

APPENDIX F - Climate and Ecology Strategy. Appendix F: emissions baselines

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The borough's greenhouse gas emissions

The borough's activities directly and indirectly cause the emissions of various greenhouse gases, particularly carbon dioxide (CO₂), nitrous oxide, and methane. These are measured in 'CO₂ equivalent' (CO₂e). CO₂ is the most significant greenhouse gas measured locally, representing 99.4% of CO₂e emissions. Some further sources of emissions, such as leakage of hydrofluorocarbons (HFCs) from air conditioning units and refrigerators are also significant, but are not yet captured in data at the local level.

Production-based emissions

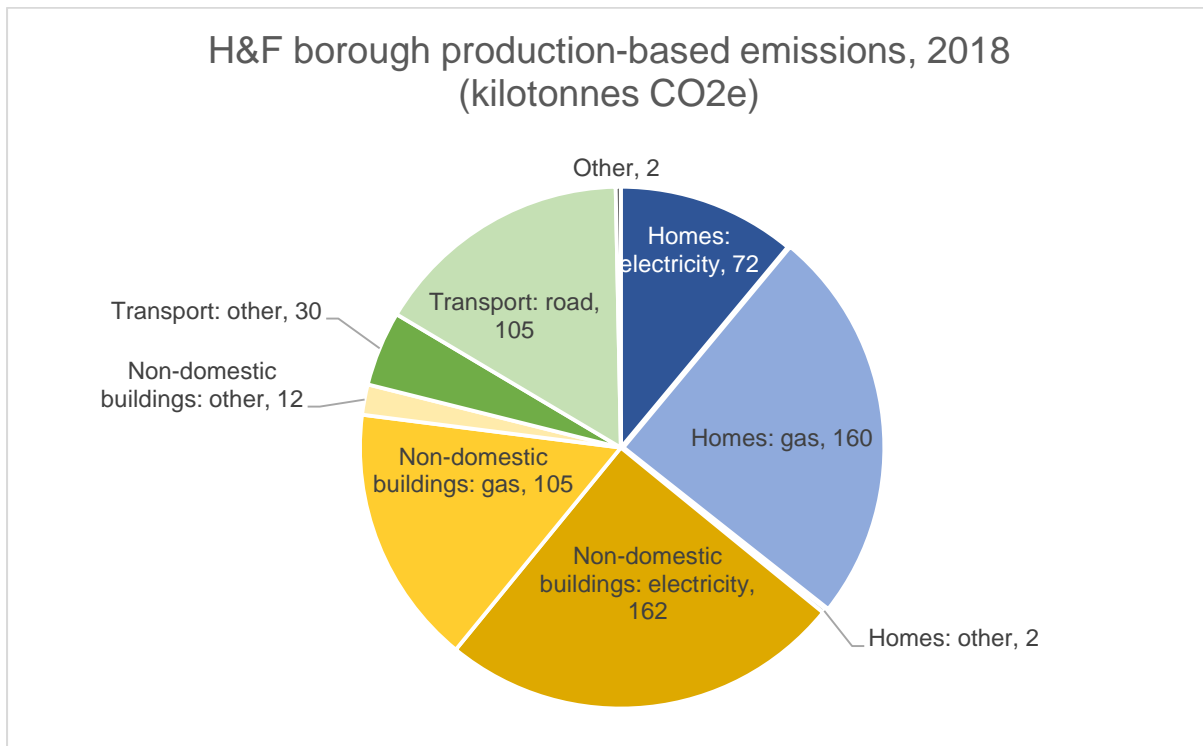
Under the UN Kyoto Protocol, a country's carbon emissions are measured by the fuel and electricity used within its boundaries, referred to as 'production-based' emissions. The majority of these in H&F are from heating and powering our homes and other buildings, and the transport we use.

These emissions are estimated for local authority areas annually by the Department for Business, Energy & Industrial Strategy (BEIS), and are further supplemented with local data for London in the London Energy and Greenhouse Gas Inventory (LEGGI). BEIS and LEGGI are the key sources for measuring the borough's overall progress towards net zero. However, these estimates are produced with a two-to-three year delay. The council will develop a further set of indicators to track its progress towards net zero where relevant and more timely data are available.

The total production-based emissions for H&F are **648,752 tonnes of CO₂e¹**, of which:

¹ Data source: LEGGI. This includes scopes 1, 2, and 3 emissions from the sources included. Scope 1 emissions are those emitted through the direct use of fossil fuels (such as oil and gas) within the borough boundary. Scope 2 emissions are those emitted in the production of electricity consumed within the borough boundary. Scope 3 emissions are all other emissions that occur due to activity within the borough, but that occur elsewhere (in this case including the upstream production and transportation of gas used within the borough, for instance). Aviation within the borough boundary

- 36% is from homes, mostly from gas heating.
- 43% is from other buildings, mostly from electricity use.
- 21% is from transport, mostly road use.



H&F's 'production-based' footprint. Source: London Energy and Greenhouse Gas Inventory.
1 kilotonne = 1,000 tonnes

These have been falling, down around 41% in total since 2005². This has been largely due to more energy efficient vehicles, appliances and homes, and an increasing share of renewables in the grid. During this time the council has undertaken energy-saving measures in the borough such as upgrades to the fabric of its housing stock and solar PV installation. However, it is widely agreed the greatest challenges in decarbonisation, such as zero carbon heating for homes, are yet to come. Certain other sources of local direct emissions are not covered by these estimates, such as from HFCs leaking from fridges, and we will seek to capture these in future updates where data are available.

Consumption-based emissions

Greater emissions still arise from the goods and services we consume that aren't produced within the borough. These include items we buy as residents and organisations such as food, appliances, clothing and cars, travel outside of the borough including flights, and services we use that operate elsewhere such as banking and leisure. The emissions from these are not included within the

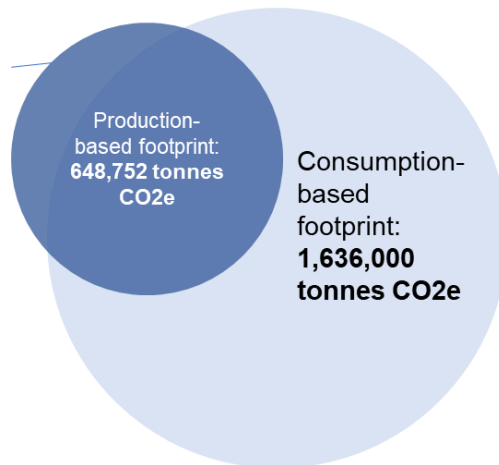
(such as helicopters) is included under 'Transport: other', but flights taken from London airports by H&F residents are not included in this, instead covered in 'consumption-based' emissions below. Waste disposal takes place out of borough and is not assigned to H&F in this footprint, but is estimated below under consumption-based emissions.

² BEIS, 2005-19 local CO₂ emissions tables.

production-based footprint, and are not within the borough's direct control as they arise elsewhere, but we can influence them through what we choose to buy and use.

Emissions from these are not included in official borough-level estimates, and are difficult to measure with accuracy at the local level. An estimated footprint of household consumption has been calculated for H&F by the University of Leeds as 8.82 tonnes CO₂e per person, or **1,636,000 tonnes CO₂e** for the borough. This is a footprint 2.5 times the size of H&F's production-based footprint alone.

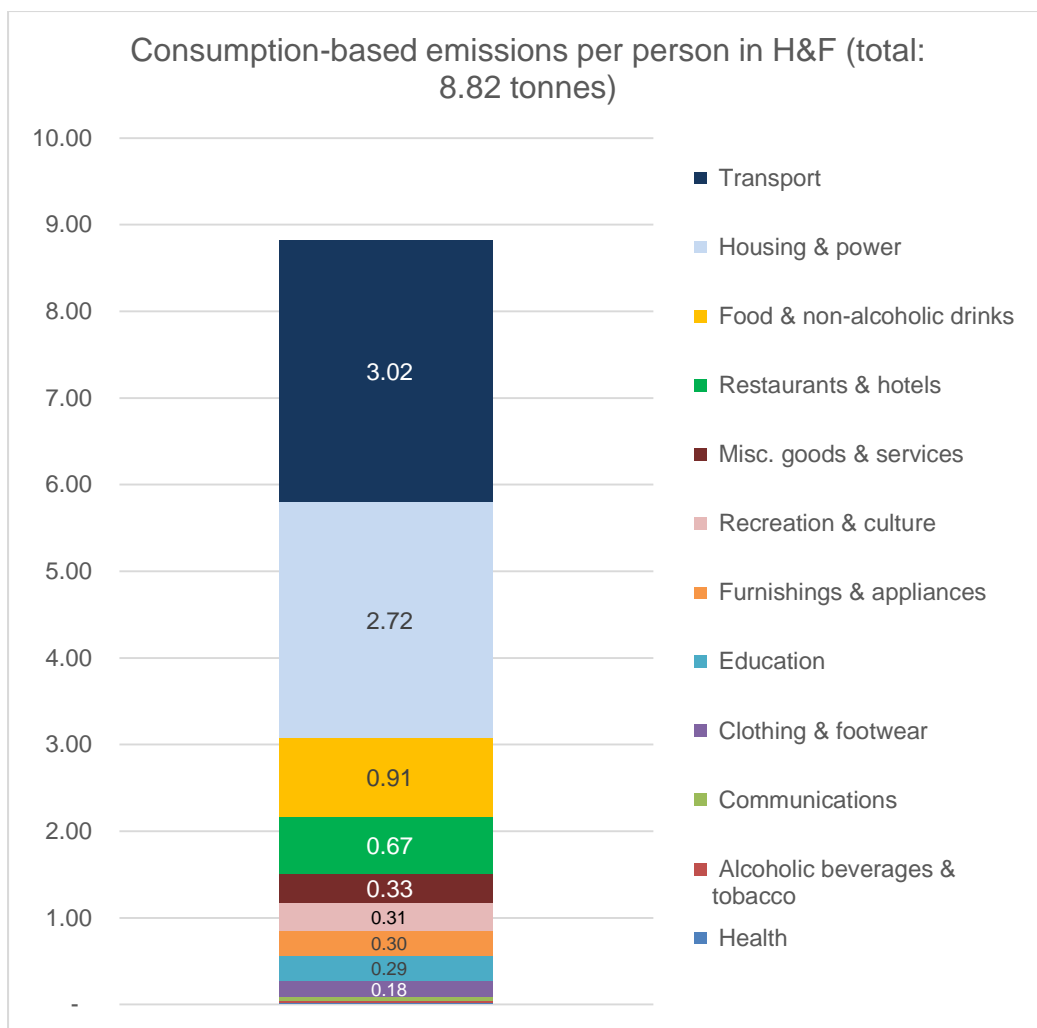
Includes: vehicle use (within borough); heating and powering buildings; goods and services produced in H&F



Includes: H&F residents' vehicle use (within and outside the borough); heating and powering buildings; food consumed locally; goods and services consumed locally; residents' travel and flights.

Excludes: goods and services produced in H&F, but consumed elsewhere.

Comparison of H&F's production-based and consumption-based footprints. Note that many sources of emissions are included in both approaches to calculating local emissions, such as electricity and fuel used within the borough.



Consumption-based emissions per capita for H&F, 2018 (tonnes CO₂e)³

Using a consumption-based approach, the greatest sources of emissions remain transport, and heating and powering our homes. However, the inclusion of flying (representing 0.63 tonnes CO₂e per person), and travel beyond the borough, moves transport to the greatest source of emissions per person. Other significant sources of emissions include household food, restaurants and hotels, and the devices, equipment and appliances we buy.

This gives an estimated average of emissions for the borough's residents. These are likely to be unevenly spread however, with higher-income groups typically responsible for a greater share of emissions⁴.

Closely linked to what we buy is what we throw away. An estimated 8,516 tonnes of CO₂e were emitted disposing of our waste in 2019/20. Conversely, an estimated

³ 'Misc. goods and services' includes a range of professional, financial and personal services such as legal services, banking, insurance, hairdressing and childcare. 'Recreation & culture' includes personal equipment such as computers and TVs, games and toys, other recreational materials, and live entertainment.

⁴ Oxfam (2020), *Confronting Carbon Inequality*, <https://oxfamilibrary.openrepository.com/bitstream/handle/10546/621052/mb-confronting-carbon-inequality-210920-en.pdf>

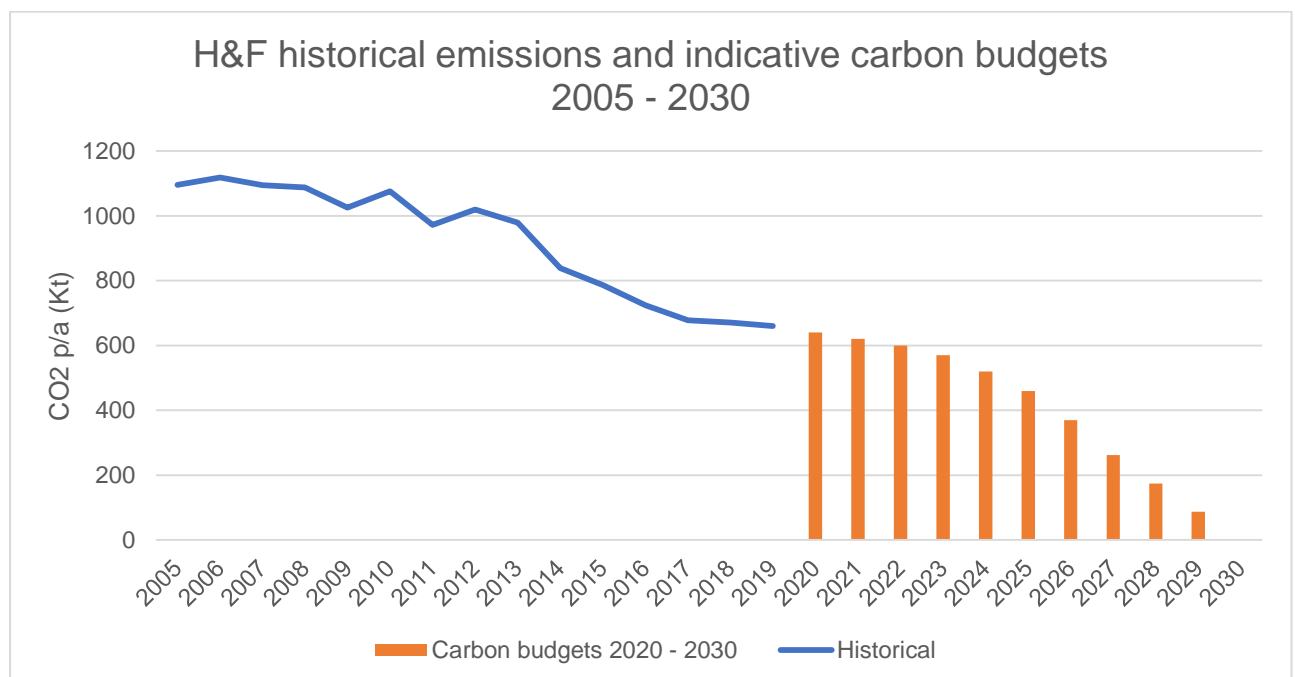
8,114 tonnes were saved through the materials we recycled replacing virgin materials⁵.

Consumption-based emissions are not yet measured in a way that allows H&F to track its progress in reducing these, and can only be partially influenced by action taken locally. While these emissions are therefore excluded from the 2030 net zero target, taking action to reduce consumption emissions is nevertheless integral to H&F's strategy, and is largely covered in the 'Things we use' workstream. The council will continue to explore approaches that would allow valid monitoring of these emissions at a local level.

Cumulative emissions

The overall target of achieving net zero by 2030 is highly ambitious. However, to meet the aim of keeping global temperature rise under 1.5°C, in line with the principles of the Paris Climate Agreement, the borough should seek to also limit its *cumulative* emissions. H&F's maximum share of cumulative emissions has been calculated at 4.8 million tonnes (Mt) of CO₂e⁶. At current emissions levels this would be exhausted within seven years; cutting emissions early counts for more than cutting late.

Visualising carbon 'budgets' within this 4.8Mt cumulative limit can help H&F understand how fast cuts in emissions are needed, and track progress against these. The chart below shows historical reductions in H&F's production-based emissions to 2019, with indicative annual carbon budgets to 2030 in line with 4.3 Mt CO₂e cumulative emissions. The budgets reflect a steady decline to 2025, followed by an acceleration in the second half of the decade as low-emissions technologies such as heat pumps and electric vehicles become more widespread.

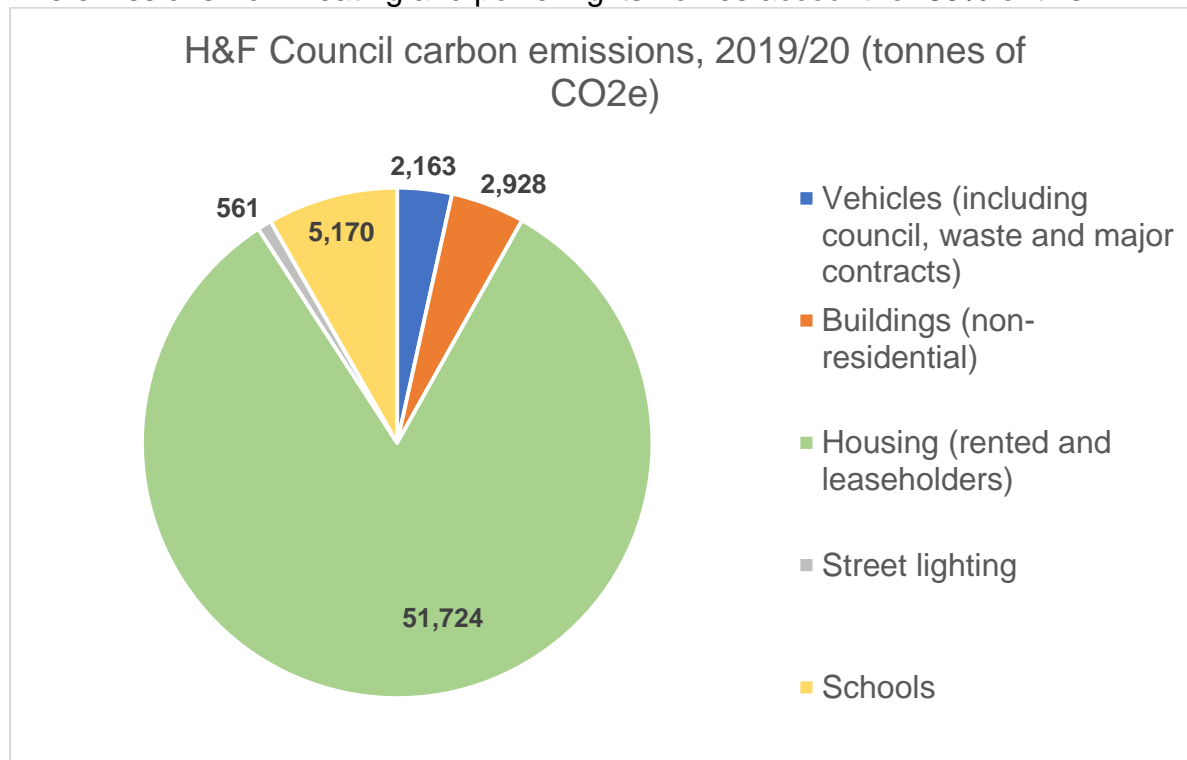


⁵ H&F Carbon Footprint report, conducted for H&F Council by Eunomia.

⁶ Tyndall Centre

The council's carbon emissions

The council's carbon footprint from its own operations and assets, including its housing, accounts for 9.6% of the borough's emissions at **62,546 tonnes of CO₂e**⁷. The emissions from heating and powering its homes account for 83% of this.



The council also procures many goods and services, with another estimated **65,360 tonnes of CO₂e** associated with these. Reduction of these emissions lies outside of the council's direct control, relying on action from our suppliers. It is therefore not within scope of the council's net zero target for its own operations. The council nevertheless recognises its influence over these emissions through its commissioning and procurement, and will develop its approach to sustainable procurement and efficient models of resource use.

The scope of H&F's net zero targets

The council has set targets for the organisation and borough to be 'net zero carbon' by 2030.

⁷ This footprint includes the council's scope 1 and 2 emissions from directly owned and operated assets, plus scope 3 emissions from its housing. It excludes emissions associated with water and waste (included within the borough-wide footprint), and scope 3 emissions from its supply chain.

Scope 1 emissions are those emitted through the direct use of fossil fuels (such as oil and gas) within the borough boundary. Scope 2 emissions are those emitted in the production of electricity consumed within the borough boundary. Scope 3 emissions are all other emissions that occur due to activity within the borough, but that occur elsewhere (such as in the production and transportation of food and goods consumed within the borough).

The target for the borough will be measured against the scope 1, 2, and 3 emissions of its production-based footprint⁸, relating to fossil fuels and electricity consumed within the borough, as well as disposal of the waste it produces. This footprint corresponds to the areas within the direct control of the borough's residents, businesses and organisations, and is the most reliably measured footprint. Tackling consumption-based emissions is recognised as critical and within our indirect influence, so remains as one of the five climate challenges around which the strategy is organised.

The target for the council will be measured against its scope 1 and 2 emissions, as well as emissions from the buildings it owns and for which it has responsibility for the fabric and fuel sources, including council housing. Scope 3 emissions from procurement fall outside of the net zero target as they are only partly within the council's influence, but we recognise our role in tackling these, so this again forms an integral part of the strategy and action plan.

⁸ Scope 1 emissions are those emitted through the direct use of fossil fuels (such as oil and gas) within the borough boundary. Scope 2 emissions are those emitted in the production of electricity consumed within the borough boundary. Scope 3 emissions are all other emissions that occur due to activity within the borough, but that occur elsewhere (such as in the production and transportation of gas consumed within the borough in this instance).