

Haringey Borough Council  
**Zero Carbon Haringey**  
Stage 1 Technical Report

Issue 2 | 18 March 2018

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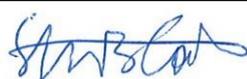
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Issue Document Verification with Document



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## Executive summary

This technical report presents the results of Stage 1 of the Zero Carbon Haringey project. It provides evidence in support of a separate Direction of Travel report, which makes the case for action and sets out priority actions for the council to take to enable the borough to meet its zero carbon target.

## Progress to date

Haringey is among the leading boroughs in London on Zero Carbon: It has a Zero Carbon commitment in place, it has published a Zero Carbon Commission report and it has begun this more detailed project to establish the evidence base for targeted action.

Figures presented in the Annual Carbon Reports show that emissions across the borough are reducing, both in total and per capita, despite an increase in population. In 2015, the latest year for which data is available, total emissions were 749,000 tonnes CO<sub>2</sub>, a decrease of 29% since 2005 (Figure 1).

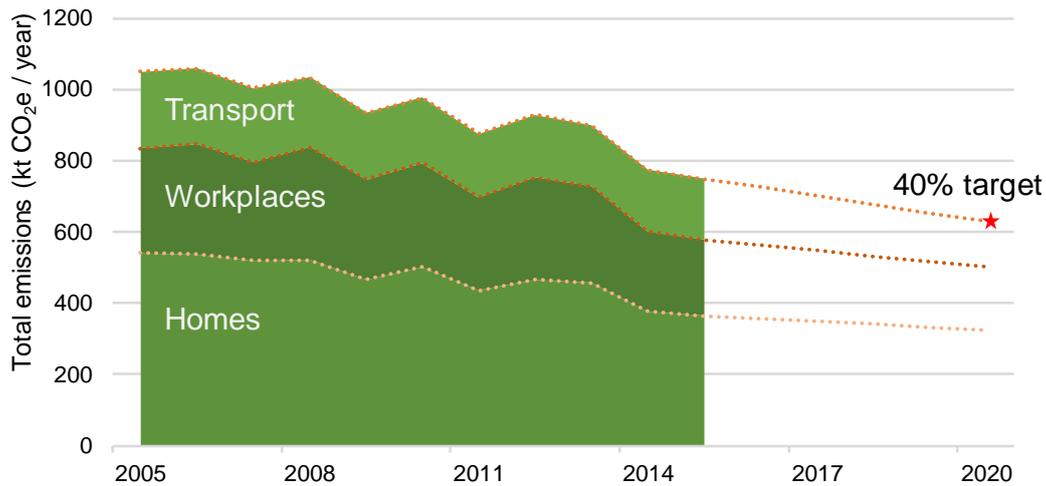


Figure 1 Haringey Annual CO<sub>2</sub> emissions, 2005-2015, with indicative pathways to meet the 40:20 Target (source: BEIS).

## Zero carbon pathway

The proposed zero carbon pathway for Haringey is shown in Figure 2, which shows both recent historical emission trends and the projection to 2050 based on modelling described within this report.

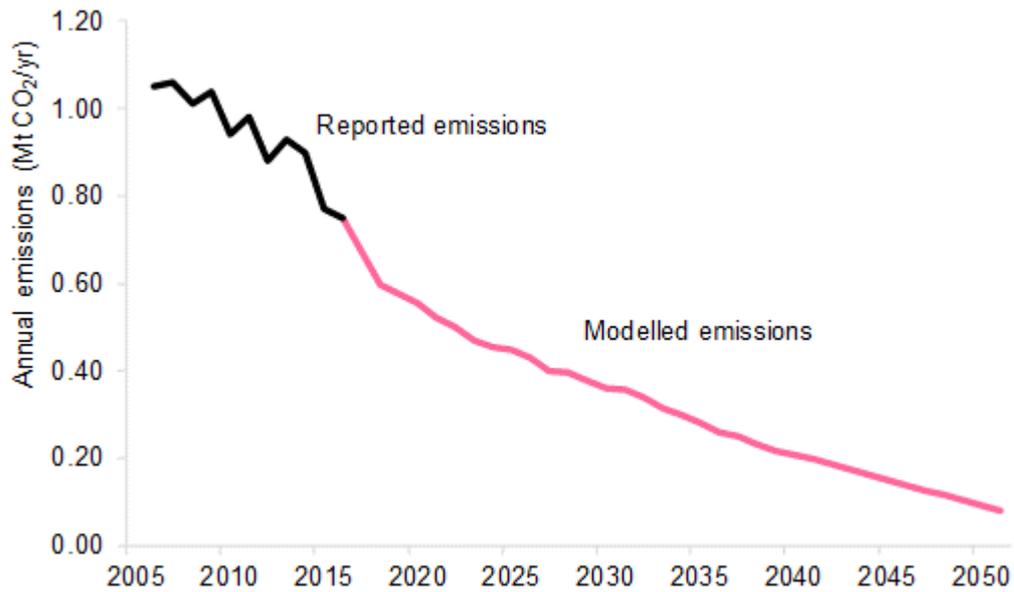


Figure 2 Haringey's Zero Carbon emission trajectory based on the GLA Zero Carbon model.

The breakdown of the emission components is shown in Figure 3. The fall in emissions is achieved through decarbonisation of energy supplies as well as through significant energy efficiency savings, with energy demand falling by around 25% between 2015 and 2050.

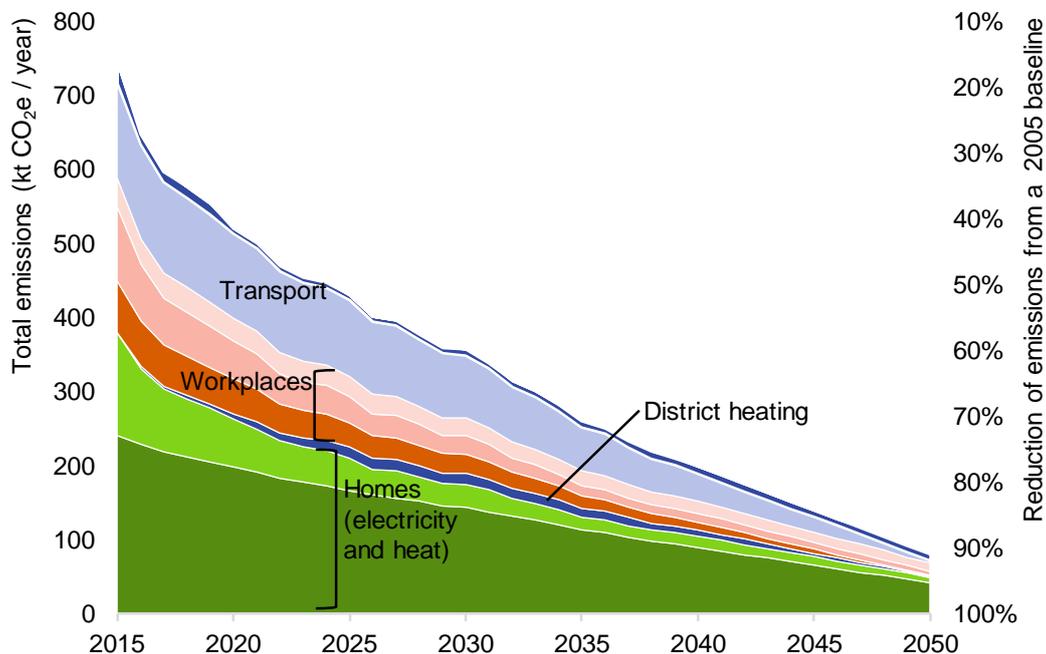


Figure 3 Haringey zero carbon trajectory, by sector

Energy efficiency gains are partially reversed by demand from new development (albeit new development is expected to be much more energy efficient than existing buildings).

Where emissions do not actually reach zero, offsetting may be an option. This is discussed in more detail in the main body of the report.

## Sectoral analysis

### Domestic buildings

Domestic heating is responsible for the largest share of Haringey's emissions at almost 32% of the total. Together with emissions from electricity, emissions associated with domestic buildings make up 50% of the borough's total emissions.

Significant reduction in this sector's carbon emissions can be achieved through comprehensive energy efficiency improvements to homes (e.g. whole-house retrofit) and from switching to lower carbon heat sources such as heat pumps, low carbon district heating networks or solar thermal.

### Non-domestic buildings

For non-domestic buildings, similar considerations to the domestic sector will be appropriate. Measures should be targeted on the basis of characteristics of buildings and occupants, including:

- New vs existing buildings
- Energy efficiency measures vs technology choices
- Tenure type of property (i.e. leased or owner-occupied)
- Size of business – SMEs vs large enterprises
- Public sector buildings
- Type of building and whether it is in a conservation area.

Within the business/commercial sector there is also greater opportunity to utilise sector-based networks and competition to increase emission reduction efforts.

### Transport

Compared to buildings, the transport sector has a smaller impact on the emissions of the borough. Currently the transport sector contributes just over 20% of the borough's emissions, though road transport alone is responsible for 17% of the total and is clearly the most significant aspect of emissions from transport. By adopting the 'near zero' scenario in the model, a reduction in emissions from road transport of 97% is contemplated.

The primary means of achieving this is by switching to electric vehicles, which allows low carbon electricity to displace high carbon petrol and diesel fuels.

## Proposals for Zero Carbon route map

On the basis of the review of progress to date, the sectoral analysis, and building on the modelled assumptions, the following general principles were developed to underpin the Zero Carbon route map. At the same time, using the same material, a series of actions have been proposed that respond to the baseline emissions, the stakeholders and council powers. These are listed below for review and consideration ahead of Stage 2 of the Zero Carbon project.

## General principles

- **Focus, scale up and sustain action:** planned programmes should have a long duration to provide market stability and sustainability, and should be ambitious in the anticipated scale of impact. Action needs to be scaled up, starting immediately.
- **Continue to work with partners:** increased partnership working and cross-borough or city-wide initiatives will help facilitate the longer duration and larger scale of programmes.
- **Step up monitoring and verification:** all programmes should have a core element of post-completion data collection enabling actual measurement of impact on emissions.
- **Communicate and measure the co-benefits of action:** programmes to assess and record co-benefits as an important justification for scaling up programmes, and to fully understand resulting costs and savings.
- **Annual reporting:** annual carbon reports should be continued but will benefit from the improved measurement and verification anticipated for future programmes.

## Actions for zero carbon homes

- H1 – Programme of deep retrofit of all council owned social housing
- H2 – Programme of technical advice on energy efficiency for all domestic property owners & occupiers
- H3 – Funding assistance to support delivery of energy efficiency in privately owned properties
- H4 – Enforcement of national regulations
- H5 – Planning policies that demand ambitious carbon emission reductions new and redeveloped homes

## Actions for zero carbon workplaces

- W1 – Engagement with professional networks to increase prioritisation of CO<sub>2</sub> reduction in commercial decision making
- W2 – Funding assistance to support delivery of energy efficiency measures in commercial premises
- W3 – Engagement with large enterprises and emitters to support large-scale projects and high-profile action
- W4 – Engagement with public bodies to support energy efficiency improvements in public buildings
- W5 – Action to improve energy efficiency and reduce energy consumption in council owned buildings
- W6 – Planning policies that demand ambitious carbon emission reductions in new and redeveloped workplaces

**Actions for zero carbon transport**

- T1 – Engagement with Haringey residents to encourage mode shift towards public and active transport choices
- T2 – Programme to improve active transport infrastructure
- T3 – Policies to that penalise private car use through parking charges based on fuel type/emissions etc.
- T4 – Programme to incentivise move to low and zero emission vehicles by residents and businesses
- T5 – Action to expand provision and accessibility of EV charging infrastructure

**Actions for zero carbon energy supply**

- E1 – Potential for large scale renewable generation in the Lee Valley through wind turbines and PV
- E2 – Programme to encourage installation of distributed renewable generation through roof mounted PV
- E3 – Policies to support appropriate installation of and connection to district heating networks
- E4 – Programme of technical advice to encourage and support residents and businesses and local supply chains to adopt heat pumps

# 1 Introduction

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Climate change is one of the most pressing concerns of our time, as we observe increasing frequency and severity of extreme weather events and disruption of natural systems. These changes are being felt through short term events such as droughts, flooding, heat waves and storm surges as well as longer term pressures including sea level rise and loss of productive land and fisheries. These changes will affect us all, and will become more severe over the course of this century unless concerted action is taken at every level of government and society.

In order to keep the global average temperature to within a 2°C increase over pre-industrial levels – and thereby avoid catastrophic climate change – radical reductions will be needed in net emissions of carbon dioxide and other greenhouse gas emissions. This target is incorporated into the Paris Agreement of the United Nations Framework Convention on Climate Change, which was ratified by 174 nations (including the UK) in November 2016.

Haringey was one of the first councils in London to respond to the climate change challenge with a commitment in 2009 to reduce CO<sub>2</sub> emissions in the borough by 40% by the year 2020, against a 2005 baseline.

Haringey's annual carbon reports show that the borough's emissions have been falling year-on-year, and describe how community actions and council-led programmes have contributed to this success. However, for the council to make its fair contribution to the Paris Agreement, its ambitions must be greater. This greater ambition is reflected in the 'Haringey Zero by 2050' initiative which was launched in October 2017.

## 1.1 Stage 1 Technical Report

This technical report presents the results of Stage 1 of the Zero Carbon Haringey project. It provides evidence in support of a separate Direction of Travel report, which makes the case for action and sets out priority actions for the council to take to enable the borough to meet its zero carbon target.

The technical work from Stage 1 is set out in three main parts:

- Background, context and progress to date.
- Analysis of current and projected future carbon emissions under “business as usual” and “Zero Carbon” scenarios.
- Sector by sector assessment of where, how and when the council could take action to reduce emissions.

## 1.2 Feedback on Stage 1

Together the Stage 1 Technical Report and the Direction of Travel report are intended to be used to stimulate discussion and obtain feedback from Haringey Council staff and local stakeholders on the council's opportunities, challenges and priorities to meet its zero carbon commitment. This process of engagement will

inform a set of decisions by the council to inform how the full zero carbon plan is developed in Stage 2.

Feedback is strongly encouraged on all aspects of the work to date and proposed priority areas. Feedback is particularly sought on the following questions:

1. Is this the right level of ambition?
2. What actions should be prioritised? What is most important or urgent?
3. What, if anything, is missing?
4. What is the best way to deliver the plan? Should direct action be prioritised, setting regulation and policy, enabling grassroots action or working with institutional partners and large organisations?

### 1.3 Limitations

Stage 1 comprised a review of Haringey’s progress to date, development of an overall zero carbon pathway and identification of priority areas. Detailed definition and modelling of actions will take place in Stage 2, following confirmation of the priority areas and actions.

## 2 International, national and regional context

Whilst this work focuses on Haringey, it is important to recognise the wider geographical and political context and how this may support and/or hinder transformative action at borough level. Key national and international documents published since 2009 relating to carbon reduction commitments are outlined below.

In addition, Arup has produced a “timeline” of the core UK legislation and policy relating to carbon emission reductions, which can be found online<sup>1</sup>.

Table 1 International and national policy context

Document	Description	Implication for Haringey
<i>International context</i>		
Paris Climate Agreement (2015)	An agreement signed by 195 countries, including the UK, committing to reduction of global emissions to keep global mean annual temperature rise below 2°C by 2100, and pursuing a more ambitious limit of 1.5°C.	New legislation, regulation and policy by central government will be needed to deliver on the UK’s Paris Agreement commitment. The pace of action at national level will influence the pace which can be achieved at local level.  In addition, the Paris Agreement provides a strong base of evidence for action at local level, and for Haringey to make the case

<sup>1</sup> <https://www.arup.com/publications/promotional-materials/section/uk-energy-legislation-timeline>

Document	Description	Implication for Haringey
		for a stronger national policy landscape.
UN sustainable development goals (2015) <sup>2</sup>	UN countries adopted seventeen ‘sustainable development goals’ (SDGs) to end poverty, protect the planet and ensure prosperity for all, with specific targets over the next fifteen years.	The UN SDGs are already influencing decisions in business and government, and whilst not mandatory, they provide a useful framework around which focused action can be developed.
<i>National context</i>		
Climate Change Act (2008)	Requires government to set legally binding carbon budgets covering five year periods, to reach a reduction in carbon dioxide emissions of 80% by 2050 compared to 1990 levels. Budgets are set 12 years in advance of each period.	Haringey’s zero carbon commitment goes beyond the Climate Change Act commitment. National policy action is strongly shaped by the CCC’s carbon budgets.  The council could align its approach and reporting to this approach by setting and reporting against local carbon budgets rather than in terms of percent reduction only.
Committee on Climate Change advice to government (various) – (2008-present)	The Committee on Climate Change was set up as a result of the Climate Change Act, and provides independent advice and reviews on setting and meeting carbon budgets and responding to climate change.	Many of the CCC publications are useful to understand actions that could and should be taken at borough level, as well as providing context within the wider national picture.
Clean Growth Strategy (2017)	The Government’s response to the CCC’s proposed fifth carbon budget identifies a range of government action over the next several years.	The CGS provides key signals for the timing of new policies and key decisions on the future of the energy system.  Haringey’s strategy should take account of these expected timings as detailed actions are planned.
Department for Transport Carbon Reduction Delivery Plan published (2009) <sup>3</sup>	Outlines the national strategy and opportunities for decarbonising the transport sector.	Sets out how regional and local partners such as Haringey can make a difference.
Carbon Reduction Commitment (CRC) scheme (2010)	A mandatory government energy reporting scheme for high energy users in the UK. Requires annual reporting of energy consumption and purchasing of allowances to cover emissions.	The scheme applies to high energy users with a presence in Haringey, as well as the London Borough of Haringey itself. In 2015/16 Haringey’s reported emissions under the scheme were around 10,000tCO <sub>2</sub> and it will have been required to purchase allowances to cover this.

<sup>2</sup> <http://www.un.org/sustainabledevelopment/sustainable-development-goals/>

<sup>3</sup> [https://www.gov.uk/government/uploads/system/uploads/attachment\\_data/file/228897/7682.pdf](https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/228897/7682.pdf)

Document	Description	Implication for Haringey
		The CRC to close at the end of 2018-19 with a corresponding increase in the Climate Change Levy.
Abolition of local government 'National Performance Framework' (2010) including national indicator 186 (NI186)	Reporting on per capita CO <sub>2</sub> emissions in local authority areas. Two thirds of local authorities had chosen to sign up to NI186	Haringey Council used this performance indicator and has continued to use the Department of Business, Energy and Industrial Strategy's (BEIS) reported per capita emissions at borough level for its annual carbon reporting.
Energy Company Obligation (ECO) (2012)	A government scheme placing an obligation on energy suppliers to deliver energy efficiency measures to domestic premises in Britain to help reduce carbon emissions and tackle fuel poverty.	Haringey has utilised this source of funding in their programmes – it was reported that in 2013/14 ECO funding was used to install loft insulation in 168 homes and cavity wall insulation in 104 homes <sup>4</sup> .
Energy Act (2013)	Established legislative framework to deliver secure, affordable and low carbon energy.	Limited implication for Haringey as relates largely to energy generation at grid scale
Private Rented Minimum Energy Efficiency Standards (2015)	From April 2018 (with a staggered approach lasting to 2023), landlords will be required to improve the EPC rating of their properties to meet a minimum of EPC rating E.	As a local authority, Haringey will be responsible for the enforcement of this legislation. It is up to Haringey to decide how it will approach this, but it is a significant opportunity to engage with landlords on energy efficiency issues.
Smart Meter Rollout (2017)	The government has set out an ambition for every home and small business to have a smart meter installed by 2020.	Smart meters facilitate consumer behaviour change and also enable smart grids. Haringey can encourage and engage with residents and businesses in the borough to encourage the uptake and best use of smart meters.
Industrial Strategy: Building a Britain fit for the future (2017)	Government industrial strategy setting long-term vision for boosting productivity and earning power in the UK. Covers key areas of relevance to climate action including infrastructure, clean growth and innovation.	May provide opportunities for funding of projects; including 'Transforming Cities Fund', EV infrastructure funding, clean growth funds, clean air funding, and local growth funding. Local industrial strategies will be agreed and will focus on local strengths, delivering economic opportunities.

Beyond the policy context, the UK has achieved significant progress in reducing the carbon intensity of the national electricity grid through a combination of

<sup>4</sup> [http://www.haringey.gov.uk/sites/haringeygovuk/files/4th\\_annual\\_carbon\\_report.pdf](http://www.haringey.gov.uk/sites/haringeygovuk/files/4th_annual_carbon_report.pdf)

sustained support for grid scale renewables and for phasing out of coal fired power stations. In transport and buildings, rising efficiency standards and related incentives are helping to reduce the energy intensity of transport and power consumption. With a market-led, and government-enabled, trend towards electric vehicles, a steady decarbonising of the transport sector can also be anticipated.<sup>5</sup>

A key remaining challenge for action is in the area of heat, particularly for the millions of existing buildings which will remain standing and occupied in 2050 and beyond. Much of this stock remains poorly insulated and obtains its heating from natural gas burned in boilers in individual buildings. The government's Clean Growth Strategy<sup>6</sup> recognises this challenge; its response includes commitments to support non-domestic building energy efficiency and it sets an ambition for "as many homes as possible" to reach the efficiency standard of EPC Band C. Nevertheless, a clear pathway and framework for action to transition this stock to highly efficient buildings heated with non-fossil-based sources is not yet in place.<sup>7</sup>

## 2.1 London context

In 2017 the Mayor of London announced his ambition for London to be a zero carbon city by 2050; achievement of this goal will require all London boroughs to contribute to the implementation of this ambition.

The Mayor's ambition is being reflected in policy through the draft London Environment Strategy (LES), released for consultation in 2017, which sets out a number of policies, principles and objectives and provides strategic backing for taking ambitious action on a number of environmental issues including tackling climate change.

In addition, the draft new London Plan (2017) supports the London Environment Strategy and specifically records the ambition to reach zero carbon by 2050. It includes supportive policies on green infrastructure, energy infrastructure and most clearly on new developments both for low carbon design, carbon offset pricing and future-proofing to accommodate developments in low carbon technology.

These policies will be felt through formal planning decisions on new developments but also potentially through London-wide programmes and initiatives to stimulate action on existing buildings and infrastructure systems and on behaviour of businesses and citizens.

Once the final LES is published in spring 2018, the priorities for Haringey can be reviewed to identify any opportunities for full alignment of actions between the council and the Mayor.

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<sup>5</sup> <https://www.theccc.org.uk/publication/the-fifth-carbon-budget-the-next-step-towards-a-low-carbon-economy/>

<sup>6</sup>

[https://www.gov.uk/government/uploads/system/uploads/attachment\\_data/file/651916/BEIS\\_The\\_Clean\\_Growth\\_online\\_12.10.17.pdf](https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/651916/BEIS_The_Clean_Growth_online_12.10.17.pdf)

<sup>7</sup> <https://www.theccc.org.uk/publication/next-steps-for-uk-heat-policy/>

## 3 Review of Haringey's progress

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Haringey is among the leading boroughs in London on Zero Carbon: Its Zero Carbon commitment is in place, it has published a Zero Carbon Commission report and it has begun this more detailed project to establish the evidence base for targeted action.

This chapter reviews the progress of the borough and the council in reducing carbon emissions.

### 3.1 Background

In 2009, Haringey Borough Council launched the 40:20 initiative, which established a target to reduce the borough's CO<sub>2</sub> emissions by 40% by the year 2020, against a 2005 baseline.

Each year since 2011 the council has published an Annual Carbon Report which documents progress towards the 40:20 goal. These reports describe activities undertaken within the borough that work to reduce emissions. In 2012 Haringey's Carbon Commission, in conjunction with the New Economics Foundation published a report, 'A sustainable new economy', and in 2017 the council published Zero Carbon Haringey: A Manifesto to Deliver Sustainable Regeneration in Haringey.

Figures presented in the Annual Carbon Reports show that emissions across the borough are reducing, both in total and per capita, despite an increase in population. In 2015, the latest year for which data is available, total emissions were down by 29% since 2005. The following sections provide an analysis of where Haringey is on its route to zero carbon through document and context review.

### 3.2 Haringey carbon emissions: recent trends

Haringey's greenhouse gas inventory data show a relatively steady decline in emissions over the past decade, from 1049kt CO<sub>2</sub> in 2005 to 749kt CO<sub>2</sub> in 2015 (see Figure 4).

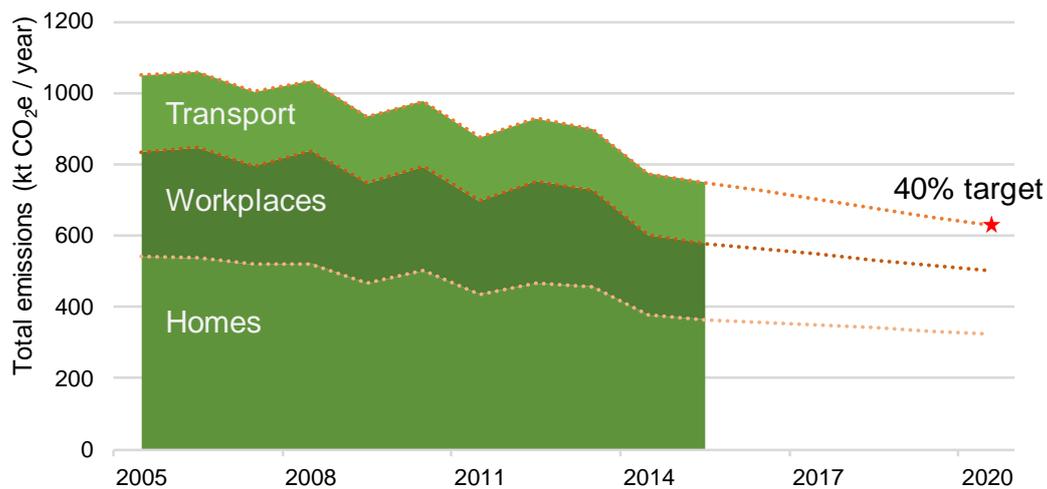


Figure 4 Haringey Annual CO<sub>2</sub> emissions, 2005-2015, with indicative pathways to meet the 40:20 Target (source: BEIS).

This decline has been achieved in spite of a growing population, which demonstrates an even more dramatic per capita reduction in emissions (see Figure 5).

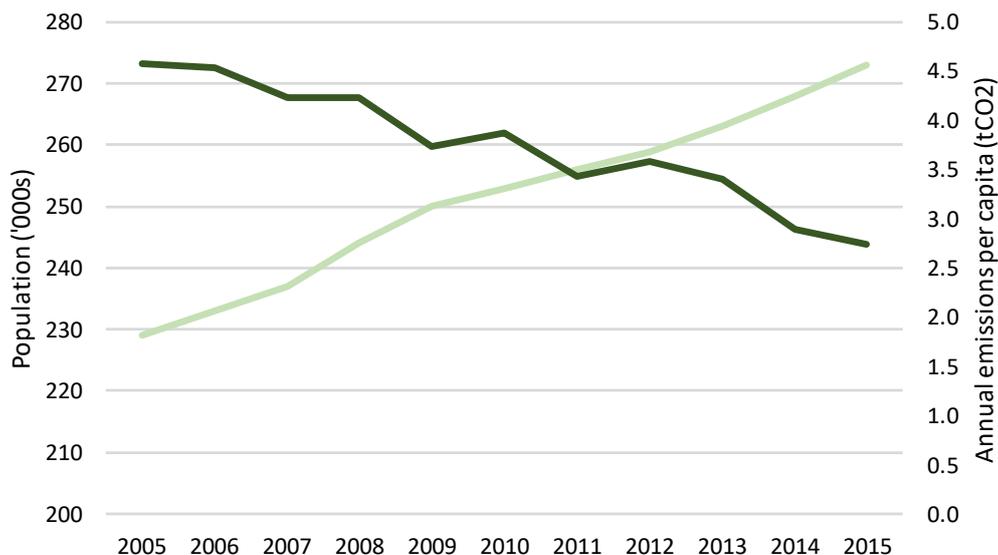


Figure 5 Haringey population and emissions per capita, 2005-2015 (Source: BEIS)

Whilst the general trend across London, and indeed across the country has been steady progress to reduce emissions, Haringey has out-performed most other London boroughs. The shared downward trend comes from a national electricity grid which has been steadily decarbonising over the same period. The effect of decarbonisation can be seen in Figure 6, which shows Haringey’s relative carbon emissions (red line) alongside those of all other London boroughs, together with the changing grid carbon intensity (blue line).

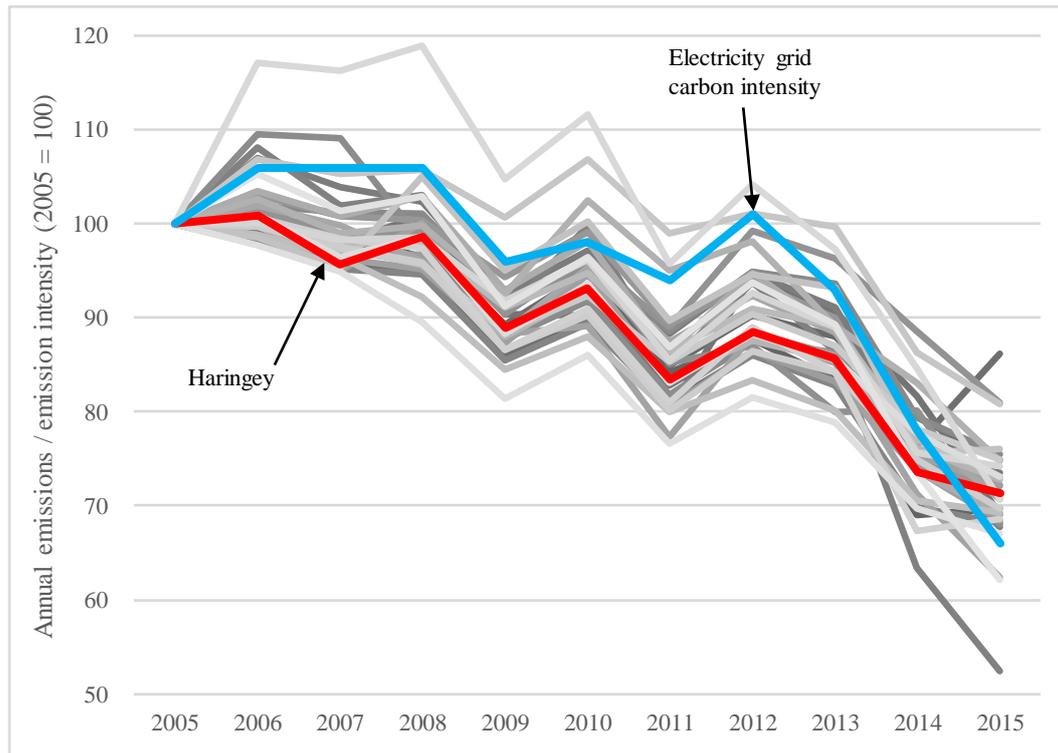


Figure 6 London borough emissions and national electricity grid carbon intensity, 2005-2015, indexed

The chart shows that changes in emissions in all London boroughs have correlated strongly with the carbon intensity of the electricity grid.

We estimate that around 55% of Haringey's reduction from 2005 to 2015 is the result of causes other than grid decarbonisation, such as increasing efficiency of buildings and vehicles, declining use of cars and switching to lower carbon fuels for heating and transport. Although other factors such as changes in economic activity and the weather will also impact carbon emissions, Haringey's emissions are reducing and the council's efforts should be regarded as successful, particularly when viewed in the context of a growing population.

### 3.3 Recent climate action programmes

Since 2009 Haringey has carried out numerous programmes as part of the 40:20 initiative. The tables below list the main programmes undertaken, each with a description and indication of impact based on available quantified data. Due to the variety of programmes listed and limitations of quantified impact data, reported metrics vary across the programmes. It is not possible to provide a sum of total impact in relation to any single metric.

It should also be noted that although labelled here as "climate action programmes," many, if not all, of these programmes had wider objectives than reducing carbon emissions. This is consistent with practice observed in cities around the world, where the climate goal is most successfully achieved when the carbon-reducing actions also provide other more tangible and salient local

benefits, such as thermal comfort, air quality improvements and time and cost savings.

### 3.3.1 Domestic buildings

Table 2 Recent climate action programmes – domestic sector

Programme	Type of assistance	Description	Scale of action or impact (see note)
Haringey Big Community Switch <sup>8</sup> (2013)	Information	Living Under One Sun (a Tottenham based charity) used an award from the One Borough One Future fund to meet with residents and encourage participation in a collective energy switching scheme, focusing on vulnerable and fuel poor households, to cut their energy bills.	Over 3000 people received advice.
Decent Homes Programme (2008)	Direct delivery	Through Homes for Haringey the Decent Homes Programme worked to improve the quality of social housing. Whilst the scheme was primarily aimed to upgrade homes to meet minimum comfort and health & safety standards, the government's 'Decent Homes' criteria includes efficient heating and effective insulation, so Haringey's Decent Homes programme included installation of measures such as insulation, new boilers and double glazing.	Ten year project (2008-2018) £292m total investment <sup>9</sup> 11,300 council homes brought up to government's Decent Homes standard. Estimated savings 5,000 tCO <sub>2</sub> /year <sup>10</sup>
Draft Core Strategy and Sustainable Design and Construction Guidance <sup>11</sup> (2013)	Policy	Planning policy adapted to require all new developments to be carbon neutral by 2016 for housing and 2019 for commercial new builds.	No information available on quantified impact.
Smart Homes	Grant funding	Based on a Green Deal assessment, homeowners could be granted up to £6,000 towards the cost of insulation – primarily for more expensive types such as solid wall insulation. The programme operated across six	255 homes treated in Haringey <sup>12</sup> 219 grants provided for Haringey <sup>13</sup> £930,000 total grant funding in Haringey

<sup>8</sup> [http://www.haringey.gov.uk/sites/haringeygovuk/files/3rd\\_annual\\_carbon\\_report.pdf](http://www.haringey.gov.uk/sites/haringeygovuk/files/3rd_annual_carbon_report.pdf)

<sup>9</sup> From information provided by Haringey Council

<sup>10</sup> Based on number of measures as reported in Haringey's annual carbon reports, and Arup benchmark values for CO<sub>2</sub> saving associated with each type of intervention.

<sup>11</sup> [http://www.haringey.gov.uk/sites/haringeygovuk/files/sustainable\\_design\\_and\\_construction\\_spd\\_adopted\\_march\\_2013.pdf](http://www.haringey.gov.uk/sites/haringeygovuk/files/sustainable_design_and_construction_spd_adopted_march_2013.pdf)

<sup>12</sup> <http://haringey4020.org.uk/home-energy-efficiency-renewables-update/>

<sup>13</sup> [http://www.haringey.gov.uk/sites/haringeygovuk/files/fifth\\_annual\\_carbon\\_report\\_final.pdf](http://www.haringey.gov.uk/sites/haringeygovuk/files/fifth_annual_carbon_report_final.pdf)

Programme	Type of assistance	Description	Scale of action or impact (see note)
		London boroughs including Haringey.	£128/tCO <sub>2</sub> average for programme Total estimated annual saving for Haringey <sup>14</sup> : 215 tCO <sub>2</sub>
Green Doctor Scheme (WARMTH) <sup>15</sup>	Advice	Ran for a year during 2016/17, offering home visits to residents to match them to relevant services to improve housing condition, including insulation and heating upgrades and advice on reducing energy bills	185 visits made 1,053 energy saving measures installed 15 tCO <sub>2</sub> saved through installation of measures 39 tCO <sub>2</sub> saved through behaviour change intervention
SHINE London (2017)	Advice	Haringey have signed up to a pilot project with Islington SHINE, scheduled to run until May 2018 providing holistic advice on fuel poverty and linked issues. Referrals to the scheme can be made (as well as direct requests by residents). The scheme is funded through the Warm Home Discount Industry Initiatives.	90 residents have benefitted from the service

Note: Carbon savings estimates are based on savings projections made at the time the intervention was carried out. No post-completion monitoring was carried out for the above programmes.

### 3.3.2 Non-domestic buildings

Table 3 Recent climate action programmes – non-domestic sector

Programme	Type of programme	Description	Scale of action or impact (see note)
Corporate estate electricity reduction	Estate investment	Investments in buildings and disposal of unneeded buildings were undertaken to achieve efficiency savings in the council's estate. Target is 10% reduction in electricity consumption by 2018/19.	34% reduction in electricity consumption from 2014/15 baseline. 2,400tCO <sub>2</sub> /yr savings.
Development of Tottenham Decentralised Energy Network (ongoing)	Information	Haringey Council continue to investigate and promote the use of decentralised energy, focusing on developing a delivery framework for three identified opportunity areas – North Tottenham, Tottenham Hale and Wood Green.	No information

<sup>14</sup> Approximation based on lifetime CO<sub>2</sub> savings for all six boroughs as reported in the Smart Homes Evaluation Report (2016)

<sup>15</sup> Haringey's 7<sup>th</sup> annual carbon report - draft

Programme	Type of programme	Description	Scale of action or impact (see note)
En10ergy social enterprise (2009) <sup>16</sup>	Grant funding	Haringey Council's Green Innovation Fund (2008/9) provided grant funding to set up a social enterprise company selling shares to residents. The company is operating a growing investment fund for carbon saving initiatives, and running a bulk purchasing scheme negotiating discounts for efficient boilers and PV arrays on behalf of residents.	2010 - 45kWp of PV on M&S in Muswell Hill 2011 - 20kWp of PV on the Methodist Church in Muswell Hill 2017 - 50kWp of PV on Woodside School in White Hart Lane
RetrofitWorks: The Good Building Co-operative (2012) <sup>17</sup>	Grant funding	A local cooperative, formed of local retrofit installers, community organisations, local authorities and other partners, to drive retrofit from the 'ground up'. Funding for initial set up and commercialisation of businesses from Green Deal Pioneer Places and Green Deal Communities	75 business members 120 homes retrofitted
Green Light North London <sup>18</sup> (2012)	Technical assistance	The council's Business Support Project which in 2012/13 provided energy saving advice to businesses resulting in lighting efficiency switching and behavioural changes (fuel saving, driving, and recycling). The project also piloted Green Deal Assessments.	101 businesses advised. 327 tCO <sub>2</sub> saved each year £60,000 savings per year

Note: Carbon savings estimates are based on savings projections made at the time the intervention was carried out. No post-completion monitoring was carried out for the above programmes.

### 3.3.3 Transport

Table 4 Recent climate action programmes – transport sector

Programme	Type of assistance	Description	Scale of action or impact (see note)
Highways, walking and cycling analysis and studies (2013)	Technical study	The Walking and Cycling study, along with the North London Cycle Strategy, has identified investment requirements for walking and cycling facilities in Haringey - £3.2 million for cycling and £561k for walking.	Study completed

<sup>16</sup> <http://en10ergy.org.uk/>

<sup>17</sup> <http://retrofitworks.co.uk/>

<sup>18</sup> [http://www.haringey.gov.uk/sites/haringeygovuk/files/4th\\_annual\\_carbon\\_report.pdf](http://www.haringey.gov.uk/sites/haringeygovuk/files/4th_annual_carbon_report.pdf)

Programme	Type of assistance	Description	Scale of action or impact (see note)
DIY Streets Toolkit <sup>19</sup> (2010)	Technical assistance and funded works.	In partnership with Sustrans, a project for community-led street design and retrofit including smart travel measures.	1,000 households in the focus area 40+ trees planted 34% increase in number of residents who felt the street is a place to socialise.
Free electric vehicle trials <sup>20</sup> (2017)	Technical assistance	Haringey are currently offering free, one week trials to residents and businesses using a selection of electric vehicles.	Project ongoing
Personal Travel Planning (2012-13)	Technical assistance	A personalised travel planning project helped residents identify lower carbon modes of travel for their regular journeys, including an emphasis on active transport.	9,115 homes visited 3,365 conversations 1,424 households requested further information

### 3.3.4 Waste

Although Haringey has a target for recycling 40% of household waste by 2020, the borough has limited direct power to take action on waste. Haringey is the waste collection authority for the borough, but treatment and disposal falls under the remit of the North London Waste Authority. Meanwhile, commercial waste, and demolition and construction waste are handled by commercial operators and regulated by the Environment Agency.

Table 5 Recent climate action programmes – waste sector

Programme	Type of assistance	Description	Scale of action or impact
Business advice (through Green Light North London)	Information	Targeted advice to local businesses regarding waste reduction and/or increased recycling.	0.3 – 7 tonnes of waste reduced or recycled for each individual business
Food waste collection in schools	Engagement and technical assistance	80% of schools (out of 80) <sup>21</sup> have signed up to the food waste collection service, and the Haringey Education Officer is engaging with the remaining 20% to encourage them to sign up to the service as well.	64 schools signed up to food waste collection.

<sup>19</sup> <https://www.sustrans.org.uk/policy-evidence/the-impact-of-our-work/community-led-street-design-turnpike-lane-haringey>

<sup>20</sup> <http://www.haringey.gov.uk/parking-roads-and-travel/travel/neighbourhoods-future-wood-green>

<sup>21</sup> <https://www.gov.uk/school-performance-tables>

Programme	Type of assistance	Description	Scale of action or impact
Haringey Waste Contract Operations	Supply chain improvement	Haringey has a target to reduce the emissions from its waste contract operations by 40% from 2011/12. This has been exceeded.	54% reduction in CO <sub>2</sub> emissions from waste contract operations in 2016/17 against a 2011/2012 baseline. <sup>22</sup>

### 3.4 London climate action context

Haringey’s recent track record of pursuing many separate initiatives, often at pilot scales, can be usefully seen in a wider context of action across London (see Figure 7).

Recent data on the number of building energy efficiency interventions<sup>23</sup> from different programmes in London shows the wide spectrum of scale of impact, from major programme such as CERT, RE:NEW and ECO to smaller programmes such as CESP, Warm Front and RE:CONNECT. The data also show a dramatic scaling back of interventions in the past 4-5 years.

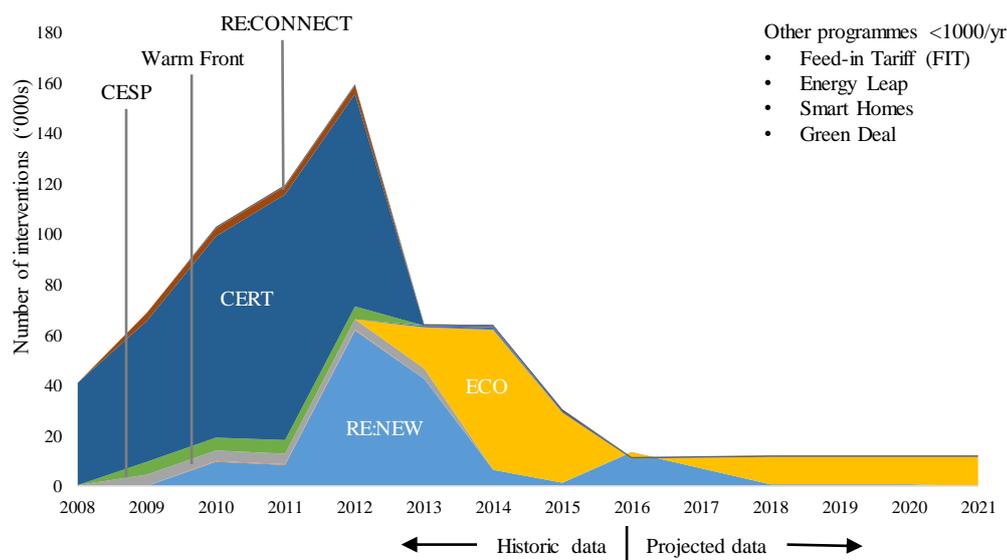


Figure 7 Recent energy efficiency and low carbon energy programmes in London

Notwithstanding the recent trends, the evidence of large scale programmes provides a useful benchmark for planning the next generation of transformation programmes which will be needed to deliver a zero carbon London.

<sup>22</sup> Haringey Annual Carbon Report, 2017 (pre-publication draft).

<sup>23</sup> “Interventions” includes a wide range of measures, from whole house retrofit to lighting replacements.

### 3.5 Haringey's progress to date: findings and recommendations

The data presented in this chapter shows that the borough is making steady progress in reducing emissions, in spite of a growing borough population. This progress owes much to a decarbonising grid but at least half of the reduction appears to be the result of local factors such as behaviour change, more efficient building stock and a more efficient vehicle fleet in the borough.

In setting its course for action, Haringey has clearly sought to engage with a range of stakeholders, including community groups, businesses, other borough councils and the GLA. This builds an important foundation for further partnership working and to enable the scale of programmes required to deliver on the borough's ambitions.

The emission savings from the council's direct actions are difficult to quantify but appears to amount to around 5,500 tonnes CO<sub>2</sub> in savings per year, against recent annual emissions of 750,000 tonnes CO<sub>2</sub>. This highlights the importance of the role of the council as a promoter and enabler of action by others, more than a direct actor itself.

Nevertheless, in contemplating a zero carbon target, there will be a need to scale up measures across the board. Taking two examples of the difference in scale:

- Haringey has over 100,000 existing dwellings, the majority of which will need fabric upgrades to improve their energy efficiency. The Smart Homes project gave grants for insulation upgrades to just 255 homeowners in Haringey. Most other actions were at a similar scale, of tens or hundreds of properties. By contrast, CERT delivered a peak of around 100,000 interventions in one year across London; this shows that action at scale is within the capability of markets and supply chains to deliver;
- The council's most significant programme, Decent Homes, has upgraded 11,300 homes over 10 years, but its prime focus was on living standards rather than energy efficiency. The estimate of the number of energy efficiency retrofits (such as double glazing, loft insulation or a new boiler) translates to around 500 domestic retrofits per year over that period. The next round of retrofits will need to be both faster and deeper, i.e. delivering to more homes a deeper set of whole house energy and carbon savings solutions.

The clear conclusion is that climate action – through investment, support programmes, regulation, enforcement, incentives and prohibitions – will need to be scaled up dramatically if the borough is to play its part in delivering the Zero Carbon target.

Interim recommended actions and priorities are as follows:

- **Focus, scale up and sustain action:** The next round of climate programmes and actions in Haringey need to be 10-100x larger in scale and longer lived. Fewer, more focused programmes would help maximise the impact of the programmes that are taken forward.

- **Continue to work with partners and the community:** The success of cross-borough working and stakeholder partnerships should continue, with a shared ambition and shared resources helping to deploy programmes and measures at a larger scale.
- **Step up monitoring and verification:** You cannot manage what you are not measuring. Like many government actors, the council's data on action has largely been based on outputs, and not on outcomes. Detailed, post-completion monitoring is critical to understanding what worked and what didn't, and what is the overall progress towards the target.

Good quality data can also help access carbon finance. Climate-focused investment funds target investments which can demonstrate impact. The International Performance Measurement and Verification Protocol (IPMVP) outlines internationally agreed guiding principles for monitoring and verification of energy saving measures.

- **Communicate and measure the co-benefits of action:** Whilst co-benefits of programmes have been acknowledged in some cases, no specific provision for assessing co-benefits has been made as part of the programmed planning. This is an emerging area of work and approaches for quantifying co-benefits are documented in recent literature<sup>24</sup>. The council's Annual Carbon Reports, for instance can provide a platform for reporting both the borough's carbon performance and the other quantifiable benefits of climate action.

## 4 Future carbon scenarios for Haringey

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In the previous chapter we looked at Haringey's historic trends in carbon emissions and the specific "climate actions" the council has taken. We also evaluated the evidence of the impact of those actions and of wider changes to national and regional systems.

In this chapter we now look forward, to set out a technical pathway for zero carbon and to identify the priority areas for action to drive both behaviour and investment in buildings and infrastructure needed to follow the Zero Carbon pathway.

The chapter first discusses the results of a scenario-based carbon modelling exercise for the borough, using the GLA's Zero Carbon Pathway tool. This is followed by a presentation of a scoring-based selection of priority measures for action. These priority measures will form the basis of detailed analysis and modelling in the second stage of the project.

### 4.1 Zero Carbon Pathway Tool

In 2016, the GLA developed a 'Zero Carbon Pathway Tool'<sup>25</sup> which brought together existing information and new evidence to create a predicted emissions

<sup>24</sup> <http://www.c40.org/researches/c40-lse-cobenefits>

<sup>25</sup> <https://www.london.gov.uk/what-we-do/environment/energy/energy-and-climate-tools>

trajectory based on energy efficiency measures and adoption of low carbon technologies out to 2050.

For this project the GLA model has been modified to focus specifically on the borough of Haringey. Modification has been done through the following measures:

- Where borough-level detail was available in the model already, data for all other London boroughs has been removed to leave just Haringey data.
- Where the existing data in the model was London-wide, and Haringey specific data sets are available, these were replaced – this was done for population projections<sup>26</sup> and 2005 baseline emissions<sup>27</sup>.
- Where the existing data in the model was London-wide and Haringey specific data sets are not available, or where we did not have access to base models, specifically for transport modelling and emissions from industry, Haringey figures are assumed to be 2% of the London total – based on an average of Haringey’s share of area and population in London.
- Waste is modelled as Haringey’s share of London’s landfill related emissions. Haringey does not actually send any waste to landfill, therefore the figures in the model are not related to activity within the borough and waste related emissions have been removed. Emissions associated with waste processes and waste related transport are included in the buildings and transport sectors.

Many inputs to the model come from external and unlinked models and datasets. Figure 8, taken from Appendix 2 of the draft London Environment Strategy (2017)<sup>28</sup> shows the links between the Zero Carbon Tool and the supporting models and datasets. Adaptations have only been made within the Zero Carbon Pathways Tool, and the data from other models has not been removed or amended, ensuring consistency is maintained between the Haringey model and the GLA Zero Carbon Tool.

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<sup>26</sup> <https://data.london.gov.uk/dataset/2016-based-population-projections>

<sup>27</sup> <https://www.gov.uk/government/statistics/uk-local-authority-and-regional-carbon-dioxide-emissions-national-statistics-2005-2015>

<sup>28</sup> <https://www.london.gov.uk/WHAT-WE-DO/environment/environment-publications/draft-london-environment-trategy>

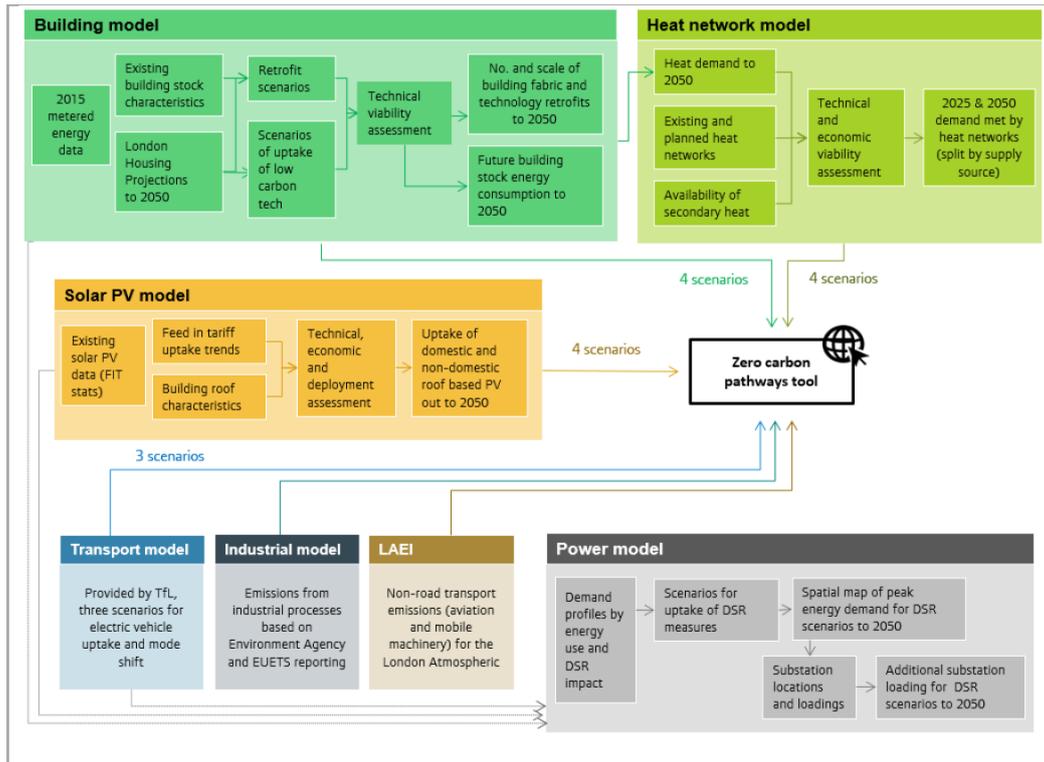


Figure 8 GLA Zero Carbon modelling architecture

### 4.1.1 Data

Data used within the model has its source documented within the model. Many of these inputs are integral to the model and have been retained for this modelling exercise. Any data sources added to or amended within the original model are detailed in Appendix A.

### 4.1.2 Modelling approach

Once the data sources are in place the model allows settings to be chosen that shape the output. The possible selection options, and those that have been agreed for interpreting this work, are set out in Table 6. These inputs were agreed to represent the most ambitious action that could be taken by Haringey, with lower ambition levels in areas outside of Haringey’s control (such as the carbon intensity of the electricity and gas grids).

Table 6 Zero Carbon Model user selection options

Selection type	Possible selection options	Selected option	Description of selected option
Energy efficiency uptake	H/M/L uptake	High Uptake	Up to 50% of buildings upgraded by 2025, 100% by 2050. Increased proportion of whole-house retrofit.

Selection type	Possible selection options	Selected option	Description of selected option
Heat pump uptake	H/M/L uptake	High Uptake	Up to 60,000 heat pumps installed by 2050
Heat network deployment	H/M/L uptake / No additional heat networks	High Uptake	Tenfold increase in heat networks by 2025, connecting up to 20,000 homes to waste and environmental heat sources by 2050.
PV deployment scenario	Ambition / Target / Business as usual	Target (see note)	Sustained growth at peak rate of recent years. Up to 1,500 installations by 2025, increasing to 10% of all viable buildings by 2050.
Electricity grid decarbonisation	BEIS Green Book Grid Emissions Factor / National Grid FES: 2 degrees / National Grid FES: Steady State / 2015 Factor unchanged / No policy baseline	BEIS Green Book Grid Emissions Factor (see note)	Reduction in line with UK carbon budgets. High penetration of renewables and nuclear, doubling capacity by 2030.
Gas grid decarbonisation	Zero carbon gas grid / Green gas introduction / Natural gas	Green gas introduction (see note)	Green gas in national supply increasing significantly from 2030, contributing 13% of gas supply by 2050.
Transport scenario	Near zero / High ULEV / Baseline	Near Zero	High investment accelerates conversion of all road transport vehicles to zero emission by 2050.

Note: Central scenario choices were made for both PV deployment and gas grid decarbonisation to reflect an ambitious but more realistic scenarios. A zero carbon gas grid in particular is highly uncertain at the present time. The BEIS Green Book grid emissions factor was chosen to ensure consistency with government targets.

### 4.1.3 Carbon emissions data

The model uses borough-level carbon emissions from the London Energy and Greenhouse Gas Inventory (LEGGI). To date Haringey Borough Council has reported using the UK local authority subset dataset from the Local Authority and Regional Carbon Dioxide Emissions and National Statistics, published by BEIS. The principal difference between the two data sources is the fact that the BEIS local authority data does not include waste or aviation, and they also differ in how transport emissions are accounted for: where LEGGI uses data from the London Atmospheric Emissions Inventory (LAEI), the BEIS published data uses transport emissions compiled by Ricardo AEA<sup>29</sup>. The actual difference between the two datasets is small, as shown in Figure 9.

<sup>29</sup> <https://data.london.gov.uk/dataset/carbon-dioxide-emissions-borough>

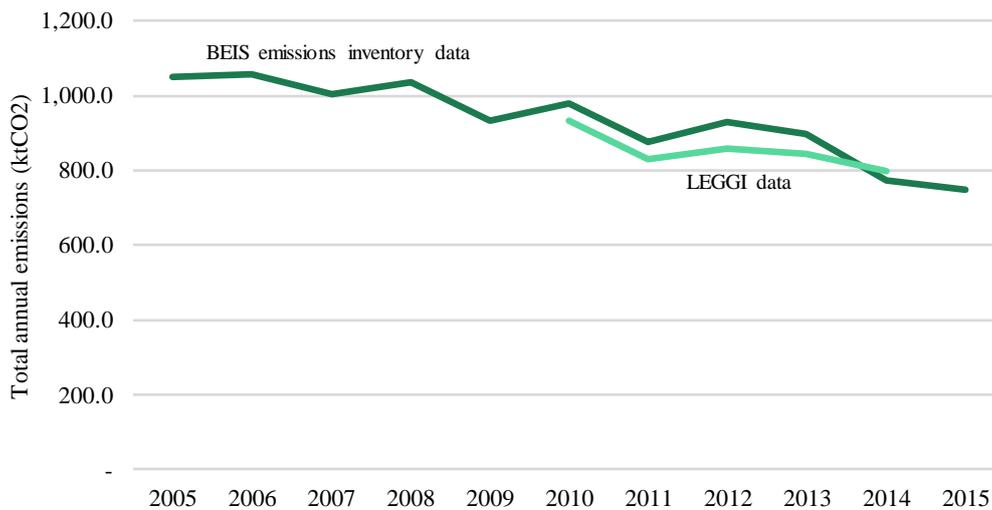


Figure 9 Comparison of BEIS and LEGGI carbon emissions data for Haringey

The small difference means that Haringey could continue to report against its subset of the BEIS dataset for continuity. However, to present a more consistent approach across London we recommend moving to using LEGGI as this is consistent with GLA reporting.

## 4.2 Haringey’s zero carbon pathway

The proposed zero carbon pathway for Haringey is shown in Figure 10 below, which shows both recent past emissions trends and the projection to 2050 based on modelling described previously.

The pathway shows a steep decline in emissions in the next few years, followed by a gentler decline from 2020 onwards.

It is noted that the modelled pathway does not reach all the way to zero carbon emissions by 2050, but rather shows an approximately 90% reduction in emissions. The residual emissions are associated with an assumed electricity grid which itself is not fully zero carbon, as well as residual use of fossil fuels for heating. Fully achieving net zero carbon would, therefore, require consideration of offsetting through carbon reduction outside the borough and/or through the development of carbon “sinks” such as afforestation or carbon capture use and storage (CCUS).

These offsetting options have not been investigated as part of Stage 1 of this project. High-level options for offsetting will be considered as part of Stage 2.

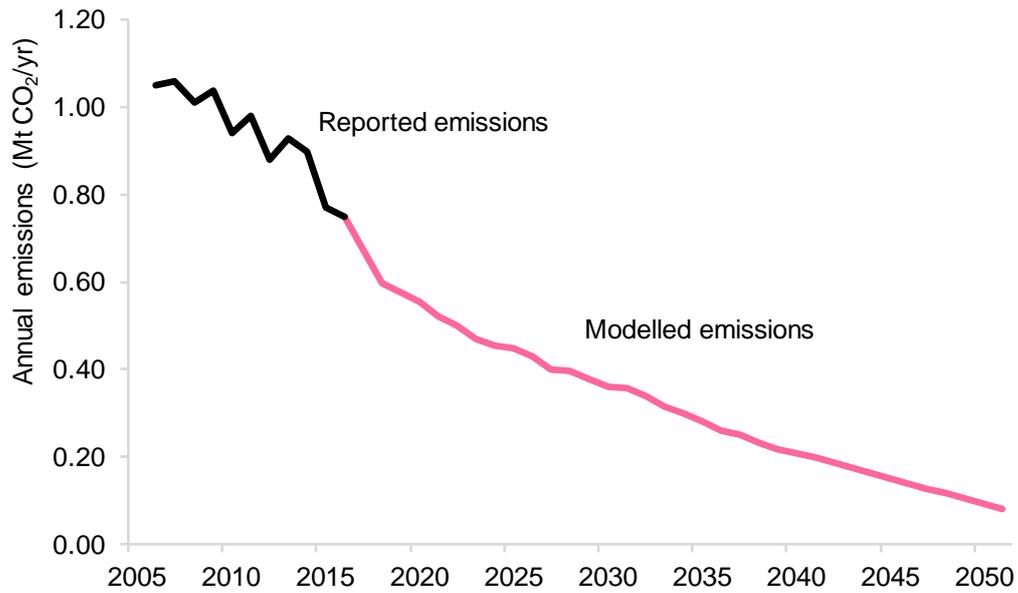


Figure 10 Haringey’s Zero Carbon emissions trajectory based on the GLA Zero Carbon model.

The zero carbon pathway is shown on a sectoral basis in Figure 11 below.

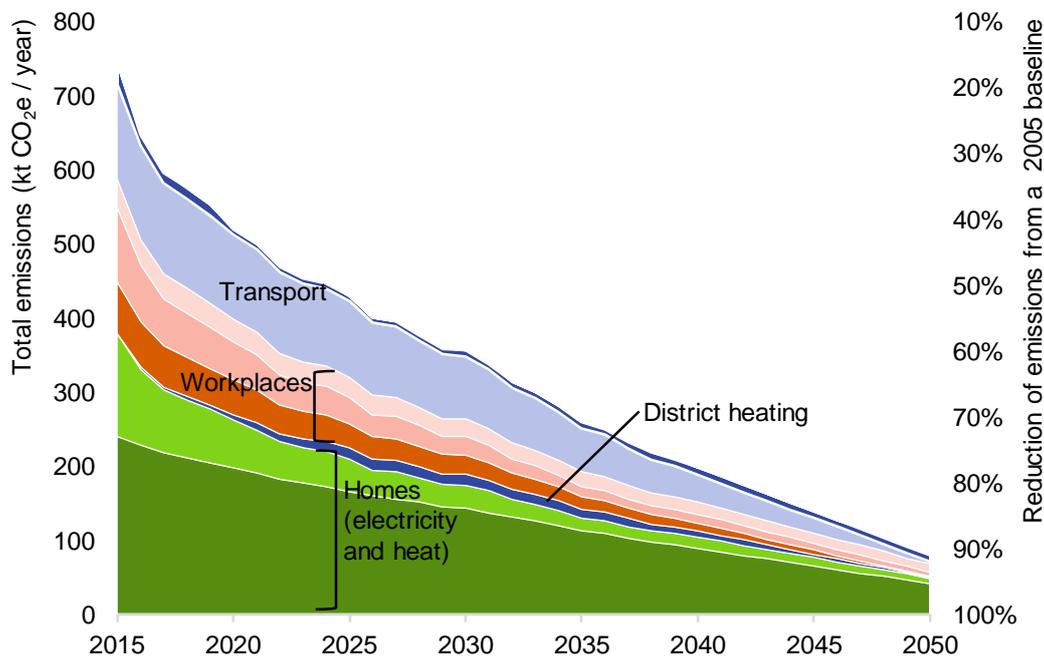


Figure 11 Haringey zero carbon trajectory, by sector, in megatons of CO<sub>2</sub>e.

The figure shows that emissions from domestic heat use (dark green) and industry (light pink) grow to become the majority of remaining emissions by 2050. The pathway also highlights the emergence of district heating to provide energy to homes and businesses.

In Figure 12 and Figure 13 we see the pathway presented in energy terms for buildings, respectively showing demand and supply.

The demand chart shows energy demand falling by around 25% between 2015 and 2050. This is achieved through significant energy efficiency improvements to existing buildings and some demolitions. These gains are partially reversed by new demand from new development (albeit new development is expected to be much more energy efficiency than existing buildings).

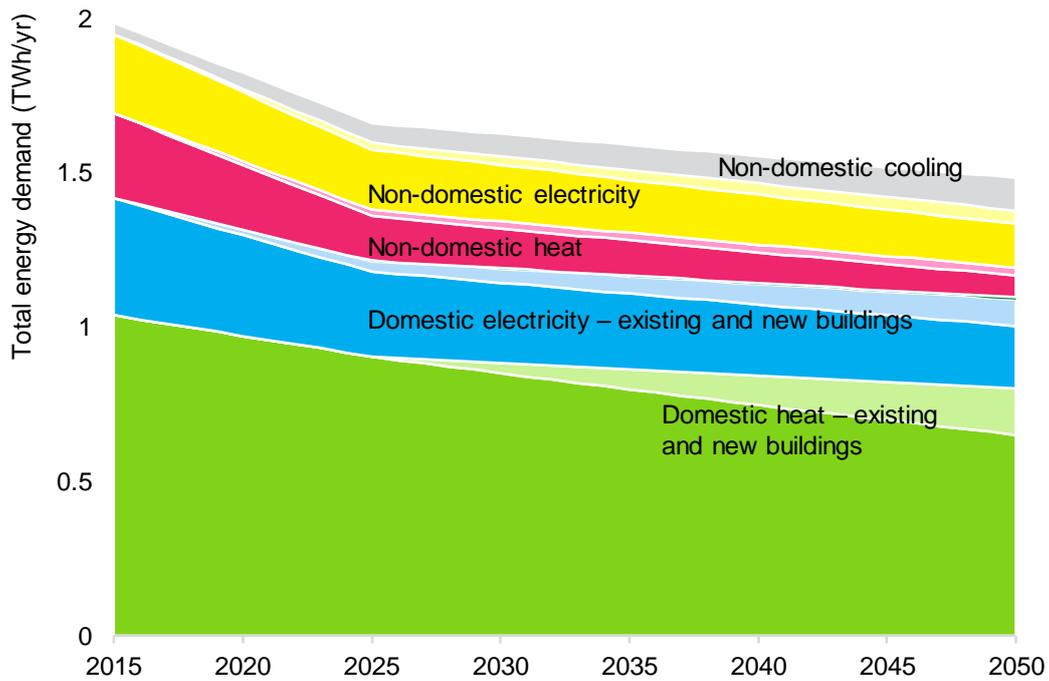


Figure 12 Building energy demand pathways, by sector and type of energy

The supply graph shows a dramatic transition in building heating from gas boilers in favour of heat networks and individual heat pumps in buildings.

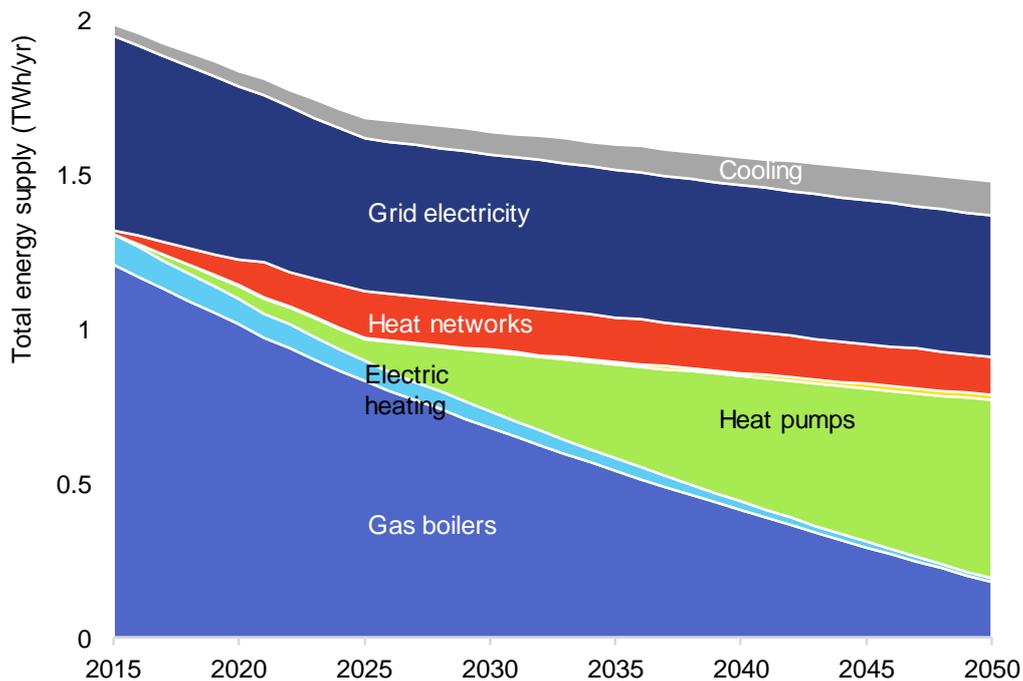


Figure 13 Building energy supply pathways, by source of energy

The modelled supply pathway for the borough’s future district heating networks is shown in Figure 14. The pathway recognises the dominance of gas CHP and boilers to supply heat networks today, but shows these technologies giving way to heat from power stations and major industrial installations (such as heat from the planned Edmonton Energy Recovery Facility).

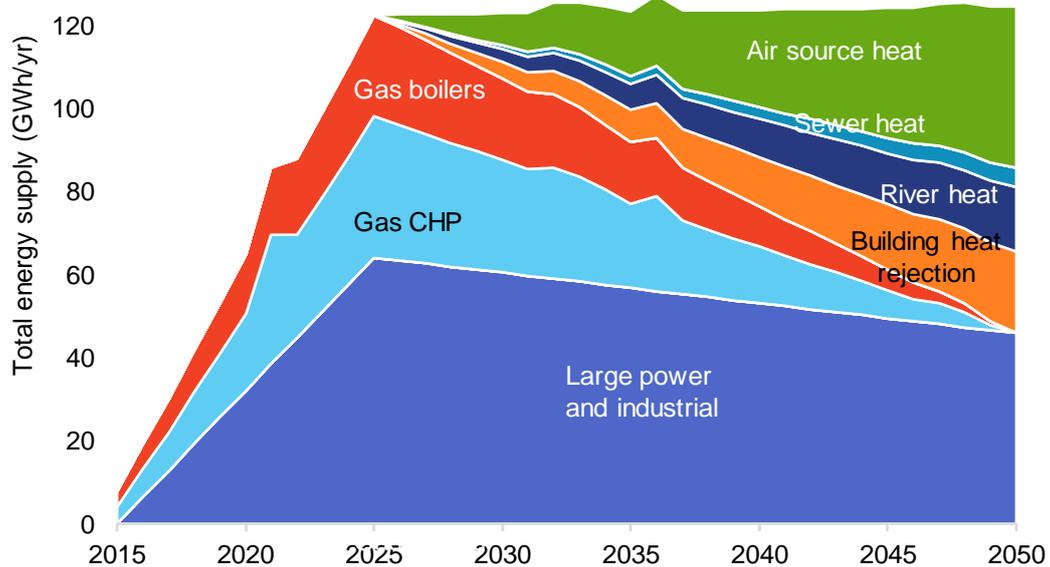


Figure 14 Heat network supply pathways, by heat source

Multiple other heat sources are modelled to increase in contribution as gas is phased out. These include heat from building cooling systems, from sewers and other infrastructure and from rivers, with air source heat pumps providing the balance of heat supply.

Drawing these themes together, the indicative pathway for each major sector is summarised in the table below.

Table 7 Relative current contribution, and description of the reduction in carbon emissions from contributing sectors

Sector	% of 2015 emissions	How the emissions reductions are achieved in the modelling
Domestic heat	33%	By implementing the highest uptake of energy efficiency, heat pumps and heat network deployment the emissions from domestic heating can be reduced by almost 83% by 2050. Domestic heat will remain the largest contributing source to residual emissions in 2050.
Domestic electricity	18%	By implementing the highest uptake of energy efficiency, heat pumps, heat networks and the target deployment scenario for solar PV, assuming grid decarbonisation happens in line with the UK's carbon budgets (BEIS Green Book emissions factors), the emissions from domestic electricity consumption can be reduced by almost 95% by 2050.
Road transport	18%	An ambitious transport scenario assumes high investment will result in the conversion of all road transport vehicles to zero emission vehicles by 2050. This, combined with assumed decarbonisation of the grid in line with UK carbon budgets, can reduce road transport emissions by 97% by 2050. This is in line with the Government's commitment to phase out sales of new petrol and diesel cars by 2040.
Non-domestic electricity	13%	By implementing the highest uptake of energy efficiency, heat pumps, heat networks and the target deployment scenario for building integrated solar PV, assuming grid decarbonisation happens in line with the UK's carbon budgets, the emissions from non-domestic electricity consumption can be reduced by 94% by 2050.
Non-domestic heat	9%	By implementing the highest uptake of energy efficiency, heat pumps and heat network deployment, the emissions from non-domestic heating can be reduced by almost 99% by 2050. With the modelled scenario, the relative emissions from non-domestic heating as a percentage of total emissions also drop the most – from 9% of total emissions in the borough in 2015 to 1% in 2050.
Industry	5%	Industrial efficiency improvements are assumed to be limited, with most emissions savings achieved through grid electricity decarbonisation in line with the UK's carbon budgets, coupled with a significant increase in the national supply of low carbon gas to the gas grid after 2030. Under these conditions, emissions from industry fall by 71% by 2050.
Non-road transport	4%	Non-road transport (comprising river, rail and non-road mobile machinery) makes up a very small proportion of the overall emissions, and is not impacted by any of the user-selected input scenarios. The fixed modelled information assumes a decrease in emissions from these sources of almost 70% by 2050.

### 4.3 Gap analysis

As noted previously, the latest reported carbon emissions for Haringey are 749,000 tCO<sub>2</sub> for 2015<sup>30</sup>. The trajectory defined in the modelling requires a reduction in emissions of 673,000 tCO<sub>2</sub>, which represents a reduction of 2.5 tCO<sub>2</sub> per person across the borough (i.e. from 2.7 to 0.2 tCO<sub>2</sub> per capita).

Whilst the borough's emissions have been decreasing overall, and in the domestic sector in particular, the magnitude of change needed for continued emissions decreases requires a scale of action is far greater than that being delivered by any of the recent and current borough climate actions.

Table 8 gives an idea of the gap between the scale of current or recent programmes and the scale of emissions reduction required to meet the 2050 goal. The figures are indicative based on simple calculations and limitations of available information, and are not intended as recommendations but rather to give an idea of the scale of actions carried out to date and how this compares to the scale of action required to meet the goal of zero carbon by 2050.

Table 8 Indicative gap analysis using existing and previous programmes as benchmarks

Programme	Scale of previous programme	Indicative required scale	Increase in impact
Smart Homes Programme (2016)	255 hard-to-treat homes retrofitted in a year	31,000 hard-to-treat homes in Haringey over 30 years	Four times more homes treated each year for the next 30 years
Decent Homes Programme (2008)	11,000 homes in 10 years	>100,000 existing homes in Haringey over 30 years	Three times more homes treated each year for the next 30 years
Green Doctor Scheme (2016)	54 tCO <sub>2</sub> saving made from programme through 185 home visits	327,000 tCO <sub>2</sub> reduction required from domestic buildings	200 times greater impact each year for the next 30 years
Green Light North London (2012)	101 businesses advised. 327 tCO <sub>2</sub> saved each year	160,000 tCO <sub>2</sub> reduction required from non-domestic buildings	Sixteen times greater increase in impact for the next 30 years
DIY Streets Toolkit (2010)	1,000 households in the focus area	>100,000 households in Haringey	Three times more impact for the next 30 years
Personal Travel Planning (2012-13)	9,115 homes visited	>100,000 homes in Haringey	37% increase in impact for the next 30 years

Note: Figures for increase in effort assume an immediate scale-up and a sustained effort over the next 30 years.

<sup>30</sup> <https://www.gov.uk/government/statistics/uk-local-authority-and-regional-carbon-dioxide-emissions-national-statistics-2005-2015>

The above figures highlight that a significant gap remains between current action and the level of action needed to meet the target, across all areas of council action.

However as noted in chapter 2 Haringey is not on its own: significant progress at the national and regional scale will continue to deliver carbon savings in the borough even with no action. The urgent need to fill the action gap will therefore be most acute in those areas where national and regional action are not sufficient or where Haringey is best placed to deliver the change which is needed.

Taking account of these factors, the most pressing area for action is in relation to building heating, especially existing buildings. This is the largest single contributor to emissions in 2015 and remains one of the key unsolved challenges within the government's carbon commitments.

Beyond building heating, reducing the need for travel and supporting public and active transport choices, represent key opportunities for effective action at a local level.

In the next chapter we examine the route to Zero Carbon across different sectors, and present a route map to provide a set of priority action areas to be developed in more detail in Stage 2.

## 4.4 Energy supply considerations

As technology advances, infrastructure in the borough needs to be able to adapt and be ready to capitalise on new opportunities.

Alongside programmes to address building energy efficiency, programmes will be required to modify existing building heating systems to make use of low-carbon sources of heat as they become technically and financially viable, which for some homes is right now.

Haringey could encourage the provision of distributed electricity generation by supporting community initiatives such as en10ergy (described in chapter 2), piloting microgrid projects and by considering a council-owned energy supply company. A local energy supply company could allow the council to buy from small-scale local generators at a low price, and sell on to public buildings and services in the borough.

This study has briefly considered the theoretical capacity of the borough to deliver renewable energy. For example, if solar PV installations sustain growth at peak rate of recent years, the borough could generate around 14,000 MWh of electricity each year, which is enough to supply around 3% of homes in the borough.

If two wind turbines were installed in areas of open land in the borough – e.g. the Lee Valley – they could generate over 5,000 MWh of electricity and supply 1% of homes in the borough.

The zero carbon pathway incorporates an estimated 15,000 MWh of rooftop solar PV, which effectively offset consumption from the electricity grid. In addition, consideration could be given to large scale solar PV installations. While it is unrealistic to consider locating such a solar farm on scarce open land in the

borough, the network of water supply reservoirs in the Lee Valley could offer scope for large scale PV. These reservoirs comprise a very large surface area; with only 20% coverage, a series of large scale floating PV arrays has the potential to generate more than 50,000MWh/yr, equivalent to the power needs of 10% of homes in the borough.

Such projects would be ambitious and challenging, but these options offer an opportunity for very large scale action by the council. Once council priorities for the Zero Carbon plan are confirmed, it is intended to develop these generation options more fully in Stage 2 of the project.

## 5 Mapping the route to Zero Carbon in 2050

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This chapter develops the proposed route to Zero Carbon in four main sections:

- Sector by sector analysis, to identify priority areas for action.
- Presentation of decision matrix to assess potential programmes
- Consideration of key stakeholders in relation to each sector and sub-sector
- Proposals for the route map

### 5.1 Sector analysis

Looking at the contributing sectors within the Zero Carbon model and by examining the nature of each sector in the borough, we can begin to map out the areas of highest priority, and how they might be targeted.

This information about the specifics of Haringey's characteristics will help to inform carbon reduction programmes by tailoring and targeting programmes appropriately.

#### 5.1.1 Domestic Buildings

Of all the sectors included in the model, domestic heating is responsible for the largest share of Haringey's emissions at almost 32% of the total. Together with emissions from electricity, emissions associated with domestic buildings make up 50% of the borough's total emissions.

Significant reduction in this sector's carbon emissions can be achieved through comprehensive energy efficiency improvements to homes (e.g. whole-house retrofit) and from switching to lower carbon heat sources such as heat pumps, low carbon district heating networks or solar thermal. Solar PV and other forms of distributed energy generation will also make a contribution, though the projected reductions associated even with high uptake of solar PV in the model are comparatively modest. Heat remains the key opportunity.

The 'high uptake' scenario selected in the model for energy efficiency assumes that 50% of buildings will be upgraded – i.e. retrofitted to achieve excellent thermal efficiency and supplied by a low carbon heat source – by 2025; and 100% will be upgraded by 2050. The 'high uptake' scenario selected in the model for

heat pumps assumes that 60,000 heat pumps will be installed to homes in Haringey by 2050 – representing over half of existing homes (see Figure 15).

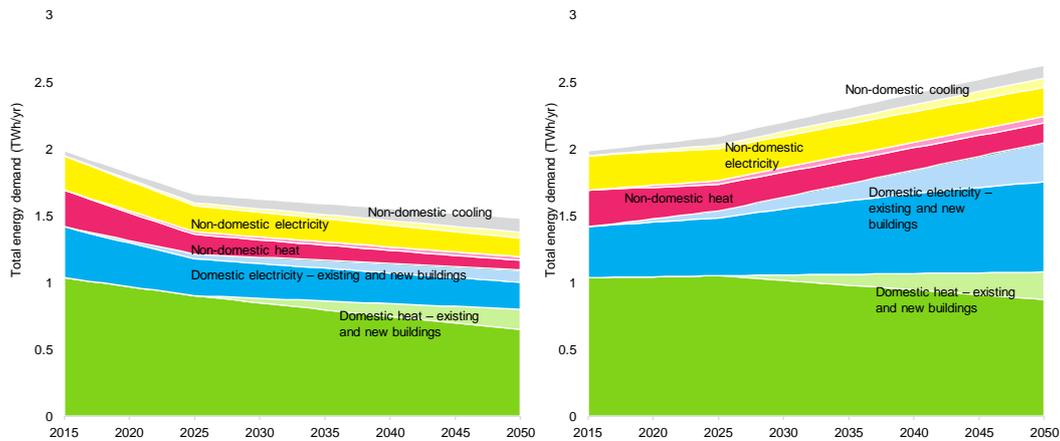


Figure 15 Comparison of energy demand between high uptake and low update of energy efficiency

Measures to reduce emissions in the domestic sector should take account of the different characteristics buildings and their tenure status:

- New vs existing buildings – eg. planning policy can achieve higher standards for new builds and redevelopments, existing housing stock is more difficult to improve.
- Tenure type of property (eg. owner-occupied, private rented and social housing)
- Fuel poor vs able-to-pay
- Energy efficiency measures vs technology choices (eg. insulation vs. switch to heat pumps for providing heat).
- Type of building and whether it is in a conservation area

## New Homes

It is estimated that there will be 52,000 new builds in the borough by 2050. Planning policy through the London Plan and the Haringey Local Plan already requires major residential developments to be zero carbon, and this policy is planned to be extended to non-domestic developments in 2019.

New developments can achieve significantly better energy performance than existing buildings, but in development densities typical of Haringey, achieving zero carbon through on-site measures is not achievable, or at least not economically viable. Carbon offsetting payments provide a means for developers to achieve reasonable carbon savings on-site while providing a funding source for boroughs to deliver carbon savings elsewhere to make up the difference.

In Haringey the current carbon offset price is £90/tCO<sub>2</sub>, similar to the draft new London Plan figure of £95/tCO<sub>2</sub>. However, previous studies by Arup for Westminster and Waltham Forest have found that a much higher offset price would be needed to deliver matching carbon savings within the borough

(£260/tCO<sub>2</sub> and £133-£333 tCO<sub>2</sub> over a 30-year timescale respectively). This has more recently been corroborated by a 2017 AECOM study for the GLA, which identified many standard measures for carbon savings having costs well over the £95/tonne benchmark value. The AECOM study indicates a figure of £191/tonne could enable a wider range of measures including cavity and solid wall insulation.<sup>31</sup> In addition, anecdotal evidence indicates that such a price may be insufficient an incentive to drive developers to maximise the potential for energy, and carbon, savings on site (although the development management process provides a technical route to maximise such potential).

## **Social Housing**

The council can take more direct action in the social housing sector, either directly where the council itself is the landlord and manager of the building, or through its influence with registered providers. The capacity to improve social housing has been demonstrated by the Decent Homes programme (discussed previously).

In 2015 social housing represented 27% of homes in the borough. Whilst energy savings are frequently a key factor in programmes to improve the quality of social housing for tenants, no programmes specifically geared towards reducing carbon emissions have been carried out in this sector.

It is typically more difficult to effect home energy efficiency improvements in dwellings with other tenure types.

## **Private Rented Sector (PRS)**

Haringey has a particularly high proportion of private rented housing stock (31% compared to the national average of 21%).

Private rented households are typically recognised as often being a difficult sector to engage. Energy bill payers, as the beneficiaries of energy efficiency improvements, are rarely those with the authority or incentive to carry out improvements to a building that they do not own. However, there are ways to achieve improvements and the Smart Homes programme saw reasonably good engagement from private landlords<sup>32</sup>.

Whilst the council currently has limited influence over private landlords, there are aspects of regulatory influence held by the council; councils can operate selective licensing schemes to ensure landlords are managing their properties adequately in areas of low demand, anti-social behaviour, poor property conditions or high levels of migration, deprivation and/or crime<sup>33</sup>. The council also has powers to address ‘rogue landlords’<sup>34</sup>.

Nationally, the sector is recognised to have been poorly regulated in the past, but the new ‘Minimum Energy Efficiency Standards’<sup>35</sup> legislation for the private

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<sup>31</sup> [https://www.london.gov.uk/sites/default/files/london\\_carbon\\_offset\\_price\\_-\\_aecom\\_.pdf](https://www.london.gov.uk/sites/default/files/london_carbon_offset_price_-_aecom_.pdf)

<sup>32</sup> Smart Homes Evaluation Report, November 2016

<sup>33</sup> [https://www.gov.uk/government/uploads/system/uploads/attachment\\_data/file/418551/150327\\_Guidance\\_on\\_selective\\_licensing\\_applications\\_FINAL\\_updated\\_isbn.pdf](https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/418551/150327_Guidance_on_selective_licensing_applications_FINAL_updated_isbn.pdf)

<sup>34</sup> Housing and Planning Act 2016

<sup>35</sup> Energy Efficiency (Private Rented Property) (England & Wales) Regulations 2015

rented sector provides a more supportive legislative environment for encouraging action in this sector. Councils will be responsible for enforcing the regulations and this provides an opportunity for engagement and incentivisation as well as a tougher approach.

### **Owner-occupied Housing**

Owner-occupied housing is the sector over which the council has the least influence. The uptake of energy efficiency improvements and low carbon technology is very dependent on each household and individual circumstances. The heterogeneous nature of the owner-occupied sector means it is difficult to make arrangements for larger scale programmes or to capitalise on economies of scale.

Impact in this sector may be achieved through a mix of education, engagement and financial incentives - for example 'green mortgages' and conditional low cost lending to encourage home owners to carry out the required measures. Stronger national policies to address this sector is likely to be necessary to drive change at scale.

### **Fuel poor**

The number of fuel poor homes in Haringey is estimated to be around 12,400 (2015)<sup>36</sup> – approximately 12% of homes in the borough. Identifying and targeting programmes at fuel poor households should be a priority as energy efficiency measures go hand in hand with increased comfort and decreased fuel bills. This will enable Haringey to achieve the fourth objective in their corporate plan<sup>37</sup> 'create and develop healthy and sustainable places and communities', as well as contribute to the success of the Mayor's 'Fuel Poverty Action Plan for London'<sup>38</sup>, and would bring down local health care costs from conditions associated with cold homes.

### **Hard to treat**

'Hard-to-treat' homes are typically homes within a conservation area, where there are generally significant restrictions from a planning perspective on what retrofit can be done externally to a building.

## **5.1.2 Non-domestic buildings**

The emissions from non-domestic buildings in the model represent the emissions used in heating and lighting buildings that are occupied by commercial and industrial businesses as well as public sector services. 'Process emissions' from industry are accounted for separately in the model, and make up a comparatively small proportion of the total emissions for the borough (see section 5.1.4).

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<sup>36</sup> <http://www.haringey.gov.uk/housing/housing-advice/home-heat-loss/energy-efficiency/fuel-poverty>

<sup>37</sup> [http://www.haringey.gov.uk/sites/haringeygovuk/files/corporate\\_plan\\_2015-18.pdf](http://www.haringey.gov.uk/sites/haringeygovuk/files/corporate_plan_2015-18.pdf)

<sup>38</sup> [https://www.london.gov.uk/sites/default/files/draft\\_fuel\\_poverty\\_action\\_plan.pdf](https://www.london.gov.uk/sites/default/files/draft_fuel_poverty_action_plan.pdf)

The model works on floorspace measurements for non-domestic buildings, as many non-domestic buildings in London cover multiple floors and contain multiple businesses.

For business emissions related to buildings, similar considerations to the domestic sector will be adopted – i.e. targeting measures on the basis of characteristics of buildings and occupants:

- New vs existing buildings
- Energy efficiency measures vs technology choices
- Tenure type of property (ie. leased or owner-occupied)
- Size of business – SMEs vs large enterprises
- Public sector buildings
- Type of building and whether it is in a conservation area.

Within the business/commercial sector there is also greater opportunity to utilise sector-based networks and competition to increase emission reduction efforts.

### New non-domestic buildings

Figure 16 shows the current and future projections for non-domestic floorspace for the planning use classes identified. Education, health and retail classes occupy the greatest area in Haringey, and continue to grow. Storage and distribution buildings also represent a significant area but this is predicted to fall. Offices and residential institutions, whilst occupying a smaller area currently, have higher projections for growth than the other smaller classes.

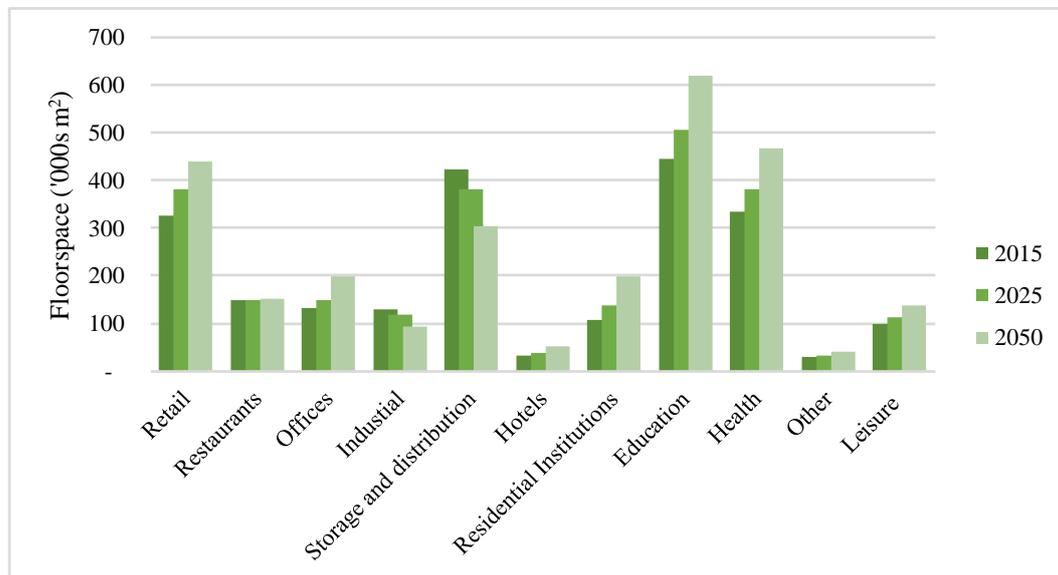


Figure 16 Projections of growth in different non-domestic sectors, 2015-2050

### SMEs vs Large Enterprise

Haringey is a micro-business economy, with almost 9 in 10 businesses classified as micro-enterprise by size (employing <10 people). Specific challenges in achieving emissions reductions in this sector include a lack of capacity (small

scale), significant heterogeneity of business and building type, and the number of different stakeholders that need to be involved.

It is also likely that a share of micro-businesses do not operate from ‘non-domestic’ premises, and may be family businesses or self-employed people operating from their own homes, in which case they will more appropriately be captured under the domestic building sector emissions.

Although medium and large businesses make up only 2% of businesses operating in Haringey, they account for 43% of people employed in the borough, and are therefore likely to account for a significant proportion of the non-domestic building occupancy in the borough.

According to government published information, there are fifteen business units within the borough that belong to large businesses.

### Public sector buildings

Across London, 15% of total employment is in the public sector. We were unable to obtain definitive statistics either for employees, buildings or floorspace of the public sector in Haringey; however, some insight is provided by the Display Energy Certificate (DEC) register.

DECs are required in public buildings larger than 250m<sup>2</sup> that are occupied wholly or in part by a public authority and are frequently visited by the public.

Analysis of national DEC data provided by Haringey Council lists the carbon emissions of all buildings with DEC in Haringey; in 2010 there were 61 buildings in the borough on the DEC register. The DEC reported emissions from the top quartile of these buildings made up 2% of Haringey’s total emissions according to their most recent DEC certificate (dates of issue range from 2010 to 2017). Nationally, hospitals feature high on this list however Haringey is not home to a large hospital. The highest emissions associated with any single building on this list are for Alexandra Palace, at 3,925 tCO<sub>2</sub> (for the latest DEC issued in 2011).

The majority of public buildings with DEC in Haringey are schools and colleges. Haringey’s council offices at River Park House have the fourth highest emissions in Haringey.

Table 9 Top quartile of high emissions public buildings in Haringey

Address	Energy rating band	Total emissions (tCO <sub>2</sub> per annum)
Alexandra Palace	B	3,925
Haringey Sports & Leisure	D	1,499
The College of Haringey, Enfield and North East London	C	1,400
River Park House	G	1,526
Haringey Sixth Form Centre	D	745
Northumberland Park Community School	E	732
Wood Green Crown Court	E	636

Address	Energy rating band	Total emissions (tCO <sub>2</sub> per annum)
Haringey Council	E	472
London Borough of Haringey	E	531
Selby Centre Co Ltd	E	565
Civic Centre	D	345
London Borough of Haringey	E	287
Bounds Green Health Centre	E	78
Broadwater Lodge	E	278
Downhill Primary School	E	148
The Mulberry Primary School	E	234

### Hard to treat buildings and energy efficiency vs energy technology switch

The considerations for hard-to-treat buildings in the non-domestic sector and the split between reducing energy demand (through energy efficiency measures) and switching technology (reducing the carbon intensity of energy supply) are of a similar nature to the same considerations in the domestic sector, as outlined in section 5.1.1.

### 5.1.3 Transport

Compared to buildings, the transport sector has a smaller impact on the emissions of the borough. Currently the transport sector contributes just over 20% of the borough’s emissions, though road transport alone is responsible for 17% of the total and is clearly the most significant aspect of emissions from transport. By adopting the ‘near zero’ scenario in the model, a reduction in emissions from road transport of 97% is anticipated. There is an assumed reduction in emissions from non-road transport of 70% (see Figure 17).

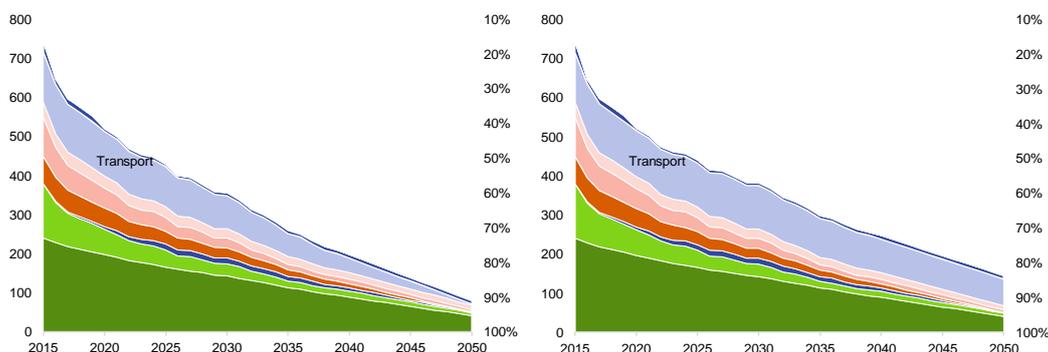


Figure 17 Comparison of carbon emission reduction in the transport sector between “near zero” scenario (left) and “baseline” scenario (right), measured in megatons of CO<sub>2</sub>e.

The Local Implementation Plan (LIP) performance indicators for Haringey for 2015/16 show that 508,000 trips per day originate in Haringey. The weekly average mode share split based on a rolling three-year average is applied to these figures and shown in Figure 18 below.

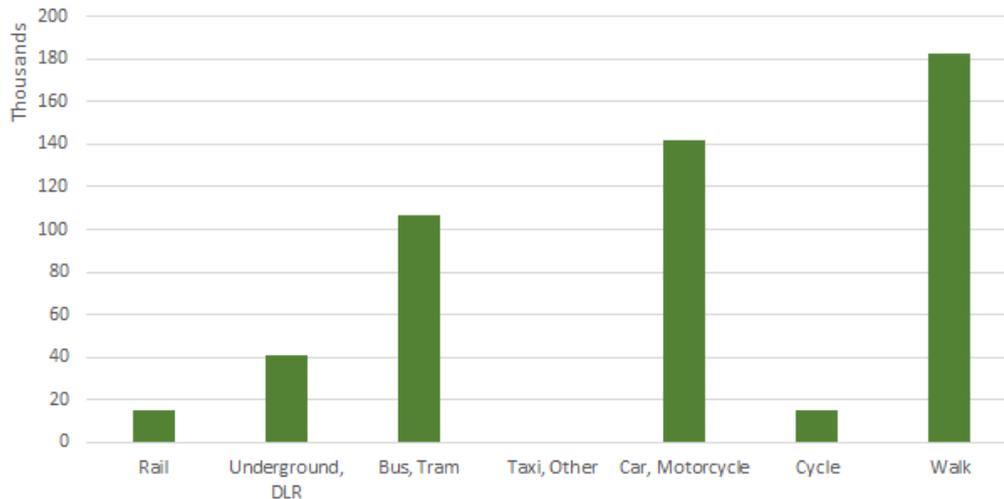


Figure 18 Daily journeys made originating in Haringey showing relative mode share (data from LIP performance indicators January 2017, using 2015 and 2015/16 figures)

This shows that:

- More journeys are made by private vehicle than by public on-road transport
- The use of public buses is much more common than the use of the London Underground
- The number of journeys made by bicycle is very low, representing just 3% of journeys starting in the borough
- Walking makes up more than a third of journeys, which compares favourably to the London average of 25%<sup>39</sup>.

The data in Figure 18 show that the share of journeys made by private vehicle is 28%, yet these journeys are responsible for over 60% of transport emissions in Haringey. Reducing the number of journeys made by private vehicles as well as encouraging a shift to low- and zero- emissions vehicles will be important in lowering these emissions, and will have positive benefits on the health of inhabitants in the borough through increased levels of physical activity and improved air quality.

The council has comparatively little control over transportation in the borough, especially public transport networks which are owned and operated by Transport for London (TfL). However, the council does set policy in the form of its Transport Strategy<sup>40</sup> and its supporting action plans, and is responsible for maintaining most of the street network in the borough.

<sup>39</sup> <https://tfl.gov.uk/corporate/publications-and-reports/travel-in-london-reports#on-this-page-0>

<sup>40</sup> [http://www.haringey.gov.uk/sites/haringeygovuk/files/1267.11\\_transport\\_strategy\\_a4\\_12pp\\_final\\_web\\_0.pdf](http://www.haringey.gov.uk/sites/haringeygovuk/files/1267.11_transport_strategy_a4_12pp_final_web_0.pdf)

Within this context, the council can achieve impact through a range of measures, including:

- Facilitating investment in electric vehicle charging infrastructure
- Setting different parking permit charges for higher and lower emission vehicles (this has recently been announced as a proposed change to permit charges<sup>41</sup>)
- Securing investments in public transport and active transport infrastructure, including bike and pedestrian paths and major public transport projects.
- Using planning powers to ensure new developments are designed and built to minimise the need for travel and to encourage active and public transport use in favour of use of private road vehicles.

Transport is also a sector which is generally recognised to have a significant potential for cross-sector benefits, for example in air pollution and health. Lower carbon transportation can significantly improve air quality and encouraging more active modes of transport is likely to have significant health benefits at a population scale, potentially helping to reduce the burden on health services within the borough.

#### 5.1.4 Waste and industrial sectors

Waste and industrial sectors' emissions in Haringey are small relative to domestic, non-domestic and transport emissions and are consequently a lesser focus for this project. Below we have provided information on the modelling of emissions and of the opportunities for emissions reductions from these sectors.

##### Waste

Waste is currently a relatively small contributor to emissions. Nationally it accounts for only 4%<sup>42</sup>, and the modelled figures for Haringey are of a similar scale; however the modelled figures are based on regional scale assumptions.

The GLA's Zero Carbon Tool calculates emissions from waste based on landfill emissions apportioned by area. However, Haringey is part of the North London Waste Authority, and consequently almost all municipal waste is recycled or sent for energy recovery at the Edmonton EcoPark energy from waste (EfW) facility. Very little waste from Haringey is sent to landfill, and where waste is sent to landfill the resulting gas is recovered.

Waste in Haringey is fundamentally linked with both energy (as above) and transport (involved in the collection and transfer of waste). There are emissions associated with both of these aspects of the process but they are accounted for under the respective areas in the modelling. It should be noted that whilst this is standard practice, it can under-represent the impact of the entire waste collection and management process on the total borough emissions.

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<sup>41</sup> [http://www.haringey.gov.uk/sites/haringeygovuk/files/2018\\_t12\\_-\\_permit\\_charges\\_2\\_nop.pdf](http://www.haringey.gov.uk/sites/haringeygovuk/files/2018_t12_-_permit_charges_2_nop.pdf)

<sup>42</sup> <https://www.theccc.org.uk/wp-content/uploads/2013/03/Waste-and-F-gases-factsheet-2015-v1.1.pdf>

The greatest opportunity for reducing emissions from waste is by reducing waste in the first place. The circular economy framework establishes a vision for zero waste – where all materials are reused in the economy. This will be a key theme for zero carbon waste management and is already being reflected in the draft London Environment Strategy and London Plan.

## Industry

The zero carbon pathway for industry projects some efficiency improvements coupled with the benefits of the decarbonising grid.

The specialist nature of industrial operations makes this a sector where the council can provide very limited influence to support carbon emissions reductions. However, one key opportunity is for the council to work with industrial operators to explore the use of surplus heat from processes to supply heat to nearby properties. As noted into the earlier discussion on heat networks, this is a key source of heat for future heat networks (see Figure 14, above)

## 5.2 Decision matrix

Through engagement with council staff and stakeholders and a technical review of opportunities in each sector, a selection of potential actions was identified.

The decision matrix shown on the next pages represents a tool for assessing potential actions. Each programme is assessed against the following considerations:

- Sector, sub-sector and action area addressed
- Magnitude of the carbon emissions emitted by this target area (scale 1-5)
- Scale of the proposed action (scale 1-3)
- Measure of the effectiveness of the proposed action, eg. % reduction in carbon emissions that could be achieved (scale 0-1)
- Time frame (short/med/long term)
- Cost of the proposed action (scale 1-5, 1 being most expensive)
- Degree of council influence (scale 1-3)

Multiplying the factors results in a figure that represents the overall attractiveness of the programme in terms of impact delivered.

At this stage the matrix is a high level screening and prioritisation tool. It will be developed further in response to engagement ahead of Stage 2 of this project, leading to confirmation of the prioritised actions to be modelling in greater detail in Stage 2.

As an example, the decision matrix has been used to evaluate the proposed actions and the results are shown in the table below. The purpose of this exercise is to demonstrate the tool and invite comment on the results ahead of refining the tool in Stage 2.

Table 10 Decision matrix for Haringey actions

Example Actions	Focus area			CO <sub>2</sub> savings	Score	Scale of action	Score	Effective-ness	Timeframe	Cost (1 = high, 5 = low)	Influence	Score	Score (excl. costs)
	Sector	Sub-sector	Action area										
<i>Decent Homes Programme (2008)</i>	<i>Domestic buildings</i>	<i>Social Housing</i>	<i>Building Fabric</i>		<i>1</i>	<i>Rollout</i>			<i>[previous programme]</i>	<i>1</i>	<i>3</i>	<i>0</i>	<i>0</i>
<i>Smart Homes Programme (2016)</i>	<i>Domestic buildings</i>	<i>Hard to treat</i>	<i>Building Fabric</i>		<i>1</i>	<i>Pilot</i>			<i>[previous programme]</i>	<i>1</i>	<i>2</i>	<i>0</i>	<i>0</i>
<i>Solar PV installation (2010-present)</i>	<i>Non-domestic buildings</i>	<i>Public sector buildings</i>	<i>Energy Supply Shift</i>		<i>1</i>	<i>Pilot</i>			<i>[previous programme]</i>	<i>2</i>	<i>3</i>	<i>0</i>	<i>0</i>
<i>Green Light North London (2012)</i>	<i>Non-domestic buildings</i>	<i>Small businesses</i>	<i>General energy efficiency improvements</i>		<i>1</i>	<i>Pilot</i>			<i>[previous programme]</i>	<i>3</i>	<i>1</i>	<i>0</i>	<i>0</i>
<i>DIY Streets Toolkit (2010)</i>	<i>Transport</i>	<i>Individual travel</i>	<i>Appliance and Lighting Efficiency</i>		<i>1</i>	<i>Pilot</i>			<i>[previous programme]</i>	<i>5</i>	<i>1</i>	<i>0</i>	<i>0</i>
<i>Personal Travel Planning</i>	<i>Transport</i>	<i>Individual travel</i>	<i>Behaviour Change</i>		<i>1</i>	<i>Pilot</i>			<i>[previous programme]</i>	<i>5</i>	<i>1</i>	<i>0</i>	<i>0</i>
H1 – Programme of deep retrofit of all council owned social housing	Domestic buildings	Social Housing	General energy efficiency improvements	88,470	3	Rollout	2	0.3	Short term	3	3	16.2	5.4
H2 – Programme of technical advice on energy efficiency for all domestic property owners & occupiers	Domestic buildings	All	General energy efficiency improvements	327,666	5	Pilot	1	0.3	Short term	4	2	12	3

Example Actions	Focus area			CO <sub>2</sub> savings	Score	Scale of action	Score	Effective-ness	Timeframe	Cost (1 = high, 5 = low)	Influence	Score	Score (excl. costs)
	Sector	Sub-sector	Action area										
H3 – Funding assistance to support delivery of energy efficiency in privately owned properties	All buildings	All buildings (domestic & non-domestic)	General energy efficiency improvements	487,720	5	Pilot	1	0.3	Medium term	2	2	6	3
H4 – Enforcement of national regulations	All buildings	All buildings (domestic & non-domestic)	Legislative enforcement	487,720	5	Pilot	1	0.2	Medium term	4	3	12	3
H5 – Planning policies that demand ambitious carbon emission reductions new and redeveloped homes	Domestic buildings	New domestic buildings	Planning policy	108,130	3	Rollout	2	0.1	Medium term	4	3	7.2	1.8
W1 – Engagement with professional networks to increase prioritisation of CO <sub>2</sub> reduction in commercial decision making	Non-domestic buildings	All	Behaviour Change	160,053	4	Pilot	1	0.1	Short term	4	1	1.6	0.4
W2 – Funding assistance to support delivery of energy efficiency measures in commercial premises	Non-domestic buildings	Small Businesses	General energy efficiency improvements	77,865	3	Rollout	2	0.3	Medium term	2	2	7.2	3.6
W3 – Engagement with large enterprises and emitters to support large-scale projects and high-profile action	Non-domestic buildings	Medium and Large businesses	General energy efficiency improvements	58,980	3	Transformative	3	0.3	Medium term	4	1	10.8	2.7

Example Actions	Focus area			CO <sub>2</sub> savings	Score	Scale of action	Score	Effective-ness	Timeframe	Cost (1 = high, 5 = low)	Influence	Score	Score (excl. costs)
	Sector	Sub-sector	Action area										
W4 – Engagement with public bodies to support energy efficiency improvements in public buildings	Non-domestic buildings	Public sector buildings	General energy efficiency improvements	23,208	2	Rollout	2	0.3	Short term	3	2	7.2	2.4
W5 – Action to improve energy efficiency and reduce energy consumption in council owned buildings	Non-domestic buildings	Public sector buildings	General energy efficiency improvements	23,208	2	Pilot	1	0.3	Short term	2	3	3.6	1.8
W6 – Planning policies that demand ambitious carbon emission reductions in new and redeveloped workplaces	Non-domestic buildings	New non-domestic buildings	Planning policy	52,818	3	Rollout	2	0.1	Medium term	4	3	7.2	1.8
T1 – Engagement with Haringey residents to encourage mode shift towards public and active transport choices	Transport	Private on-road transport	Mode share increase - public transport	86,445	3	Rollout	2	0.1	Short term	4	2	4.8	1.2
T2 – Programme to improve active transport infrastructure	Transport	Private on-road transport	Mode share increase - active travel	86,445	3	Transformative	3	0.2	Medium term	2	3	10.8	5.4
T3 – Policies to that penalise private car use through parking charges based on fuel type/emissions etc.	Transport	Private on-road transport	Transition to zero emissions vehicles	86,445	3	Rollout	2	0.3	Medium term	3	2	10.8	3.6

Example Actions	Focus area			CO <sub>2</sub> savings	Score	Scale of action	Score	Effective-ness	Timeframe	Cost (1 = high, 5 = low)	Influence	Score	Score (excl. costs)
	Sector	Sub-sector	Action area										
T4 – Programme to incentivise move to low and zero emission vehicles by residents and businesses	Transport	All transport	Transition to zero emissions vehicles	142,968	3	Rollout	2	0.3	Short term	4	1	7.2	1.8
T5 – Action to expand provision and accessibility of EV charging infrastructure	Transport	All transport	Transition to zero emissions vehicles	142,968	3	Transformative	3	0.3	Medium term	2	2	10.8	5.4

## 5.3 Stakeholder analysis

Stakeholders in its broadest sense includes any individual or group that has an interest in, an impact on (or will be impacted by) this work. Everyone that lives in, works in, visits or has business in Haringey is a stakeholder of the Zero by 2050 initiative, as they will all be affected by the actions arising from this plan, and equally will all be affected if there is a lack of sufficient action to improve Haringey's environment and reduce emissions.

In order for Haringey to maximise the action taken and the impact of that action, it will be crucial to engage with key stakeholders from across the spectrum. Types of stakeholders in each key action area are identified below.

### 5.3.1 Domestic buildings

Haringey's domestic building stock is the largest contributor to its emissions. Domestic buildings can be thought of in terms of different tenancy types, as the type of resident/tenancy has a significant impact on how to achieve action and who has the power to upgrade the building stock.

As mentioned previously, Haringey has a particularly high proportion of private rented sector housing stock (31% compared to the national average of 21%), and engaging with this subsector as well as owner-occupied housing is recognised to be difficult, but will be key to achieving the level of emissions reductions required.

Key stakeholders in the domestic buildings action area are identified in Table 11.

Table 11 Stakeholder analysis - domestic buildings

Subsector	Proportion of sector	Key stakeholder groups	Potential routes to engagement
Owner-occupied	41%	Individual owners	Residents' associations Community groups Incentive-based schemes
Private rented sector	31%	Large corporate landlords Small landlords Universities and student housing companies Tenants	Letting agents Managing agents Maintenance contractors Residents' and tenants' associations
Social housing	27%	Haringey Borough Council Registered providers Maintenance service providers Tenants	Direct engagement Tenants' associations

### 5.3.2 Non-domestic buildings

Non-domestic buildings in Haringey will include businesses (commercial and industrial) as well as public sector offices and facilities.

Within the commercial and industrial sector, a key distinction in terms of approach to emissions reduction is likely to be between small and medium enterprises (SMEs) and large enterprises.

Work will be required to identify and develop the council's relationship with its business community – internal leads on this could be explored as well as obtaining relevant data for Haringey from the Inter-Departmental Business Data held by the Office for National Statistics.

Key stakeholders in the non-domestic buildings action area are identified in Table 12.

Table 12 Stakeholder analysis - non-domestic buildings

Subsector	Proportion of sector (by employees)	Key stakeholder groups	Potential routes to engagement
Small and micro businesses	49%	Business owners	Local events Federation for Small Businesses Workshops Sector based energy efficiency knowledge sharing networks linking small businesses with larger businesses
Medium and large businesses	37%	Education Transportation and storage firms Public administration and defence Administrative and support services Wholesale and retail trade; repair of motor vehicles Accommodation and food services	Business sector forums Trade associations Professional bodies and institutes Partnership working Workshops Publicised initiatives leveraging large business support
Public sector	15%	Alexandra Park and Palace Charitable Trust NHS Trusts and other actors Schools and colleges Leisure centres and public sports facilities Community centres Police and fire stations Royal Mail Service contractors (e.g. framework contracts)	Existing relationships between council and schools/colleges Parent action groups/forums Education programmes for school children Integration of apprenticeships and college courses with the green building and low carbon market.

### 5.3.3 Transport

Transport is a difficult sector to delineate; unlike buildings, transport by its nature crosses borough boundaries and forms part of larger strategic networks across the city and connecting to the wider region/nation.

Haringey can only influence and not control the transport choices people make – so it is important to identify the best ways to engage with individuals to achieve this step change.

Key stakeholders in the transport sector are identified in Table 13.

Table 13 Stakeholder analysis - transport

Subsector	Proportion of sector		Key stakeholder groups	Potential routes to engagement
	Number of journeys made daily <sup>43</sup>	Proportion of transport emissions <sup>44</sup>		
Public transport	162,560	19%	TfL Franchised operator	LIP planning London Technical Advisory Group London Councils TfL borough engagement team
Private Vehicles	142,240	61%	Members of the public (residents and workforce) Taxis Coach hire companies	Public advertisements Communication through parking transactions
Goods vehicles	No information	20%	Business forums Fleet services Freight Transport Association Low Carbon Vehicle Partnership	Public advertisements Communication through parking transactions Business sector networks and supply chain conversations
Infrastructure e.g. parking and charging	n/a	n/a	TfL Private premises Source London	Focus groups Local business/neighbourhood associations Communication through parking transactions
Active transport	198,120	0	Pedestrians Cyclists	Public advertisements Focus groups

<sup>43</sup> Borough Local Implementation Plan (LIP) performance indicators

<sup>44</sup> <https://data.london.gov.uk/dataset/london-atmospheric-emissions-inventory-2013>

Subsector	Proportion of sector		Key stakeholder groups	Potential routes to engagement
	Number of journeys made daily <sup>43</sup>	Proportion of transport emissions <sup>44</sup>		
			Users of inactive transport modes	Charities like Sustrans Schools and outreach programmes Targeted programmes for delivering information Fitness centres/gyms Healthcare centres, GP surgeries.

## 5.4 Funding

Government funding to the council has been cut in real terms by 40% since 2010. This restricts not only the ability to fund projects in the community, but also the resources available to facilitate and carry out the programmes identified in this plan.

The challenge is to find smarter ways to work to maximise the limited resources available – pooling resources and aligning goals with other boroughs and organisations, and leveraging private sector support and national funding to scale our impact.

There are also opportunities to take advantage of the savings that programmes will deliver in terms of reduced energy costs, or by sharing the financial rewards of associated co-benefits.

During Stage 2 of the project, options for funding will be identified for the priority actions.

## 5.5 Proposals for route map

The results of the analysis and work completed to date have identified key focus areas for the zero carbon route map. Once the programmes are analysed in more detail in Stage 2, the route map will show how a set of actions – through investment, support programmes, regulation, enforcement, incentives and prohibitions – will need to be scaled up dramatically if the borough is to play its part in delivering the Zero Carbon target.

The proposals will be based on the following priorities and principles:

### 5.5.1 Looking back

The conclusions drawn from assessing Haringey's progress to date form the basis on which future, improved action can be delivered.

Key areas that were identified in this assessment and that need to be considered carefully going forwards are:

- **Focus, scale up and sustain action:** planned programmes should have a long duration to provide market stability and sustainability, and should be much more ambitious in the resulting scale of impact. Action needs to be scaled up starting immediately.
- **Continue to work with partners:** increased partnership working and cross-borough or city-wide initiatives will help facilitate the longer duration and larger scale of programmes.
- **Step up monitoring and verification:** all programmes should have a core element of post-completion data collection enabling actual measurement of impact on emissions.
- **Communicate and measure the co-benefits of action:** as important additional justification for scaling up programmes, and to fully understand resulting costs and savings.
- **Annual reporting:** annual carbon reports should be continued but will benefit from the improved measurement and verification anticipated for future programmes.

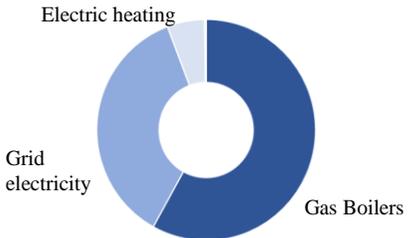
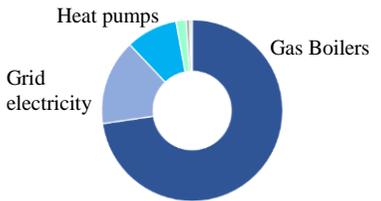
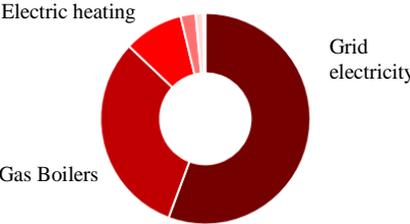
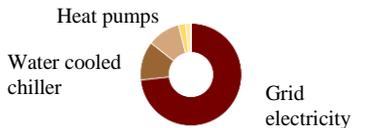
## 5.5.2 Looking ahead

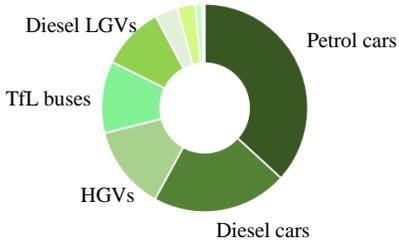
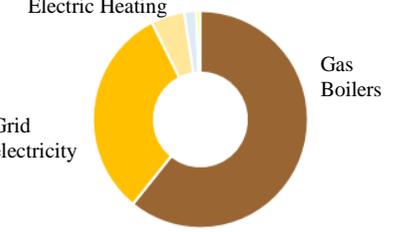
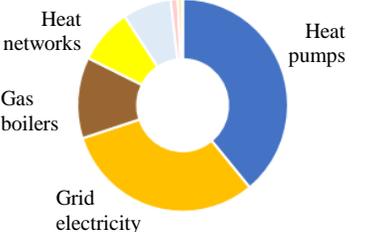
The work to develop a scenario model for emissions reduction to 2050, understand what the modelled trajectory means for Haringey as a borough, and begin identifying priority measures as summarised in this report allows us to visualise the pathway to a zero carbon Haringey in 2050.

Table 14 shows how the component sources in the three key sectors change between the 2015 baseline and 2050, as well as demonstrating the overall reduction in emissions required in these sectors.

The remaining emissions sources in 2050 help to give an idea of how the energy landscape in each sector will have changed.

Table 14 The Route to Zero Carbon

2015	2050	Priority Action Areas
<b>Homes</b>		
	 <p><b>Emissions reduced by 87%</b></p>	<p>H1 – Programme of deep retrofit of all council owned social housing                      H2 – Programme of technical advice on energy efficiency for all domestic property owners &amp; occupiers                      H3 – Funding assistance to support delivery of energy efficiency in privately owned properties                      H4 – Enforcement of national regulations                      H5 – Planning policies that demand ambitious carbon emission reductions new and redeveloped homes</p>
<b>Workplaces</b>		
	 <p><b>Emissions reduced by 95%</b></p>	<p>W1 – Engagement with professional networks to increase prioritisation of CO<sub>2</sub> reduction in commercial decision making                      W2 – Funding assistance to support delivery of energy efficiency measures in commercial premises                      W3 – Engagement with large enterprises and emitters to support large-scale projects and high-profile action                      W4 – Engagement with public bodies to support energy efficiency improvements in public buildings                      W5 – Action to improve energy efficiency and reduce energy consumption in council owned buildings                      W6 – Planning policies that demand ambitious carbon emission reductions in new and redeveloped workplaces</p>

2015	2050	Priority Action Areas
<b>Transport</b>		
 <p>Diesel cars Diesel LGVs TFL buses HGVs</p>	 <p>Electric vehicles</p> <p><b>Emissions reduced by 97%</b></p>	<p>T1 – Engagement with Haringey residents to encourage mode shift towards public and active transport choices</p> <p>T2 – Programme to improve active transport infrastructure</p> <p>T3 – Policies to that penalise private car use through parking charges based on fuel type/emissions etc.</p> <p>T4 – Programme to incentivise move to low and zero emission vehicles by residents and businesses</p> <p>T5 – Action to expand provision and accessibility of EV charging infrastructure</p>
<b>Energy supply</b>		
 <p>Gas Boilers Grid electricity Electric Heating</p>	 <p>Heat pumps Grid electricity Gas boilers Heat networks</p>	<p>E1 – Potential for large scale renewable generation in the Lee Valley through wind turbines and PV</p> <p>E2 – Programme to encourage installation of distributed renewable generation through roof mounted PV</p> <p>E3 – Policies to support appropriate installation of and connection to district heating networks</p> <p>E4 – Programme of technical advice to encourage and support residents and businesses and local supply chains to adopt heat pumps</p>

The charts in the table show the approximate scale of change in total CO<sub>2</sub> emissions and contributing sources between 2015 and 2050

### 5.5.3 Key supporting actions to support the route map

In addition to the main policy and programme actions set out in the route map above, the additional actions below will help to maximise their impact and effectiveness.

#### Short term actions

- **Data collection improvements:** Post-completion data for previous projects is sparse. Clear requirements need to be set at inception for gathering useful data on the delivered carbon savings, costs and associated impacts from projects. This will allow Haringey to make informed plans for future programmes, and can help to obtain funding.
- **A long-term approach:** Planning properly for action over the next thirty years needs to be undertaken now. Longer-term programmes and reliable funding is critical for sustainable, cost-effective delivery.
- **Piloting for scaling up:** Piloting new approaches and technologies and gathering evidence for their application will be important preparation for larger scale effort in the medium to long term. Technology agnostic approaches will allow for flexibility in later stage improvements.
- **Quantify the wider impact of climate action:** Recent studies show that citizens are more likely to take or support action on climate change if the wider benefits of those actions are emphasised. Particular sectors where the potential for benefits to be found include health, land use and transport.<sup>45</sup>
- **Partnership working:** Planning for a zero carbon Haringey in 2050 is clearly focused at borough-level delivery, however it is becoming increasingly important to recognise the impact and influence that can happen by working on a wider platform. The Smart Homes project demonstrated how potential for larger scale action can be unlocked by working with neighbouring boroughs, benefitting Haringey's delivery targets. By building influence with key partners in the regional and wider context, as a leader in this area Haringey can bring others with them and have a wider impact.
- **Public engagement from the outset:** Haringey can only achieve its goals if the residents, workforce and visitors to Haringey are actively involved. Education, outreach and behaviour change all take time to have an appreciable effect and increased efforts in these areas should be supported now.
- **Stakeholder engagement:** Efforts to engage further with other key stakeholders must be made now, to build a strong platform on which to take co-ordinated action.

#### Medium term actions

- **Sustain action:** Most actions from the short-term approaches will continue – so it is important that they are set up and planned correctly for sustained action.

<sup>45</sup> <http://www.c40.org/researches/c40-lse-cobenefits>

- **Scale up:** Build on the evidence base from the early stages, allowing increasingly large-scale programmes to get underway.
- **Target “hard to treat” measures:** Harder to treat homes, along with individuals and markets that are more difficult to engage with, will be focused on in the medium term.
- **Apply developed technologies:** Advances in technology to enable cost-effective heating system upgrades and distributed energy generation will begin to be rolled out on a larger scale.

### Long term actions

- **Large-scale technology switching:** By the 2030s, technologies will have advanced - low-carbon and renewable sources of energy supply will now be implemented at a large scale.

## 6 Next steps

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The Zero Carbon Haringey project was designed to be completed in two stages. This report, together with the Direction of Travel report, comprises the conclusion of Stage 1.

Following local elections and confirmation to proceed to Stage 2, the proposal is that the work will include the following activities:

- Review of stakeholder responses on the Stage 1 outputs.
- Development of detailed plans for the opportunities outlined in this report including financial models, policy assessments and funding options
- Working with key stakeholders to ensure the developed plans are right for all borough residents and focus on programmes that will deliver co-benefits as well as emission reductions
- Setting out a rigorous plan for monitoring and reporting progress that will establish Haringey as a champion of collecting and using real-world data to inform decision making

## Appendix A

Model data added or amended

## A1 Model data added or amended

Model data/input	Change or new source	Justification
Population growth	<a href="https://data.london.gov.uk/dataset/2016-based-population-projections">https://data.london.gov.uk/dataset/2016-based-population-projections</a>	Borough-specific population projections
Industry emissions	All taken to be 2% of the original modelled London totals.	Based on Haringey's share of the city's area and population
Transport emissions		
Landfill emissions	Omitted	Not representative of treatment of waste in Haringey
Input scenario descriptions	Scaled according to Haringey borough level data	Model originally worked on a proportional approach for London, amended to a proportional approach for Haringey.

## **Appendix B**

### **Case studies**

## NYC Retrofit Accelerator<sup>46</sup>

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New York City aims to reduce its carbon emissions by 80% by 2050<sup>47</sup> from a 2005 baseline. This pathway, similar to Haringey's, includes buildings, energy supply, transportation and waste. Their flagship program "The NYC Retrofit Accelerator" offers free, personalised advisory services that streamline the process of making energy efficiency improvements. This program is targeted at home owners and includes in its scope; updating heating systems, reducing water usage, upgrading lighting and improving building envelopes. The program does not pay for the upgrading of equipment but there are cash incentives as well as financing options to encourage homeowners to implement the advised changes.

## Community Retrofit Accelerator<sup>48</sup>

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This program is designed to support communities in scaling up sustainability projects in small and mid-sized multifamily buildings to help lower the buildings in Central Brooklyn and Southern Queens that have between 5 and 50 apartments and are less than 50,000 square feet. These services can help complete energy and water upgrades by providing support throughout the retrofit process and connecting owners and operators with financing and incentives that are available to help cover costs.

Together, these programs have been identified as having major potential in greenhouse gas reductions, meaning that these programs are predicted to save more than 400,000 tCO<sub>2</sub> by 2030. The programs are currently assisting decision makers in 4,000 buildings in identifying energy and water retrofit opportunities and connecting them to financial and technical resources. Benefits of these programs include lowering building energy costs for owners and residents, improving housing quality for tenants, improving skills of the workforce, and improving air quality. The city investment is between \$0-\$10 million until 2030, however, the non-city investment has not yet been assessed

## Pooling Properties to Finance Energy Upgrades<sup>49</sup>

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BlocPower based in New York organises micro-portfolios of houses of worship, small businesses, non-profits, and multi-family properties in low-income communities in need of retro fitting, aiming to cut energy costs by an average of 25%. The portfolios of clean energy projects are connected to investors seeking social, environmental and financial returns via an online market place. BlocPower leverages credibility to investors by performing energy audits and retro fitting plans.

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<sup>46</sup> <https://retrofitaccelerator.cityofnewyork.us/>

<sup>47</sup> <https://www1.nyc.gov/assets/sustainability/downloads/pdf/1point5-aligning-nyc-with-paris-agreement.pdf>

<sup>48</sup> <http://www1.nyc.gov/site/communityretrofitnyc/index.page>

<sup>49</sup> <http://solutions.sustainia.me/solutions/pooling-properties-to-finance-energy-upgrades/>

The relevance of this case study is apparent in Haringey as (number of SMEs) As well as this program helping reduce the energy efficiency of the buildings it has additional Socio-economic benefits. This type of program will create local jobs, and provides stability and lower energy bills for low-income families. The money saved from the energy retrofit and be reinvested into the communities, helping them improve service and standards of living.

## **Appendix C**

### **Glossary of terms**

## C1 Glossary of terms and acronyms

Term	Definition
BEIS	UK Government Department for Business, Energy & Industrial Strategy
Data	Information that is used as input to the model, both historical records and future estimates
Model	Excel spreadsheet that calculates outputs based on input data and settings
Settings	Options that can be chosen that change the output of the model
CO <sub>2</sub>	Used generically to refer to CO <sub>2</sub> equivalent emissions
tCO <sub>2</sub>	Tonne of CO <sub>2</sub> equivalent emissions
kWp	Used when referring to maximum generation capacity of solar PV panels – represents kWh at peak performance.
CERT	Carbon Emissions Reduction Target – energy efficiency programme run by Ofgem 2008-2012.
GLA	Greater London Authority
PV/Solar PV	Solar photovoltaic
ULEV	Ultra Low Emissions Vehicle
LEGGI	London Energy and Greenhouse Gas Inventory
DEC	Display Energy Certificate