New Southwark Plan

Energy Policy – Background Paper

Produced by:

Freya Cunningham – London Borough of Southwark

Quyen Phan – London Borough of Southwark

Huw Blackwell – Anthesis Ltd

Internal Quality Assurance by:

Juliet Seymour – London Borough of Southwark

Tom Buttrick– London Borough of Southwark

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1. Introduction

This evidence paper was commissioned by The London Borough of Southwark (Juliet Seymour) to aggregate and provide a brief synopsis of the relevant legislation, regulation and guidance impacting Local Authorities associated with Energy and Climate Change. It is intended to be the first of a series of pieces exploring the role of local authorities and the London Borough of Southwark in particular in reducing the impact of Climate Change and mitigating its effects at a local, regional, national and ultimately international level. This includes examining the requirement of statutory legislation as well as local policy on the borough. The authors do not claim this paper is exhaustive in its analysis, and wish to highlight that some evidence by its nature makes assumptions and potentially assertations which by their nature may be demonstrated to be inaccurate as further information comes to light. This is particularly true with regards to Climate Change where both the Science and Policy response are developing at a fast pace. Where possible we have referenced evidence, which is publicly available for independent examination by any reader of this document to allow verification of facts and potential interpretations of data and documentation. This initial paper focuses on energy use within the operation of building stock, for reasons discussed in later sections of this report. It excludes carbon associated with manufactured goods (including those that are used in the construction of buildings), though this does not preclude the addition of such analysis in later documents. The authors and commissioning team welcome commentary and feedback as part of an open and constructive 'critical review' of the information presented so that this may improve this document and any future policy basis for the London Borough of Southwark.

1.1. COVID – 19

This paper was instigated at the early stage of the global coronavirus pandemic (also known as COVID 19). Forecasting techniques, such of those used in this paper are by their nature based on historic data, taking a review 'backwards' to identify trends which are used to forecast forwards. It is highly likely that economic, societal, and demographic changes from the crisis will impact energy consumption and production at every level of society. For example, UK electricity consumption[i] has reduced by 15-25% over the period of 'lockdown'. However these effects are not yet reflected (and are likely not to be yet fully recorded) in the datasets commonly used in energy projections. Therefore for the purpose of this paper analysis has continued with existing data available from before the Coronavirus pandemic with projections made accordingly. In time it is acknowledged that the assumptions made will require revisiting with updated data as and when this becomes available.

2. Energy and carbon

For clarity, the linkage between energy, carbon and the terminology to be used in this paper is defined within this section.

A large proportion of ***energy*** consumption within the UK is linked back to the consumption of traditional fossil fuels, coal, oil and gas. A lessor but increasing proportion of energy is met from renewable energy sources. These are defined by the IPCC[ii] as bioenergy, direct solar energy, geothermal energy, hydropower, ocean energy, and wind energy. Other energy systems may be considered low or zero carbon, but not renewable e.g. Nuclear energy.

Where fossil fuel is consumed this is in the form of ***combustion***. Combustion inevitably leads to the formation of combustion by products, which include (amongst other items) Carbon Dioxide, Nitrogen Oxides and particulates. Note that all forms of combustion have similar impacts, including some of those listed as 'Renewable' above.

Carbon dioxide, as will be made clear in section 3 is a gas linked to climate change. Nitrous oxides are not only linked to climate change but also impact air quality.

Therefore, as this document will demonstrate the type and form of energy consumption at a local level is directly linked to larger local, national, regional and international environmental impacts. Local planning policy which impacts energy consumption will therefore also have consequences on these wider targets.

To statistically 'normalise' the impacts of different fuels and greenhouse gases this paper converts all energy consumption into a ***Cardon Dioxide Equivalent (CO_2e)*** emissions, inline with IPCC Metrics and Methodology[iii].

Energy consumption is intrinsic from the fuels we use directly, through to the products we buy, and therefore also requires a system boundary to define it. Within this report the Green House Gas Protocol[iv] is used to break emissions into 3 Scopes.

- Scope 1 – GHG emissions from sources located within the city boundary e.g. gas consumption for heating in buildings
- Scope 2 – GHG emissions occurring as a consequence of the use of grid supplied electricity, heat, steam and/or cooling within the city boundary
- Scope 3 – All other GHG emissions that occur outside the city boundary as a result of activities taking place within the city boundary e.g. the production of food

This paper will only consider ***Scope 1 and 2 emissions*** within the London Borough of Southwark. With respect to policy changes, this paper currently only considers energy policy effecting emissions from the built environment, though this may change upon future development and assessment of the evidence base.

3. Climate Change - International Context

The Intergovernmental Panel on Climate Change (IPCC) is the international UN body for assessing the science related to climate change, tasked with providing policymakers with regular scientific assessments concerning climate change, its implications and potential future risks, and to put forward adaptation and mitigation strategies.

In the IPCC's Summary for Policymakers[v] on its Fifth Assessment Report (AR5, 2014) it is stated:

Anthropogenic greenhouse gas emissions have increased since the pre-industrial era, driven largely by economic and population growth, and are now higher than ever. This has led to atmospheric concentrations of carbon dioxide, methane and nitrous oxide that are unprecedented in at least the last 800,000 years. Their effects, together with those of other anthropogenic drivers, have been detected throughout the climate system and are *extremely likely* (defined as 95th percentile confidence interval) to have been the dominant cause of the observed warming since the mid-20th century.

The following section provides a brief synopsis of the latest international evidence and policy response to Climate Change.

3.1. IPCC Special Report on Global Warming of 1.5ºC (2019)

The 2019 IPCC report contributes to overwhelming evidence that confirms climate change is already affecting people and ecosystems all over the world. The IPCC estimates that human activities have already caused approximately 1.0°C of global warming above pre-industrial levels and that global warming is likely to reach 1.5°C between 2030 and 2052 if it continues to increase at the current rate.

Warming greater than the global annual average is already being experienced in many regions, with associated risks including drought, food and water shortages, heat-related morbidity and mortality, biodiversity loss, and flooding. The likelihood of these risks occurring is projected to be higher at 2°C compared to 1.5°C of global warming in some regions. Model-based projections of global mean sea level rise (relative to 1986–2005) suggest an indicative range of 0.26 to 0.77 m by 2100 for 1.5°C of global warming, which will dramatically impact on low-lying coastal regions and islands.

The report identifies that in order to limit global warming to 1.5°C with no or limited overshoot, the electricity share of energy demand in buildings would need to be around 55–75% in 2050 compared to 50–70% in 2050 for 2°C global warming. The report recognises that land-use planning can contribute to climate mitigation and adaptation,

and that the application of building codes and standards for 1.5°C-consistent pathways will require improved enforcement.[vi]

3.2. Paris Agreement

The United Nations Framework Convention on Climate Change (UNFCCC) manages international negotiations concerning climate change. The most recent meeting concluded with the Paris Agreement in December 2015, which binds every country to the collective ambition of limiting temperature rises to below 2°C, with a further collective aspiration to reduce emissions in line with keeping the temperature increase to 1.5°C. 187 countries have now announced mitigation targets for the post-2020 period, which if achieved will represent a significant reduction in emissions relative to the current emissions pathway. The Agreement created a mechanism of five-yearly cycles to look at and increase the level of global ambition in order to ensure that target-setting remains ambitious.[vii]

3.3. EU Directives

The status of these directives will be affected by the UK leaving the EU following the referendum in June 2016.

It is acknowledged that the UK has left the EU and is in a 'Transition period' where additional arrangements between the EU and UK are negotiated. This is anticipated to last until 1st January 2021. During this period the current EU rules continue to apply, therefore for formal completeness of this review the following are cited until further detail is provided as to how these may be amended in the future.

2.3.1. Energy performance of buildings (EU Directive 2010/31/EU)

Article 9 of the EU directive (2010/31/EU) requires member states to ensure that progress is being undertaken towards making all new buildings zero carbon by 2020, and that all new buildings delivered by public authorities must be nearly zero carbon after 31st December 2018.

EU member states were also required to set intermediate targets for improving the energy performance of new buildings to meet the 2020 timeframe.

2.3.2. Renewable Energy (EU Directive 2009/28/EC)

Article 5 of the EU Directive (2009/28/EC) states that in order to reduce greenhouse gas emissions and to reduce dependence on energy imports, the development of energy from renewable sources should be closely linked to increased energy efficiency. Article 6 supports the move towards decentralised energy pro-duction, and Article 15 sets a target of all members to achieve a 20% improve-ment in energy efficiency by 2020.

4. National Policy Context

The following section provides a synopsis of the evidence commissioned and policy response by the UK government to evaluate and address Climate Change at the national level.

4.1. Stern Review (2005)

The Stern Review assesses a wide range of evidence on the impacts of climate change and on the economic costs resulting from inaction. Using results from formal economic models, the report estimates that if strong and early action is not taken, the overall costs and risks of climate change will be equivalent to losing at least 5% of global GDP each year for the foreseeable future. If a wider range of risks and impacts is taken into account, the estimates of damage could rise to 20% of GDP or more. The costs of action - reducing greenhouse gas emissions to avoid the worst impacts of climate change - can in contrast be limited to around 1% of global GDP each year.

The report states that the risks of the worst impacts of climate change can be substantially reduced if greenhouse gas levels in the atmosphere can be stabilised between 450 and 550ppm CO2 equivalent (CO2e). At the time of the report the published, the level was 430ppm. The level reached a value of 454 ppm in CO2 equivalents in 2017 — an increase of more than 4 ppm compared with 2016, and 37 ppm more than 10 years ago.

4.2. Climate Change Act 2008 (with 2019 amendment)

The Climate Change Act outlines the action taken by the UK to become a low carbon economy and to reduce emissions by 100% by 2050 (compared to a 1990 baseline). The Act initially recommended a target of an 80% reduction. This target was increased in 2019 under the recommendation of the Committee on Climate Change to 100%[viii], to ensure that the UK continues to be responsible for an appropriate share of global action to limit global surface warming to around 2°C above pre-industrial levels by 2100.

The act references and regulates the following greenhouse gases[ix]:

- Carbon Dioxide
- Methane
- Nitrous Oxide
- HydroFlurocarbons
- PerFlurocarbons
- Sulphar Hexafluoride

Carbon dioxide and nitrous oxide are directly associated with the combustion of fuels (both renewable and non-renewable). Three of the other gases (Methane, Hydroflurocarbons and Sulphar Hexafluroide) are indirectly associated with energy systems (gas networks, refrigeration, and electrical switchgear).

The Act also establishes the supporting framework of carbon budgets as a means of measuring progress towards the 2050 target, which must be produced every 5 years.

The UK is currently in the third carbon budget period (201 to 2022), with a carbon budget level of 2,544 MtCO2e to result in a 37% emissions reduction by 2020.

4.3. Fifth carbon budget (2016)

The Fifth Carbon Budget presents the carbon emissions for the UK allowed from 2028 to 2032. The budget level is 1,765 million tonnes of carbon dioxide equivalent (MtCO2e)[x], which will result in a 56.9% reduction by 2030. The budget does not take into account internal shipping or aviation emissions.

As the fifth carbon budget report was published in 2016, it does not take into account the 2019 amendment to the Climate Change Act and so is based on the original 80% carbon reduction target.

The Climate Change Committee (CCC) is required to provide advice on the level of the sixth carbon budget (covering the period 2033-37) before the end of 2020.

4.4. Progress against fifth carbon budget

The Government's energy and emissions projections 2018 (published April 2019) predicted that the third carbon budget would be outperformed by around 3% but (taking into account existing and new policies and proposals) predicted a projected shortfall of around 6% and 10% against the fourth and fifth budgets respectively.

The Committee on Climate Change (CCC) recommended in 2019 that the Government should develop policy approaches consistent with reducing carbon intensity of the power sector to below 100 gCO2/kWh in 2030 (compared to 450 gCO2/kWh in 2014 and 200-250 gCO2/kWh expected by 2020).

The Government published its Clean Growth Strategy in October 2017, setting out a "possible pathway" for meeting the fifth carbon budget. The CCC supports this strategy, but advised in 2019 that the UK should use its new net-zero target to also encourage increased effort to reduce emissions worldwide, including pushing for the adoption of similar world-leading targets by other developed countries in the EU and beyond.

The CCC identifies that UK greenhouse gas emissions have reduced by 43% compared to 1990 levels, on the way to a target of at least an 80% reduction by 2050. 75% of emission reductions since 2012 have come from the power sector, but all other sectors are flat (transport, industry, buildings, agriculture, waste and F-gases (fluorinated gases, e.g. as used in refrigeration)).

4.5. Clean Growth Strategy (2017)

The Clean Growth Strategy was presented to Parliament in 2017 pursuant to Sections 12 and 14 of the Climate Change Act 2008. The strategy outlines how the UK will grow its national income whilst cutting greenhouse gas emissions.

Actions proposed to take place to support the strategy include:

- Support around £3.6 billion of investment to upgrade around a million homes through the Energy Company Obligation (ECO), and extend support for home energy efficiency improvements until 2028 at the current level of ECO funding;[xi]
- All fuel poor homes to be upgraded to Energy Performance Certificate (EPC) Band C by 2030 and the aspiration is for as many homes as possible to be EPC Band C by 2035 where practical, cost-effective and affordable;[xii]
- Following the outcome of the independent review of Building Regulations and fire safety, to consult on strengthening energy performance standards for new and existing homes under Building Regulations, including future proofing new homes for low carbon heating systems;[xiii]
- Build and extend heat networks across the country, underpinned with public funding;[xiv]
- Exploring how voluntary building standards can support improvements in the energy efficiency performance of business buildings;[xv] and
- Invest around £184 million of public funds develop new energy efficiency and heating technologies to enable lower cost low carbon homes.[xvi]

4.6. Planning and Compulsory Purchase Act 2004

Section 19 (1A) of the Planning and Compulsory Purchase Act requires local planning authorities to include 'policies designed to secure that the development and use of land in the local planning authority's area contribute to the mitigation of, and adaptation to, climate change'.[xvii]

Section 39 (3) expressly provides for sustainable development, stating that local planning authorities must plan for all objectives to contribute towards the achievement of sustainable development.[xviii]

4.7. Planning and Energy Act 2008

The Planning and Energy Act states that local planning authorities in England may in their development plan documents include policies imposing reasonable requirements for[xix]:

(a) a proportion of energy used in development in their area to be energy from renewable sources in the locality of the development;

(b) a proportion of energy used in development in their area to be low carbon energy from sources in the locality of the development; and

(c) development in their area to comply with energy efficiency standards that exceed the energy requirements of building regulations.

4.8. Localism Act

Section 361B of the Localism Act sets out that the Mayor must prepare a London Environment Strategy which should contain provisions for dealing with matters relating to climate change mitigation and energy in London. The Strategy must take into account existing adopted plans. The most recent version of the London Environment Strategy was published by the Mayor in 2018[xx].

4.9. National Planning Policy Framework 2019

The National Planning Policy Framework (NPPF) states a presumption in favour of sustainable development. Paragraph 148 states that the planning system should support the transition to a low carbon future in a changing climate, taking full account of flood risk and coastal change[xxi]. It should help to: shape places in ways that contribute to radical reductions in greenhouse gas emissions, minimise vulnerability and improve resilience; encourage the reuse of existing resources, including the conversion of existing buildings; and support renewable and low carbon energy and associated infrastructure.

Paragraph 149 of the framework states that planning authorities should take a proactive approach to mitigating and adapting to climate change.[xxii]

Paragraph 150 states new development should be planned for in ways can help to reduce greenhouse gas emissions, such as through its location, orientation and design.

Any local requirements for the sustainability of buildings should reflect the Government's policy for national technical standards.[xxiii]

Paragraph 151 states that to help increase the use and supply of renewable and low carbon energy and heat, plans should provide a positive strategy for energy from these sources, should consider identifying suitable areas for renewable and low carbon energy sources, and should identify opportunities for development to draw its energy supply from decentralised, renewable or low carbon energy supply systems and for co-locating potential heat customers and suppliers.[xxiv]

Paragraph 154 states that planning authorities should recognise that even small-scale projects provide a valuable contribution to cutting greenhouse gas emissions, and that once suitable areas for renewable and low carbon energy have been identified, major scale applications outside of these areas must justify their location against the criteria used in identifying suitable areas.[xxv]

4.10. Building Regulations: Part L

Schedule 1 of Part L of the UK Building Regulations (as amended in 2013) concerns the conservation of fuel and power in developments by the provision of materials that limit heat gains and losses, and by installing services that are energy efficient.[xxvi]

There are four parts to Approved Document L:

- Approved Document L1A: Conservation of fuel and power (New dwellings)
- Approved Document L1B: Conservation of fuel and power (Existing dwellings).
- Approved Document L2A: Conservation of fuel and power (New buildings other than dwellings).
- Approved Document L2B: Conservation of fuel and power (Existing buildings other than dwellings).

The Approved Documents include the following requirements:

- The designed carbon emission rate (Dwelling Emission Rate (DER) for self-contained dwellings and individual flats, and Building Emission Rate (BER) for buildings other than dwellings) must not exceed the Target Emission Rate (TER) for a notional building of similar type, size and shape. Both are expressed in $kgCO_2/m^2$ per year. As-built performance should be consistent with the DER.
- Fixed building services should achieve a reasonable standard of energy efficiency, with minimum limiting parameters in place for key components of the building fabric to ensure that this is achieved.
- For dwellings, the Standard Assessment Procedure (SAP) should be followed. For buildings other than dwellings, the TER and BER can be calculated using approved simulation software.
- Consideration of high-efficiency alternative systems for new buildings (other than dwellings) [xxvii]

- The Target CO_2 Emission Rate (TER) is the minimum energy performance requirement for a new building (other than dwellings) based on the methodology approved by the Secretary of State in accordance with building regulation 25. It is expressed in terms of the mass of CO_2 emitted per year per square metre of the total useful floor area of the building.[xxviii]

- The building owner should be provided with detailed information that will enable them to operate the building at the highest energy efficient mode as possible. An example, is utilizing the building logbook, which will enable the building management team to understand the working of the energy efficient mode.

It is noted that Building Regulations exclude accounting carbon emissions from some sources (e.g. some appliances) for technical reasons, as these are not usually under the control of the building design team.

4.11. Proposed Changes to Part L of the Building regulations

In 2017, the government consulted on proposed changes to Part L and Part F of the Building Regulations for new dwellings. The consultation sets out two options to uplift energy efficiency standards and requirements:

- Option 1: 20% reduction in carbon emissions compared to the current standard for an average home. It is anticipated this could be delivered by very high fabric standards (typically with triple glazing and minimal heat loss from walls, ceilings and roofs).

- Option 2: 31% reduction in carbon emissions compared to the current standard. It is anticipated this could be delivered based on the installation of carbon-saving technology such as photovoltaic (solar) panels and better fabric standards, though not as high as in option 1 (typically double not triple glazing).

Option 2 is favoured by the government.

The consultation also considers the impact on airtightness and on Part F (Ventilation) of the Building Regulations and also sought to clarify the role of planning authorities in setting energy efficiency standards.

The London Borough of Southwark responded to the consultation, and its consultation response is available publicly at:

https://www.southwark.gov.uk/assets/attach/11931/Future-homes-standard-consultation-responses.pdf.

5. Greater London Context

The London Borough of Southwark forms part of Greater London, which is a wider region regulated the devolved regional governance body, the Greater London Authority (GLA). The following section presents data for the London regional area and the policy response to climate change by the GLA.

5.1. Current CO_2 Emissions

The London Energy and Greenhouse Gas Inventory (LEGGI) measures the emission of carbon dioxide equivalent in London, in order to meet the monitoring requirements of the Mayor's Climate Change Mitigation and Energy Strategy (2010).

The LEGGI uses sub-regional energy (electricity, gas and other fuels) and carbon dioxide equivalent (CO_2e) data published by the Department of Business Energy and Industrial Strategy (BEIS) for homes and workplaces, and data from the London Atmospheric Emissions Inventory (LAEI) for energy and CO_2e data for transport.

Interim results show that in 2017 (latest available dataset), London's CO_2e emissions were 30.3 million tonnes. This is a 33 per cent reduction on 1990 levels and a 40 per cent reduction since the peak of emissions in 2000. This is despite an ever-increasing population – an increase of nearly 30 per cent since 1990. London's per capita emissions were estimated at 3.4 tonnes of CO_2e in 2017, down from 3.5 tonnes of CO_2e in 2016.[xxix]

5.2. London Plan

The London Plan is published by the Greater London Authority (GLA) to guide development in London. The most recent version of London Plan was adopted in 2016. The plan acknowledges that London has to be ready to deal with a warmer and more extreme climate, and that action must be taken to limit the extent and impacts of future climate change on the city.

Policies 5.1 and 5.2 of are most relevance to energy use.

Policy 5.1 Climate change mitigation
Policy
Strategic

A The Mayor seeks to achieve an overall reduction in London's carbon dioxide emissions of 60 per cent (below 1990 levels) by 2025. It is expected that the GLA Group, London boroughs and other organisations will contribute to meeting this strategic reduction target, and the GLA will monitor progress towards its achievement annually.[xxx]

LDF preparation

B Within LDFs boroughs should develop detailed policies and proposals that promote and are consistent with the achievement of the Mayor's strategic carbon dioxide emissions reduction target for London.[xxxi]

Policy 5.2 Minimising Carbon Dioxide emission
Policy
Planning decisions

A Development proposals should make the fullest contribution to minimising carbon dioxide emissions in accordance with the following energy hierarchy[xxxii]:

1. Be lean: use less energy
2. Be clean: supply energy efficiently
3. Be green: use renewable energy

B The Mayor will work with boroughs and developers to ensure that major developments meet the following targets for carbon dioxide emissions reduction in buildings. These targets are expressed as minimum improvements over the Target Emission Rate (TER) outlined in the national Building Regulations leading to zero carbon residential buildings from 2016 and zero carbon non-domestic buildings from 2019.[xxxiii]

Table 1: Carbon Dioxide reductions required under the London Plan (2016) for Residential buildings:

Year	Improvement on 2010 Building Regulations
2010 – 2013	25 per cent (Code for Sustainable
2013 – 2016	40 per cent
2016 – 2031	Zero carbon

Source: London Plan 2016, page 180.

Table 2: Carbon Dioxide reductions required under the London Plan (2016) for Residential buildings for Non-domestic buildings:

Year	**Improvement on 2010 Building Regulations**
2010 – 2013	25 per cent
2013 – 2016	40 per cent
2016 – 2019	As per building regulations requirements
2019-2031	Zero Carbon

Source: London Plan 2016, page 180.

Policy 5.2 also requires carbon dioxide reduction targets be met on-site, with any shortfall to be provided off-site or through a cash in lieu contribution to the relevant borough to be ring fenced to secure delivery of carbon dioxide savings elsewhere.[xxxiv]

Zero Carbon is defined in this document as;

(Subject to the Government's final definition for zero carbon) A zero carbon development is one whose net carbon dioxide emissions, taking account of emissions associated with all energy use, is equal to zero or negative across the year. The definition of "energy use" will cover both energy uses currently regulated by the Building Regulations and other energy used in the home.

5.3. Draft London Plan

A revised version of the London Plan has undergone an Examination in Public and is due to adopted in late 2020.

Policy SI 3 Energy infrastructure provides detailed guidance relating to the use of Heat Networks[xxxv], and Policy SI 4 Managing heat risk states that major development proposals should demonstrate through an energy strategy how they will reduce the potential for internal overheating and reliance on air conditioning systems in accordance with the cooling hierarchy. [xxxvi]

Building on existing Policy 5.2, revised Policy SI 2 Minimising greenhouse gas emissions introduces the new 'Be seen' requirement to the energy hierarchy, which requires developers to install monitoring systems on site and to report energy use to the GLA.[xxxvii] This policy is seeking for Major Development to be net-zero carbon. Net zero carbon is defined in the glossary as:

'Activity that causes no net release of carbon dioxide and other greenhouse gas emissions into the atmosphere.'[xxxviii]

The policy also seeks a minimum on-site reduction of at least 35% beyond building regulations 2013 targets (Part L), with residential development achieving a 10%, and non-residential development a 15% reduction through energy efficiency measures.

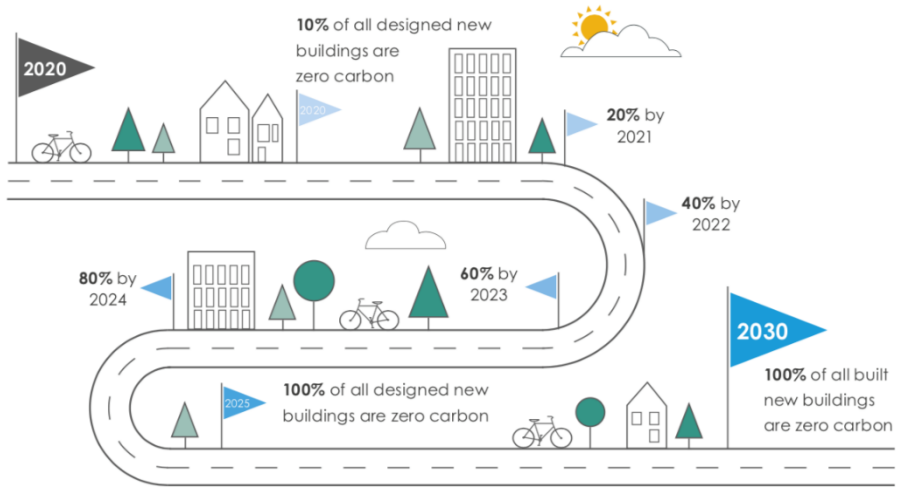
The policy requires major developments to calculate onsite unregulated carbon emissions (see section 4.10 for a Building Regulation definition of these).

5.4. London Energy Transformational Initiative (LETI)

LETI was established in 2017, to support the shift of the capital's emissions concerning the built environment to net zero carbon. It is a voluntary industry network comprised of over 1000 environment professionals seeking to achieve a zero-carbon future. LETI seeks to produce evidence-based recommendations to inform two pieces of policy, the London Environment Strategy, and the London Plan. The guidance developed has been proposed to be applied to the rest of the United Kingdom, and to evolve over time to reflect changes in carbon budgets, technologies and the construction industry.

LETI has estimated that in order to be on track to achieving real net carbon zero emissions for all new builds by 2030, 10 % of all new buildings need to be designed in 2020 to deliver net zero carbon performance. Increasing proportions of building are proposed to be designed to be net-zero carbon in operation in subsequent years up to 2030. This requirement arises owing to the time lag between design and actual construction. [xxxix]

Getting to Net Zero Carbon:



Source: LETI Design Guide (Jan 2020)

LETI has broken down key measures in defining and achieving net zero carbon zero into 5 elements:

1. Operational energy
2. Embodied carbon
3. Future of heat
4. Demand response
5. Data disclosure

Although LETI is focusing on zero carbon as the outcome, it recognizes that reducing energy demand overall is key to achieving a net zero carbon city. Their documentation also suggests potential routes and metric for achieving greater energy efficiency as well as zero carbon heating.

6. Local Context: London Borough of Southwark

In this section a synopsis of the direct impacts, local drivers and policy responses of the London Borough of Southwark related to Energy and Climate change.

6.1. Energy Consumption and Global Warming– Direct Impacts

Some of the following direct local impacts are anticipated within the London Borough of Southwark as a result of energy consumption and global warming. This is intended to be an illustrative list and not an extensive list.

- Flood Risk – The borough benefits from extensive flood risk defenses along the Thames River, however climate change is anticipated to impact the effectiveness of these, requiring upgrades to infrastructure, as well as increasing the risks of Groundwater, surface and sewer flooding within the borough
- Increased overheating – Increase in UK warm spells or 'heat waves', increasing the risk of overheating in buildings and potentially increasing demand for the installation and operation of cooling systems
- Reduced Air Quality – from the combustion of fossil fuel in transportation and for heating leading to adverse effects on human health and the environment

6.2. Key objectives

The following are key objectives for the London Borough of Southwark for local policy to address. These are broadly based on the Energy Hierarchy principles of

- Reduce consumption
- Produce or use energy efficiently
- Generate energy cleanly

5.2.1. Reducing Energy Consumption

Policies that assist in the reduction of energy consumption in a capital efficient manner, lower emissions and operational costs directly and lower the capital investment required in low carbon infrastructure for example renewable energy generation.

5.2.2. Improvement of Existing Housing Stock

A subset of reducing energy consumption is the reduction of energy consumption in existing buildings which may also be linked to a wider improvement or refurbishment of existing housing stock.

5.2.3. Generate Energy Locally

Generating energy locally may form a subset of producing or using energy efficiently. Local energy production can reduce the losses associated with distributing energy over long distances, and provide opportunities to make use of energy that might otherwise

be wasted. The generation of energy within the borough may also bring local economic benefits associated with activity. For example, the local deployment of PV systems may result in savings or even revenues paid to residents. Similarly, making use of waste heat from Local waste to energy facilities suppresses the consumption of gas within the borough and supports local employment and investment in these facilities.

5.2.4. Decarbonising Heating

Reducing the carbon content of heat supplies (typically direct gas consumption) within the borough is required, whilst maintaining thermal comfort for end users.

5.2.5. Decarbonising Electricity

Reducing the carbon content of electricity consumed within the borough is necessary. This also requires accounting for potential increased electricity consumption, potentially from the electrification of heat, increased deployment and use of cooling systems and the electrification of transportation, whilst maintaining thermal comfort for end users.

5.2.6. Improving Air Quality

The London Borough of Southwark is impacted by low levels of air quality[xl]. Reducing the number of combustion sources (boilers, internal combustion engines etc) whilst maintaining an appropriate standard of living is likely to improve local air quality. Appropriate monitoring and mitigation of any remaining unavoidable combustion processes is also required

5.2.7. Fuel Poverty

Care is required to ensure that additional capital investment required to invest in improvements in energy efficiency or increased green infrastructure does not lead to inappropriate adverse economic effects for the poorest demographics.

5.2.8. Promotion of low carbon transportation

The decarbonisation of fuel consumption from transportation requires the facilitation of low carbon alternatives, such as improved pedestrian and cycling access and infrastructure.

Where local journeys cannot be made by one of these alternatives, public transportation by electric train or decarbonised bus fleets is likely to be required.

Service vehicles and any remaining road transportation is also likely to require de-carbonisation e.g. via electrification with the associate supporting infrastructure deployed.

6.3. Current Emissions

The table below shows the origin of tonnes of carbon emitted within Southwark in 2017, according to the London Energy and Greenhouse Gas Inventory (LEGGI). These are the latest available dataset, and are also currently considered an 'interim' publication, therefore may be updated further at a future date.

Table 3: LEGGI carbon dioxide equivalent emissions by energy source for The London Borough of Southwark 2017 (most recent dataset)

Energy source	Domestic (CO2e)	Commercial (CO2e)	Total
Electricity	124	333	457
Gas	199	192	391
Coal	1	0	1
Oil	2	9	11
Waste and renewables	n/a	4	4
Total	325	519	**845**

In addition to this road transport contributes 142 tonnes CO2e of the total 168 tonnes CO2e emitted due to transport overall in the borough.

The data suggests that in total 1,013 tonnes of CO2e were emitted in Southwark in 2017, ranking the borough 22nd highest out of the 33 London boroughs in that year.

Table 4: Historic annual carbon dioxide equivalent emissions by energy source for The London Borough of Southwark (excluding transport)

Year	Total tonnes of CO2e
2016	1,070
2015	1,195
2014	1,170
2013	1,406
2012	1,406
2011	1,318
2010	1,502

LEGGI data shows that the total annual CO2e emitted in Southwark has decreased nearly every year since measurements began in 2010, approximately 29% in total.

6.4. Current Policies

The current local plan is made of Saved Southwark Plan (2007) and Core Strategy (2011).

Strategic Policy 13 – High environmental standards sets out guidance relating to energy efficiency, stating that development must meet the development to meet the highest possible environmental standards, including targets based on the Code for Sustainable Homes and BREEAM, and that development must be designed and built to minimise greenhouse gas emissions across its lifetime. The policy also details an expectation for all major developments to set up and/or connect to local energy generation networks where possible.

The policy also details that Southwark has particularly high levels of air pollution, mainly caused by traffic and that as a result, the entire borough north of the A205 has been declared an Air Quality Management Area.[xli]

6.5. Linked Planning documentation

The following evidence and documentation has been commissioned or produced by the London Borough of Southwark to support planning policy associated with energy consumption and climate change.

5.5.1. Infrastructure Background Paper 2020

This paper provides background evidence and justification for London Borough of Southwark's Infrastructure policies in the New Southwark Plan.[xlii]

5.5.2. Integrated Impact Assessment 2019

The Integrated Impact Assessment (IIA) carried out to support the New Southwark Plan recognises that there is a risk that an increase in housing may increase energy consumption and carbon emissions in Southwark. However, this is required to be offset through policies P68 Sustainability standards and P69 Energy.

The IIA identifies that many policies will play a role in reducing energy use in the borough and in improving the ability of the borough to adapt to climate change. This includes all of the transport related policies, which promote active movement and the use of public transport, which will reduce carbon emissions. All policies under SP6 Cleaner, greener, safer are also likely to guide sustainable development and to protect green infrastructure and biodiversity in the borough.

The efficient use of land and the decision to focus on densifying areas which are already well served by public transport and existing Heat Networks is anticipated to result in less energy demand overall, and in improved air quality.[xliii]

5.5.3. Sustainable Design and Construction SPD 2009

This document provides guidance on how new development in Southwark should be designed and built so that it has a positive impact on the environment.

The SPD states that the energy hierarchy must be considered during the design process: first, use good design to minimise the development's energy needs; then, make the most use of efficient energy, heating and cooling systems; and then, use renewable sources of energy. Buildings should be fitted with energy efficient lighting and appliances.[xliv]

Residential development should connect to area-wide CHP or CCHP systems where these exist or are being developed within the following distances of the site:

- Less than 20 dwellings: 50 metres
- 20-30 dwellings: 100 metres
- 31-40 dwellings: 150 metres
- Over 40 dwellings: 200 metres

Commercial and other non-residential development within 200 metres of an area-wide CHP or CCHP system should connect unless it is demonstrated that there is not enough heating demand for an efficient connection.

Small-scale wind-turbines have not been shown to be highly effective in Southwark. It is noted that heat pumps will not be counted as a 100% renewable source of energy as they are powered by electricity.

5.5.4. Aylesbury Area Action Plan (2010)

The Aylesbury plan sets out how up to 4,000 new homes will be delivered on the estate. The first new homes were completed in 2012 and the council has now appointed Notting Hill Housing Trust as its Development Partner to take forward the continued regeneration of the area over the next 20 years across four phases.[xlv]

In the Old Kent Road & Aylesbury Estate Regeneration Electricity Report (2019), Utility Results have interrogated the development information available and anticipate the proposed Old Kent Road regeneration will require an electrical load in the region of 14MVA (based on gas heating) or 30MVA (based on electrical heating).[xlvi] Analysis of the proposed development programme has confirmed that the 83 electrical demand will ramp up very quickly initially over the first five years before plateauing. Based on current findings, a new primary substation will not be required as the existing primary substations can currently accommodate the extra demand. However, the utility networks are dynamic and always changing with new sites coming online taking capacity and likewise buildings going offline. After the Bankside and Verney Road Primary Substation upgrade works are completed there will be 30MVA & 40MVA available. However, after the upgrades are completed, there will be no space to upgrade further

5.5.5. Peckham and Nunhead Area Action Plan (2014)

The plan sets out policies to guide development over the next 10 years that will help bring long-lasting improvements to Peckham and Nunhead.

Policy 21 states that the development will be expected to apply the energy hierarchy as set out in the London Plan. Major developments will be required to evaluate the feasibility of connecting to existing heating and cooling networks and Combined Heat and Power (CHP) systems, and that where a new CHP system is appropriate proposals should also assess the feasibility of extending the system beyond the site boundary to adjacent sites. Where practical and viable, development should be future proofed and designed to be capable of connecting to a future CHP/communal heating network.[xlvii]

5.5.6. Canada Water Area Action Plan (2015)

The Canada Water plan sets out a vision for how the Canada Water area will change over the period leading up to 2026. By 2030, around 5,100 new homes are expected to be built in Rotherhithe and the amount of shopping space will be significantly expanded. Existing infrastructure will need to be improved and new infrastructure provided to cope with the additional population.[xlviii]

The Canada Water Energy Study (2018) identifies significant potential to establish a district-heating network in the area, however noting that a connection to SELCHP would not be possible. The option to centralise heat pumps on a site-wide basis has been considered and discounted; there is insufficient space to provide a central heat pump installation and the significant additional distribution losses generated by a site-wide heat network increase the carbon dioxide emissions compared to providing plant on a plot by plot basis, where heat pumps can be optimised to suit each building and its authorised use. All development plots will be required instead to provide a connection ready for a future district heating network, should this become available and viable, to ensure compliance with policy.[xlix]

5.5.7. Old Kent Road Area Action Plan (emerging)

The Old Kent Road plan details the ongoing regeneration of the Old Kent Road which is estimated to involve the delivery of around 20,000 new homes. The plan is expected to be adopted in 2020.

Policy AAP 11: Cleaner, greener, safer states that development must deliver an energy centre or link to one of Old Kent Road decentralised heat networks, and must not create pollutant hot spots on site or for adjacent sites.

The Old Kent Road Decentralised Energy Study (2016), which was undertaken to support the Area Action Plan, suggests that there is extensive local gas infrastructure across the opportunity area arising from its historical usage being a gas works.[l] This is likely to result in localised contaminated ground, which will require mitigation when new utility infrastructure is installed below ground. This infrastructure has potential to supply any new local gas demand, however it is assumed, in accordance with recent developments in national policy, that an increasing quantity of energy demand will be placed on the electrical network. The Old Kent Road development has been estimated to require a peak electrical load in the region of 12MVA in the year 2020. It is assumed that this load will continue to rise, peaking at 15MVA in 2030 (assuming gas heating systems).

6.6. Carbon reduction Targets

The London Borough of Southwark is initially investigating its role in discharging the Statutory requirement for government of a 100% reduction of emissions in greenhouse gases by 2050 as defined by the amended Climate Change Act (2019).

6.7. Forecast Energy Consumption and emissions

The following Graphics estimate the carbon emissions for the London Borough of Southwark. These estimations have been undertaken using the SCATTER tool, produced by Anthesis, with support from the Tyndall Centre for Climate Change research and funded by BEIS.

SCATTER produces regional Carbon Budget reporting outputs and emission reduction pathway scenarios at a local authority level using public data sources. It has been used for this evidence paper to:

- Forecast The London Borough of Southwark's current emissions rates and sources
- Forecast a pathway where business continues as usual, without further policy interventions
- Provide greater granularity on emissions from the built environment, which may be influenced directly by planning policy
- Estimate the potential impacts from adopting proposed New build planning policy by the London Borough of Southwark.

Elements of the SCATTER input data have been tailored to reflect some specifics of the London Borough of Southwark, namely construction build out data has been amended to reflect planning aspirations for the Southwark plan. Please note that for this evidence paper only Scope 1 and Scope 2 emissions are reported for the borough.

Figure 1 estimates the 'Business As Usual' pathway for the London Borough of Southwark. Note that SCATTER estimates total carbon emissions for the borough in 2020 at a level close to that accounted for by LEGGI (see section 6.3), which demonstrates that both approaches are complementary and do not produce a significant variation in carbon accountancy. Business As Usual estimates the current greenhouse gas emissions (in tonnes CO_2 equivalent) and forecast emissions out to 2050 assuming no further policy intervention, but accounting for existing policy actions. For example, ongoing reductions in energy consumption (i.e. improved energy efficiency) and further reductions in electricity carbon factors are accounted for. These are summarised in Table 5.

Table 5:Assumptions for London Borough of Southwark 'Business As Usual' forecast pathway

	Business As Usual
Emissions	**Agriculture and Land Use**
Forestry	5% increase in forest cover by 2030.
Land Management	2% decrease in grassland
Livestock Management	0.2% annual growth in dairy cows & livestock
Tree-planting	Tree-planting to increase current coverage by 30% by 2030; no subsequent commitments.
	Domestic Measures
Demand for heating and cooling	By 2050, domestic lighting and appliance total energy demand has dropped to 80% of current levels.
Electrification of lighting, appliances, and cooking	Small reductions in energy demand from cooking; no change in heat source.
Domestic space heating and hot water – Demand	Hot water demand per household grows 5% every 5 years
Insulation of new houses	All new houses are built to 2013 building regulations (no change).
Retrofit	All current households remain at weighted average heat loss.
Technology mix for heating	No change to current technology mix for home heating.
	Energy Supply
National Grid – Electricity Carbon Factor	As per Government (BEIS) forecast – Future UK Electricity carbon factors.

	Business As Usual
	Commercial, Industrial and Institutional Measures
Demand for heating and cooling	In 2050, commercial heating, cooling and hot water demand is 103% of today's levels
Technology mix for heating and cooling	No change to current technology mix for commercial heating.
Energy demand for lighting, appliances and cooling	Commercial lighting & appliance energy demand increases 28% by 2050
Electrification of lighting, appliances, and catering	Share of cooking which is electric is as today.
Industrial processes – Efficiency	Industry moves to higher natural gas consumption, with electricity consumption falling before 2035 then remaining constant.
Industrial processes – Output	Other industry process emissions are reduced at a rate of 2.6% per year.
	Transport
Domestic freight (road and waterways)	47% increase in distance travelled by road freight; 40% increase in efficiency. In waterborne transportation, 15 % decrease in fuel use.
Domestic passenger transport – Demand	No change to total travel demand per person
Domestic passenger transport - Modal Shift	No change to current national average modal split by total miles: 74% transportation by cars, vans and motorcycles.
Domestic passenger transport – Technology	Cars, buses and rail is 100% electric by 2050. Slight increase in average train occupancy.
International aviation	Department for Transport "central" forecast for aviation.
International shipping	47% increase in distance travelled by road freight; 40% increase in efficiency. In waterborne transportation, 15 %decrease in fuel use.

	Business As Usual
	Waste
Increase in rates of recycling	65% recycling, 10% landfill, 25% incineration by 2040; remaining constant to 2050
Reduction in volume of waste	Total volume of waste is 124% of 2017 levels by 2040.

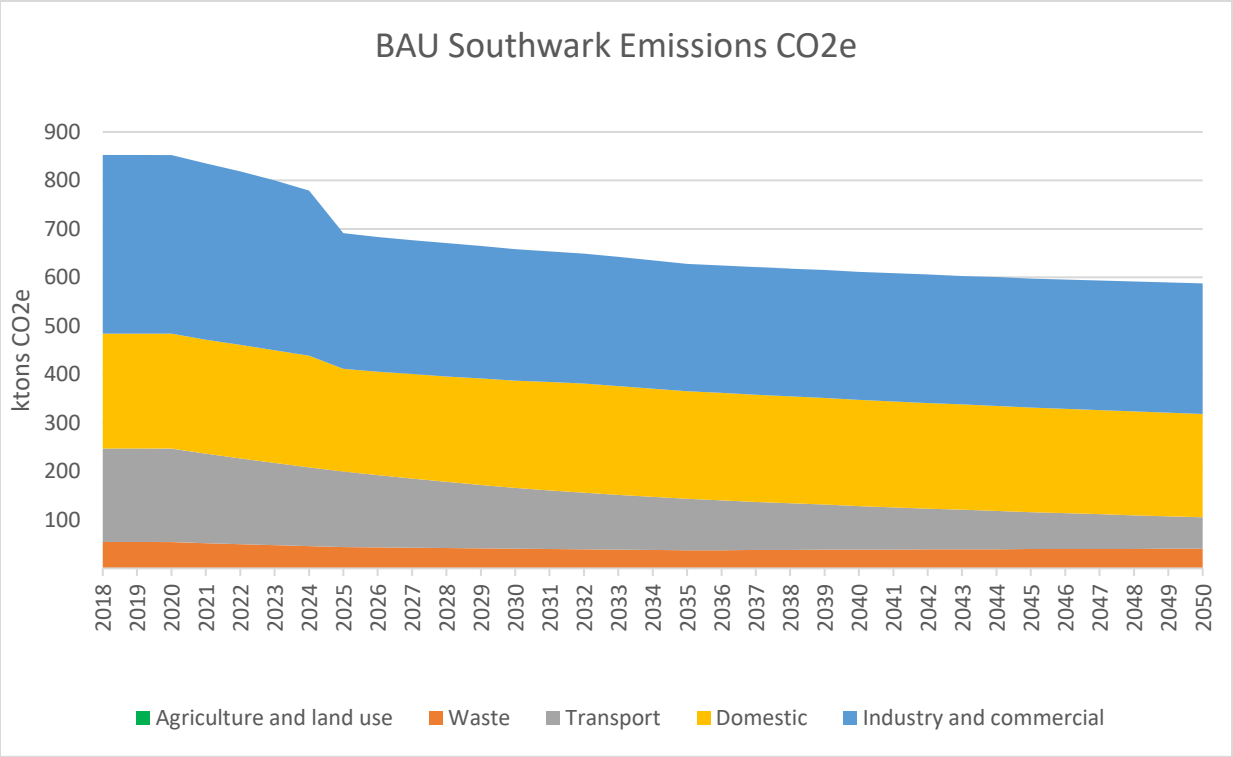


Figure 1: Summary Carbon emissions for the London Borough of Southwark 2020-2050 (tCO_2e), Business as usual

As may be seen in Figure 1:

- Agriculture and land use contribute only a small quantity of emissions to the borough (Negligible, to the point of not identifiable on the graph at this scale)
- Waste is the next smallest fraction of emissions
- Transport accounts for approximately 25% of emissions, and is forecast to fall in the future
- Domestic emissions account for approximately 25% of emissions and is forecast to remain relatively unchanged in the future
- Industry and commercial are the largest component of emissions, at approximately 50% and are also forecast to remain relatively unchanged in the future
- Overall total emissions are forecast to reduce by20-30% by 2050

As a result, without further action, including policy intervention at all levels of Government, it is unlikely that the London Borough of Southwark will achieve the emissions reductions required under the amended Climate Change Act by allowing the continuation of 'Business As Usual'.

Emissions associated with the built environment account for approximately 75% of estimated emissions for the London Borough of Southwark and are forecast to remain relatively unchanged into the future. As the majority these are the current focus for energy policy. They may be further broken down into more detail by SCATTER.

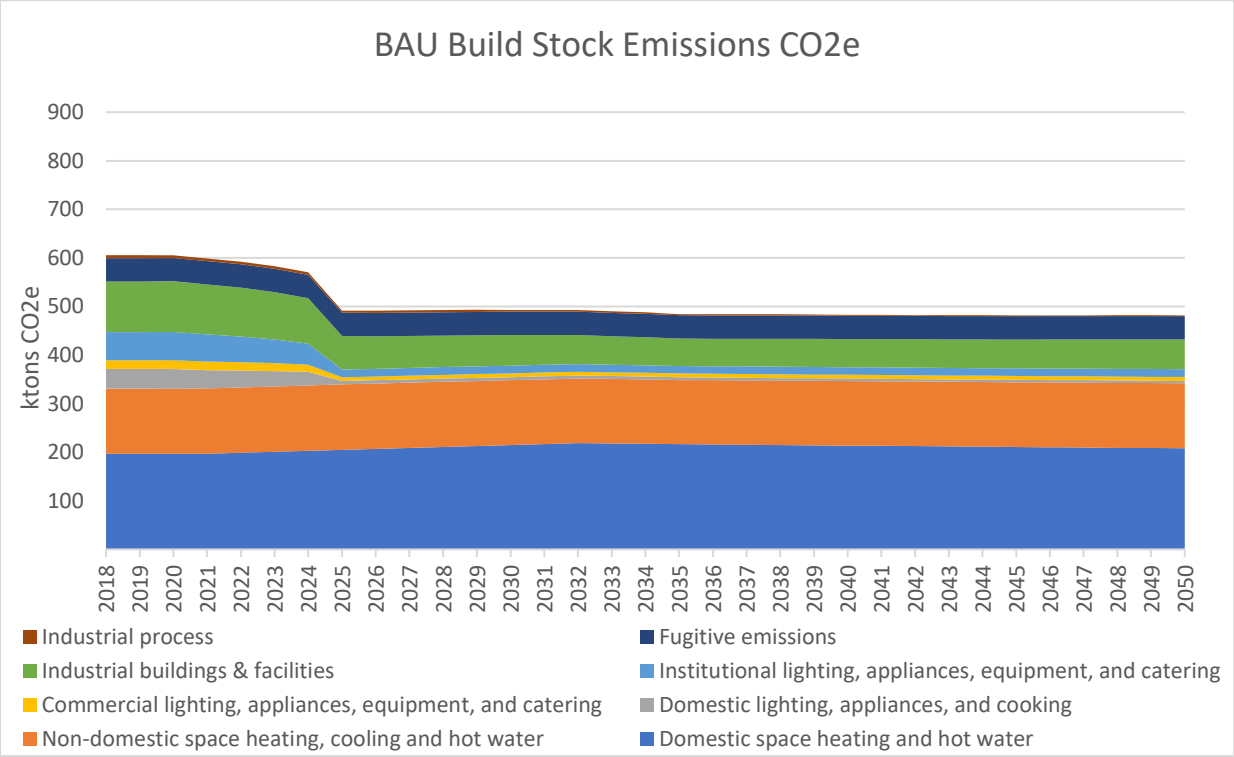


Figure 2: Summary Carbon emissions for Building Stock the London Borough of Southwark 2020-2050 (tCO_2e), Business As Usual

A further breakdown of emissions to review those from building stock is presented in Figure 2 with the same Business As Usual Assumptions. As may be seen, approximately half of emissions arise from Domestic gas consumption for space heating and Hot water in domestic and non-domestic properties. This demonstrates that gas consumption is one of the largest contributions to CO_2 in the London Borough of Southwark with this forecast to remain relatively static under a Business As Usual scenario.

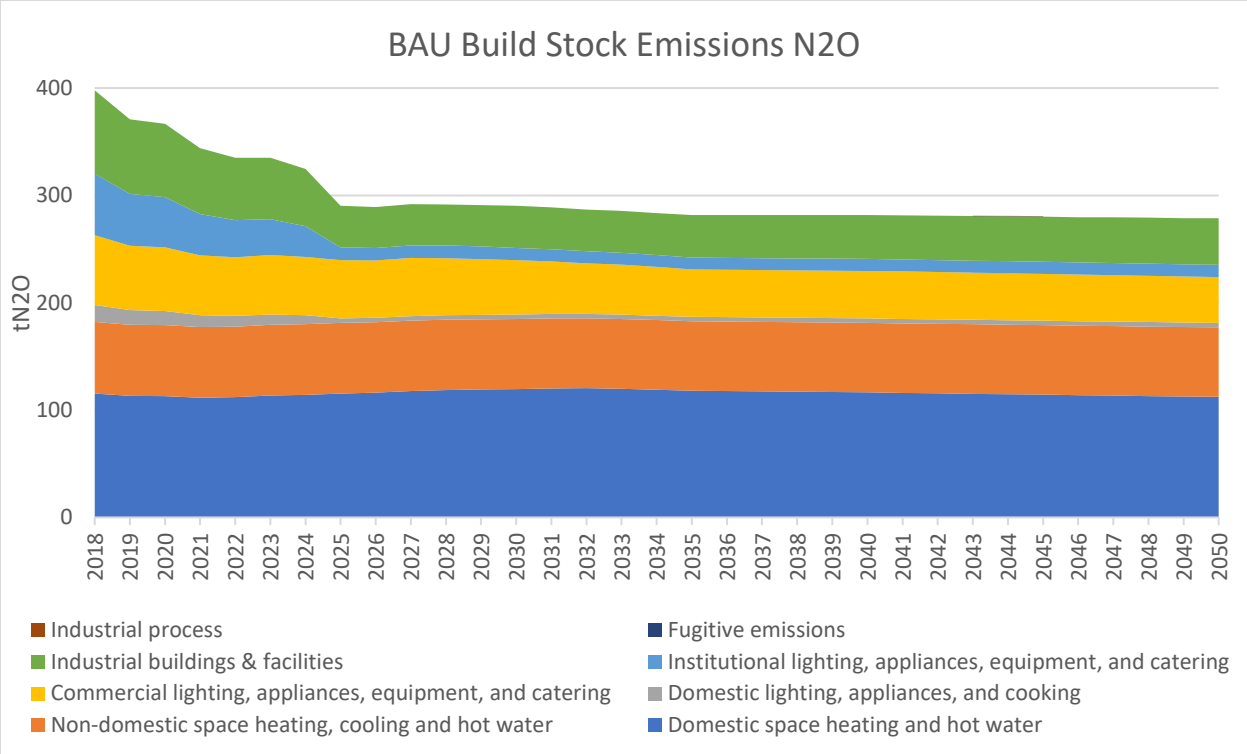


Figure 3: Summary N_2O emissions for Building Stock the London Borough of Southwark 2020-2050 (tN_2O), Business As Usual

Figure 3 is a graphic of the Nitrous Oxide emissions forecast for building stock under business as usual as forecast by SCATTER. Nitrous oxide is a regulated greenhouse gas as well as a contributor to poor air quality. Again, it may be seen that Domestic and non-domestic gas combustion for space heating and Domestic Hot water accounts for 50% of emissions. These are direct local emission within the borough, remaining emissions associated with electricity may not arise immediately within the borough, but are generated at a national level at power stations across the UK

6.8. Proposed Policy for New Build

The proposed amended energy planning policy for buildings by The London Borough of Southwark is development must reduce carbon dioxide emissions on site by:

- 100% on 2013 Building Regulations Part L standards for residential development; and
- A minimum of 40% on site reduction on 2013 Buildings Regulations Part L standards for non-residential developments; and
- Any shortfall against carbon emissions reduction requirements must be secured off site through planning obligations or as a financial contribution.

The residential development energy policy and requirement for shortfall payments mirrors the Current and Proposed Regional policy stated in the Existing and Draft

London Plan, with explicit definitions that reductions in carbon emissions are measured against Building regulations.

The non-domestic policy requests that non-residential developments improve upon Building regulations on-site by 40% in place of the 35% on-site improvement stated in the Draft London plan, a 5% uplift on this standard.

As highlighted in Sections 2 and 6.7, this paper focuses only on emissions from the build environment, the largest overall source of emission for The London Borough of Southwark. For this reason, The Building Regulation definition of Net Zero Carbon (including unregulated energy) is used as the benchmark for new build policy in the built environment. This provides a nationally agreed definition of what emissions are and are not included, and how these may be calculated. Other definitions may exist but are not considered in this paper. It is also clear that this definition is inappropriate for defining and measuring 'Net Zero Carbon' outside of this sector, for example in Transport.

These requirements have been modelled in the SCATTER tool, with the results presented in section 0.

7. Evidence to support policy

The domestic policy requirement for Net Zero carbon development (100% reduction on 2013 Part L building regulations, including an allowance for unregulated emissions) and requirement for shortfall payments reflects current regional policy (Current London Plan) and proposed regional policy (Draft London Plan). It is therefore considered currently a reasonable and proportionate policy position, equivalent to that requested across Greater London.

The proposed Non-domestic policy requirement of The London Borough of Southwark is an **on-site** emissions reduction of 40% Under building Regulations Part L excluding emissions from unregulated energy.

The overall reduction target is set at a lower level than the current regional policy for major Non-domestic developments (in London this is a Net zero target).

However the proposed Non-domestic target in the London Borough of Southwark does represents a 5% uplift on the proposed **on-site** regional Non-Domestic policy standard in the Draft London Plan. In the Draft London Plan this is a 35% emissions reduction through on-site efficiency measures as a component part of an overall Net Zero target.

The New London Plan was Examined in Public (EiP) between November 2018 and May 2019. The evidence basis for the examined policies is publicly available and published online[li] .

Within the evidence base is a report by Buro Happold 'Driving Energy Efficiency Savings through the London Plan', supported by an AECOM report 'GLA Energy Efficiency Target'.

A key finding from the Buro Happold report is that for non-domestic buildings there is only weak correlation on cost uplift between higher energy efficiency targets against Part L 2013 and cost. The report analyses these up to a reduction target of 39.9% (effectively 40%), equivalent to the proposed policy of the London Borough of Southwark. It is noted that there will always be exceptions to the general cost exercise undertaken and that planning policy will need to be flexible to accommodate these where demonstrated.

8. Analysis to support policy

In addition to existing and future policy requirements and evidence basis the proposed updated Southwark policy for domestic and Non-residential development have been modelled in the SCATTER tool assuming:

- The proposed development build out under the Southwark Plan
- A continual constant demolition of building stock such that 85% of current stock remains in 2050
- A Building Regulation 'Net Zero Carbon' policy requirement for New Build Housing regulated energy emissions only. Note, in the SCATTER model this excludes the Building regulation allowance for unregulated energy emissions, as this is modelled separately as part of the entire boroughs electrical demand, with the national grid carbon factors applied as stated in Table 5.
- A Building Regulation 40% reduction in regulated emissions on-site for new build Non-domestic properties
- For comparison, a Building Regulation 35% reduction in regulated emissions on-site for new build Non-domestic properties (proposed GLA policy) is also provided

The resulting forecast emissions are provided overleaf.

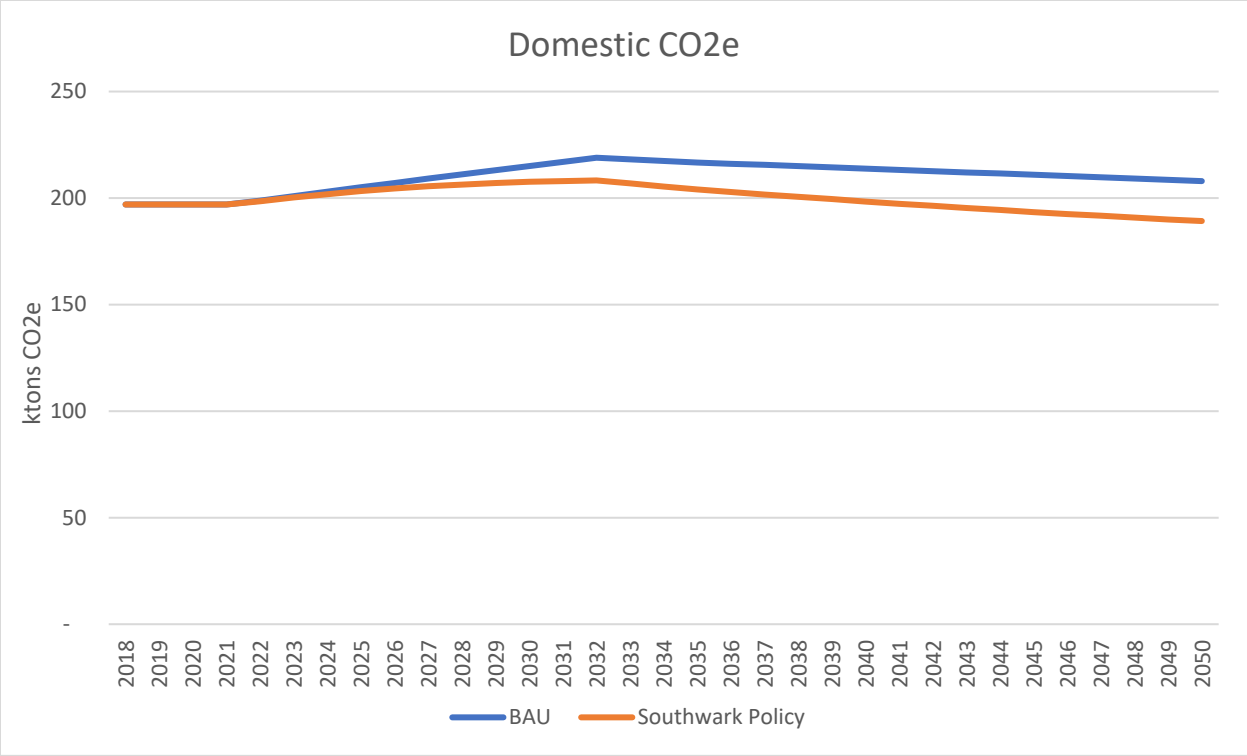


Figure 4: A comparison of total Domestic Emissions of Carbon Dioxide between Business As Usual, and with the estimated outcome of the London Borough of Southwark Domestic New Build Planning policy

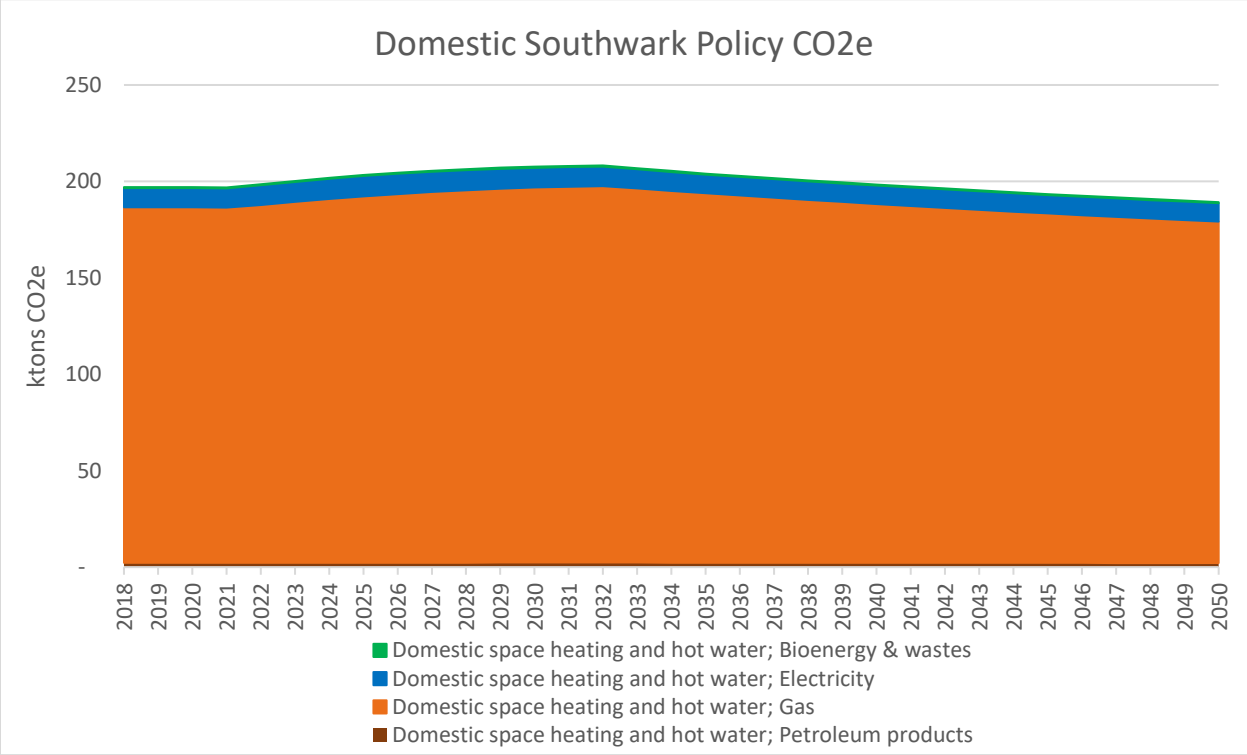


Figure 5: Breakdown of forecast Domestic Carbon Emissions(all housing stock) from differing energy sources, all new residential development assumed 100% reduction on 2013 Building regulation levels

Figure 5 demonstrates that with all new build housing built to Net zero carbon standards under building regulation the London Borough of Southwark Domestic building stock is forecast to be a net carbon emitter in 2050. The largest domestic emission source remains consumption for heating and hot water. It is assumed from the LEGGI data this is predominantly by Natural Gas systems. As emissions from new housing are forecast to be substantially reduced it is likely that further intervention is required particularly to improve the energy performance of existing domestic housing stock to improve on this position.

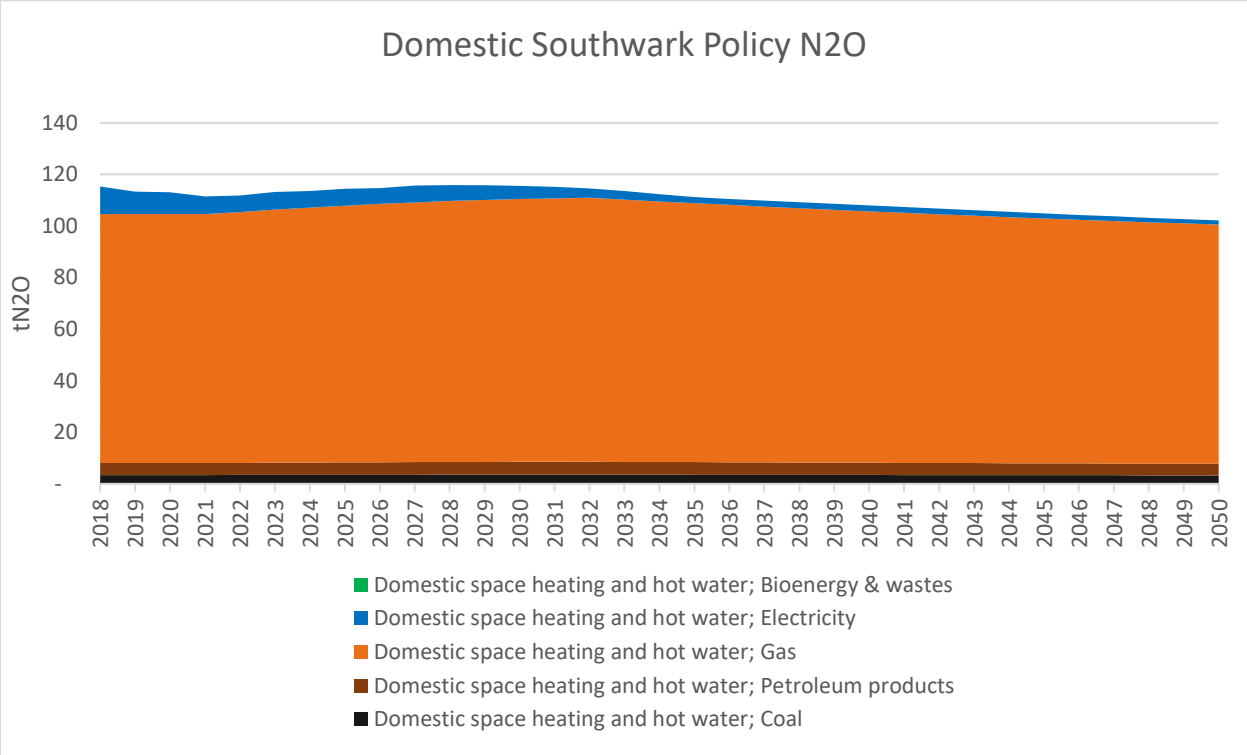


Figure 6: Forecast Nitrous Dioxide Emissions, all new residential development 100% reduction on 2013 Building regulation levels

Figure 6 demonstrates that with all new build housing built to Net Zero carbon standards under building regulations there are still forecast to be large Nitrous Oxide emissions in 2050, assumed predominantly from gas consumption for space heating and hot water in existing housing stock. As stated previously, gas emissions are direct local emissions, emissions for electricity are assumed to be distributed across electrical power generation across the UK so may not be produced locally. Further policy intervention is likely to be required to promote alternative low NO_x space heating solutions within the borough.

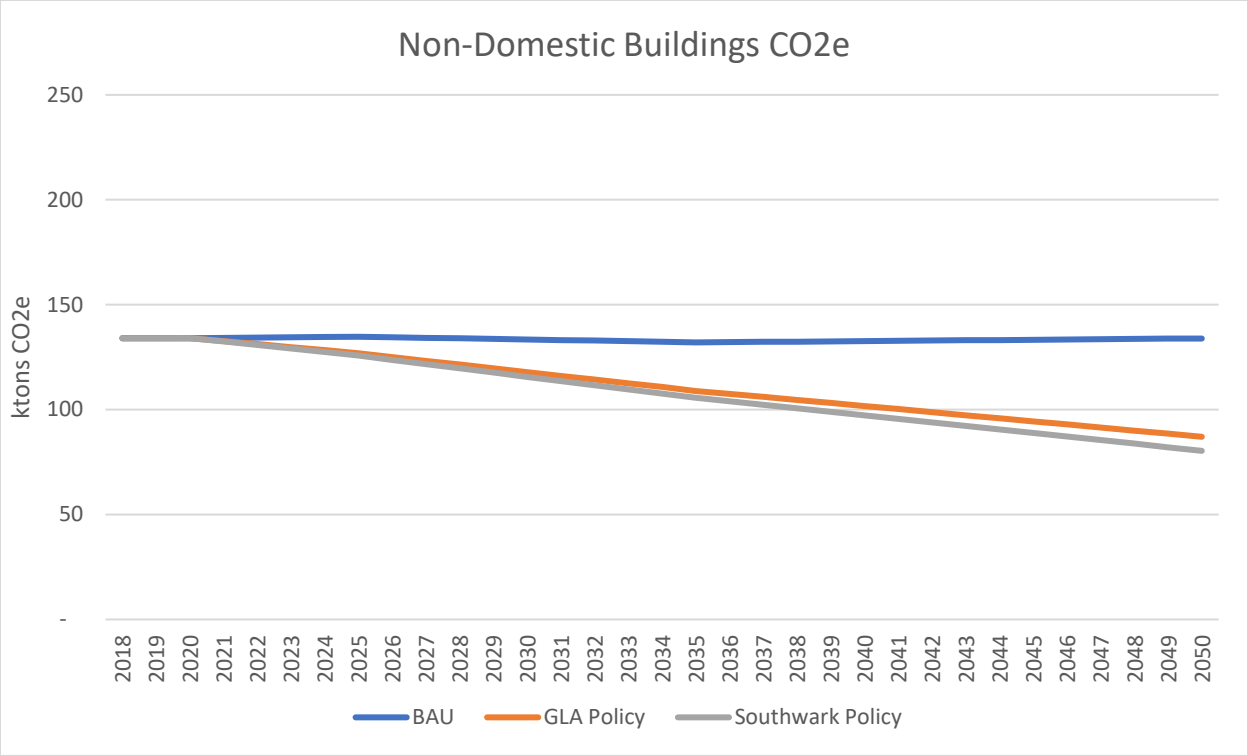


Figure 7: A comparison of total Domestic Emissions of Carbon Dioxide between Business As Usual, and with the estimated outcome of the Draft London Plan and proposed London Borough of Southwark Non-Domestic New Build Planning policy

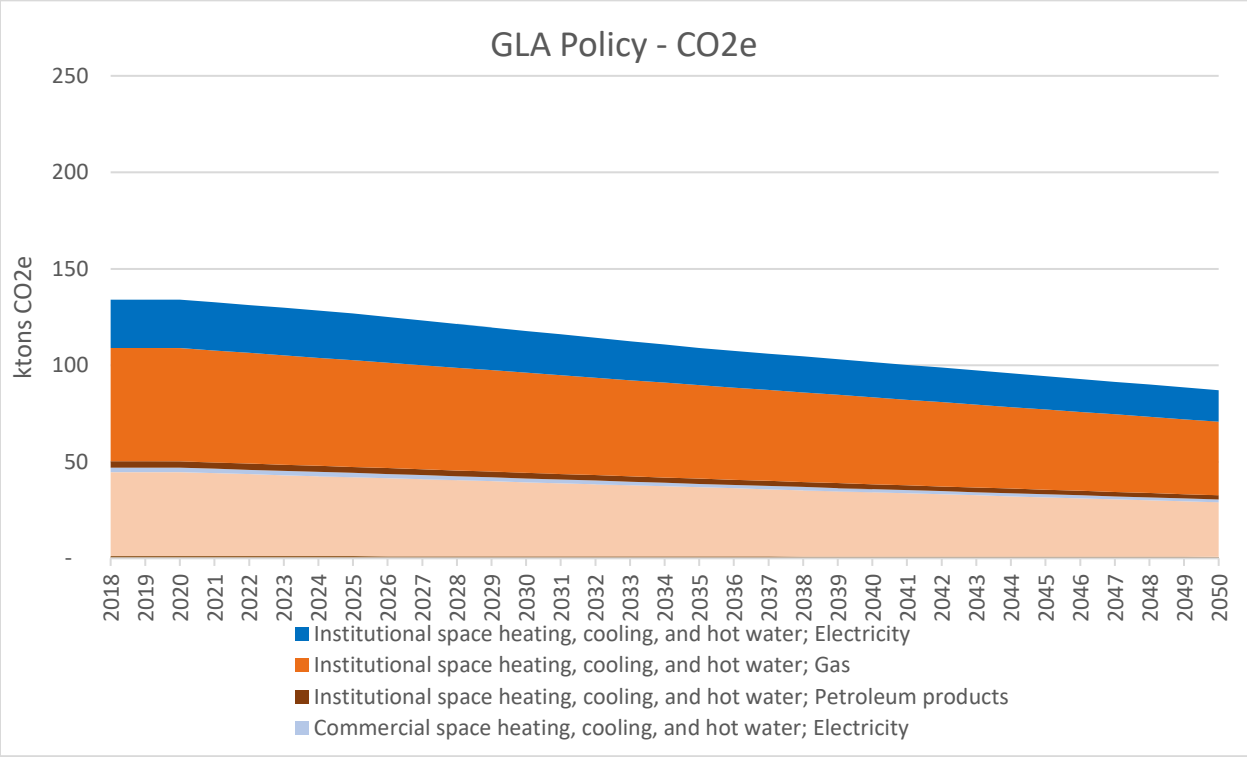


Figure 8: Forecast Non-domestic Carbon Emissions, all new non-domestic development 35% reduction on 2013 Building regulation levels

Figure 8 demonstrates that with all new build non-domestic properties built to a 35% reduction on Part L 2013 building emissions, the London Borough of Southwark Non-Domestic Building stock is forecast to be a net carbon emitter in 2050. A greater proportion of emissions are linked to electricity consumption (lighting, equipment, cooling and some process loads), in comparison to Domestic properties. These can be seen improving with further decarbonisation of the local and national electricity system. Overall emissions reduction to 2050 are relatively larger than in the domestic sector, forecast to fall below 100 ktons CO_2e before 2050.

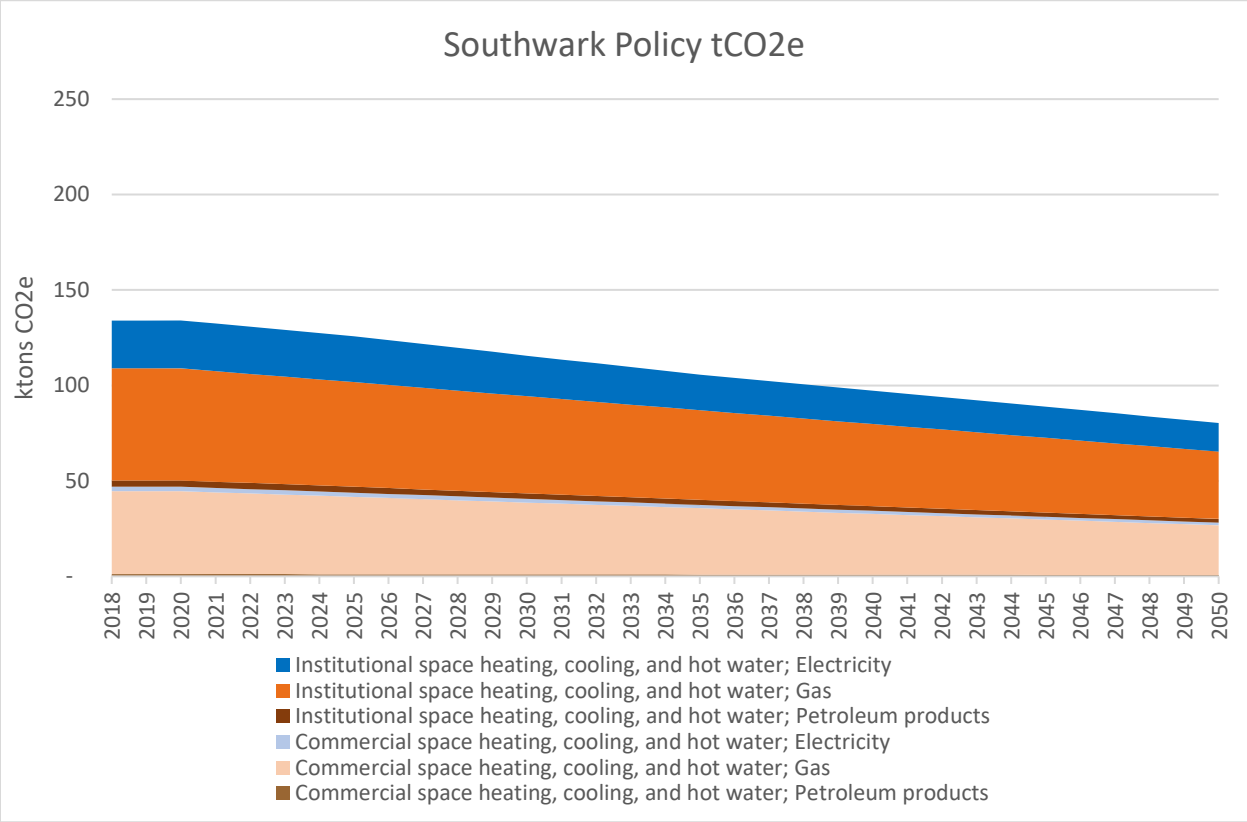


Figure 9: Forecast Non-domestic Carbon Emissions, all new non-domestic development 40% reduction on 2013 Building regulation levels

Figure 9 demonstrates that with the policy proposed by the London Borough of Southwark, that all new non-domestic properties achieve a 40% reduction on Part L 2013 there is a small benefit to reducing carbon levels through to 2050, with carbon emissions forecast to fall below 100 ktons CO_2e approximately 4 years earlier than in Figure 9. The London Borough of Southwark non-domestic building stock is still forecast to be a net carbon source in the year 2050, with this measure in place.

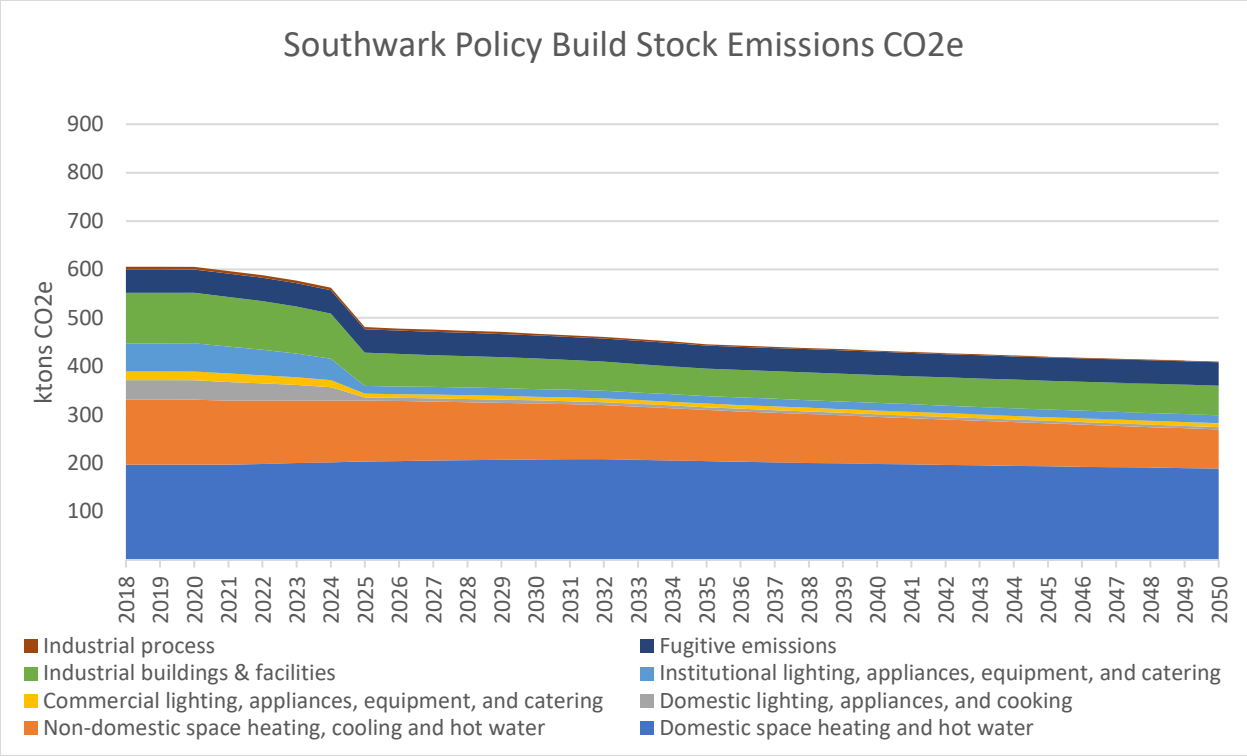


Figure 10: Building Stock CO_2e emissions projections for the London Borough of Southwark, with adoption of proposed New Build Domestic and Non-domestic policies

The combination of the proposed domestic and non-domestic new build policies namely:

- 100% on 2013 Building Regulations Part L standards for residential development; and
- A minimum of 40% on site reduction on 2013 Buildings Regulations Part L standards for non-residential developments

May be combined with the previous forecasts to give Figure 10. An emission reduction of less than 100ktons CO2e by 2050 may be observed in comparison to Figure 2, with the majority of emissions arising from space and hot water heating for Domestic and Non-domestic stock. This is likely to represent the performance of existing buildings within the borough, 85% of which are assumed to still be present in 2050.

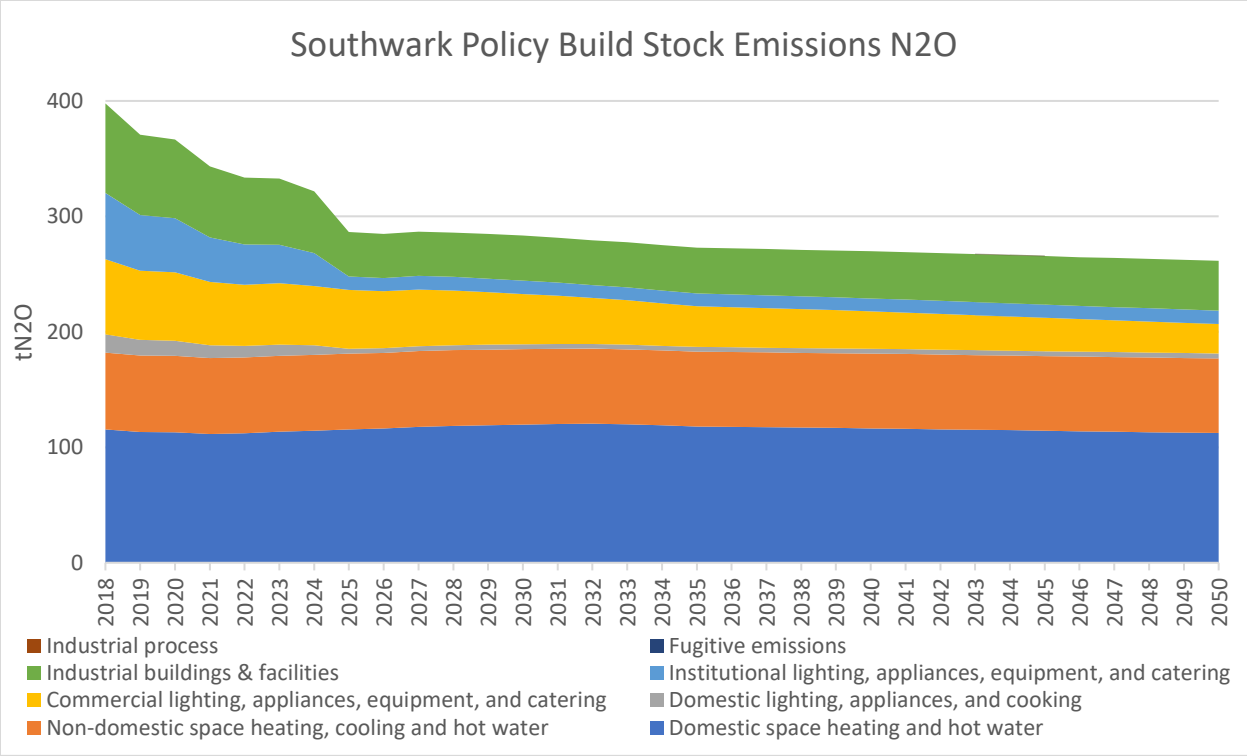


Figure 11: Building Stock N2O emissions projections for the London Borough of Southwark, with adoption of proposed New Build Domestic and Non-domestic policies

The same analysis with Nitrous Oxide emissions (N_2O) is presented in Figure 11. As may be seen there is a forecast reduction in comparison to Figure 3 however this is not substantial, and domestic and non-domestic space heating an Domestic Hot Water still predominate as the main source of emissions in building stock. This is again likely to represent the performance of existing buildings within the borough, 85% of which are assumed to still be present in 2050.

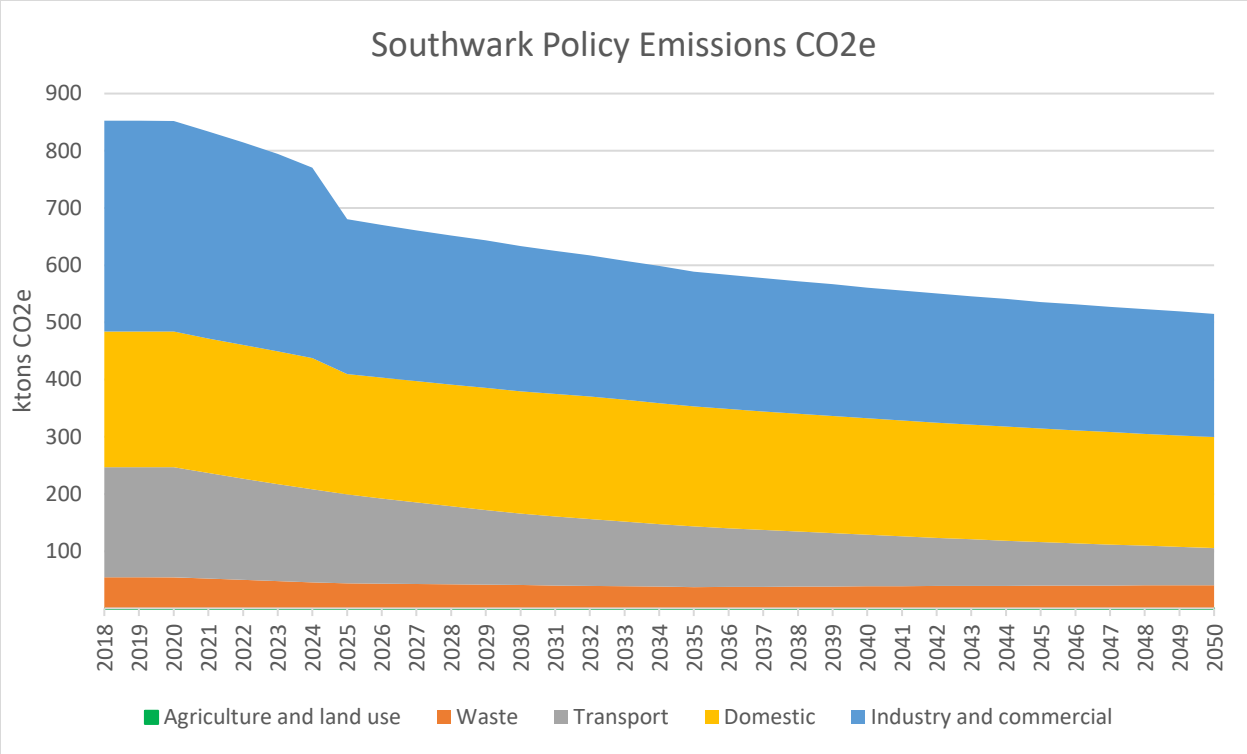


Figure 12: Forecast CO_2e emissions pathway for London Borough of Southwark including proposed policy changes

Figure 12 forecasts the future pathway for Carbon dioxide emissions inclusive of those from outside building stock incorporating the impact of the proposed planning policies. Total reductions by 2050 are forecast to be approximately 100 ktons CO2e lower in comparison with Figure 1. This provides an estimate of the impact of the new planning policies. It may be observed in the forecast that under this scenario The London Borough of Southwark does not achieve the statutory target under the Climate Change Act (2019), of a 100% reduction in emissions by 2050.

8.1. Summary Conclusions

From the analysis provided it is understood:

- The majority of Carbon Dioxide emissions within the London Borough of Southwark originate from the Built Environment, with a substantial additional contribution from Transport
- Within the building stock, the majority of carbon dioxide emissions and Nitrous Oxide emission originate from Energy Consumed for space heating and Domestic Hot water production
- It is theorized that these arise mainly from Natural Gas heating and Hot water systems
- The proposed New build policy is forecast to reduce Carbon Dioxide and Nitrous Dioxide emissions compared to a 'Business As Usual' alternative
- Overall the borough is forecast to continue to reduce emissions until 2050
- Emission are not forecast to be to zero by 2050 on the current forecast pathway

It is likely that further policy intervention at all levels of government will be required for the London Borough of Southwark achieve the Statutory target under the Climate Change act 2019.

8.2. Policy evidence basis

The proposed planning energy policies in the New Southwark Plan are:

- 100% on 2013 Building Regulations Part L standards for residential development; and
- A minimum of 40% on site reduction on 2013 Buildings Regulations Part L standards for non-residential developments; and
- Any shortfall against carbon emissions reduction requirements must be secured off site through planning obligations or as a financial contribution.

The residential development energy policy and requirement for shortfall payments is aligned with the Current and Proposed London Plan, and is therefore considered reasonable and proportionate.

The Non-domestic policy requires an improvement of 5% on proposed London Plan on-site carbon reduction targets.

The analysis presented has demonstrated that a large proportion of the Borough's emissions come from its current and future building stock.

Evidence submitted as part of the London plan indicates that generally, achieving a target reduction of 40% in regulated Non-domestic energy emissions on-site for developments has weak correlation with increased development cost. There may be individual exceptions to this rule, these may be managed in the course of the normal planning process.

The higher carbon reduction required is expected to contribute to the reduction of the London Borough of Southwark's carbon dioxide emissions in the future.

With this measure in place The London Borough of Southwark will also require further policy intervention to achieve the long term national statutory target of a 100% reduction in carbon emissions by 2050.

It is therefore considered that an enhanced 40% on-site reduction in non-domestic buildings is a reasonable and proportionate requirement at this stage to assist the Borough in meeting this target.

Further investigation is required to determine which other future policy interventions will be required at a local level to achieve the national statutory target.

9. Next steps

The initial analysis indicates the major greenhouse gas emissions sources within the London Borough of Southwark are:

- Domestic Building Stock
- Industrial and Commercial Building stock
- Transport

Within the building stock emissions are dominated by Space Heating and Domestic Hot Water production. This is assumed to originate from the existing building energy demands, and natural gas energy sources.

Further evidence is required:

- to confirm these assumptions
- to define 'Net Zero Carbon' outside of the built environment
- to integrate transport energy use and policy goals into the wider energy policy
- to determine appropriate local policy interventions versus necessary national policy interventions to achieve the national Statutory target
- to map a pathway to achieving the national and any agreed local targets
- to consider the sources and impact of other greenhouse gas emissions associated with energy production, consumption and distribution in the borough, and potential policy interventions to control these

In addition to this further investigation is required into:

- Appropriate Climate Change adaption for the Borough
- Embodied Energy and emissions, the circular economy and whole life carbon assessment
- The role of local large infrastructure interventions, in particular the use of District Heating networks
- Limitations in delivering net zero carbon buildings in city environments
- The deployment of Carbon offset funding raised through policy
- Measuring and monitoring the impact of funds, where they are deployed

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