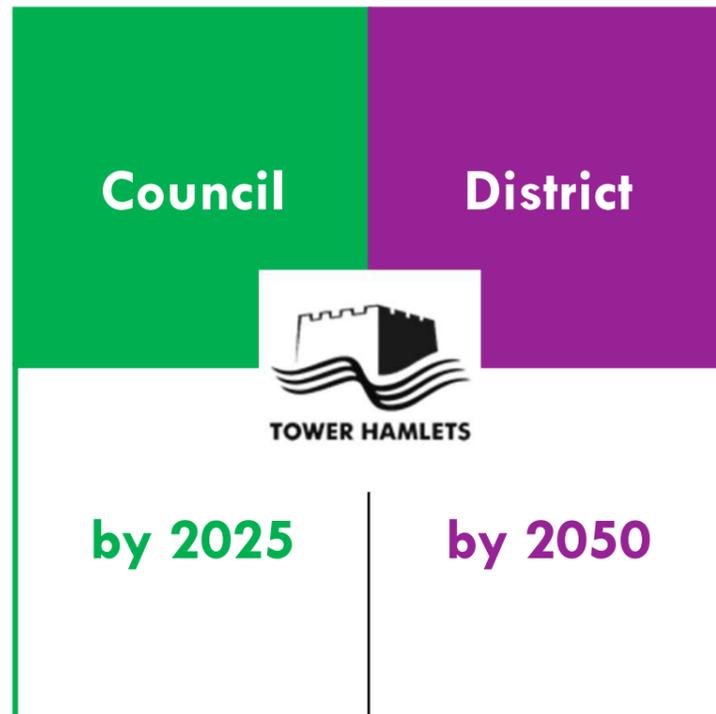


**Net Zero Carbon**



**Net Zero Carbon Plan**

## The science is clear

Climate change is happening and needs to be urgently slowed down to avoid terrible consequences. Business as usual is not an option to solve this crisis.

## A Net Zero Carbon Council by 2025

In March 2019, Tower Hamlets Council declared a climate emergency. The Council is now aiming to be Net Zero Carbon by 2025. This report shows that it is possible but that it will require decisive action starting now to reduce direct emissions by 75%. The residual emissions will have to be offset.

## A Net Zero Carbon Borough by 2050

This report also recommends that Tower Hamlets Council uses its powers, influence and leadership to put the Borough on the right track to achieve Net Zero Carbon by 2050 (or earlier if possible).

## Net Zero Carbon is possible

This report demonstrates that it is technically possible to achieve Net Zero Carbon. This would require decisive strategic decisions from Tower Hamlets Council in 8 key areas shown on the adjacent diagram.

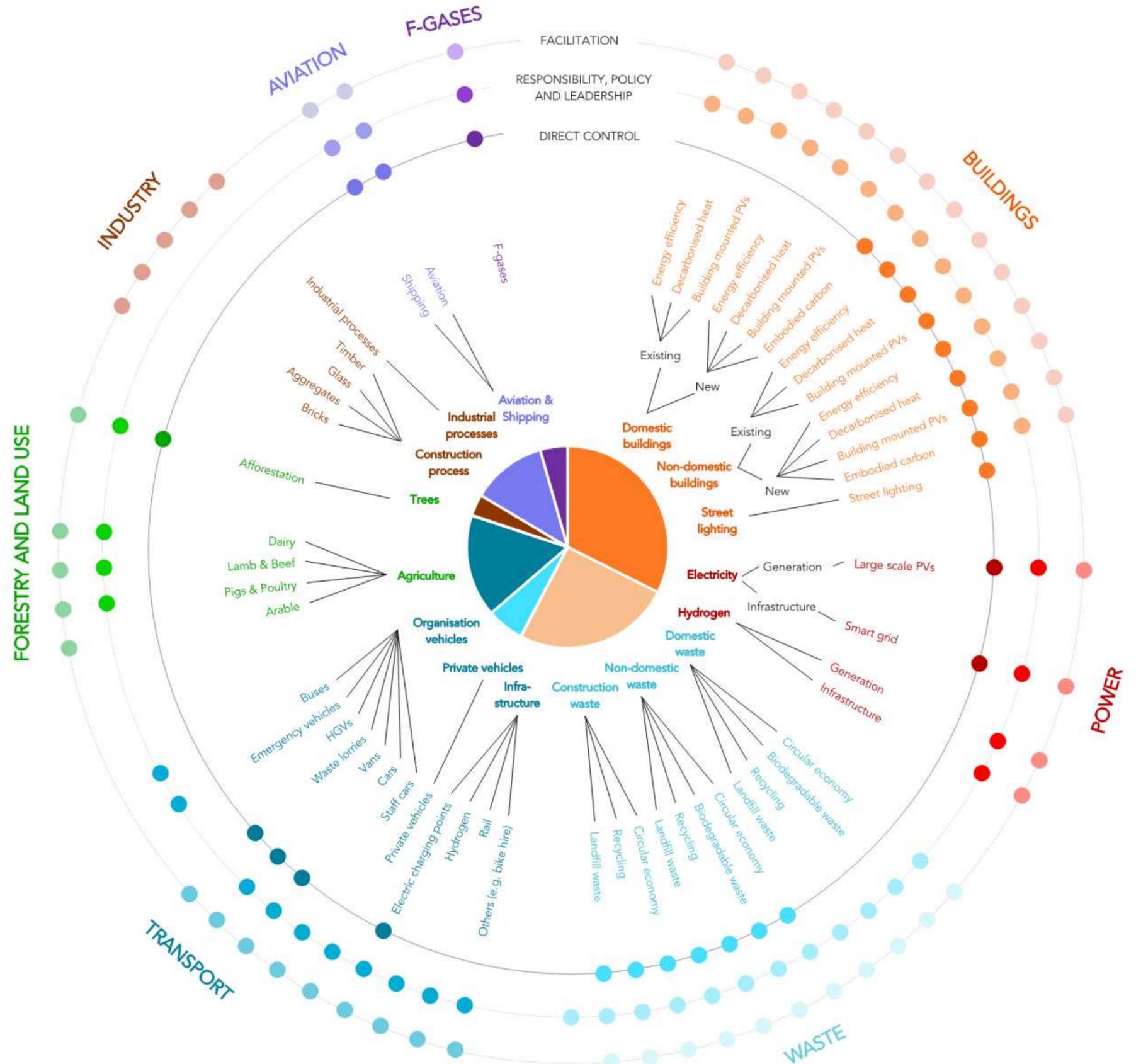
This would also require significant investments, although there is a huge potential to combined them with regular maintenance and replacement cycles.

The Council should also develop an approach to offset the residual emissions. Some solutions (e.g. social housing retrofit, investment in additional renewable energy capacity) are possible in 2025 but not acceptable in the long term. By 2050, residual emissions in the UK will have to be less than 10% of what they are now, leaving only a marginal role for offsetting by increasing plant cover, for example tree planting.

## Our approach for real emission reductions

To allow the council to see how to effect emissions this report categorises emissions by use type. This means emissions are assigned based on the ability to affect change.

All calculations show total greenhouse gas emissions (CO<sub>2</sub>e) and all reductions refer to this, however for accessibility and simplification we refer to 'carbon' throughout the report. By this we mean carbon dioxide which contributes by far the majority of greenhouse gas emissions in the borough.



Breakdown of borough carbon emissions by use type, showing the categorisation and proportion of emissions from each source, and the control the Council has over each sector.

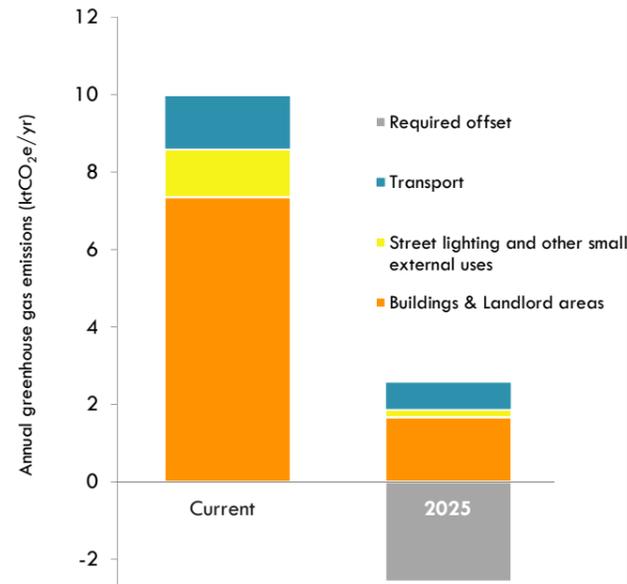
# Zero Carbon Tower Hamlets | Executive summary

## Net Zero Carbon Council by 2025

The current total carbon emissions under the Council's direct control are 10 ktCO<sub>2</sub>e/year and are dominated by buildings. External energy use (e.g. street lighting) and transport also represent significant sources of emissions.

There is considerable potential to reduce emissions very significantly by 2025: a target of **75% carbon reduction** should be set, bringing the estimated annual emissions to 2.5 ktCO<sub>2</sub>e/year.

The residual emissions will need to be offset, and suitable offset mechanisms are discussed in the report.



Total annual carbon emissions from Tower Hamlets Council for the last reported year (2018) and the required emissions in 2025

Key actions include:

### Power

#### Install 20,000 sqm PVs on the Council's non-domestic buildings

Start with the largest roof areas. The targeted installed capacity should be at least 4.2MW.

#### Renewable power

Ensure that electricity supply to all the Council's assets is on a 100% renewable tariff or Power Purchase Agreement

### Buildings

#### Start retrofitting existing buildings owned and operated by the Council (e.g. Council's offices)

Retrofit heat pumps, use energy management to reduce energy use, improve building energy efficiency: insulation, improved airtightness and better windows, install Mechanical Ventilation with Heat Recovery (MVHR) wherever possible, install PVs. An 80% carbon reduction on-site should be achieved for full retrofit projects, or a plan put in place to achieve this.

### Transport

#### Replace the Council's diesel and petrol cars with electric cars and vans

Accelerate the replacement cycle so that 95% of the Council's cars and vans are electric by 2025

#### Replace the Council's lorries with cleaner options when they become available

The aim is to have 30% of the Council's lorries as low emissions by 2025.

#### Install electric charging points for the Council's fleet

### Waste

#### Target a 70% recycling rate for waste from all Council buildings by 2021

### Forestry, land use and agriculture

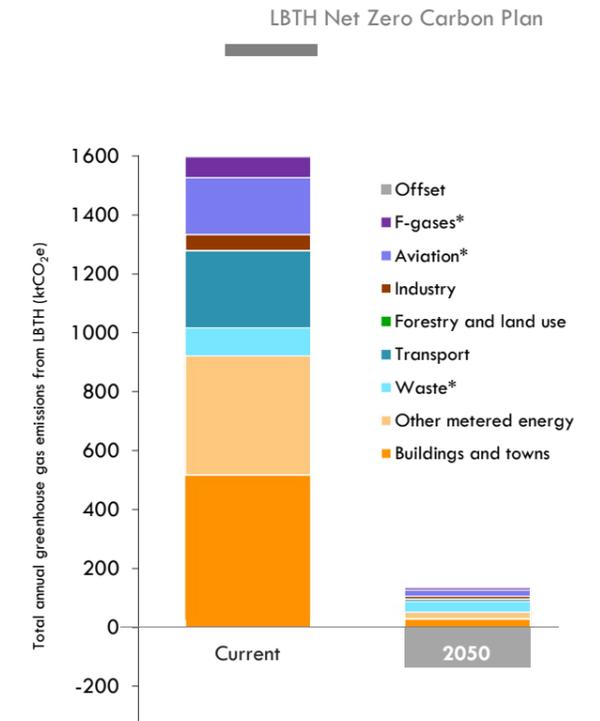
#### Change diets

Reduce the meat content and increase vegetarian choices of food served on Council owned premises.

## Net Zero Carbon Borough by 2050

The current carbon emissions from the whole borough are 1,600 ktCO<sub>2</sub>e/year.

The 'Net Zero' report by the Committee on Climate Change articulates what the UK will need to do to achieve Net Zero Carbon by 2050. The London Borough of Tower Hamlets would need to implement these solutions. We estimate that a minimum 90% reduction in carbon emissions should be achieved (ideally lower). The total residual emissions would need to be lower than 150 ktCO<sub>2</sub>e/year.



Total annual greenhouse gas emissions from the London Borough of Tower Hamlets as a whole LBTH for the last reported year (2018) and the required emissions for Net Zero Carbon in 2050

Key actions include:

### Power

#### Achieve a total PVs capacity across the whole of the borough of 430 MW (equivalent to 1,500,000-1,900,000 sqm)

### Buildings

#### Phase out gas boilers and gas-fired CHP

Stop the installation of any new gas boilers from 2020. Stop the installation of new gas-fired CHP immediately. Switch to low carbon heat (e.g. heat pumps). Gradually phase out gas for heating and cooking in the borough.

#### Net Zero Carbon new buildings from 2025

Mandate ultra-low levels of energy use in new buildings. This is through setting a kWh/m<sup>2</sup> total energy target, and a space heating demand target in line with Passivhaus (15 kWh/m<sup>2</sup>). Buildings should also use low carbon heat and have on-site renewable energy (e.g. PVs).

#### Major retrofit programme with ambitious energy objectives

90% of existing homes and buildings should have benefited from low energy retrofit by 2050 (by 2030 for Tower Hamlets homes, schools leisure centres). An average heating energy demand of 40kWh/m<sup>2</sup>/yr should be achieved for retrofit homes. Low carbon heat should replace gas boilers.

### Transport

#### 99% carbon reduction from cars and vans

All domestic and light goods mileage should be completed by electric vehicles or equivalent by 2050.

#### 80% carbon reduction from lorries

HGV emissions reduced by 50% through reduced journeys, switch to rail, and developing hydrogen or electric drivetrain technologies.

#### Reduce air travel

To meet zero carbon ambition the number of flights from the UK should reduce by more than 80% unless alternative technologies can be found.

### Waste

#### Waste reduction and circular economy

64% reduction in emissions from waste in line with 'further ambition' recommendations by the CCC.

# Listening to the voices of experts

## The Committee on Climate Change

The Committee on Climate Change is an independent, statutory body established under the Climate Change Act 2008. Its purpose is to advise the UK Government and devolved administrations on emissions targets and report to Parliament on progress made in reducing greenhouse gas emissions and preparing for climate change.

The Committee on Climate Change published its report “**Net Zero: The UK’s contribution to stopping global warming**” in May 2019. Some of the key recommendations of the report include:

- A Net Zero greenhouse gas emission target is not credible unless policy is ramped up significantly.
- Delivery must progress with much greater urgency.
- Clear leadership is needed, right across Government, with delivery in partnership with businesses and communities.

## The National Grid

Each year the National Grid issues its Future Energy Scenarios. Its analysis aligns with the Committee on Climate Change. It concludes that strong policy actions [to wholly decarbonise electricity supply and improve energy efficiency of new and existing homes] must be taken and there is no room for delay.

## World Health Organisation

The World Health Organisation published “COP24 special report: health and climate change” in 2018. It states that the severity of the impact of climate change on health is becoming increasingly clear and that the drivers of climate change – principally fossil fuel combustion – pose a heavy burden of disease. The costs of this ill health and disease represent in turn a heavy economic burden. The report states that “*the most recent evidence indicates that the health gains from energy scenarios to meet the Paris climate goals would more than meet the financial cost of mitigation at global level*”.

## Extinction Rebellion

Extinction Rebellion is a movement that uses non-violent civil disobedience to highlight the urgency of the climate change crisis. Their key demands are:

1. Tell the truth about the climate and ecological emergency
2. Act Now
3. Hold a citizen’s assembly on climate and ecological justice

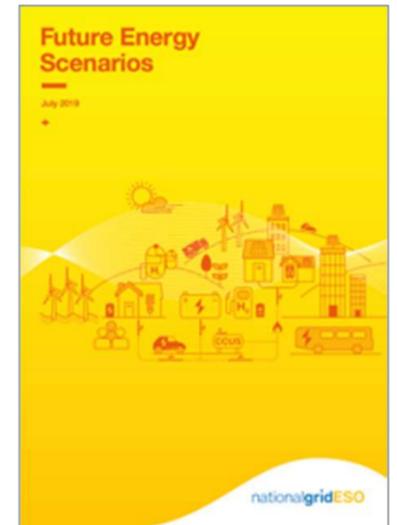
“Delivery of greenhouse gas emission reductions must progress with **far greater urgency**”

**Committee on Climate Change**  
“Net Zero” Report, 2019



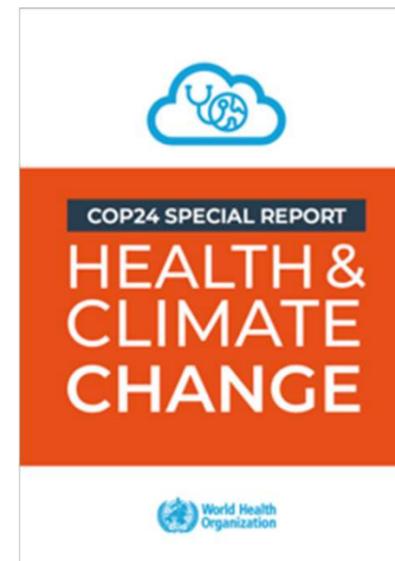
“Reaching net zero carbon emissions by 2050 is **achievable**. However, this requires **immediate action** across all key technologies and policy areas.”

**National Grid**  
Future Energy Scenarios, 2019



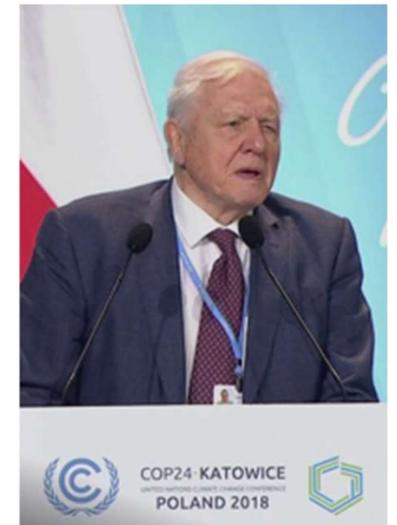
“Economic valuation of **health gains** would tip the balance decisively in favour of more aggressive climate mitigation.”

**World Health Organisation,**  
“COP24 special report: health and climate change”, 2018



“If we don't take action, the collapse of our civilisations and the extinction of much of the natural world is on the horizon”

**David Attenborough**  
at the UN Climate Summit,  
Poland, 2018



# Where are we now?

- The climate emergency
- Energy and the electricity revolution
- Understanding the Council's emissions
- Understanding the Borough's emissions
- What will happen if no action is taken
- The case for acting now



## The science is clear

Climate change is happening and needs to be urgently slowed down to avoid terrible consequences.

The most recent international negotiations on Climate Change concluded with the Paris Agreement in December 2015. This Agreement reaffirms global ambition to limit temperature rises to below 2°C and binds every country to produce national plans to reduce emissions. The agreement also contains a further collective aspirational goal to reduce emissions in line with keeping the temperature increase to 1.5°C.

The Special Report on Global Warming of 1.5°C (SR15) was published by the Intergovernmental Panel on Climate Change (IPCC) in October 2018. It highlighted the urgency of the situation and the need for decisive action in the next 10 years.

## National commitment

In May 2019, the Committee on Climate Change published its 'Net Zero report' and set out the ambitious aim of phasing out carbon emissions in the UK by 2050. The Government adopted the recommendation of this report and the Climate Change Act was amended in June 2019 to reflect this ambition: achieving net zero emissions by 2050.

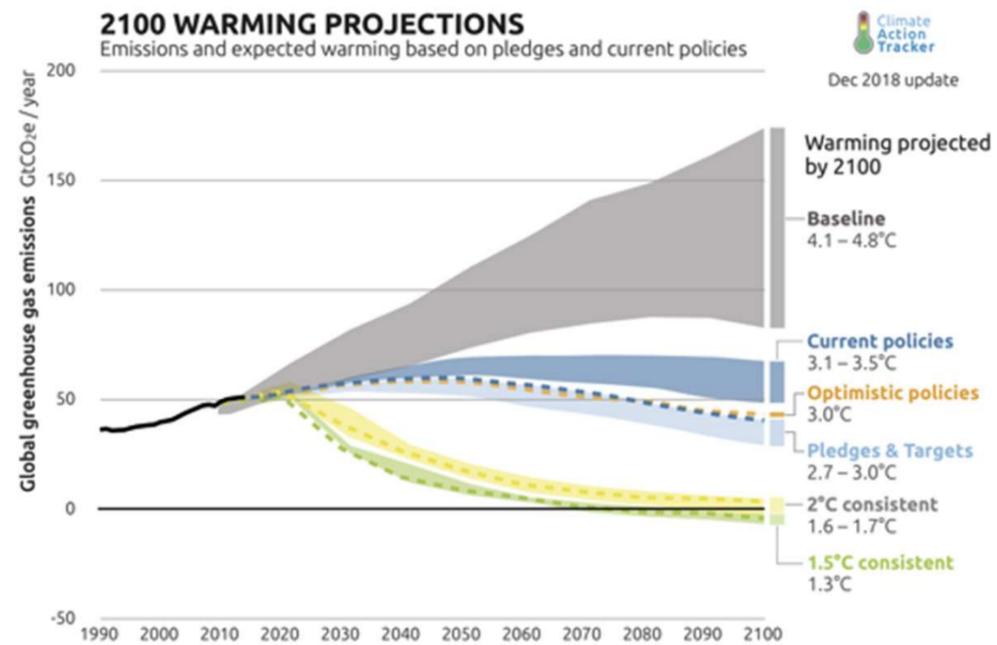
In addition, the Department for Business, Energy and Industrial Strategy (BEIS) has set the Buildings Energy Mission, with the objective of halving the energy use of new buildings by 2030.

## Tower Hamlets declaration of climate emergency

In March 2019, Tower Hamlets became one of the first councils in the country to declare a climate emergency. One of the associated commitments is for Tower Hamlets to aim to become a zero carbon or carbon neutral Council by 2025.

## Public calls for action

Since October 2018, there has been a surge in civil society's interest and action on climate change. The Schools strike movement started by Greta Thunberg and civil disobedience from Extinction Rebellion are requesting action and truth from those in a position to act.



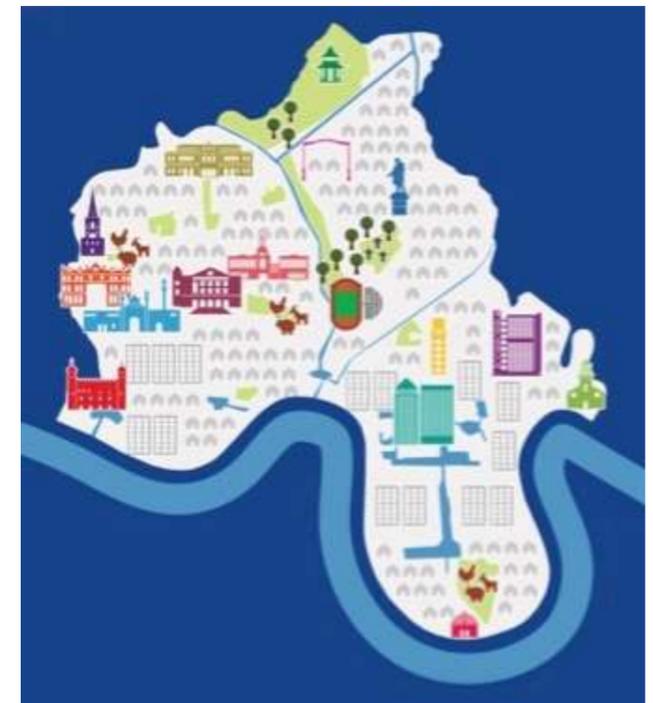
We have to do everything we can to reduce global warming to less than 1.5°C



The UK Government has committed in June 2019 to Net Zero emissions by 2050



Greta Thunberg, the Schools strike movement and Extinction Rebellion are calling for action now



In March 2019, Tower Hamlets became one of the first councils in the country to declare a climate emergency

## The decarbonisation of the grid

Electricity used to have a very high carbon content: more than 1,000 gCO<sub>2</sub>e/kWh in the early 1970's. It has become steadily 'greener' since, although it reached a plateau of approximately 500 gCO<sub>2</sub>e/kWh during the 2000's. At that time, heating systems using gas such as boilers and especially CHP were seen as environmentally friendly options.

This has now changed completely: the de-commissioning of coal-fired power stations and the rise of renewable energy (particularly wind and solar) have meant the annual average carbon content of electricity is now around 150-200 gCO<sub>2</sub>e/kWh and predicted to reduce more in the next decade (see adjacent graph).

## The National Grid's Future Energy Scenarios

The National Grid produces a set of future energy scenarios every year. These are used to facilitate the understanding of how the UK's electricity generation mix could develop.

We focused on the two scenarios which can meet (or be close to meeting) the UK climate change targets: the 'Two Degrees' and the 'Community Renewables' scenarios.

As the 'Two Degrees' scenario relies on a large proportion of new nuclear energy plants and as there is a significant degree of uncertainty for new nuclear plant financing, our recommendation is to consider the 'Community Renewables' scenario as the most likely.

This scenario assumes that around 70% of annual electricity demand in 2050 will be met by wind and solar power.

## BEIS and HM Treasury projections

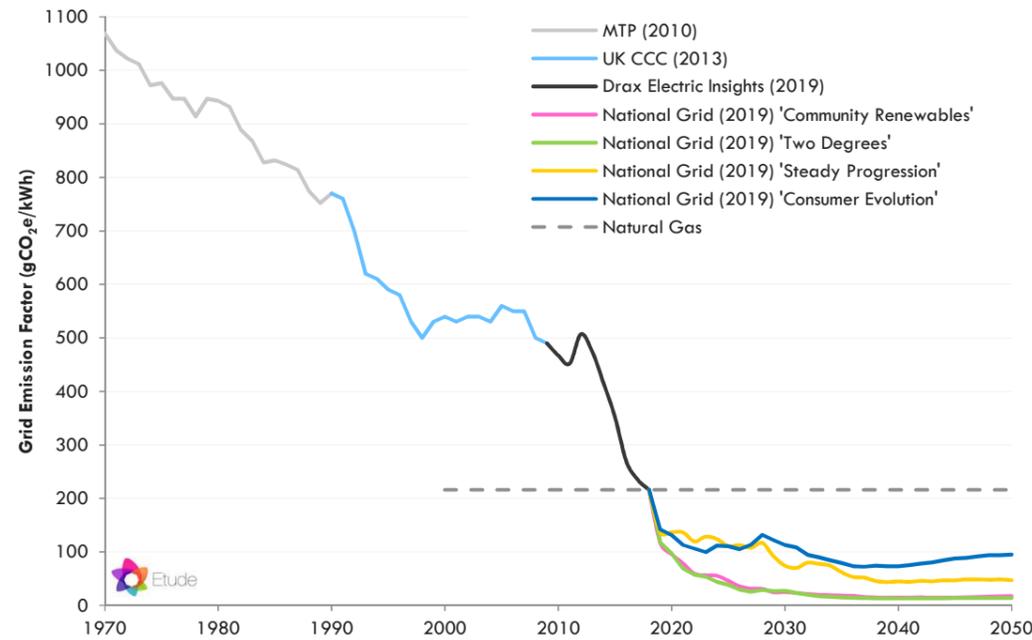
BEIS and HM Treasury have also published their projections for the future carbon content of electricity, which show good agreement with the 'Community Renewables' scenario.

## What it means in practice

We have used these sources to predict the future carbon content of electricity over the next 30 years, e.g.

136 gCO<sub>2</sub>e/kWh in 2020  
 108 gCO<sub>2</sub>e/kWh in 2025  
 27 gCO<sub>2</sub>e/kWh in 2050.

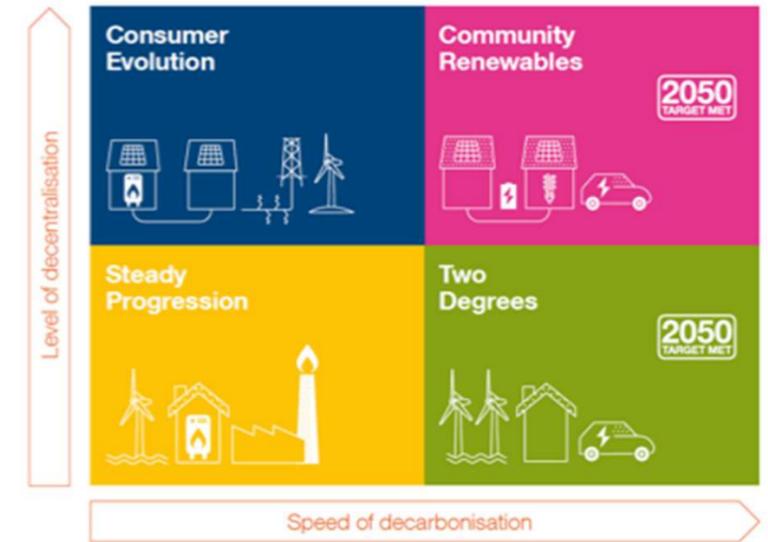
Our calculations have taken into account the changing carbon content of electricity, while gas was assumed constant at 216 gCO<sub>2</sub>e/kWh.



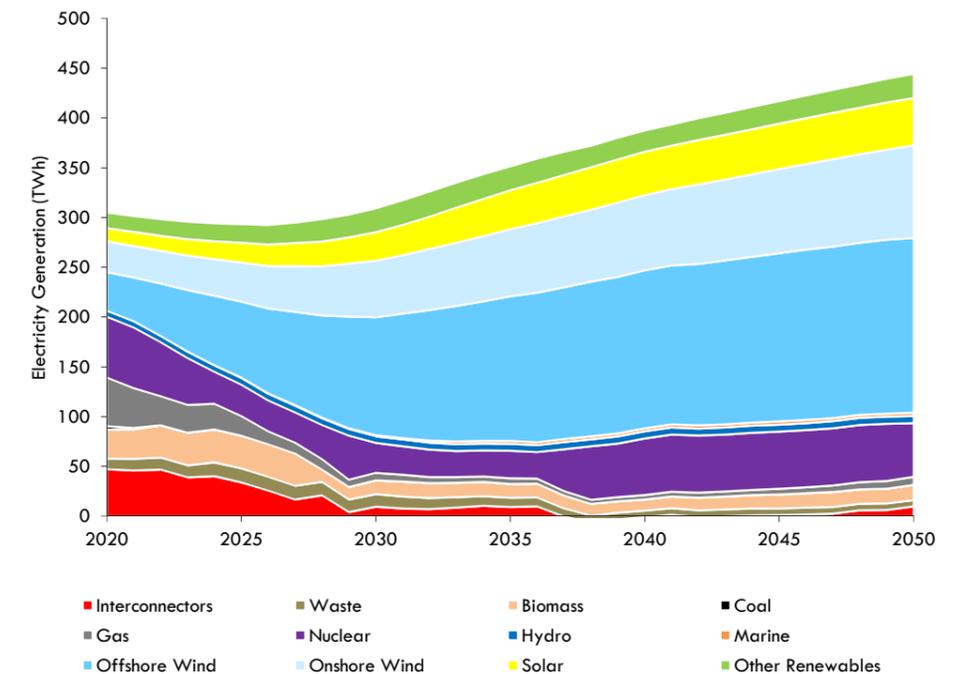
The carbon content of electricity has fallen in the last few years and will continue to decrease. Unfortunately, the carbon content used in Part L 2013 of the Building Regulations has not been updated.

<b>'Consumer Evolution'</b>	<b>Discounted</b> Not compliant with avoiding 1.5°C warming
<b>'Steady Progression'</b>	<b>Discounted</b> Not compliant with avoiding 1.5°C warming
<b>'Two Degrees'</b>	<b>Discounted</b> Relies on nuclear capacity increasing from 9GW in 2018 to 17GW in 2050. Not considered realistic as three of six proposed new nuclear projects have been cancelled, nuclear has consistently failed to attract private investment and electricity prices are higher than those for onshore wind, offshore wind and solar photovoltaics.
<b>'Community Renewables'</b>	<b>Considered</b> Etude assume this scenario offers the most plausible 1.5°C compliant UK electricity generation mix pathway. This scenario was developed to achieve the UK's now outdated Climate Change Act target of an 80% reduction in emissions by 2050.

High level assessment of the four National Grid scenarios



The four National Grid Future Energy Scenarios (© National Grid)



Community Renewables: what it means in terms of power generation in the UK over the period 2020-2050: the rise of renewable energy

## Direct Council emissions

Tower Hamlets Council's **direct control** emissions only cover the following sources:

1. The buildings the Council occupies (owned or rented)
2. Landlord areas in rented buildings e.g. Tower Hamlets Homes communal lighting, building-based pumping for communal heating
3. The Council's fleet and business travel
4. Street lighting and other external public uses e.g. CCTV, markets, parks.

## The Council's ability to influence

The Council has however significant power and influence to be able to affect greenhouse gas (GHG) emissions beyond its own operations to the borough as a whole.

### Responsibility

These include schools and leisure centres in Tower Hamlets (also including a small number of nurseries) and all dwellings managed by Tower Hamlets Homes (excluding landlord areas).

### Policy

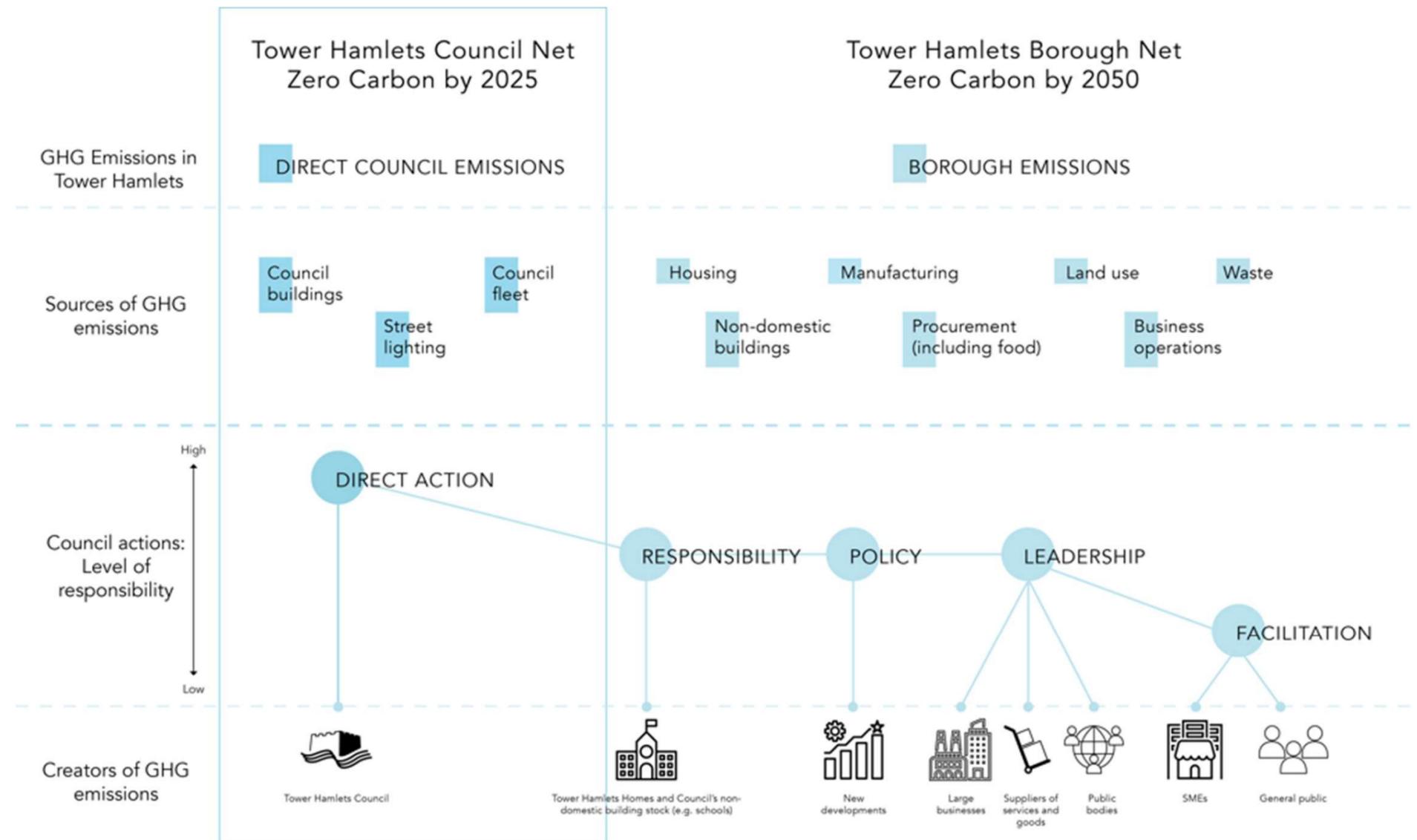
Well crafted policy is a key change driver. It has significant ability to reduce carbon emissions from new developments, limit the destruction of natural habitats and increase nature and biodiversity within the borough.

### Leadership

Tower Hamlets Council is in a position of leadership. It holds great power to drive change through the procurement processes it is involved in, through activities it will and will not allow to take place within its jurisdiction, and through partnerships with other key players in the borough, such as Canary Wharf, Queen Mary University, TfL and the NHS.

### Facilitation

The public and local businesses look to Tower Hamlets for leadership and guidance. The Council could become a trusted advisor and leader in the climate crisis through the provision of support to the public and businesses in reducing their carbon footprint and engendering more sustainable and ethical behaviour.



A breakdown of the influence the Council has over sources of emissions in the borough. Note: diagram not to scale

# Understanding the Council's direct emissions, and those under its responsibility

## Direct emissions are dominated by buildings

Buildings owned and/or occupied by the Council represent the majority of its direct control emissions, followed by emissions from external areas and from landlord areas (e.g. staircase lighting, presumably mostly in housing blocks).

After buildings, the Council's vehicle fleet is the largest source of direct emissions; the majority from lorries.

## Emissions under the Council's responsibility are significant and need to be addressed

Emissions from Tower Hamlet Homes are more than three times higher than the total of those directly controlled by the Council from buildings and transport. There are approximately 11,500 THH dwellings. They are mainly EPC D-rated (42%) and E-rated (32%). No THH energy consumption data is available, therefore it was estimated using the Ofgem national average. It should be noted that EPCs are a poor indicator of actual energy consumption.

Schools and leisure centres also represent a significant source of emissions. Schools are spread over 73 sites, with 11 responsible for over 50% of emissions.

## Emissions are reported by user, inline with the CCC

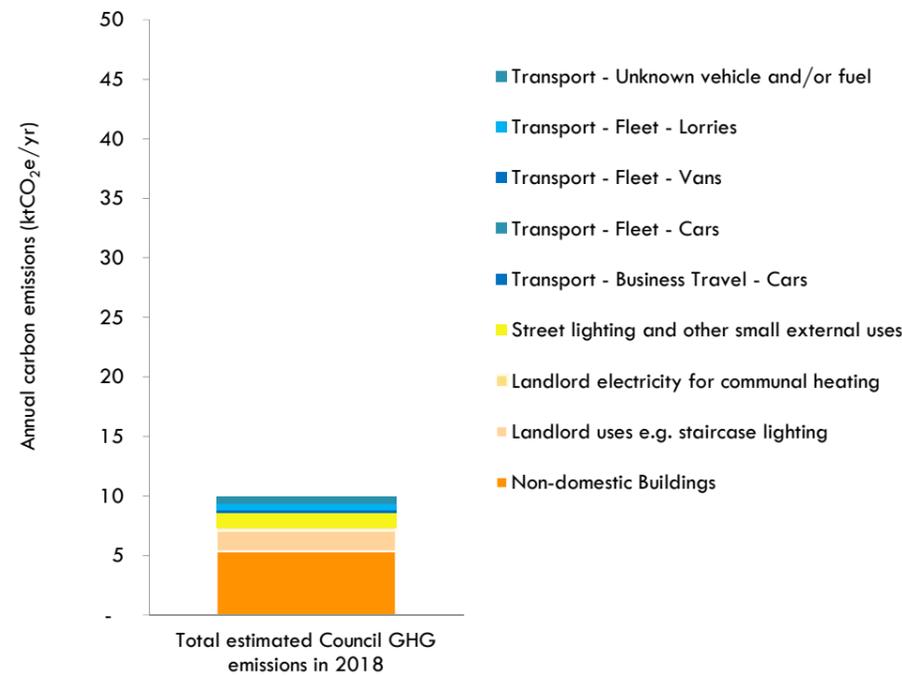
The Green House Gas reporting protocol defines a methodology for organisations to report emissions arising from their activity. It defines a convention to ensure that emissions are not double counted by different organisations, and identifies responsibility based on the root source of emissions.

Here we have taken a different approach, reporting the carbon emissions that the Council is responsible for based on use. This gives a more robust strategy to target reducing emissions, and is in line with the Committee on Climate Change approach to national emissions reporting.

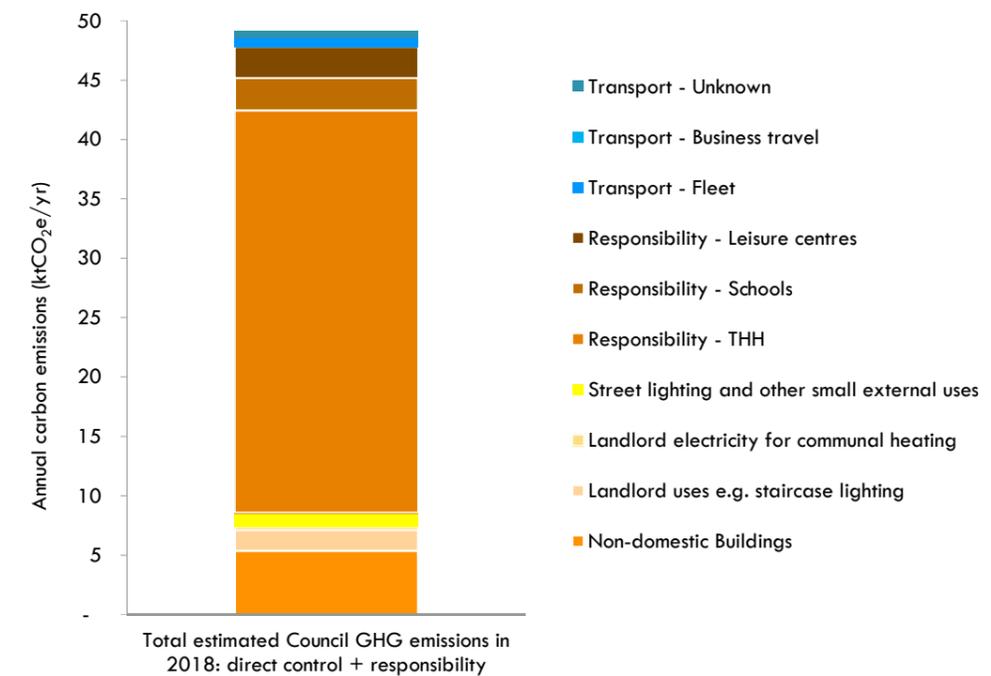
## The Council can influence further savings in the borough

The Council's direct greenhouse gas emissions account for only 1% of the Borough's emissions, and 3% when also accounting for those under its responsibility e.g. emissions from THH, schools and leisure centres.

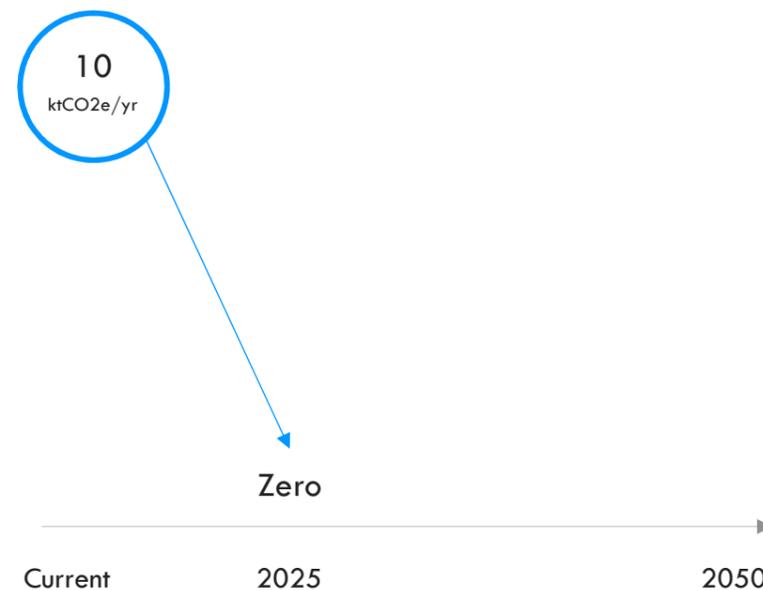
However, the Council also has some influence over a proportion of Borough-wide emissions for example through planning and transport policy, waste collection policy, and stakeholder engagement.



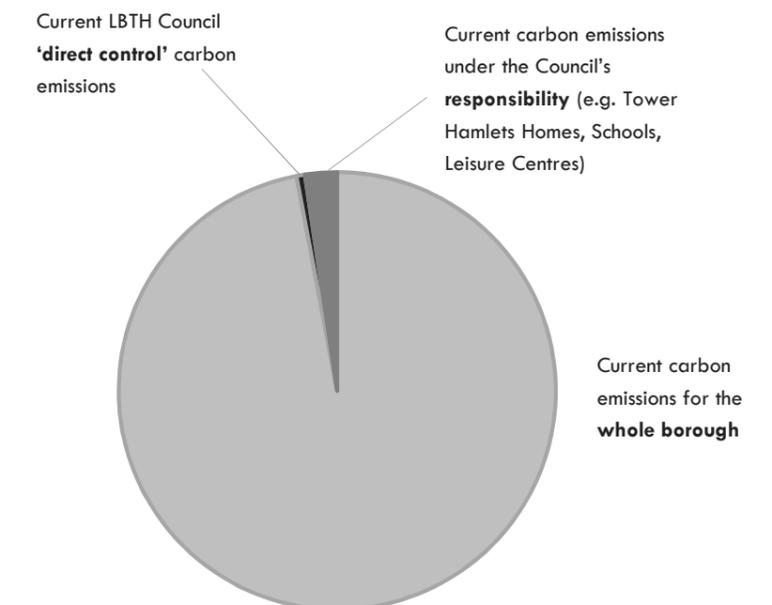
The Council's 'direct control' carbon emissions are dominated by buildings; emissions from landlord areas represent a non-negligible part



Emissions under the Council's 'direct control' and 'responsibility' (including those from Tower Hamlets Homes, schools and leisure centres) are much more significant than those under its direct control only. They need to be addressed as well.



The target is for the Council's 'direct control' emissions to achieve Net Zero Carbon by 2025



The Council's own emissions and those under its responsibility represent approximately 3% of the total Borough emissions

## Carbon gap analysis

The Council's emissions are already expected to reduce between now and 2025 due to a combination of factors

- **Management of assets** e.g. disposal / moving out of inefficient buildings, in particular Mulberry Place and the associated move towards a lower carbon new Town Hall. The Council may dispose / move out of other buildings but we have currently only accounted for Mulberry Place.
- **Carbon policy measures** from the Council (e.g. retrofitting, energy management, and tree planting) and from Government, as well as **market-driven changes** (e.g. uptake of electric vehicles). This is estimated to lead to a 10% reduction in building's carbon emissions by 2025, and a 30% reduction in emissions from cars and 10% from vans (by switching to EVs and hybrid vehicles).
- **Decarbonisation of the electricity grid:** as the carbon content of every unit of electricity used continues to decrease, emissions associated with electricity will reduce without any action from the Council.

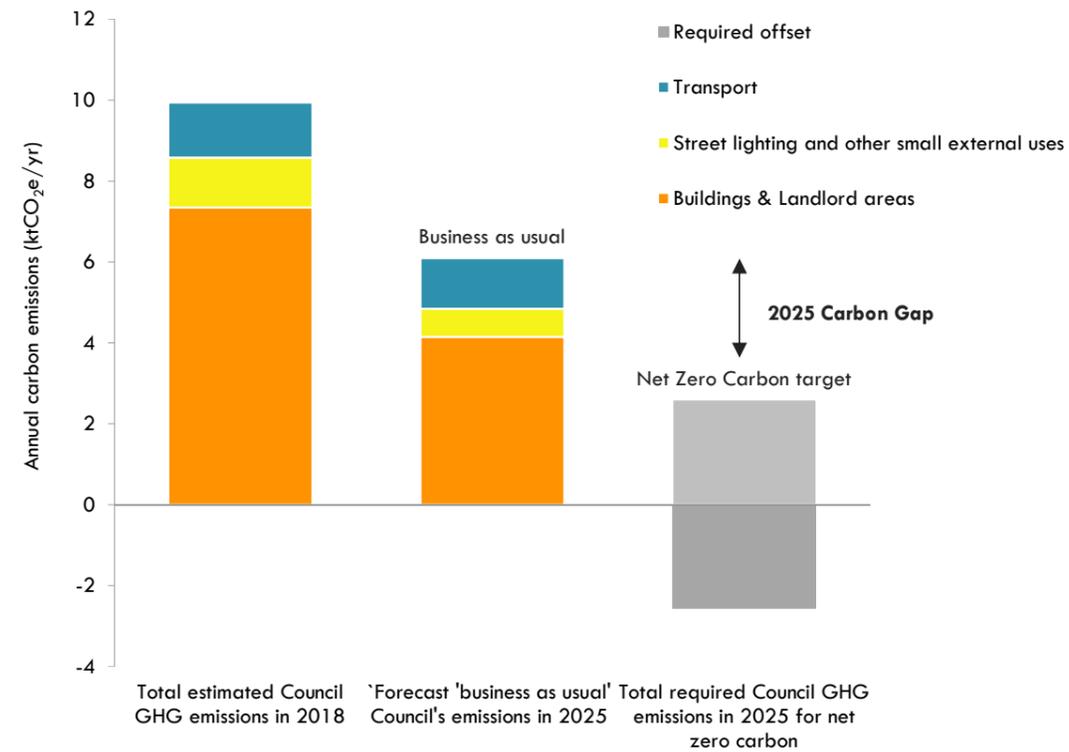
## The Council can and must do more, and faster

Overall, under the current "business as usual" trajectory, it is estimated that by 2025 the Council's direct control emissions would be approximately 40% lower than currently.

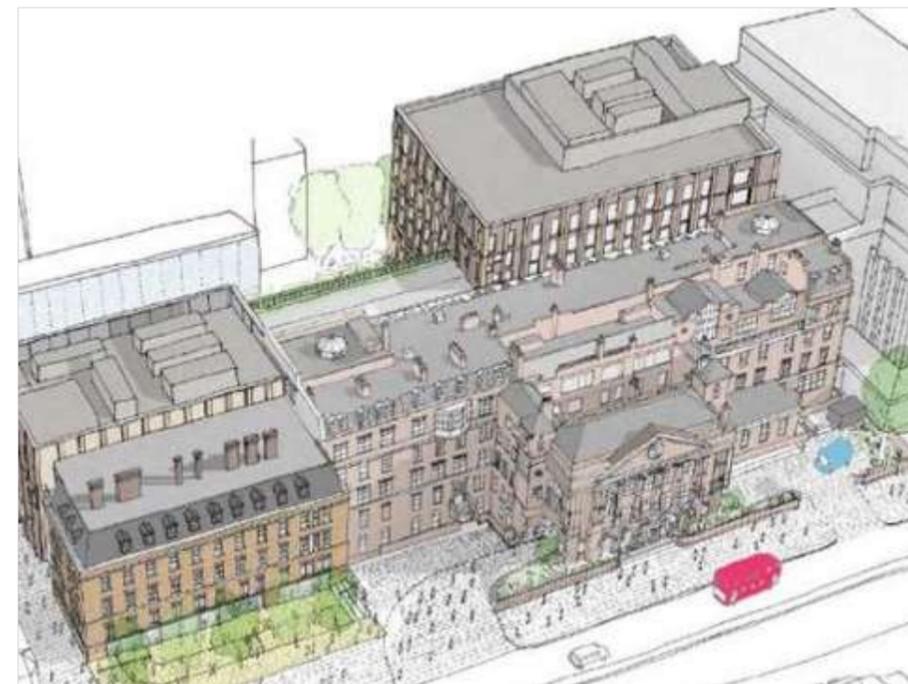
Unfortunately, this is **more than twice higher than what they need to be** if the Council is to achieve a 75% carbon reduction and offset the residual emissions in order for the Council to be zero carbon by 2025.

Actions required to deliver this objective are provided in this report.

*This analysis focuses on the Council's direct control emissions. When also accounting for emissions under the Council's responsibility (e.g. Tower Hamlets Homes, leisure centres and and schools), the gap would significantly increase.*



The carbon gap by 2025: estimated **direct control** emissions accounting for current carbon policy, stock management, and electricity grid decarbonisation will be lower than current emissions... but not low enough.



Switching Town Hall from Mulberry Place to the new Town Hall is a large part of the expected reduction by 2025 (based on planning stage carbon predictions for the new Town Hall) (© AHMM)

# Understanding greenhouse gas emissions from the borough as a whole

## Whole borough greenhouse gas emissions

The emissions for the borough as a whole are estimated to represent approximately 1,600 ktCO<sub>2</sub>e/yr. The size of the challenge to reduce greenhouse gas emissions is clearly shown. Although emissions are already forecast to reduce (see 'business as usual' bar), this drop is almost entirely due to decarbonisation of electricity. As the rate of national grid decarbonisation slows in the late 2020's the borough emissions are shown to level unless more actions are taken.

## Emissions are categorised by sector in a similar way to national reporting by the CCC

The categories used are the same as those used by the Committee on Climate Change for national reporting. The building sector has been split between known building emissions, and unknown additional metered energy, mainly electricity.

## Emissions are dominated by buildings and commercial electricity use

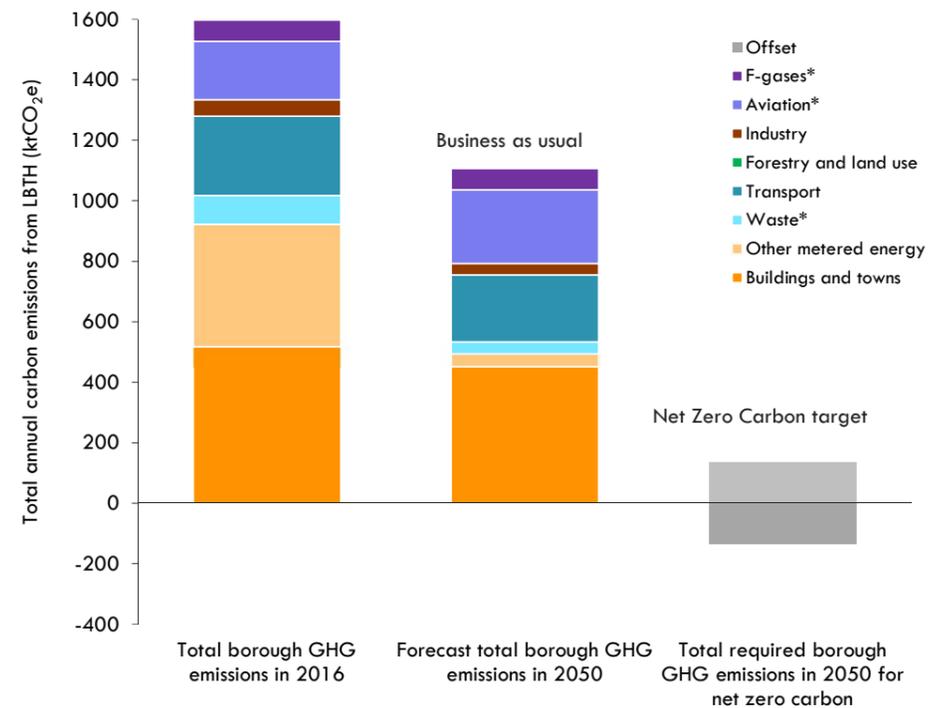
Current emissions are dominated by **heating in buildings**, and **electricity use**. As the carbon content of electricity reduces the importance of **reducing heating demand**, **switching to low carbon heat** (for example heat pumps) and **electrifying transport** become increasingly important.

The contribution from road transport has been calculated on a per capita basis from the total London emissions.

The contribution from aviation has been calculated on a per capita basis from the total national emissions.

## There is a big gap between business as usual and what is required for Net Zero Carbon by 2050

With the introduction by LBTH of required improvements over Part L at planning, the London Plan for larger developments (minimum 35% reduction over Part L + offset payments), the Ultra Low Emission Zone (ULEZ), and changes to the electricity grid there are already drivers for reducing emissions. However including an estimate of the effect of these changes in forecasting shows a considerable shortfall when compared to a zero carbon target. A step change in ambition and action is required.



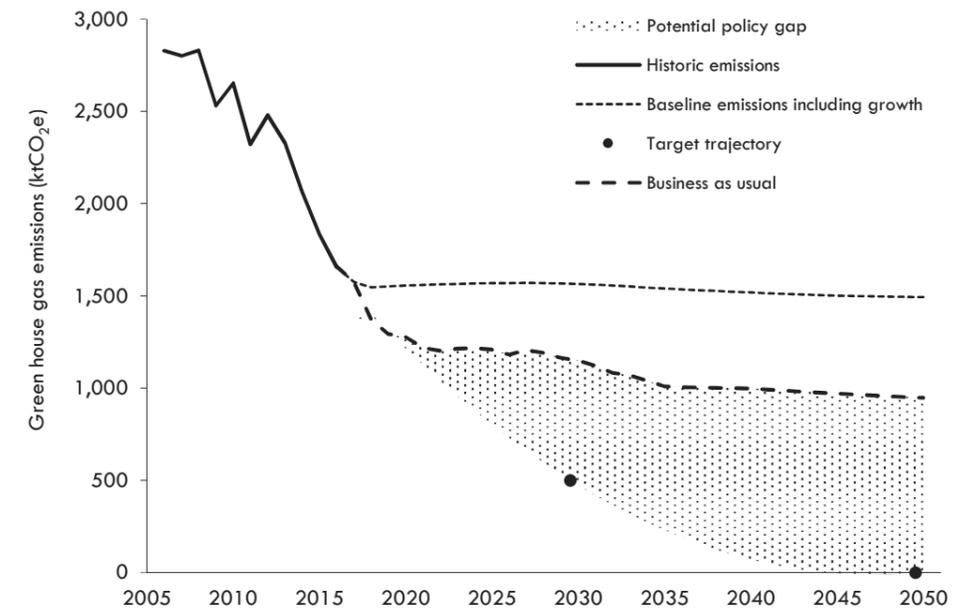
Latest reported emissions (2016) and forecast 2050 emissions based on a business as usual scenario with no major changes in policy. Emissions are currently set to reduce by 30% over the next 30 years, but are significantly higher than could be offset and so higher than what is required for net zero carbon. A net zero carbon scenario is shown for comparison.

### Etude carbon emissions forecast

Etude have developed a tool to forecast local emissions based on bottom up analysis for buildings and transport to show what effect current policy and potential policy changes for each building or vehicle type could have on the total emissions.

The bottom up analysis has been calibrated using building stock information from MHCLG housing stock, EPCs, DECs, and VOA information<sup>1</sup>. Reduction from other categories is estimated using the national CCC 'core' reduction estimates and local considerations<sup>2</sup>.

The estimates for buildings can be compared to the total electricity use from BEIS subnational metered data. Etude estimates that over three quarters of electrical consumption in Tower Hamlets is likely to be from uses not related to buildings. This is significantly larger than other London boroughs and therefore may be linked to intensive commercial office use such as server rooms. The estimated split has been shown as 'Other metered energy'.



Historic and forecast business as usual greenhouse gas emissions from the London Borough of Tower Hamlets between 2005 and 2050 showing a target trajectory for Zero Carbon in line with a 1.5C warming scenario. There is a large gap between the reduction likely due to the current rate of change and trajectory, and what is required to achieve Net Zero.



The large additional electrical consumption metered in Tower Hamlets is likely to be from server rooms and trading floors in Canary Wharf. These are not reported on building Display Energy Certificates (DECs). Image courtesy Green Cooling

1. MHCLG, Ministry of Housing Communities and Local Government; EPCs, Energy Performance Certificate database gives building attributes such as floor area and a modelled energy consumption; DECs, Display Energy Certificates give actual metered energy consumption for a sample of non-domestic buildings; VOA, Valuation Office Agency issue a periodic database of non-domestic buildings and energy consumption.

2. Net Zero: The UK's contribution to stopping global warming (2019) Committee on Climate Change

# The case for acting (now)

## The rate of change

The climate is warming. Sea level rises, the reduction of ice sheets and warming of oceans are happening at a rate faster than IPCC predictions, and projections have consistently underestimated the rate of climate change in each of their major reports since 1990. Urgent action must be taken now.

## Co-benefits

Many of the solutions proposed for reducing carbon emissions in Tower Hamlets have a positive effect on other important issues. For example:

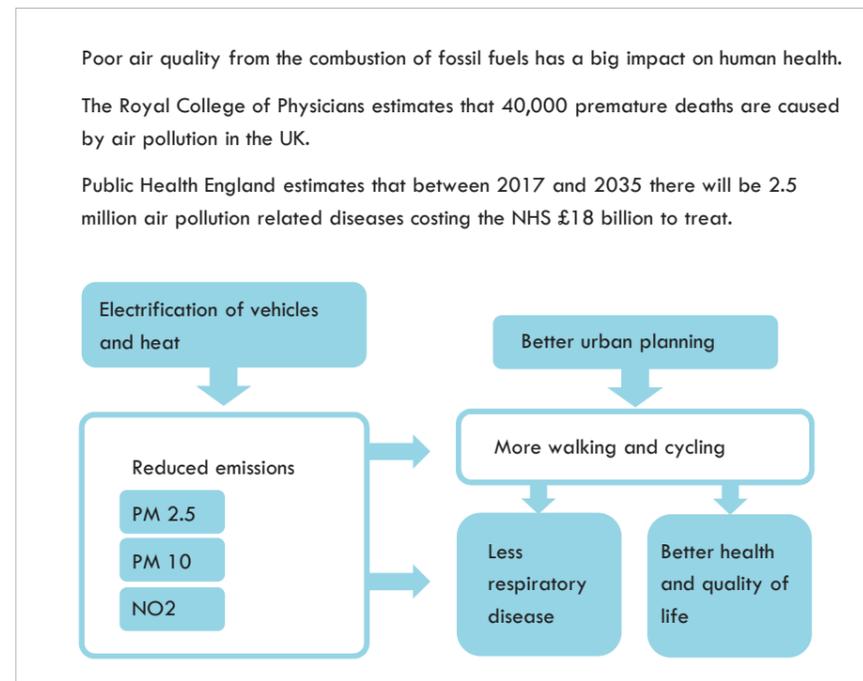
- **Improved air quality** – phasing out of petrol and diesel powered vehicles on our roads and gas boilers in our buildings will reduce local air pollution. This will result in improved health of the population, a reduction in avoidable premature deaths and savings for the NHS.
- **Fuel poverty / housing health / equality** – improving the energy efficiency of homes also reduces fuel poverty, reduces inequality and improves health.
- **Job creation** – commitment to climate change mitigation and adaptation will create new and sustainable jobs.
- **Green infrastructure / biodiversity** – Preserving green space and creating more woodlands and wetlands not only acts as a significant carbon sink, it also creates habitat for animals, birds and insects, and valuable leisure amenity for people.

## The solution is not to offset carbon

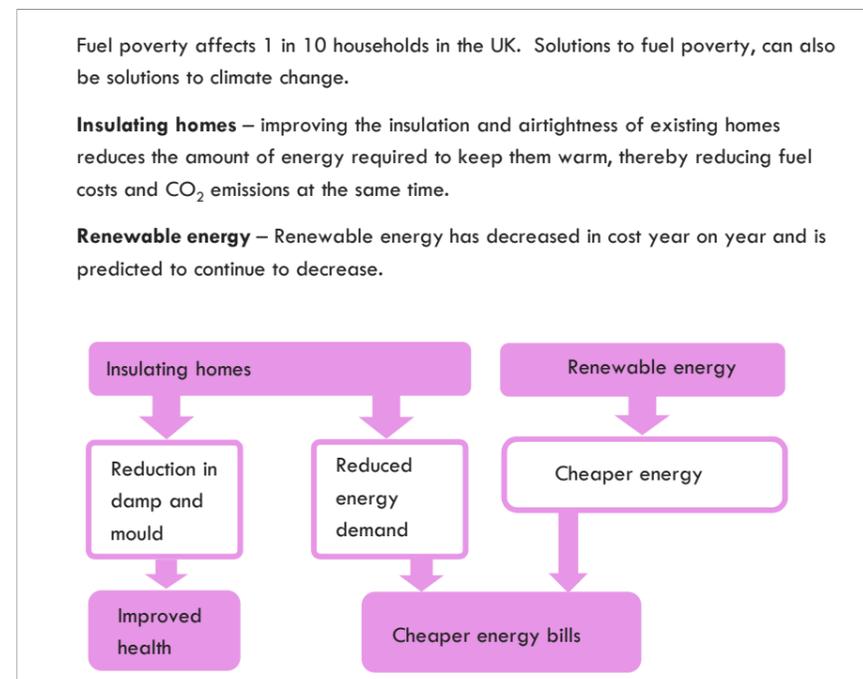
To achieve the global reduction in greenhouse gas emissions required to limit global temperature rises to 1.5°C, it is not enough to simply offset emissions of one area by reducing them somewhere else. Where it is possible to reduce greenhouse gas emissions locally or nationally this must be done.

Carbon offsetting, done well, can play an important **short term** role by funding land restoration, tree planting, energy efficiency measures and additional renewable energy capacity. However the **focus should be on eliminating reliance on fossil fuels and reducing emissions in the first place.**

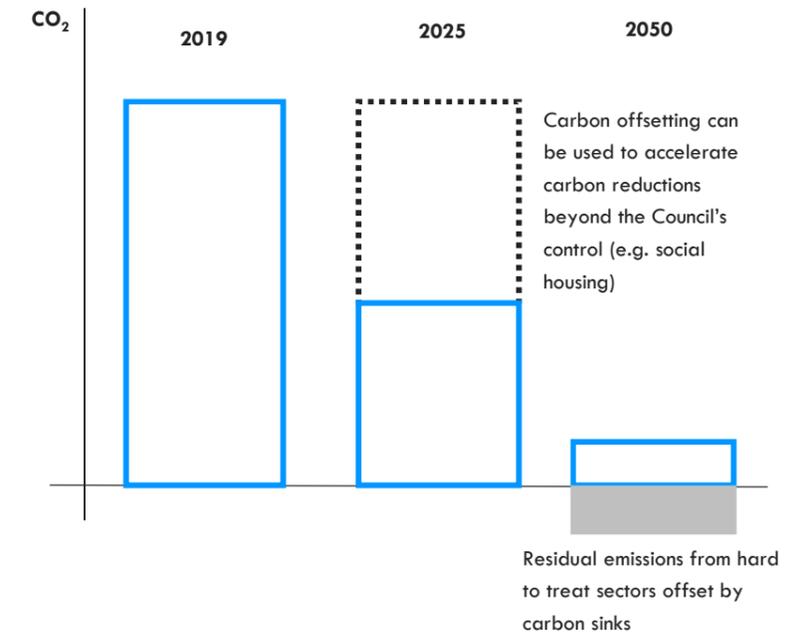
Carbon Capture and Storage may also have a place for mopping up unavoidable emissions from very hard to treat sectors such as certain industry niches. However the technology is unproven, expensive and must not be relied upon to justify business as usual.



Health benefits of improving local air quality by reducing emissions



Fuel poverty benefits of reducing emissions



The role of offset changes over time. Initially it can be used to fund projects for carbon reduction that might otherwise not have taken place. By 2040 to 2050 the only offsetting possible will be actual additional carbon reduction.

*“I am firmly of the view that the next 18 months will decide our ability to keep climate change to survivable levels and to restore nature to the equilibrium we need for our survival.”*

HRH Prince Charles

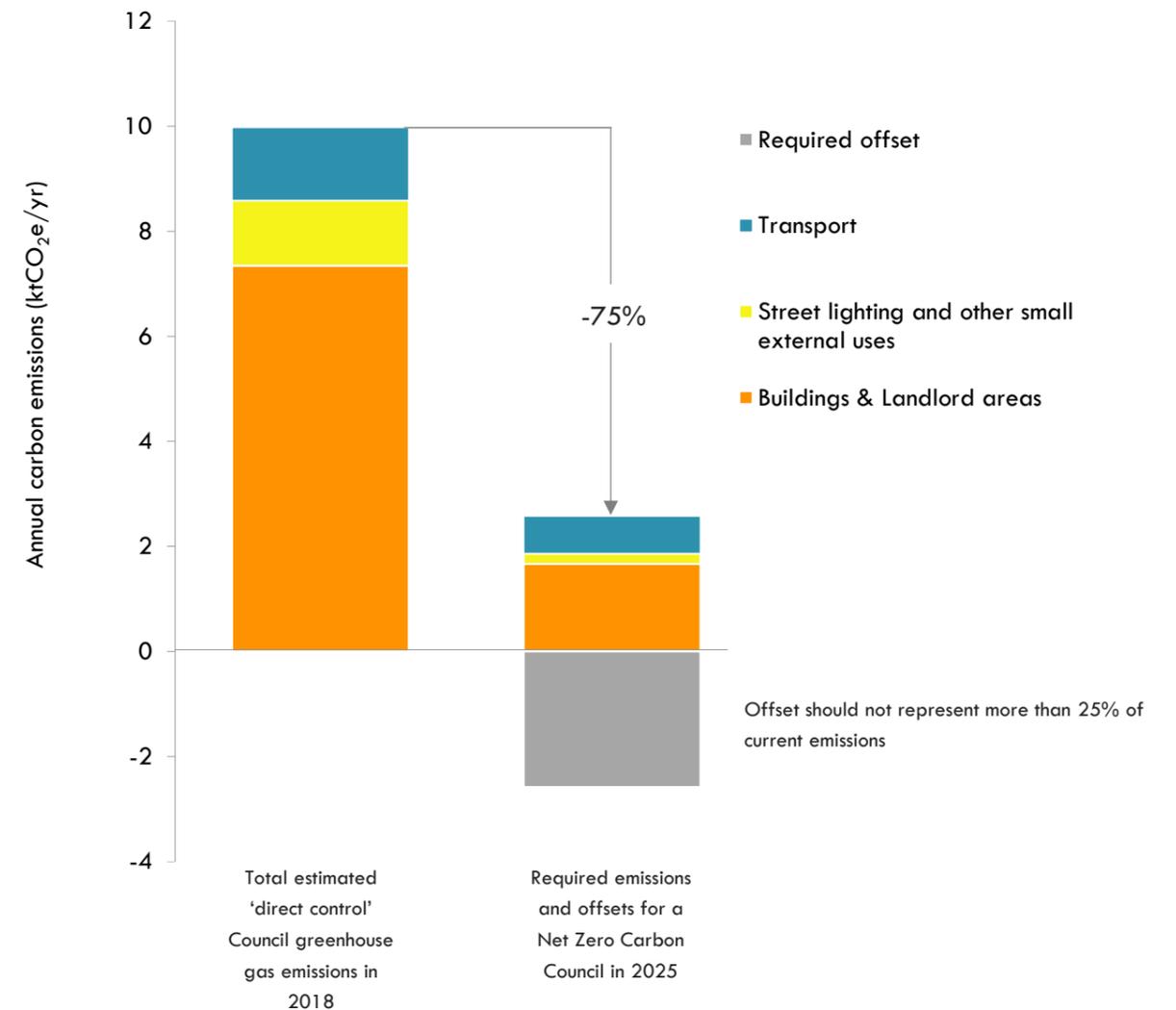
*“Confidence is very high that the window of opportunity – the period when significant change can be made, for limiting climate change within tolerable boundaries – is rapidly narrowing.”*

IPCC's Special Report on Climate Change and Land

# Becoming a Zero Carbon Council by 2025



- A closer look at the Council's direct emissions
- Decarbonising non-domestic Council buildings
- The electrification of the fleet
- Action plan



# A closer look at the Council's direct emissions

## A detailed understanding is required

A detailed assessment is important in order to identify priority actions and opportunities. We have used granular data as much as possible (e.g. metered energy use reported by CRC reports, mileage).

### Non-domestic buildings

The largest emitters are the Council's Town Halls and offices. Emissions from landlord areas are also significant, but spread over a large number of sites. While there are over 500 sites, 13 buildings are responsible for over 50% of these emissions.

Of the known floor area, just over 75% is heated by gas.

### Energy benchmarking indicates the potential for significant energy and carbon savings

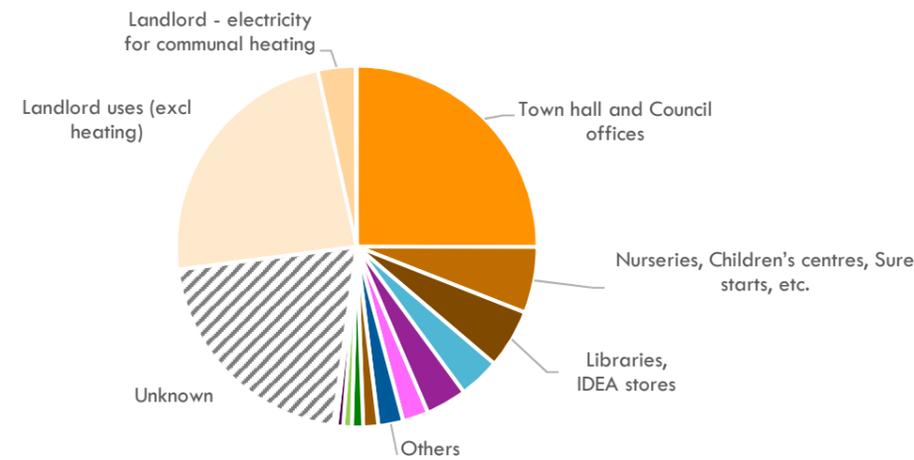
Where possible, average energy consumption was estimated for the main Council building types. For the majority, this indicates high energy consumption compared to CIBSE benchmarks, i.e. the potential for significant energy consumption savings. This is taken into account in the recommended actions.

### Transport: Council's fleet and business travel

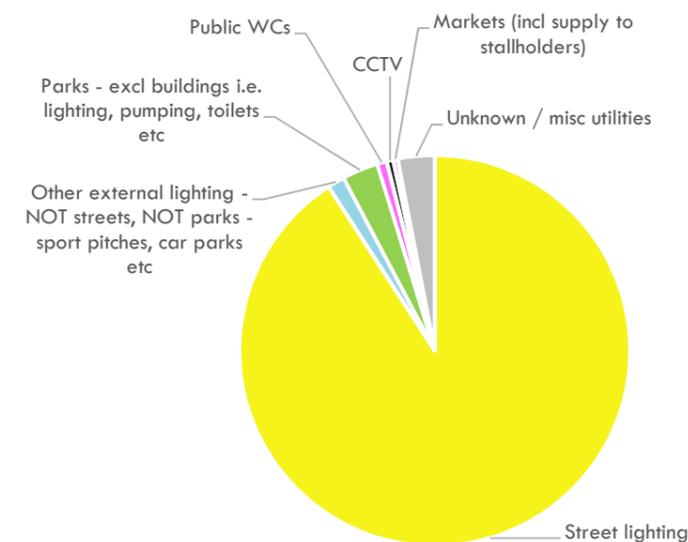
Transport emissions are from the Council's fleet, in particular its lorries which are mostly on diesel. There is only one hybrid and no electric cars. A large proportion have unknown vehicle type and fuel.

### Current renewable energy generation

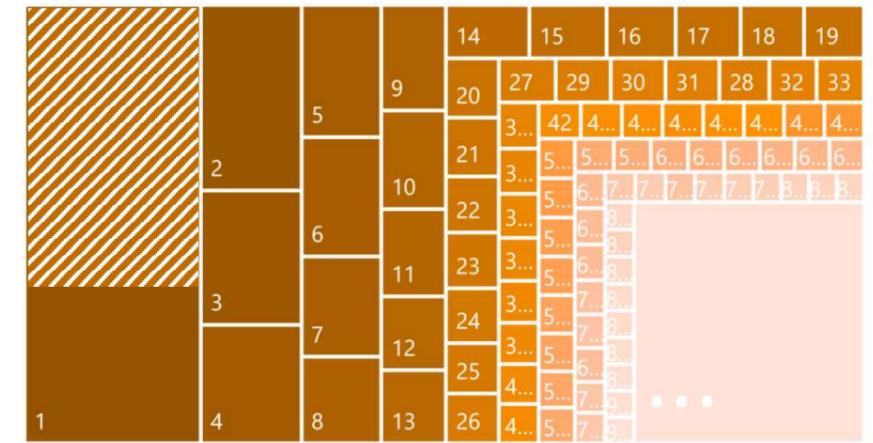
There is currently no known renewable energy generation (e.g. solar photovoltaics) on the Council's buildings.



Current breakdown of the Council's non-domestic building-based emissions. The total in 2018 is estimated at **7.3 ktCO<sub>2</sub>e/year**. (please note that Tower Hamlets Homes, schools and leisure centres are not 'direct control' emissions. They are covered in the following section.)

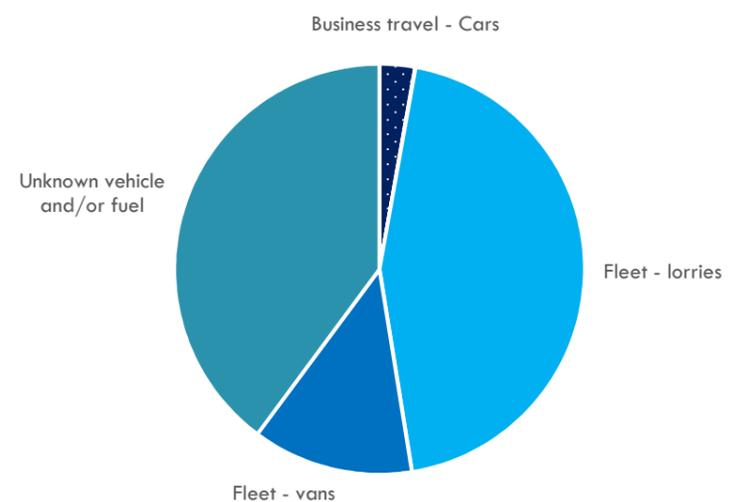


Current breakdown of the Council's emissions from external uses. The total in 2018 is estimated at **1.2 ktCO<sub>2</sub>e/year**. They are dominated by street lighting.



1 = Mulberry Place Town Hall – expected to reduce once it is replaced by the new Town Hall (the resulting expected reduction is shown as hashed area on the graph); 2 = John Onslow House; 3 = Albert Jacobs House; 4 = Jack Dash House

Proportional representation of carbon emissions from non-domestic buildings (each block is one site, except the lighter, bottom left block which groups several hundreds of the smaller ones); 13 buildings cover over 50% of building emissions; they include the Town Hall and many Idea stores / libraries



Current breakdown of transport emissions per vehicle type. The total in 2018 is estimated at **1.4 ktCO<sub>2</sub>e/year**. They are dominated by those from lorries, both due to miles travelled and type of fuel used

## Target: 80% on-site carbon reduction by 2025

At this initial estimate stage, we recommend targeting a 80% on-site carbon reduction from buildings and external energy uses by 2025. This is considered the maximum realistic on-site saving. With further grid decarbonisation, this would be equivalent to 90% on-site reduction by 2050.

## Improving the energy efficiency of existing buildings

Benchmarking indicates a significant saving potential through energy management and efficiency. We recommend a target of **50% reduction in energy consumption**, in line with the BEIS energy mission, to be achieved by 2025 for Council buildings, street lighting and most other stationary sources.

This should be achieved by improving the building fabric (insulation, airtightness), its services (ventilation, lighting, energy management) and, crucially, switching away from gas heating towards low carbon heat (e.g. heat pumps).

## Phasing out gas use

The majority of buildings should switch to a low carbon supply. Crucially, we have assumed that **95% of gas-heated buildings** will switch to a heat pump system by 2025.

Buildings currently served by district heating schemes (assumed to be on gas) should change to a low-carbon heat supply, whether Council-led or in partnership with energy suppliers, e.g. with TfL to utilise waste heat from the tube, with Canary Wharf occupiers to utilise heat from servers.

## Installing PVs

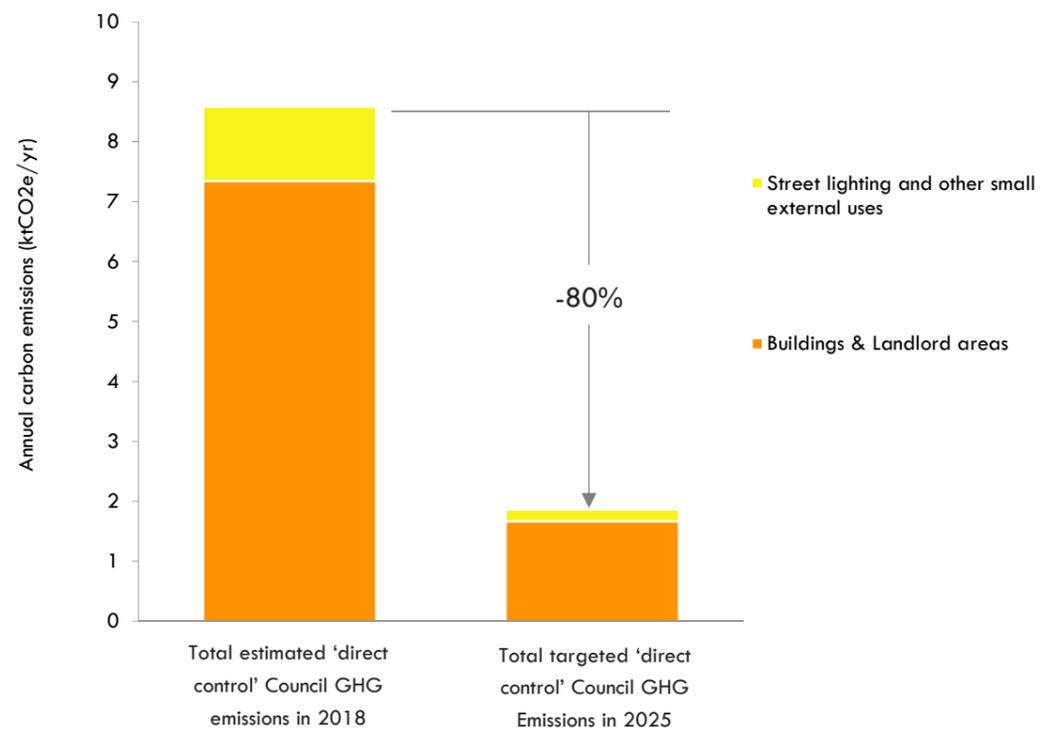
High-efficiency PVs should be installed on the Council's buildings. As an indication, installing PVs on 25% of the roof areas would represent 20,000 sqm or PVs, or 4.2MW. All roofs should be investigated, but the large ones first. In addition, approx. 20,000sqm PVs (or 4.2MW) should be installed over external areas (e.g. car parks or markets).

## Standards for new buildings

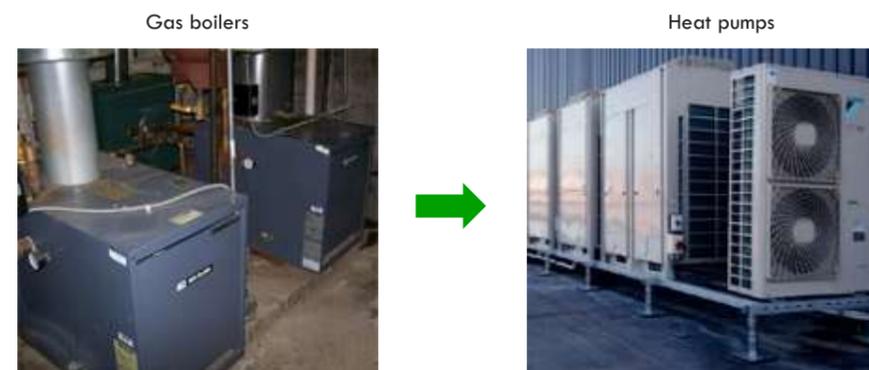
All new buildings should be Net Zero Carbon buildings.

## Different approaches for different building types

For smaller and simpler buildings such as community centres, landlord areas etc, the Council could develop standard carbon reduction packages of measures to be deployed.



Estimated strategy to 2025 decarbonisation of Council buildings and other stationary uses (direct control emissions)



Low carbon heat – We have assumed that 95% of the Council buildings will switching to heat pumps by 2025



PVs on all large Council buildings' roofs – for example, the transport / depot sites have significant roof areas, and potentially car park areas, which lend themselves well to large PV installations: Vehicle Testing Station, Blackwall (left); Car Pound (middle); Toby Lane depot (right).

## Two representative buildings

The Idea Stores selected as case studies are located in different types of building of different ages; for example, Cubitt Town Library is in a Grade II Listed Building, whereas Bow Idea Store is located in the ground floor of John Onslow House, a 4-storey office building of relatively modern brick construction (1990s). Both were selected as, in principle, all existing buildings will need significant refurbishment to achieve a zero carbon borough. This may include recently completed buildings.

## Each building counts

Establishing a **whole building retrofit plan** for each Idea Store that identifies the key changes required is recommended. This would include improvements to the building fabric for all buildings, as reducing heating energy use is a primary aim. **The greatest improvement in carbon emissions will come from changing the heating system to low carbon heat sources** (heat pumps). For these to be cost effective in operation, it is **also important that the building fabric performs well, and air leakage is low.**

In some cases, some flexibility and innovation may be needed to ensure that Heritage buildings can be preserved as functioning spaces in a Net Zero Carbon Borough.

Three initial surveys – an Infrared Thermography (IRT or thermal image) survey to identify the main deficits in insulation, an Airtightness test and a structural survey to establish whether the roof can be used for Photovoltaics – will form the foundation of the plan for each building.

## Investment in Council buildings is required

These refurbishments can be carried out over an extended period of time, but will be a challenging requirement for an already financially constrained service. Additional funding for upgrading buildings is required.

To give an idea of the scale of investment required,

- Cubitt Town Library would require an investment of £200k-£410k
- Bow Idea Store would require an investment of £200k-£1M



Cubitt Town Library



Bow IDEA Store

## Cubitt Town Library - 650m<sup>2</sup>

Triple glazing where Heritage concerns allow – secondary glazing otherwise	£130-250/m <sup>2</sup> GIFA
Thermal imaging survey and airtightness test to check insulation and air leakage and carry out repairs/remedial works where needed.	Imaging survey – low cost Remedial works - cost dependent on scope
Add insulation to all walls and insulation overlay on floor. External wall insulation where possible and internally elsewhere.	Walls – £70-100/m <sup>2</sup> GIFA depending on specifications and finish level
Insulate the roof internally	Approx. £10/m <sup>2</sup> GIFA
Upgrade the lighting throughout to LED	£20-£120/m <sup>2</sup> GIFA depending on whether relamping only or new light systems
Replace the existing boiler with a low carbon heat pump	£80-£150/m <sup>2</sup> GIFA depending on heat demand and on need for wider system upgrades (e.g. radiators).
<b>Total</b>	<b>£330 to £630/m<sup>2</sup> GIFA (indicative)</b>

Cubitt Town Library - list of suggested changes to improve carbon performance

## Bow Idea Store – 1000m<sup>2</sup>

Review the existing cooling system in the entire building and upgrade to a heat recovery based system with centralised time and temperature control. Install/improve heat recovery in mechanical ventilation systems	£25-30/m <sup>2</sup> GIFA for new AHU and controls £40-50/m <sup>2</sup> GIFA for new high efficiency chiller £150-200/m <sup>2</sup> GIFA for new fan coils and ventilation ducting
Replace the existing boiler with a low carbon heat pump or – preferably - integrate with the mechanical system	£100-120/m <sup>2</sup> GIFA – savings available by avoiding new chiller costs (see above)
Triple glazing to the single glazed curtain wall	£200-500/m <sup>2</sup> GIFA (depending on extent of curtain walling)
Upgrade the lighting throughout to LED	£20-£120/m <sup>2</sup> GIFA depending on whether relamping only or new light systems
Carry out a thermal image survey to check insulation and air leakage and carry out repairs/remedial works where needed	Imaging survey – low cost Remedial works - cost dependent on scope
<b>Totals</b>	<b>£200 to +£1000/m<sup>2</sup> GIFA (indicative) depending on scope</b>

Bow IDEA Store – list of suggested changes to improve carbon performance  
(Total building area is 5500m<sup>2</sup>)

## Scope for improvement

The 'best practice' benchmark energy performance for library buildings in the UK is around 30% better than Cubitt Town Library and 60% better than the Bow Idea Store. This shows that there is significant room for improvement in terms of energy use reduction. As a guideline, the target should be to approximately halve the energy consumption in each building in order to achieve the overall target of an 80% on site carbon reduction.

### Cubitt Town Library

From a brief initial visual survey, key building features include:

- Solid wall construction with single glazing
- Gas fired boiler – fairly recently changed from oil
- Natural ventilation
- Old fluorescent lighting throughout

The priorities for carbon reduction therefore include:

- Focus on fabric – improve insulation, airtightness and ventilation strategy
- Replace the lighting as part of routine maintenance work
- Change the existing boiler to a heat pump within 10 years

### Bow Idea Store

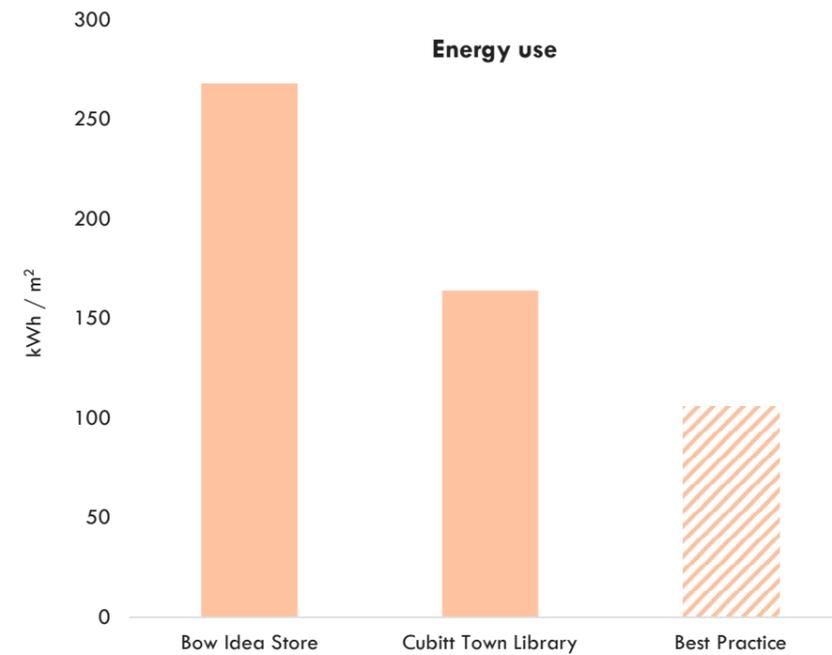
From a brief initial visual survey, key building features include:

- Substantial single glazed curtain walling
- Mechanical ventilation
- Mechanical cooling. From the air conditioning inspection report (dated 2017), there are/have been some issues with the system controls
- The current electrical consumption at Bow is high. Other Idea Stores do not have a similar profile, so it is probable that the air conditioning system and direct electric heating are the principal reasons

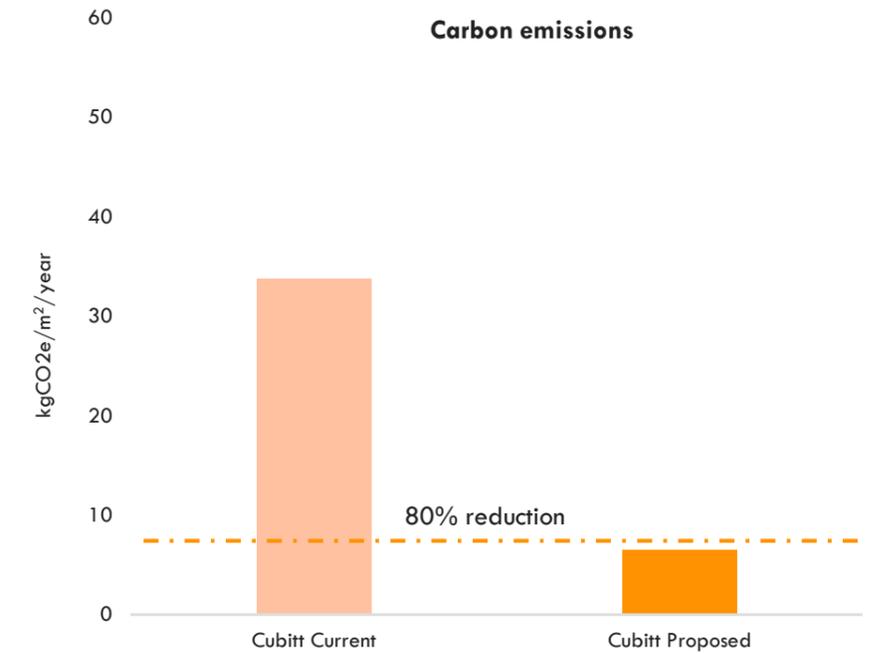
The priorities for carbon reduction therefore include:

- Replacement windows with triple glazing and a draft lobby
- Review mechanical services to ensure air handling units for mechanical ventilation have heat recovery and review heating/cooling controls
- Complete lighting overhaul to include LED fittings
- Review building insulation – is there any cavity wall insulation? Retrofit full fill cavity wall injection and improve airtightness.

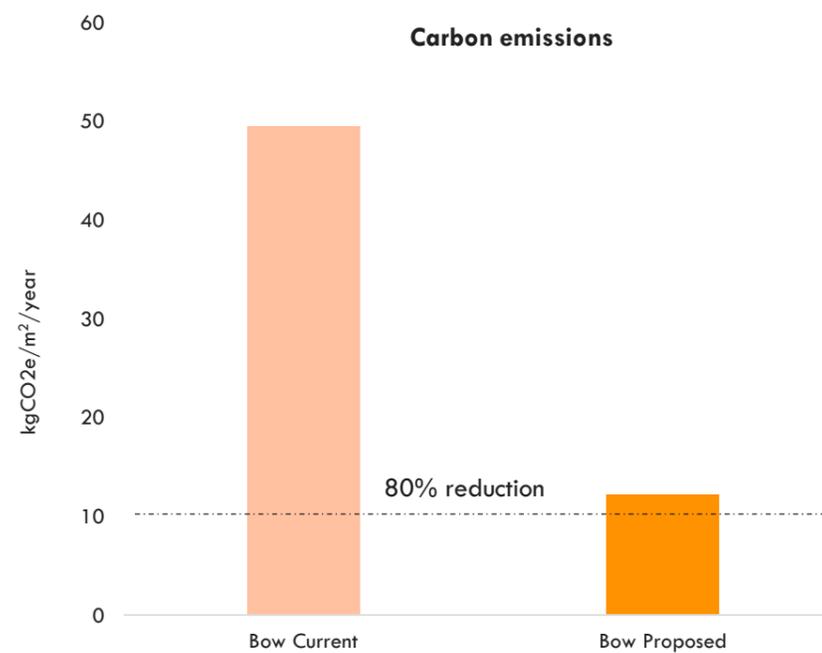
Jon Onslow House is one of the highest carbon emission buildings in the Tower Hamlets portfolio. Therefore, although some issues could be addressed for the Idea Store in isolation, a comprehensive review of the whole building may give a much better overall emissions reduction.



Current energy consumption of Bow IDEA stores and Cubitt Town Library vs best UK practice



Current CO<sub>2</sub> emissions vs what the proposed actions can achieve at Cubitt Town Library



Current CO<sub>2</sub> emissions vs what the proposed actions can achieve at the Bow IDEA store



Diagram showing the cost involved and the energy savings possible (© Investment Property Forum, 2017. Costing Energy Efficiency Improvements in Existing Buildings, Currie & Brown)

# Electrification of the Council's fleet

**Target: a 50% carbon reduction by 2025**  
**a 85% carbon reduction by 2030**

These are recommended targets for the Council's fleet and business travel vehicles, at this initial estimate stage. Electrification of transport will not only bring significant carbon savings, but also important co-benefits including air quality, noise, and reduced contribution to the urban heat island.

## Electric vehicles

Electric vehicles use 80-90% less energy than those powered by fossil fuels, due to the efficiency of electric motors and their ability to brake regeneratively. A typical electric vehicle charged in the UK currently produces around 32-43g CO<sub>2</sub> per km; for a typical electric car this would reduce to just 13-17g CO<sub>2</sub> per km by 2030 and 4-5g CO<sub>2</sub> per km by 2050, thanks for further decarbonisation of electricity. This compares to an EU average of 121g CO<sub>2</sub> per km for petrol and diesel cars sold in 2018.

It is recommended that the Council procures **pure electric vehicles rather than hybrid vehicles**. Where pure electric vehicles are not yet available it may be better to wait rather than to purchase hybrid vehicles, which are mechanically more complex and expected to be made obsolete by advances in battery technology in the next few years.

## Accelerating the natural replacement cycle

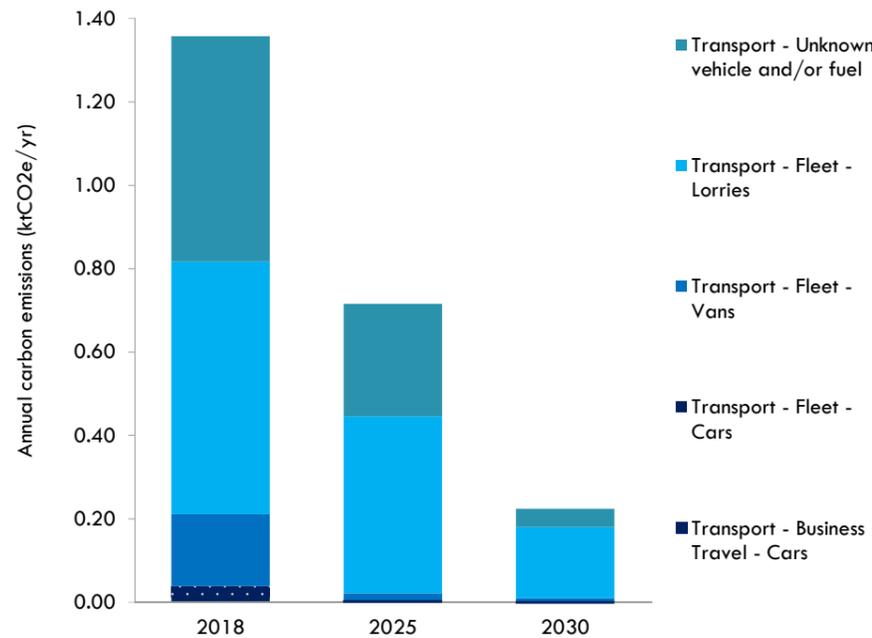
**Cars and vans.** All cars and van trips should be made by electric vehicles by 2025, leading to 90% reduction in emissions. We have assumed that the normal replacement cycle is 7 years. To limit wastage it is important that **the Council immediately stop purchasing petrol and diesel vehicles** where viable electric alternatives are available

**Lorries.** We recommend engaging with manufacturers early; this could be done in partnership with other councils to send strong signals to the market and stimulate product development. A 30% reduction in carbon emissions by 2025, and a 70% reduction by 2030 are the recommended target.

**Fleet management** should prioritise the of electric vehicles use over the others.

## Charging infrastructure

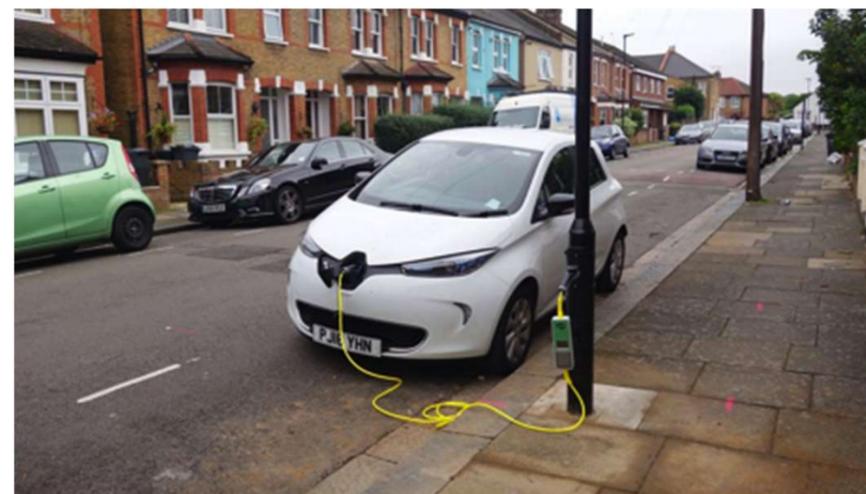
The Council should develop a strategy with UKPN and other stakeholders to identify the most appropriate locations and types of charger. It is recommended that a combination of slow (3kW) and fast (7-22kW) chargers be installed.



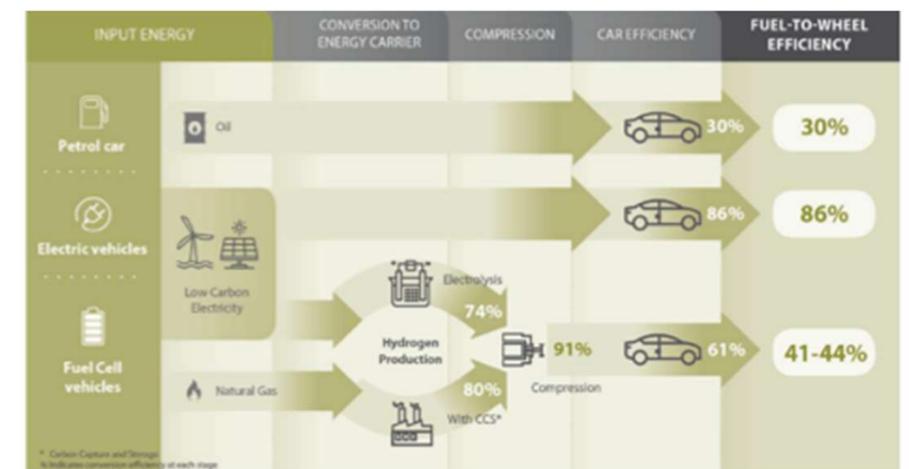
Carbon pathway for 2018-2025-2030 showing decarbonisation of the Council's fleet and business vehicles



Image of current latest commercially available electric car © Nissan



An electric vehicle charging point integrated with a lamp post on a UK street. Chargers that do not offer debit/credit card payment should be avoided if possible, as these may be phased out by legislation.



Efficiency of battery electric vehicles vs combustion engine and hydrogen vehicles © Committee on Climate Change

## Quantifying the residual emissions

We have estimated that the Council will have to reduce its direct control emissions by 75% by 2025, down to approximately 2.5ktCO<sub>2</sub>e/year. These residual emissions will have to be offset for Tower Hamlets Council to be 'Net Zero Carbon'.

## Residual emission allowance

The Committee on Climate Change indicates that in a net zero scenario, residual emissions in 2050 should be no more than 3% of current emissions across the UK. Over 80% of residual emissions in 2050 are forecast to occur in the aviation, agriculture, industry and waste sectors.

This means that acceptable residual emissions in other sectors such as buildings and transport within Tower Hamlets are almost zero.

## Strategies to address residual emissions

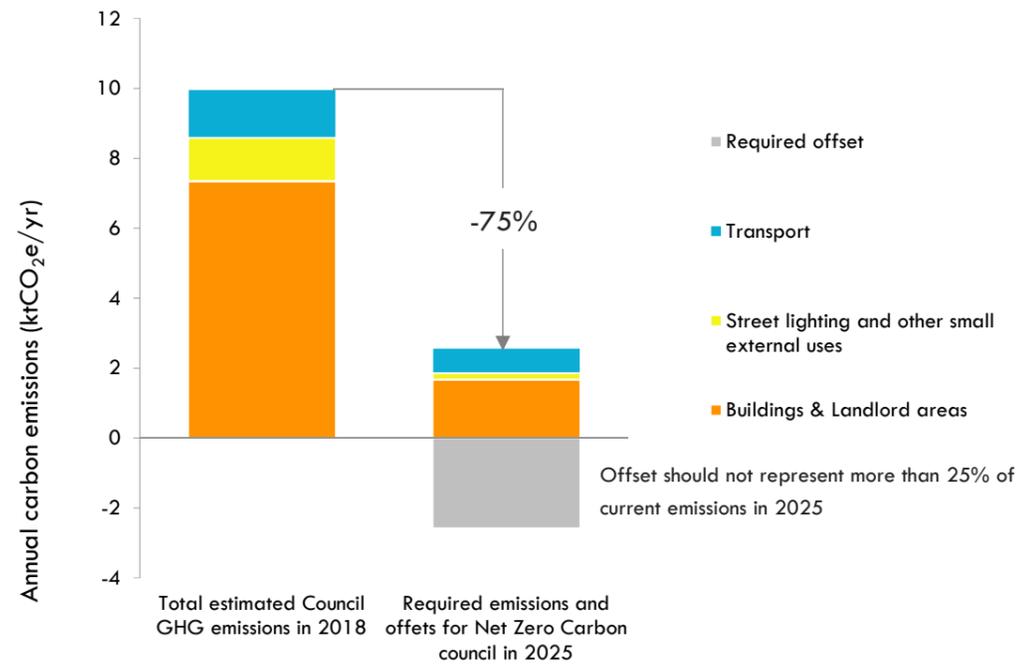
**Forestation** offers the only practical strategy to remove atmospheric carbon. Total potential is very limited, therefore emissions must be reduced as much as possible first. In Tower Hamlets the total potential tree planting will only make up a very minor fraction of the offset requirement, therefore trading with other local authorities will be required.

**Housing Retrofit** in Tower Hamlets to fit heat pumps and improve building fabric efficiency can reduce emissions and fuel poverty, while improving air quality. It cannot reduce atmospheric carbon however.

**Solar Panels** fitted to buildings in Tower Hamlets use sites that have already been developed to provide cheap and clean electricity that is essential to power heat pumps and electric cars. It also cannot reduce atmospheric carbon.

**Renewable Energy** funded by LBTH but installed on greenfield sites outside of the borough contributes toward decarbonisation of the electricity grid. It also cannot reduce atmospheric carbon.

**Carbon Capture and Storage (CCS)**. Drax power station is amongst a handful of Bioenergy with Carbon Capture and Storage pilot projects worldwide, which the CCC view as an essential technology. It is currently capturing just 1 tonne of CO<sub>2</sub> per day however, so is not a viable option at present.



LBTH Council's residual 'direct control' emissions and required offsets in 2025



DRAX Power Station is operating a Bioenergy with Carbon Capture and Storage pilot project, capturing just 1 tonne of CO<sub>2</sub> per day.

Recommended Strategy	2020 - 2030	2030 - 2040	2040 - 2050
Reforestation or afforestation	✓	✓	✓
Housing retrofit in Tower Hamlets	✓	✓	✗
Solar photovoltaic panels in Tower Hamlets	✓	✓	✗
Renewable energy outside of LBTH	✓	✗	✗

Potential strategies to offset residual emissions in LBTH and whether they should be used in the short term, medium term and/or long term



Reforestation and afforestation are currently the only commercially available options for removing carbon emissions from the atmosphere.

## Acting now

This page summarises the actions recommended in the following areas. The Committee and Climate Change categories have been used to ensure consistency with the national 'Net Zero Carbon' plan.

Power
Buildings
Transport

### Power

	<p><b>Install approximately 20,000 sqm PVs on the Council's non-domestic buildings</b></p> <p>Start with the largest roof areas. The targeted installed capacity should be at least 4.2MW.</p>	Sustainable Development team to develop costed solar PV programme by August 2020
	<p><b>Renewable power</b></p> <p>Ensure that electricity supply to all the Council's assets is on a 100% renewable tariff or Power Purchase Agreement.</p>	Already in place. Energy services team to undertake an on-going review of utility contracts (including gas) required

### Buildings

	<p><b>Start retrofitting existing buildings owned and operated by the Council (e.g. Council's offices)</b></p> <ul style="list-style-type: none"> <li>Improve building energy efficiency: insulation, improved airtightness and better windows</li> <li>Install Mechanical Ventilation with Heat Recovery (MVHR) wherever possible</li> <li>Retrofit heat pumps</li> <li>Use energy management to reduce energy use</li> <li>Install PVs</li> </ul> <p>An 80% carbon reduction on-site should be achieved on average.</p>	Technical Services to develop costed retrofit plan for the top 15 carbon emitters by May 2020. Indicative costs for two case study buildings have been included in this report.
	<p><b>Set best practice energy standards of new buildings built or acquired by the Council.</b></p> <p>This should be consistent with BEIS energy mission to halve energy use in new buildings. Passivhaus or equivalent should be considered and an assessment against Net Zero Carbon should be required.</p>	Housing and regeneration team to set new standards by March 2020. Every new development to require a Zero Carbon Plan.
	<p><b>Commit to Net Zero Carbon for the new Town Hall</b></p> <p>Review the design and energy strategy with the aim of improving the building fabric and installing additional renewable energy.</p>	Whitechapel Civic Centre team to prepare Zero Carbon Plan for the Town Hall by March 2020.
	<p><b>Complete the replacement of all inefficient street and car park lighting with efficient LEDs and improve controls to save energy</b></p>	Highways to review LED roll-out by May 2020 and accelerate if required to meet 2025 target.
	<p><b>Work with UKPN to prepare tomorrow's electricity grid in Tower Hamlets (grid reinforcement)</b></p> <p>The London Borough of Tower Hamlets should work with UKPN to ensure there is a plan in place for grid reinforcement to enable the shift to zero carbon (e.g. more decentralised renewable energy, electrification of transport, wider heat pump uptake).</p>	Planning and infrastructure team to organise Net Zero Carbon meeting with UKPN by March 2020.

### Transport

	<p><b>Replace the Council's diesel and petrol cars with electric cars</b></p> <p>Accelerate the replacement cycle so that 95% of Council cars are electric by 2025</p>	Transport Services Unit to prepare costed car replacement plan by June 2020.
	<p><b>Replace the Council's diesel and petrol vans with electric vans</b></p> <p>Accelerate the replacement cycle so that 95% of Council vans are electric by 2025</p>	Transport Services Unit to prepare costed van replacement plan by June 2020.
	<p><b>Install electric charging points for the Council's fleet</b></p> <p>The service could be extended at Council's buildings and carparks for staff. This should include evaluation of charging points on non council land such as Housing Estates.</p>	Technical Services Unit to propose costed plan for installation of EV charging points by August 2020.
	<p><b>Start the replacement of the Council's lorries with low emission alternatives as soon as they are available</b></p> <p>30% of Council lorries should be low emission by 2025</p>	Transport Services Unit to undertake analysis of current available options by June 2020.
	<p><b>Electrify all remaining vehicles</b></p> <p>Consider the electrification of the Council's remaining vehicles (e.g. diggers, lawn mowers)</p>	Transport Services Unit to complete costed feasibility study by June 2020.

## Acting now

This page summarises the actions recommended in the following areas. The Committee and Climate Change categories have been used to ensure consistency with the national 'Net Zero Carbon' plan.

Waste
Forestry, land use and agriculture
Other sectors
Organisational readiness and commitment

### Waste

<b>Conduct a waste inventory to understand better where Council waste comes from, so that a recycling target for waste from all Council buildings by 2021 can be set</b> Once this is understood, explore ways to minimise the waste generated, look for alternatives for any non-recyclable waste.	Waste team to tender for external expertise to undertake waste inventory by October 2020.
<b>Introduce food waste bins in all office areas</b> Achieving a target of zero organic waste to landfill by 2025 will require a behavioural shift in the way we do things. Food waste bins should be collected daily and placed in a centralised location ready for collection.	Facilities management & Waste team to review feasibility by April 2020.
<b>Target exemplary levels of recycling of waste materials from Council construction projects</b> A minimum target of 95% should be set and the proportion of energy recovery should be minimized over time.	Housing and regeneration team to set new waste requirements by March 2020.
<b>Grow waste and circular economy awareness</b> Take responsibility for knowing where the waste from the borough is going, and what happens to it.	The Council's waste strategy covers the circular economy and should be used.

### Forestry, land use and agriculture

<b>Tree planting schemes</b> Increase tree planting on Council owned land and parks; carry out surveys to establish where trees can be planted. It is not possible to plant enough trees to meaningfully offset total emissions, so as many trees as possible should be planted.	Programme to plant 1,000 new street trees (by 2021) is under way. Community tree planting projects to commence in 2020.
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### Other sectors

<b>Procurement of goods and services</b> Procurement and Sustainable Development Team to review councils procurement policies and tender documentation by May 2020 to ensure carbon emission requirements are incorporated as part of all relevant new contracts.	Procurement and Sustainable Development Team to review councils procurement policies and tender documentation by May 2020 to ensure carbon emission requirements are incorporated as part of all relevant new contracts.
Base refrigerant selection in cooling systems used by the Council on a principle of 'lowest available Global Warming Potential (GWP) refrigerant'.	Technical Services have information available to review .

### Organisational readiness and commitment

<b>Create and resource a Zero Carbon team</b> The team, part of the Sustainable Development Team, will have responsibility for implementing the Zero Carbon Roadmap, collect and monitor CO <sub>2</sub> emissions data.	Sustainable Development Team to make proposal for overall ownership, leadership and delivery of Zero Carbon target by February 2020. Where necessary and internal climate change taskforce will be set up with the responsibility to accelerate change.
<b>Collect data on energy and CO<sub>2</sub> from Council operations, reporting annually</b>	Zero Carbon Team to undertake assessment in October 2020.
<b>Develop the Carbon Reduction Action Matrix</b> Implicate and involve all services for maximum impact and reach. Adjust the Matrix of actions developed by Etude.	Zero Carbon Team to update Carbon Reduction Action Matrix by March 2020.
<b>Create internal policies on waste, procurement and travel that are aligned with overall 2050 objectives</b> Internal policies guide Council staff on targets for waste, procurement and travel and give weight to initiatives developed.	Each team (Waste, Procurement, Transport) to update their policies to refer to Zero Carbon



## A clear trajectory

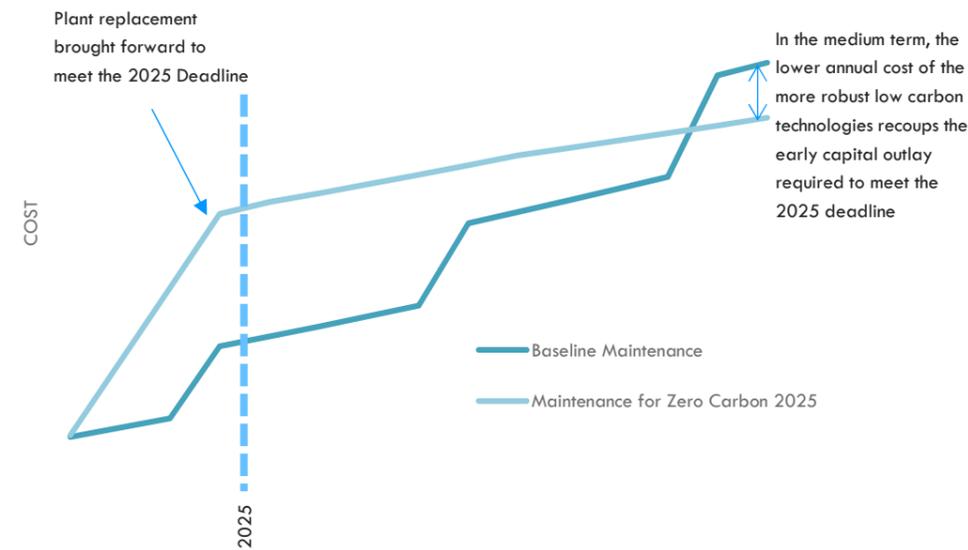
To minimise the capital cost of achieving net zero carbon it is important that a strategic approach is adopted which builds on the opportunities presented by estate and asset management events. These might include:

- **Reduce** - reduction in estate size through agile working implementation delivering estate, energy and carbon savings together with improved productivity.
- **Renew** - investment in new estate and disposal / redevelopment of poor quality estate. These events present a major opportunity to achieve net zero carbon standards. It should be noted that improved performance is not a given though and will depend on the quality of design, construction and commissioning. Also, the embodied carbon impact of the development should be considered and minimised.
- **Improve** - investment to improve the quality of existing assets (e.g. replacing aged cladding or heating system) presents a very significant opportunity to make significant performance gains for little additional cost.
- **Enhance** – significant savings can be achieved by addressing backlog maintenance and through enhanced management regimes with improved monitoring of performance and building setup

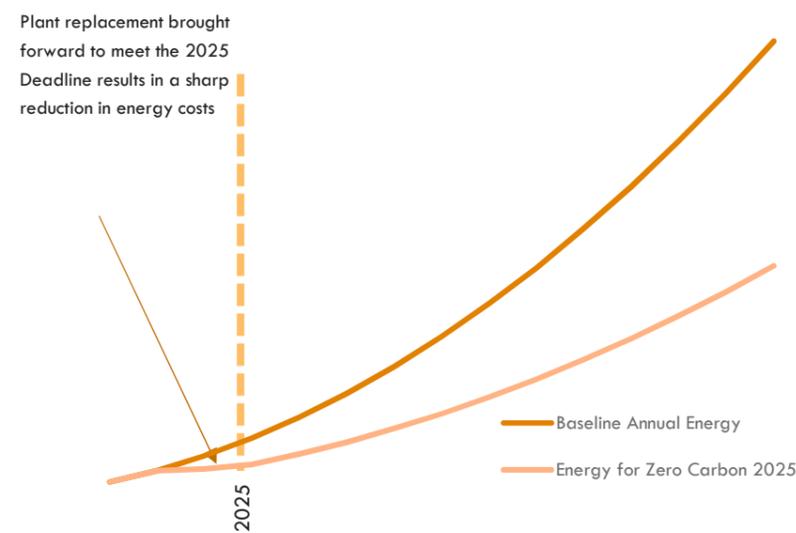
A costed plan is required that covers each Council asset, prioritising those with the greatest impact and where there is a significant improvement opportunity, for example large buildings with poor performance and those with forthcoming investment. Research has shown that, where refurbishment is already planned, additional investment of just £50/m<sup>2</sup> can achieve very carbon savings of over 400 kgCO<sub>2</sub>/m<sup>2</sup> over 15 years together with significant savings in running costs compared to 'like-for-like' renewals.

For large poorly performing assets that are to be retained, consideration should be given to bringing forward planned investment cycles to energy and carbon secure savings and improved building performance. Programmes such as London RE:FIT can help to enable such investments by guaranteeing the associated energy savings that underpin the investment case.

A costed investment plan should detail the timetable for improving the standard and management of existing assets, together with clear specifications and standards for new assets including buildings, vehicles or IT systems. This approach will leverage existing council expenditure to help deliver a substantial part of the necessary investment.



Cumulative operating costs – 15 years



Cumulative energy costs – 15 years

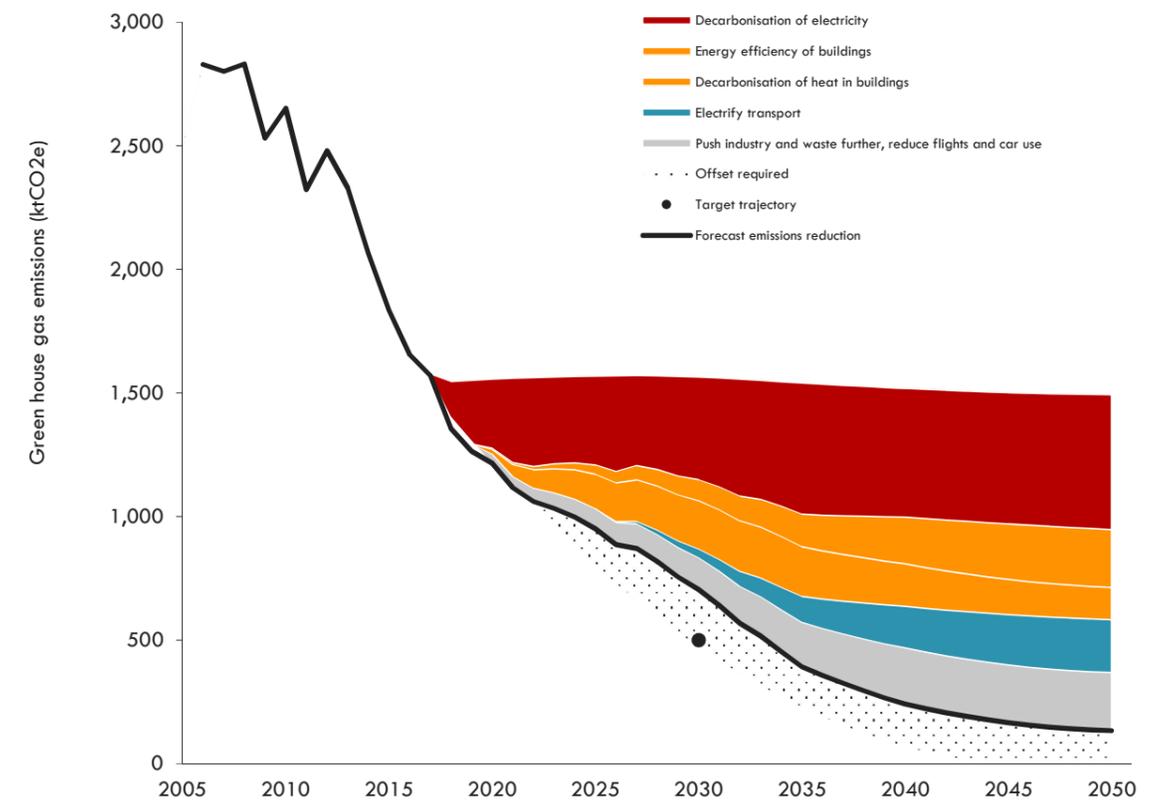
Item	Planned work	Improvement opportunity
<b>Monitoring</b>	Limited / none other than visual inspection	IRT survey to identify improvement opportunities Install energy monitoring and targeting system to larger buildings
<b>External envelope</b>	None / cosmetic redecorations	Sealing eaves and install draught stripping to doors Increase loft insulation Additional insulation to cavity walls
<b>Windows</b>	Replace end of life single glazing with new double glazed units	Replace single with high performance glazing (triple)
<b>Mechanical Ventilation</b>	Replace end of life AHU fans with similar system	Install best in class AHU fans and add run-around coil Clean and repair ductwork
<b>Lighting</b>	Replace T5 bulbs like for like	Use LED lamps for all replacements and add daylight and presence controls in all rooms
<b>Air conditioning</b>	Inspection and servicing of terminal units and replacement of any that are faulty	Install new EC drives in terminal units Replace refrigerant to one with GWP Add new controls to check performance and calibration
<b>Heating</b>	Inspection / balancing of radiators and service to boiler Replace boiler with new more efficient plant	Install ASHP rather than new gas boiler Review radiators sizes, increase only were needed (or use FCU's for heating also) and add TRVs where absent Change circulating pumps
<b>Renewable Energy</b>	None	Install PV array

Improving the ambition of the planned works represents a fantastic opportunity to minimise costs

# Phasing out carbon emissions in Tower Hamlets by 2050



- A comprehensive set of actions
- Timeline: a long and ambitious journey
- LBTH Zero Carbon pathway
- Decarbonisation of domestic buildings
- Case study: a typical existing block of flats
- Focus on policy
- Focus on procurement



# A comprehensive set of actions

## Wide-ranging actions

This diagram illustrates the key areas of actions for reducing carbon emissions in Tower Hamlets towards:

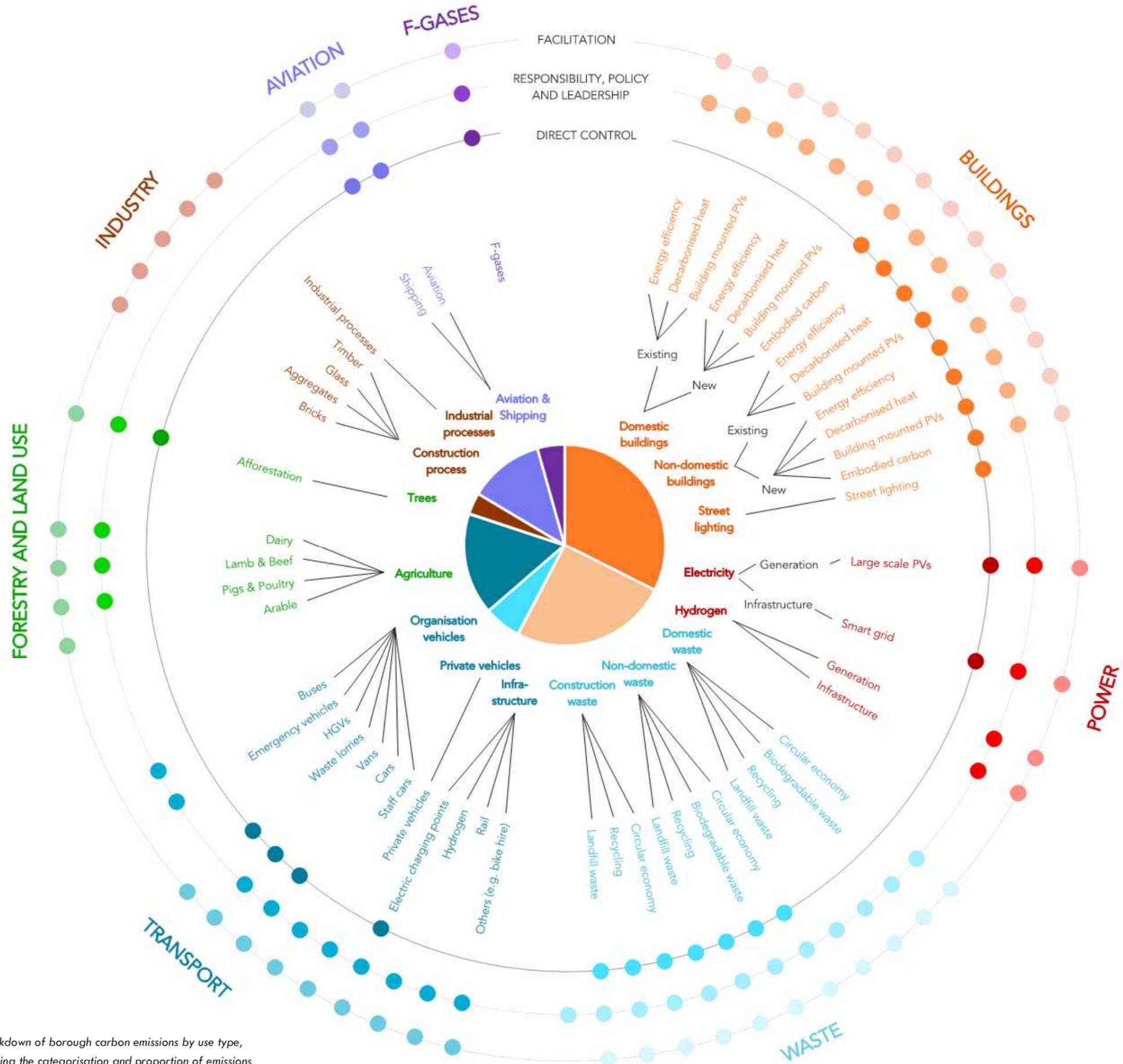
1. A Net Zero Carbon Council by 2025
2. A Net Zero Carbon Borough by 2050

Actions are required in all key sectors:

- Buildings
- Power
- Waste
- Transport
- Forestry and land use
- Industry
- Aviation
- F-gases

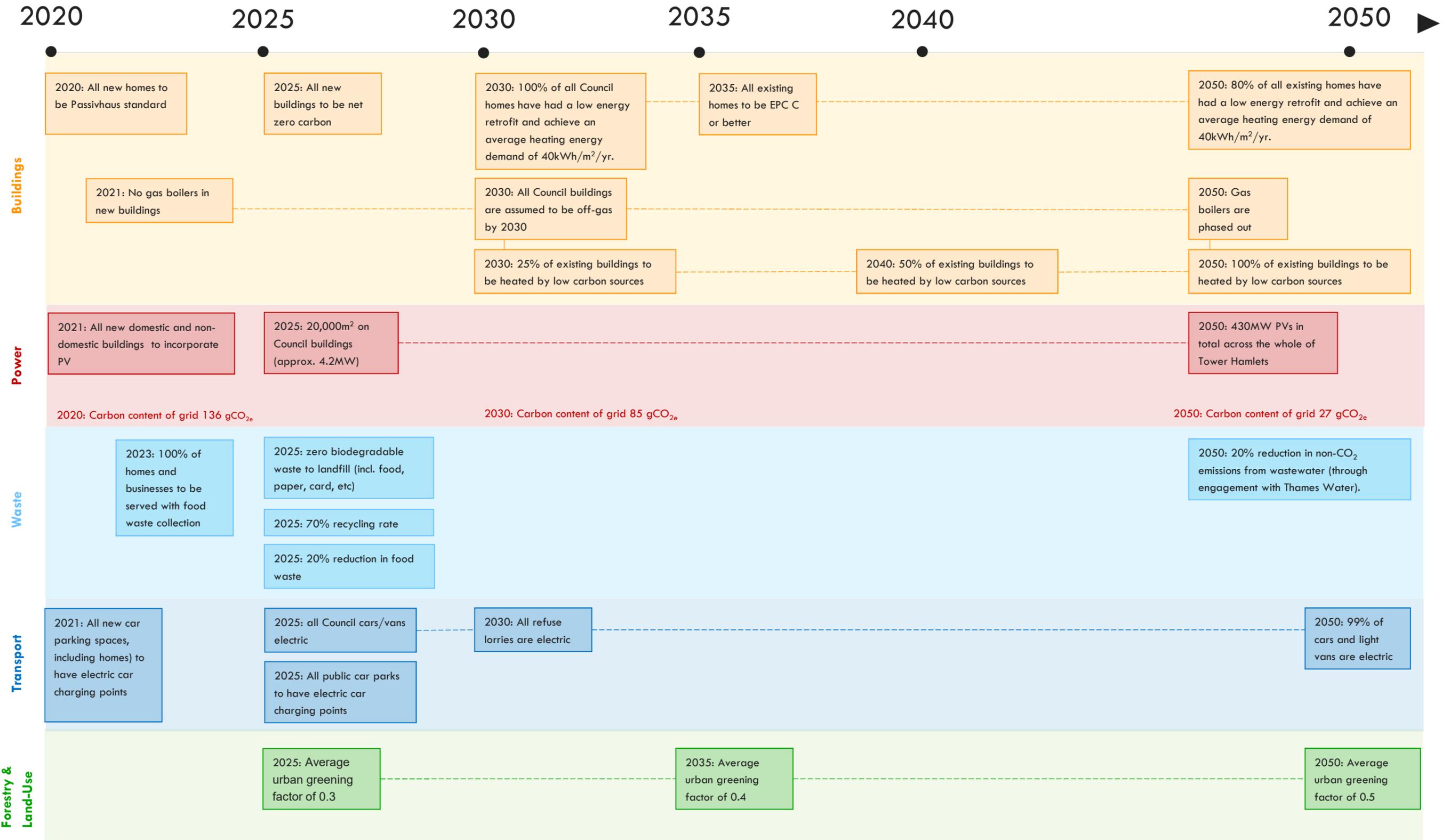
Actions can be split up between in different categories, depending on the scale of control Council has over the emissions:

- **Direct Council control** (e.g. Council's offices)
- **Responsibility** (e.g. Tower Hamlets Homes, Schools), **Policy** (e.g. local plan) and **Leadership** (e.g. engagement with local businesses and organisations)
- **Facilitation** (e.g. engagement with the public).



Breakdown of borough carbon emissions by use type, showing the categorisation and proportion of emissions from each source, and the control the Council has over each sector.

# Timeline | A long and ambitious journey



## Achieving Net Zero Carbon by 2050

We have used the Etude tool for estimating future Borough emissions and to estimate what changes are required to move towards a net Zero Carbon borough. The tool shows that radical changes to all sectors are required. In the borough this includes Net Zero Carbon new buildings, existing building stock energy efficiency, switch from gas heating to low carbon heat and the electrification of transport.

The cumulative emission reductions demonstrate that near zero carbon emissions are possible, and these can be feasibly offset by carbon reduction projects. However, it is likely that these projects will not be possible within the borough, and will have to be achieved elsewhere. Other local authorities are likely to have the same issue, and this is something that it makes sense to assume may be dealt with at a national level.

## Key features of a zero carbon future

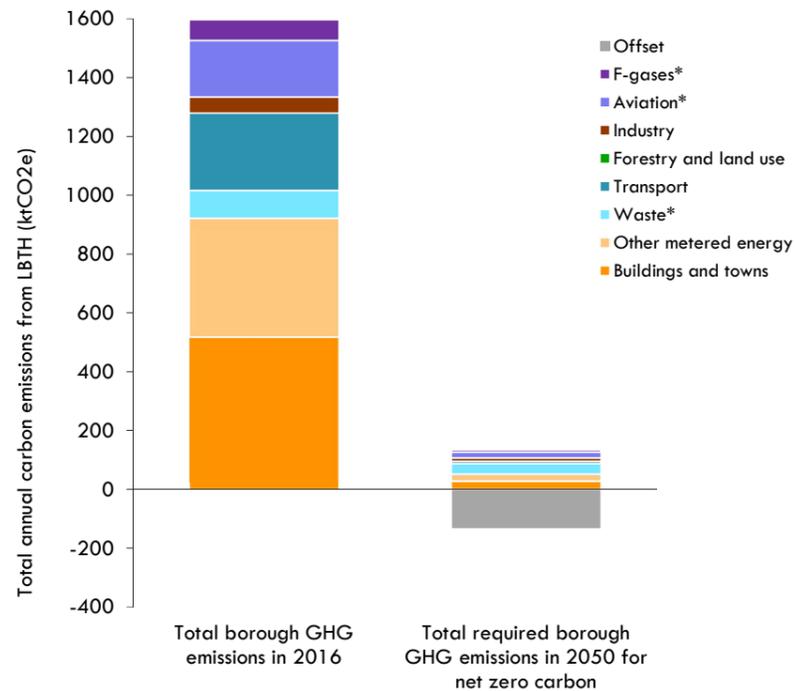
A summary of the assumptions used in the forecast is given. The key features of this scenario are:

- All new buildings, from now, are built to be highly energy efficient and use a heat pump as the primary heat source.
- Road transport rapidly converts to electric. Road journeys are reduced.
- Incentives and regulation result in a significant reduction in commercial, industry and aviation emissions.

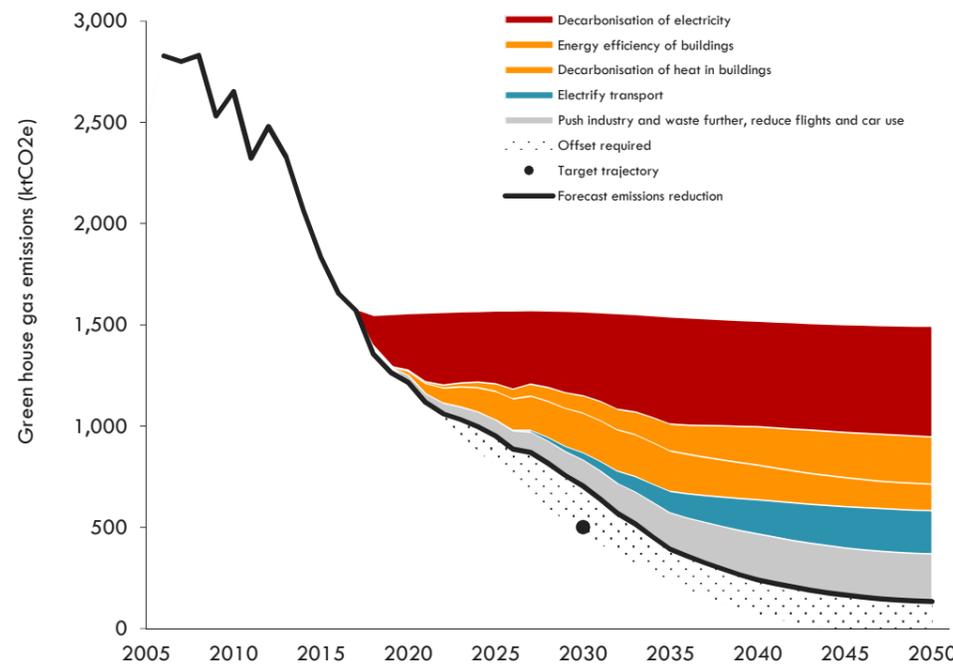
The first two changes mean major investment in the electric infrastructure in the borough is necessary,

## Acting quickly and achieving Net Zero Carbon earlier than 2050?

It is possible to achieve Net Zero Carbon earlier than 2050 but it is very challenging. We would recommend identifying credible solutions to achieve Net Zero Carbon by 2050 with a minimal amount of offset first and also accelerate any actions which can be accelerated, while taking the time required to deliver others.



Latest reported emissions (2016) and forecast 2050 emissions based on a scenario where carbon emissions reduction is prioritised in policy, by businesses and by national government. The breakdown matches the categories used by the CCC. Emissions would need to reduce by 90% over the next 30 years.



Historic and forecast emissions for LBTH from 2005 to 2050. Showing contribution of main sectors to overall reduction.

Category	Major assumptions for change used for net zero carbon forecast
<b>Decarbonisation of electricity</b>	Carbon content of electricity falls rapidly in line with Government projections. Carbon content of electricity is 0.085 kgCO <sub>2e</sub> /kWh in 2030 and 0.030 kgCO <sub>2e</sub> /kWh in 2050.
<b>Residential building energy efficiency</b>	All new homes built after 2020 achieve Passivhaus or an equivalent standard. 15kWh/m <sup>2</sup> /yr heating energy demand achieved on average.
	90% of existing homes have a complete low energy retrofit by 2050 (by 2030 for Council homes). Homes achieve an average heating energy demand of 40kWh/m <sup>2</sup> /yr.
	2% of existing buildings are demolished and replaced with new build by 2050. This is approximately 2,000 homes over the whole period.
	Electrical efficiency of appliances continues to improve but is offset by increased use. A net 20% improvement is achieved between 2020 and 2050.
<b>Non-residential building energy efficiency</b>	Commercial gas consumption reduces by 90% through replacing gas heating with heat pumps or equivalent, and energy efficiency measures.
	Electrical consumption increases by 10% net as a consequence, however the majority of the increase from electrification is offset by improved efficiency and use of commercial heat pumps.
	Full retrofit of Council buildings to achieve a heating demand of 40kWh/m <sup>2</sup> /yr and net zero carbon through the switch to low carbon heating (heat pump) and solar PV installation.
	All Council owned non-domestic properties are refurbished on change of lease. Achieve 50% carbon emission reductions.
<b>Building heating</b>	Gas boilers are phased out by 2035. Residual 1% of buildings use gas. (All Council buildings are assumed to be off gas by 2030).
	All building heating is provided by a heat pump, or an equivalent low carbon technology (for example hydrogen fuel cell, or waste industrial heat). No buildings are heated by on-site combustion.
<b>Electrification of transport</b>	10% reduction in in car use through switch to walking and cycling.
	Department for Transport emissions forecast for London is used and modified to adopt the CCC further ambition. Equivalent to 99% of domestic and light goods mileage completed by electric vehicles or equivalent by 2050. (All Council vehicles are electric by 2030). Electric vehicles achieve an average efficiency of 30kWh/100miles.
	HGV emissions reduce by 80% through reduced journeys, change in manufacturing patterns, switch to rail, and developing hydrogen or electric drivetrain technologies.
<b>Reducing waste</b>	62% reduction in emissions from waste in line with 'further ambition' recommendations by CCC <sup>1</sup> .
<b>Industrial efficiency</b>	80% reduction in industrial emissions through efficiency or changes in the sector. This is comparable to the 'Further ambition' recommendations by CCC <sup>1</sup> .
<b>Aviation</b>	<b>88% reduction in emissions.</b> Personal air travel is reduced, particularly long haul and regular flight, efficiency improves. This deviates from national aviation growth projections which show a 1% increase in emissions. Aviation emissions are calculated from LBTH's population as a proportion of total UK emissions.
<b>Forestry &amp; land use</b>	Significant tree planting in the borough has a very small but important impact. LBTH would need further reductions in emissions from forestry in other local authorities, potentially through a future national trading scheme.
<b>F-gases</b>	EU targets for F-gas reductions are kept as UK law and CCC further ambition scenario is met.

Key assumptions used for zero carbon forecast.



1. Net Zero: The UK's contribution to stopping global warming (2019) Committee on Climate Change

## Target: achieving an 85% carbon reduction by 2030 for Tower Hamlets Homes

Tower Hamlets Homes (THH) dwellings represent the majority of emissions under the Council's responsibility, and are therefore a crucial part of achieving significant carbon reductions. There are approximately 11,500 dwellings managed by Tower Hamlets Homes. The majority of them have an EPC energy rating of D (42%) and E (32%) – although EPC ratings are not a reliable indicator of actual energy use.

### Standards for new homes

All new homes should be zero carbon (regulated and unregulated), following Passivhaus or equivalent standards, and supplied from a low-carbon heat source e.g. heat pump.

### Retrofit of existing homes

The principles are similar to those recommended for non-domestic buildings i.e. a combination of low carbon heat, fabric and systems efficiency, and PVs.

Because of residential demand profile a low-carbon heat supply is even more important than in non-domestic buildings, and will require liaising with utilities and a careful selection of systems and contract arrangements to ensure sufficient capacity and acceptable heat costs for residents. Direct electric heating is generally not recommended except in the most efficient dwellings with minimal thermal demand.

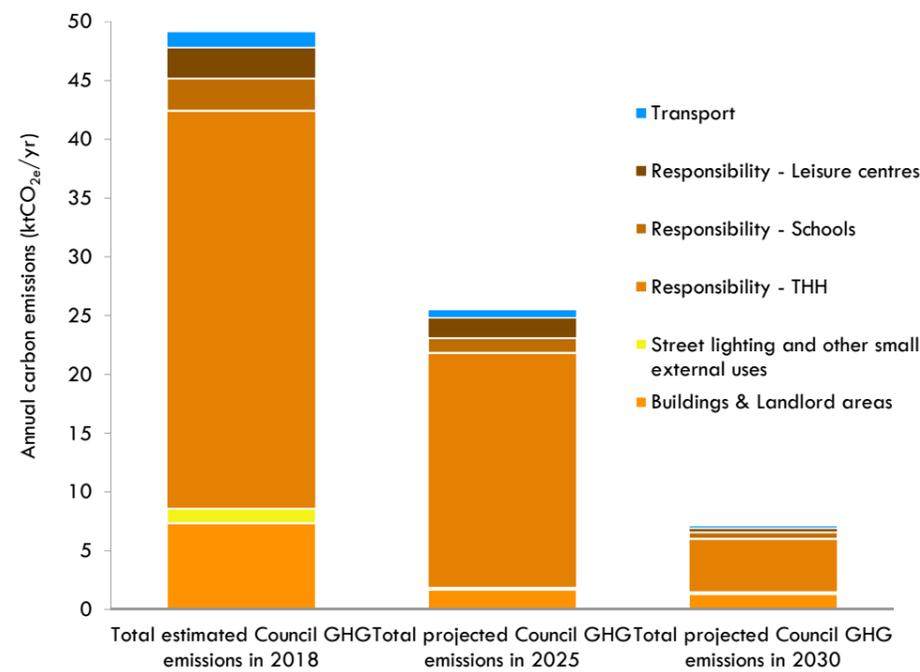
### Retrofit: building up quality and capacity

Supply chain capacity and skills will be crucial to reduce emissions and avoid unintended consequences. The Council should use the lessons of existing schemes (e.g. ECO, RE:FIT) and review recent initiatives such as the Retrofit Academy and TrustMark, potentially with the view to develop its own system of trusted suppliers. We would recommend partnering with other London Boroughs engaged on a zero carbon pathway e.g. Haringey Council.

This will also help the Council to develop expertise and a supply chain which will benefit later housing associations, landlords and residents.

### Engaging with residents

Deep retrofit offers significant opportunities for co-benefits, such as improved health and comfort for residents, which could help engage them with the Council's Zero carbon efforts.



Carbon emissions in 2018 (actual), 2025 (target) and 2030 (target) showing rapid decarbonisation of Schools, Leisure Centres and THH Homes, alongside Council's direct control emissions. As transport emissions from larger vehicles will take longer to decarbonise, these have also been assumed to reduce post-2025.

- 2020 Setting the overall programme
- 2020 Phase 1: priority & pilot dwellings e.g. 250 units/yr
- 2021 Phase 2: delivery lessons from Phase 1 e.g. 500 units/yr
- 2023 Phase 3: performance lessons from Phase 1 and delivery lessons from Phase 2, feeding into increased programme e.g. 1000 units/yr
- 2025 Phase 4: performance lessons from Phase 2 and delivery lessons from Phase 3, feeding into peak programme e.g. 2000 units/yr
- 2028 Phase 5: ramping down, starting to allocate resources and expertise to domestic retrofit wider in the Borough e.g. 1000 units/yr
- 2030 Phase 6: minimal number, allowing completion and evaluation before end 2030 e.g. 500 units/yr

- ✓ Retrofit & evaluation of 11,500 homes
- ✓ Expertise and supply chain ready to benefit the wider Borough



Programming and scaling up: a total of 11,500 homes will need to be retrofitted. The programme should be phased in order to allow the gathering of lessons and the development of a trusted supply chain, while responding to the challenging timescale of deep retrofit by 2030.

### Addressing the issue of energy data from homes

The Council should work with THH and seek ways to improve its understanding of energy consumption in homes, without giving rise to privacy concerns. For example, at the very minimum, a service could be put in place for residents to voluntarily give access to their energy consumption. This could be incentivised (e.g. vouchers for energy saving measures, access to energy saving advice), and potentially reported by postcode / block without identifying individual homes.

## A representative building

The block of flats shown opposite is typical of residential accommodation in Tower Hamlets. A typical building is four storeys high, with a pitched roof. Floors are expected to be concrete, or suspended timber for smaller properties. Walls are typically masonry with a cavity. Buildings are generally heated with gas boilers or electric heating.

## Retrofit required

Four core strategies must be pursued to achieve net zero carbon within this type of building:

- 1. Fabric retrofit**, usually achieved through external wall and roof insulation, floor insulation, airtightness works, high performance windows and mechanical ventilation with heat recovery.

Estimated cost per flat: £11,000 - £19,500

- 2. Low carbon heating**, the most suitable technology is likely to be either individual water source heat pumps in each apartment, with an ambient temperature ground water loop supplying them, or an air source heat pump. Where inefficient communal heat distribution systems exist, they should be replaced.

Estimated cost per flat: £1,500-£7,000

- 3. Energy efficient services**, appliances and lighting have quickly become more energy efficient due to energy efficiency regulations.

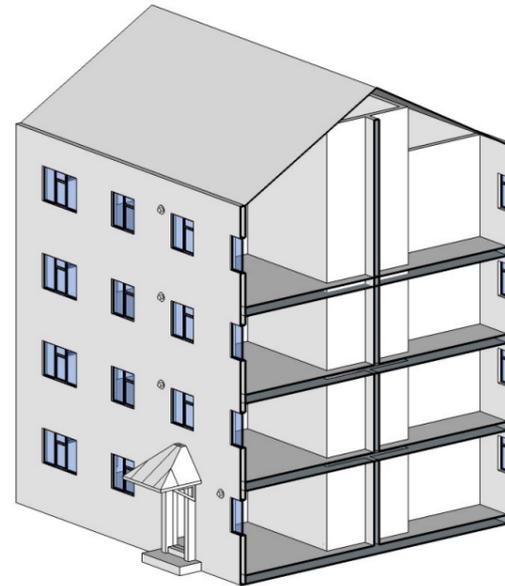
Estimated cost per flat: Generally low

- 4. Solar photovoltaics (PVs)**, installed to best practices they can provide more than enough electricity to achieve net zero energy consumption for low and mid rise buildings with good levels of fabric efficiency that are heated by heat pumps. Financial benefits for tenants can be maximised by the landlord submetering tenants and connecting the PV system to the landlord supply, so it can be used by all tenants within the building.

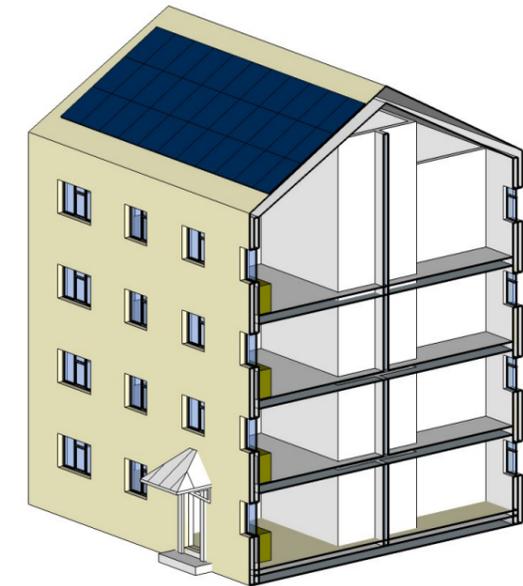
Estimated cost per flat: £2,500 + submetering cost

## Reduced energy bills

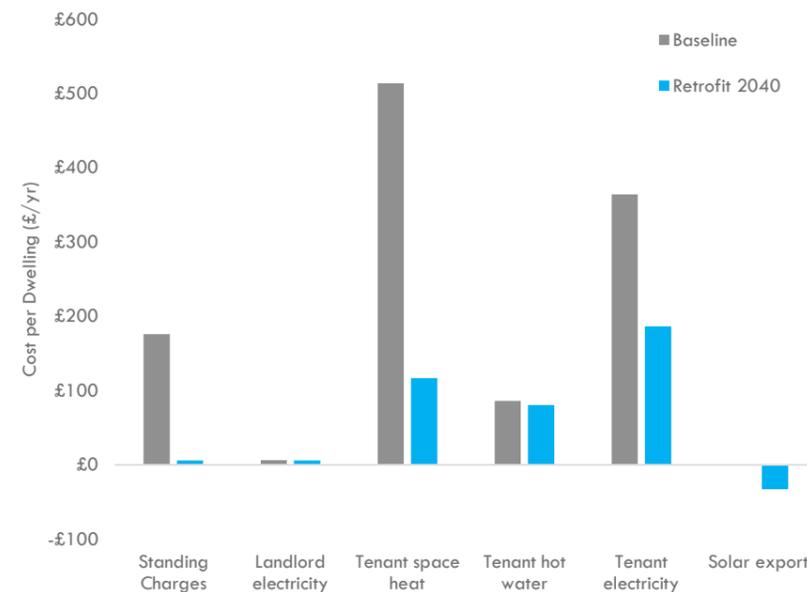
These changes would not only dramatically reduce carbon emissions but also significantly reduce energy bills.



Baseline block of flats: Gas boilers or electric heating, little insulation, single or poor double glazing, poor airtightness and uncontrolled ventilation through gaps in the building fabric. Space heat demand of around **160kWh/m<sup>2</sup>/year**.



Retrofitted to achieve net zero carbon: Heat pumps, 150+mm of continuous insulation to floors, walls and roof, very good double or triple glazing, excellent levels of airtightness and mechanical ventilation with heat recovery. Full-size photovoltaic array fitted with high efficiency modules and microinverters. Space heat demand of around **40kWh/m<sup>2</sup>/year**. **Net producer of clean energy.**



Bar chart showing estimated energy costs for a dwelling in this apartment building now and in 2040, assuming a best practice retrofit takes place.



Housing blocks in Tower Hamlets already include significant PV installations

## Parity Projects CROHM tool

As part of this study Parity Projects have been commissioned to carry out a stock assessment of the homes in Tower Hamlets using their CROHM Area tool. This analyses SAP, EPC and LBTH data to give a breakdown of housing stock and to help with costing and planning retrofit measures at scale.

### Currently low data quality

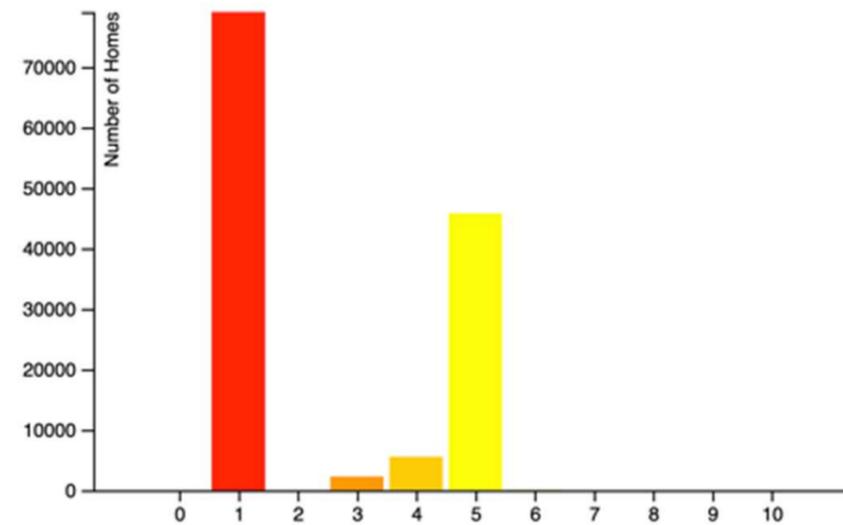
The database is in its infancy, and it appears that only the available EPC information has been used to give information about the stock. This means the confidence in the data is currently low and some assumptions and cloning have been used to populate data for all the properties.

However, the tool provides a central database that LBTH can now look to improve to give them clear oversight of the energy and carbon profile of their portfolio. The assumptions can be revised as surveys and other intelligence-gathering improve the accuracy of data, and tracked using CROHM's in-built data quality management tool.

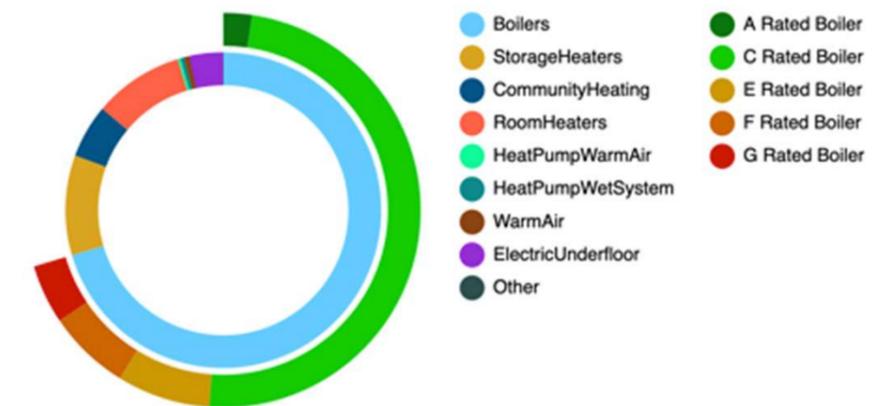
### Improving the stock assessment

Improving the stock assessment requires providing more data on housing to Parity Projects for integrating with the tool. This could be from work carried out by LBTH, the GLA, or by private landlords based on incentives provided by LBTH. Examples include:

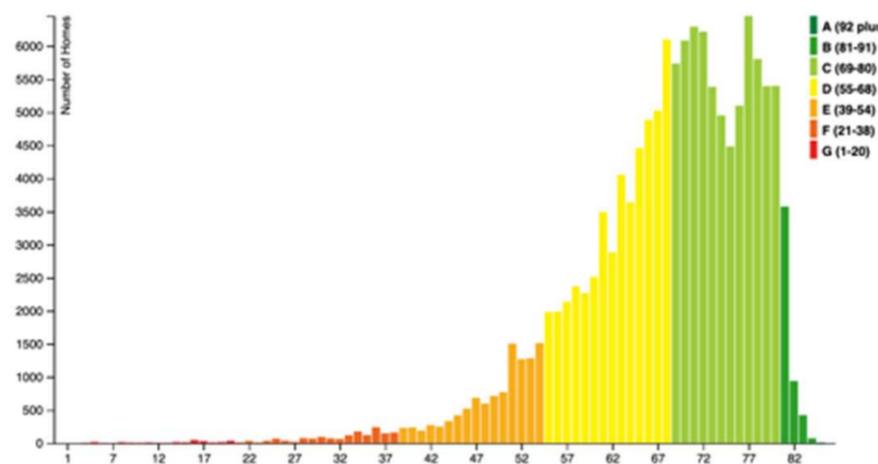
- Importing any data held by Tower Hamlets Homes for their properties.
- Requesting data from Registered Social Landlords in the borough.
- Carrying out home energy surveys for parts of the borough due to energy bill aggregation schemes, or fabric improvements through ECO for example.



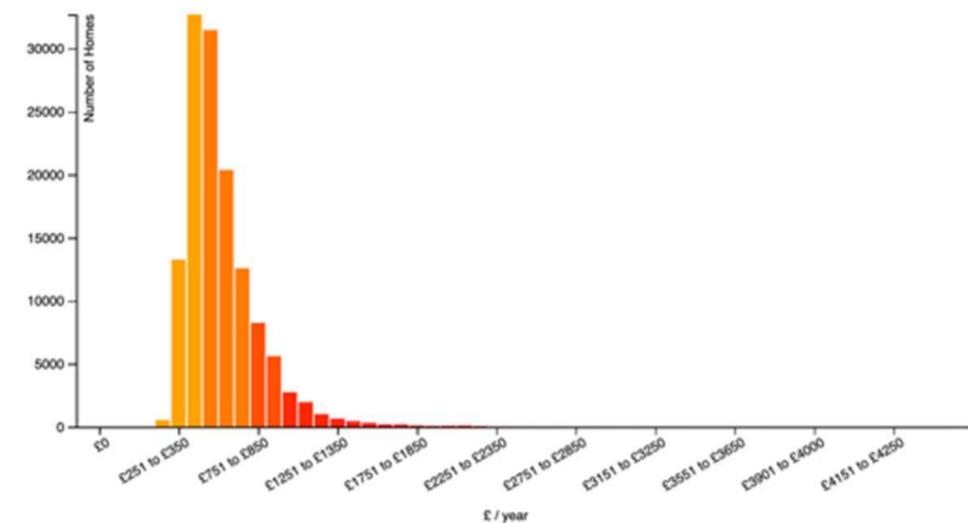
Current combined data confidence for all homes in the CROHM Area tool for Tower Hamlets. 1 is the lowest confidence in data, 10 is highest. **Almost 2/3 or homes are at the lowest data quality level.** To improve this requires the quality of surveys of existing homes typically carried out for EPCs to be improved, or for LBTH to pass any data they may hold on properties to Parity. Image © Parity Projects CROHM Area.



Estimated breakdown of housing by heating type for Tower Hamlets from CROHM Area tool. This data should be used with caution due to the confidence in the data at this time, but demonstrates the capability of the tool. This graph shows that 19.2% of gas boilers are older than an EPC C rating and so could be due upgrading.



Estimated distribution of housing by EPC band for Tower Hamlets from CROHM Area tool. This data should be used with caution due to the confidence in the data at this time, but demonstrates the capability of the tool.



Estimated distribution of housing by annual fuel bills for Tower Hamlets from CROHM Area tool. This data should be used with caution due to the confidence in the data at this time, but demonstrates the capability of the tool.

## The power of policy

Policy is critical to deliver Net Zero Carbon. The potential for policy to cause significant change within the borough cannot be understated. New policies should be bold and reflect the urgency of the changes that we need to see to avert catastrophic climate change.

## Net Zero carbon new buildings

LBTH would have to go further than the draft London Plan if Net Zero carbon new buildings are to be required by the Tower Hamlets Local Plan. These buildings must have ultra-low levels of total energy use and space heating demand, have low carbon heating system and maximised on-site renewable energy.

Viability assessments are undertaken on any new planning policies. It is important that the Council's consultants who undertake these viability assessments use the latest and most up to date costs, and account for projected cost reductions associated with more energy efficient buildings and low or zero carbon technologies as economies of scale take effect. The cost of not taking action should also be considered

## Existing buildings

Every major retrofit which does not significantly reduce a building's carbon emissions should be seen as missed opportunity. Planning policy should prevent this.

## Low carbon heat

Phasing out all uses of gas between now and 2050 is critical if LBTH is to achieve Net Zero Carbon. This change must start as soon as possible and planning policy should prevent the installation of any new gas heating system: gas boilers and gas CHP.

## Electrification of transport

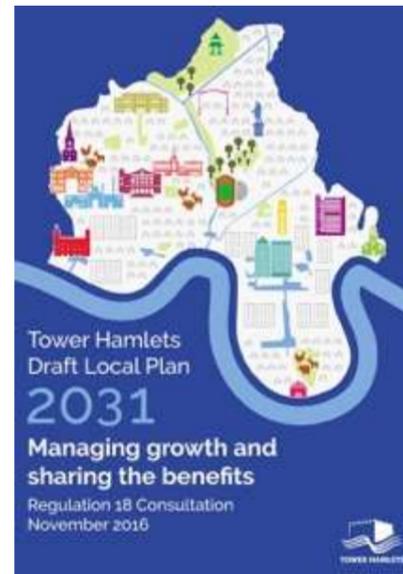
Planning policy should include a vision for electrical infrastructure and transport in the borough.

## Waste

New developments must be designed to meet increasing collection and recycling requirements.

## Nature and Biodiversity

The Greater London Authority's urban greening factor could be used to ensure that individual sites contribute to the overall 'greening' of the borough.



The Tower Hamlets Draft local plan

## Comment on Environmental Impact Assessment (EIAs)

All major developments that require an Environmental Impact Assessment must include an assessment of greenhouse gas emissions and the implications of climate change. The guidance from the Institute of Environmental Management and Assessment (IEMA) 'Assessing Greenhouse Gas Emissions and Evaluating Their Significance' (2017), states the following:

**'All GHG emissions will contribute to climate change and thus might be considered significant, irrespective of whether this is an increase or decrease in emissions.'**

Mitigation measures should therefore go beyond normal practice, and will need to be secured within any given planning consent. Particular attention should be made to ensuring emission reduction measures are integrated and delivered through the construction and operation phases.

- For construction impacts it is noted that there will be monitoring and measuring, but LBTH will require reductions.
- For operational impacts, the EIA should set out how the scheme will be net zero carbon on-site in 2050 as required by the Climate Change Act 2008 (as amended).

All assessments of GHG emissions should be done quantitatively and any use of professional judgement to assess significance should be fully justified. Reference in the ES should be made to whether the national, regional and local policy requirements in relation to energy and GHG are satisfied by the Proposed Development. The latest UK Climate Projections (Currently UKCP18) should be used to inform any such assessment.

## Power

**Set a formal target for solar capacity** in Tower Hamlets to at least 430 MW by 2050

## Buildings

**Introduce planning requirements for all future housing in line with Zero Carbon target**  
This should be consistent with the recommendations of the CCC report on the future of housing (i.e space heating demand < 15-20 kWh/m<sup>2</sup>.yr). Passivhaus or equivalent should be considered and an assessment against Net Zero Carbon should be required.

**Introduce planning requirements for all new non-domestic buildings in line with Zero Carbon target.**  
This should be consistent with BEIS energy mission to halve energy use in new buildings. Passivhaus or equivalent should be considered and an assessment against Net Zero Carbon should be required.

**Use policy intervention to prevent the installation of any new fossil fuel heating system (e.g. gas boilers) from 2020**

**Use policy intervention to prevent the installation of any gas-fired CHP system from 2019**

## Transport

Include **electrical charging infrastructure** in strategic plan

## Waste

**Target a 70% recycling rate for waste from all buildings by 2025.**  
The CCC has advised central government that to meet our targets of achieving zero carbon by 2050, a recycling rate of 70% of all solid municipal waste must be achieved by 2025.

**Target zero biodegradable waste to landfill by 2025**  
As recommended by the CCC to the UK Government in May 2019.

**Introduce new planning requirements for domestic waste storage and collection**

**Introduce planning requirements for construction waste** on new-build projects

**Introduce a food waste collection scheme for businesses**

## Forestry, land use and agriculture

**Set minimum standards for green spaces in new developments.**

**Increase tree planting**

## Others

Implement Planning policies restricting use of F-gases by discouraging air conditioning and prioritizing lower GWP refrigerants.

List of recommended changes to Policy

## The power of procurement

Perhaps the biggest opportunity Tower Hamlets has to influence greenhouse gas emissions and sustainability performance in the private sector is through the products it buys and the services it procures.

According to the Council's Procurement Strategy 2016-2019, the Council spends £340 million a year, across 3,500 different suppliers. 20% of these suppliers are locally based.

A focus on procurement therefore not only potentially supports a reduction in emissions from the Council's activities, but also a reduction in emissions from the borough as a whole.

## Co-benefits of sustainable procurement

It is the Council's responsibility as a consumer and community leader to procure its goods and services responsibly, and work with suppliers to improve the sustainability of their operations and supply chains.

Sustainable procurement is a powerful driver for delivering improved economic, environmental and social outcomes.

In doing so, some of the co-benefits that can be achieved are:

- Create markets for new services and products
- Reduce waste and improve resource efficiency
- Enhance image and reputation in the community

## Tower Hamlet's Procurement Strategy 2016-2019

The existing Procurement Strategy (2016-2019) sets out the vision, strategic objectives and a working implantation and delivery plan. A large part of the delivery plan is the implementation of the Stakeholder Engagement Plan.

Sustainability is given a brief mention in the document. Life cycle, whole life costing and carbon emissions are not mentioned.

As this plan comes to the end of its life and is being replaced, **we recommend that sustainability, carbon emissions and whole life costing are discussed more in depth in the new procurement strategy.** Further recommendations are discussed on the right.



£340 million spent in 2018-19

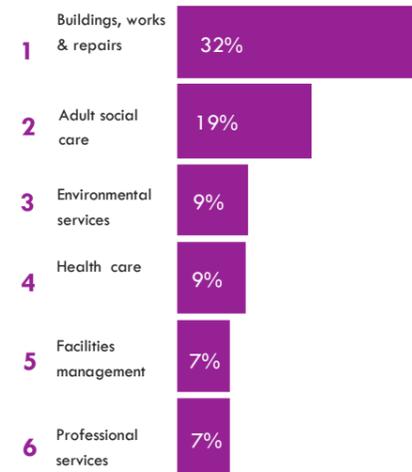


3,500 suppliers



20% of suppliers are local

### Top areas of spend, % of total



Key spending facts for Tower Hamlets

### Targets to work with suppliers towards

- ✓ 100% zero carbon energy purchased
- ✓ Key suppliers demonstrate continual improvement in sustainability
- ✓ All suppliers use low emission transport for LBTH business and report emissions to LBTH
- ✓ Buildings that host services run by suppliers (e.g. adult social care centres) to have low carbon retrofits. Emissions reported to LBTH.
- ✓ Food procured by the Council is high welfare, local and sourced from environmentally responsible farms.
- ✓ Work with all suppliers to reduced packaging and improve its recyclability.
- ✓ Create policies that materials must be assessed based on whole life carbon, be responsibly sourced (BES 6001, ISO 14001, FSC etc)



Sustainability targets in procurement

## Actions to support sustainable procurement

### 1. Strengthen sustainable procurement policies

Create specific policies that are targeted at embodied carbon, whole life costing, recyclability and repairability

### 2. Benchmark, monitor and improve\*

Identify high sustainability impact suppliers.

Set targets.

Carry out regular sustainability audits.

### 3. Supplier engagement

Engage with key suppliers to help them improve their sustainability performance. Suppliers will recognise they must continually improve their sustainability performance to keep the business.

Include senior management involvement, map supply chains, run supply chain improvement programmes and offer incentives.

### 4. Trial and innovation

Encourage trial and innovation in order to find ways of doing things differently.

## \*Tools for supporting Sustainable Procurement

**GHG Protocols** - The GHG Protocol Corporate Value Chain helps companies identify GHG reduction opportunities, track performance and engage suppliers at a corporate level. The GHG Protocol Product Standard helps a company meet the same objectives at a product level.

**Government Buying Standards (GBS)** – contain a set of mandatory and best practice criteria across a variety of key sustainability issues.

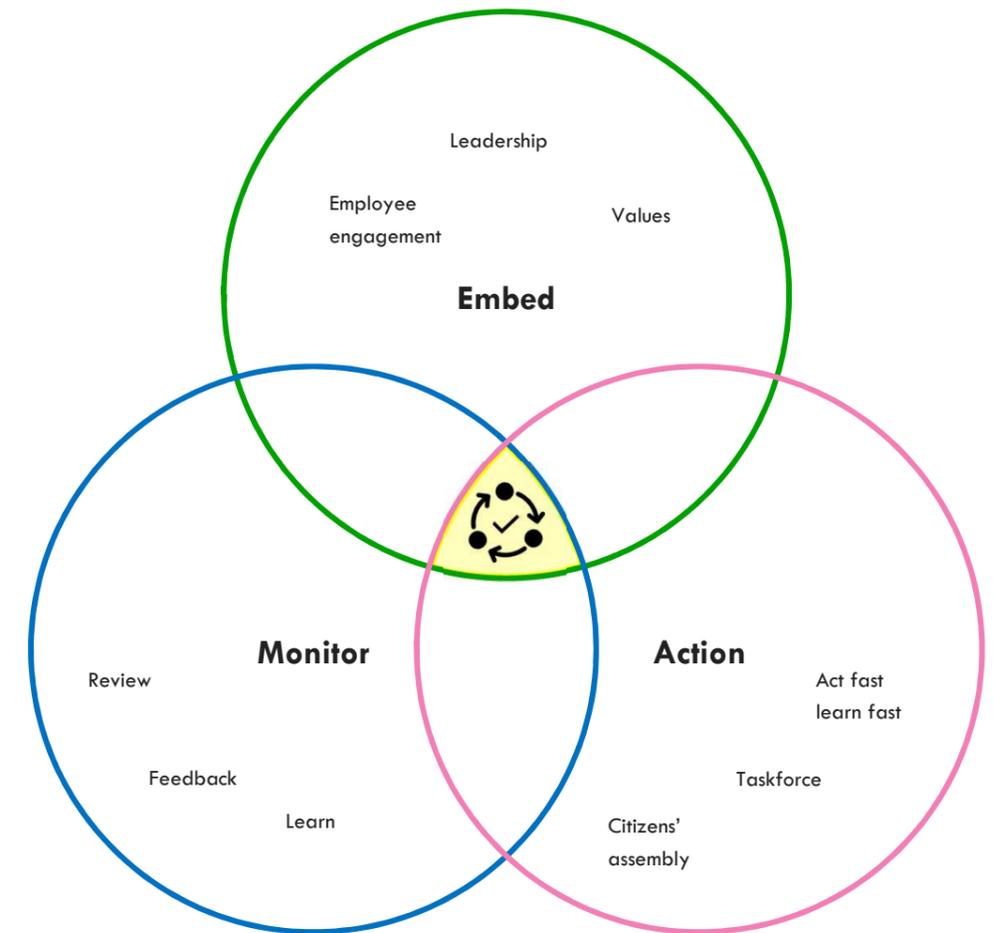
**The Flexible Framework Tool** - self-assessment package which allows organisations to measure, monitor and improve how they procure.

**ISO 20400: Sustainable Procurement (2017)** – An international standard for sustainable procurement, designed for all types and sizes of organisation.

List of recommended criteria for procurement

# Stepping up actions & Next steps

- Organisational changes
- Key stakeholders
- A Zero Carbon plan blueprint



## A new regenerative culture

The goals of a Net Zero Council by 2025, and a Net Zero Carbon borough by 2050 are ambitious. The achievement of any ambitious goal requires strong commitment.

We believe there are three essential cornerstones to achieving the sustainability targets at Tower Hamlets.

**Embed** – Goals and targets should be embedded within the organisation's ethos and culture. Strong leadership buy-in and a high-level of employee engagement are crucial.

**Action** – Action towards the achievements of goals should be committed and sustained.

**Monitor** – Monitoring of progress should be undertaken throughout.

The figure opposite illustrates how each of these elements are required in order to achieve results that are meaningful, informed and impactful.

## Agility and flexibility

We are responding to a global challenge as yet unprecedented. We are learning as local, national and global communities. The journey towards our goal of climate stability and the restoration of balance to the natural world is uncharted. We can outline a path ahead but we will need to be flexible and adaptable in order to be able to change direction if it becomes apparent that is the best thing to do.

Tower Hamlets will need to create organisational agility in order to be able to respond to the obstacles, challenges and failures encountered on the way to success.

## Sharing and learning

We are all in this together. Seeking to learn from others and sharing lessons learned in this process of change will be necessary and extremely useful.

Setting up carbon reduction communities, bringing together other local authorities in London, nationally and internationally for inspiration and learning are all significant opportunities.

### Embed

- Align Tower Hamlets mission and vision with climate and sustainability goals.
- How much status and importance is sustainability given within the Council? What proportion of the budget is allocated? How many people are actively working on it? Does this reflect the importance of the issue?
- Define clear, descriptive goals - What? How? Why?
- Help foster a shift in values of each employee through enhanced training on sustainability and environmental issues. This will automatically lead to higher employee engagement.
- Assign responsibility for goals.
- Align role descriptions with goals.

### Action

- Create a taskforce
- Assign budgets
- Identify steps towards goals and take early action.
- Implement early test-beds and trials.
- Be open to failure, learn quickly and try again.
- Organise a citizen's assembly

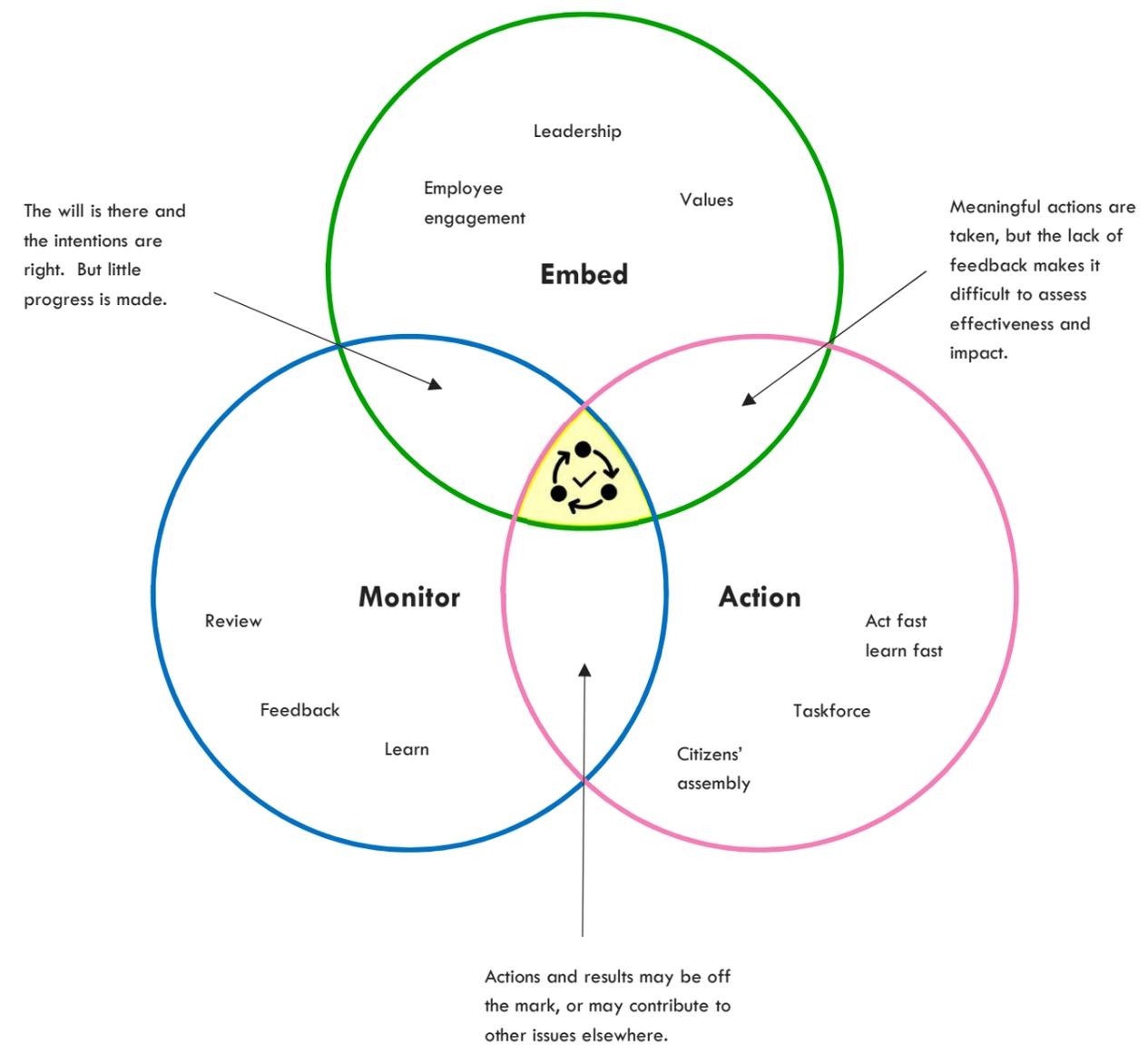
### Monitor

- Monitoring – data helps inform decisions, actions and design. Prioritise early data collection on energy use and CO<sub>2</sub> emissions of existing building stock and transport fleet.
- Encourage setting up feedback loop. Learn from own lessons.

## Embed : Action : Monitor

Each element is key to Tower Hamlet's success in its climate change goals.

Actions are targeted and aligned with Tower Hamlets goals and values, achieving emission reduction and other targets. Actions are informed by a monitoring and feedback process, learning from past successes and failures.



## Engagement is key

Engaging with stakeholders will be crucial to build acceptance of the Zero Carbon plan, and therefore help deliver it effectively. Solutions and lessons learned can be shared with others and opportunities for joint initiatives identified, with significant cost and time efficiencies. Finally, key stakeholders should be encouraged to develop their own plan, towards a Net Zero Carbon borough.

## Mapping the stakeholders towards Net Zero Carbon

A stakeholder mapping exercise should be carried out. The adjacent figure is just starting point of key parties, listed here due to their expected share in the borough's total emissions, their potential influence, their existing commitments to tackle climate change, their public visibility, how much they will be affected by the plan, and their interest in co-benefits such as air quality and reducing fuel poverty.

In particular, the Council should start engaging on Net Zero Carbon with:

- The public
- Large energy users e.g. Housing associations; Queen Mary University; NHS; Canary Wharf
- Other London Boroughs targeting zero carbon

Engagement should include, at the very least, the Council's usual channels of consultation and communication.

In addition, we recommend creating a **citizens' assembly** as a way to examine solutions, build consensus and visibly demonstrate the Council's commitment to engage the whole Borough on the zero carbon transformation.

## Internal stakeholder engagement – putting carbon at the core of Council decisions

The net zero carbon objective cuts across all areas of the Council's activities and objectives including air quality, asset management, highways, planning, green spaces etc. **Sharing information and taking carbon impacts into account in all decisions, policies and activities is therefore essential.** We recommend mapping areas of overlap and impacts, and a review of internal resources and decision-making processes.

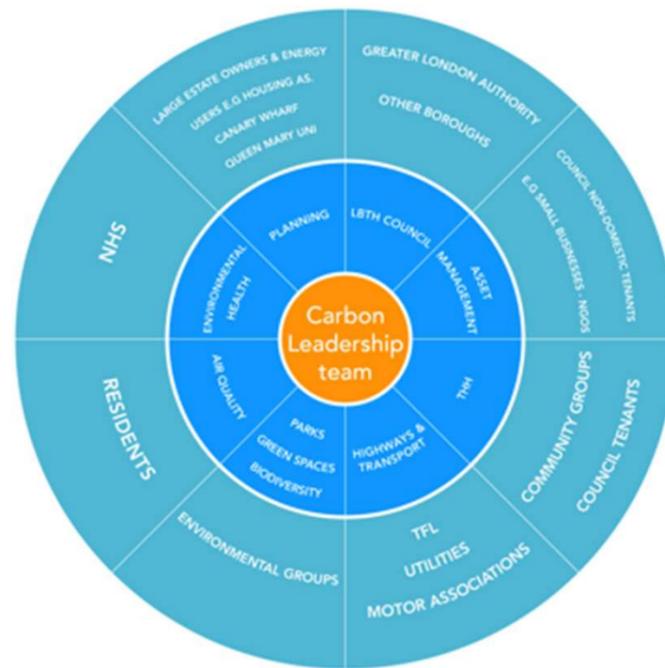
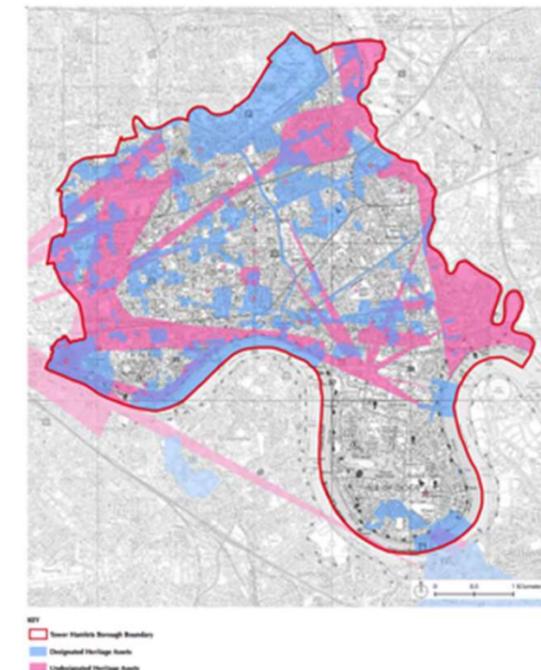


Illustration of key internal and external stakeholders: the net zero carbon target should be at the centre of policy and decision making across the Council's department, as it cuts across all areas. The various Council departments will also provide useful links with external stakeholders



It is crucial to engage with the public



Heritage assets in the Borough (2016 map): Engaging early with the heritage community is really important to build their buy-in, benefit from their expertise and resources, minimise the detrimental effects and maximise the benefits of carbon reduction measures,

- Be open about the possible **visual effects** of low-carbon retrofit (e.g. air source heat pump, PV panels, external insulation, new / secondary glazing)
- Develop **context-specific** solutions
- Maximise **co-benefits** e.g. better maintenance; fabric repairs; future-proofing against the effects of climate change (e.g. strong winds and rains)
- The benefits of minimising new **embodied carbon** expenditure by retaining and prolonging the useful life of our existing stock should be acknowledged



The Council should engage with stakeholders such as Canary Wharf, who have significant resources, buildings and land assets, are responsible for high carbon emissions, have the capacity to reach and influence numerous other parties, and already have set themselves ambitious carbon targets

## Changing together

The world will only meet this challenge if everyone acts. For the Tower Hamlets to meet its part of the global ambition, local people and businesses need to establish what they can do themselves and take action, beginning immediately, to implement change.

The 4 key pillars of every strategy should be to **quantify** current emissions, to **set headline objectives** in line with regional and national objectives, to translate the targets into clear, **deliverable actions** and to consider how to **influence** others to act.

## Developing a common language

The specific actions required will be widely varied depending on the nature of the business or organisation. However there are some common elements that everyone and every organisation should use as a framework in order for priorities to be clear and ultimately so that progress is measurable. Separating current emissions into the sectors set out by the Committee for Climate Change makes it easier to fit the specific plan for one organisation into the National action framework. Understanding precisely for each sector the difference between direct control emissions and influence is also very useful.

## Quantifying greenhouse gas emissions

The first concern is to establish, with as much clarity and detail as possible, what the starting point is. Priorities for action, where the greatest improvement may be achieved most expeditiously, quickly become clear by having a thorough audit of the current emissions.

## Setting headline objectives and concrete actions

Breaking the overall objective (Net Zero) down, both in time as a set of milestones and within any organisation as a set of headline objectives and deliverable actions is a vital exercise if ambitions are to be turned into real progress. The strategy should also recognise that change will happen over time but that steady progress is necessary.

## Influencing

Most organisations have influence over emissions that are outside their direct control, as Landlords to individuals or smaller businesses, as exemplars to peer businesses and staff members and as networkers, interacting with partner organisations and especially with suppliers.

## A common language

### 1. Quantify emissions

Start with an assessment of the current baseline emissions

### 2. Set headline objectives

Headline objectives should articulate the 2050 destination

### 3. Define concrete actions

Actions should be clearly defined and include a timescale or schedule

### 4. Consider influence

Procurement and engagement can greatly increase the effect of the plan

	1. Quantify emissions	2. Set headline objectives	3. Define concrete actions	4. Consider influence
<b>Power</b>	<i>Example:</i> Establish current renewable energy generation capacity	<i>Example:</i> Set renewable energy generation capacity target for 2050	<i>Example:</i> Install X <sup>m</sup> ² of PVs on the roof of building A by the end of 2022	<i>Example:</i> Favour suppliers with a commitment to renewable energy
<b>Buildings</b>	<i>Examples:</i> Record current gas, electricity and other fuel usage Categorise existing heating systems by fuel type, location and energy use Analyse building stock	<i>Examples:</i> Set carbon reduction (on-site) for all buildings or a typical building Set year for phasing out of gas heating	<i>Example:</i> Switch gas boiler to heat pump in building B by 2024	<i>Example:</i> Liaise with landlord regarding energy efficiency of rented properties
<b>Transport</b>	<i>Example:</i> Prepare schedule of current fleet with fuel/mileage per year and expected replacement/lease termination dates	<i>Example:</i> No more petrol or diesel cars by 2030	<i>Example:</i> Accelerate the replacement cycle and replace 12 vans per year by electric vehicles from 2020	<i>Example:</i> Change private car allowance to incentive use of electric cars by staff
<b>Waste</b>	<i>Example:</i> Quantify current waste production by waste stream and recycling rates	<i>Example:</i> No more food waste by 2025	<i>Example:</i> Start food waste collection in all offices in 2020	<i>Example:</i> Explain to staff why food waste is being collected separately
<b>Industry</b>	<i>Example:</i> Estimate current emissions by fuel and by process	<i>Example:</i> Achieve a 80% reduction in industrial emissions	<i>Example:</i> Review energy supply to process Z with a view of changing its energy source by 2025	
<b>Aviation</b>	<i>Example:</i> Audit of current 'air miles' for staff (and goods if possible)	<i>Example:</i> X% reduction in air miles travelled by staff and goods	<i>Example:</i> Invest in good quality video conferencing equipment for main meeting rooms in 2022	<i>Example:</i> Favour airlines with a commitment to reduce their carbon emissions
<b>Forestry &amp; land use</b>	<i>Example:</i> Audit current land uses by category	<i>Example:</i> Y number of trees to be planted	<i>Example:</i> Run a staff tree planting initiative in 2023	<i>Example:</i> Liaise with Woodland Trust
<b>F-gases</b>	<i>Example:</i> Audit of current refrigeration equipment	<i>Example:</i> No refrigerant with a Global Warming Potential of more than X by 2025	<i>Example:</i> Set design standards for new buildings and equipment.	