Aether

London Borough of Merton

Greenhouse Gas Inventory Report 2021

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1 Introduction

Merton Council declared a climate emergency in July 2019 and set carbon reduction targets to decarbonise the Council by 2030 and the borough by 2050. Merton's Climate Strategy and Action Plan[1] was approved by Council on 18 November 2020.

Aether compiled a greenhouse gas (GHG) emissions inventory for the Council and borough as part of the strategy development, in order to understand the baseline carbon emissions[2] (referred to as the '2020 inventories' in this report). This report presents a brief analysis of the 2021 update to the GHG inventories (referred to as the '2021 inventories' in this report).

2 Data and Methods

2.1 Greenhouse Gas (GHG) Inventories

A GHG inventory is a dataset which presents estimates of emissions of various greenhouse gases from a wide range of activities in an organisation, country or other geographical area. The standard approach to estimate GHG emissions is by multiplying activity data by an emission factor associated with the activity being measured (**Equation 1**).

Equation 1: Emission factor approach for calculating GHG emissions.

GHG emissions = activity data * emission factor

Emission Factor - This is the emissions per unit of activity, which usually comes from scientific literature. It is typically derived from measurement.

Activity data - This is a measure or estimate of the activity which is taking place, such as number of cows or tonnes of fuel. This data typically comes from national statistical datasets or from the organisation in question, in this case Merton Council.

For example, estimating CO_2 emissions from the use of electricity involves multiplying data on kilowatt-hours (kWh) of electricity used by the emission factor ($kgCO_2/kWh$) for electricity, which will depend on the technology and type of fuel used to generate the electricity.

When reporting emissions, it is important to consider which sources to include. The Greenhouse Gas Protocol provides a widely used set of standards which describe emission sources and "scopes" which should be considered as part of a local carbon accounting process; the definition of the three scopes is shown in **Table 1**, below, as applied to the 2021 inventories for the council and borough.

[1] https://www.merton.gov.uk/system/files?file=draft20climate20strategy20and20action20plan20-20council20v2.pdf

[2] https://www.merton.gov.uk/assets/Documents/Merton_Support-Climate-Action_v3.1.pdf

Table 1: Summary of emissions sources by scope in Merton's GHG inventories

Scope of emissions	Merton Council	Borough of Merton
1	Direct fuel consumption of (gas, petrol, diesel) in council operational buildings, community schools, council transport fleet	Direct fuel consumption of (gas, petrol, diesel, coal) in buildings and transport, net CO_2 emissions from land use and land use change
2	Electricity use purchased from the national grid in council operational buildings, community schools, streetlighting and council transport fleet	Electricity use purchased from the national grid
3	Fuel consumption (petrol and diesel) in council contracts for waste collection, highway works, green spaces maintenance, council grey fleet, and transmission and distribution of electricity use	Waste processing at the Energy Recovery Facility (ERF) plant located outside the borough, transmission and distribution of electricity use

2.2 Input Data

The scope of the 2021 borough and Council GHG inventories for Merton are the same as the 2020 GHG inventories, as agreed through workshops with cross-department colleagues from Merton Council in November 2019.

For the borough GHG inventory the time series is 2017-2019. For the council inventory the time series is 2018-2020. The difference is due to the different time-lag of the input data required; the borough inventory uses national statistics which have a larger delay than the Council-collected data.

In the previous inventory, emissions resulting from the processing of local authority collected waste could not be included due to lack of input data. In 2020, the South London Waste Partnership (SLWP) set up a working group with the four SLWP boroughs (Croydon, Kingston, Merton and Sutton) to agree an approach for baselining emissions from the Beddington Energy Recovery Facility (ERF). The data for Merton is now available from Beddington ERF for 2019 and has been included in the GHG inventory. This covers emissions from the ERF and from waste diverted from the ERF to Beddington landfill when the ERF was still in the commissioning phase. Average carbon intensity values and tonnage of waste sent to the ERF and landfill were used to estimate these waste emissions for 2017 and 2018 due to lack of data availability. As such, the trend in waste processing emissions in 2017 and 2018 is an approximation only and does not reflect efforts made by SLWP to decarbonise their operations.

Data were collected from both national data sets and directly from Merton Council. **Tables A1.1** and **A1.2** in **Appendix 1** summarise the data sources used for the council and borough GHG inventories.

GHG emissions for 2017 and 2018 have been recalculated in this inventory. This is standard practice for GHG inventory compilation to ensure that revisions to input data methodology and estimates are used in a consistent manner. See **Appendix 3** for more details on recalculations of previous estimates.

3 Merton Borough GHG Inventory

3.1 Borough Inventory for 2019

Merton Borough's GHG emissions for 2019 have been estimated to be 663 ktCO_2e. Emissions by sector are presented in **Figure 1** and **Table 2.** The most significant emissions source is the residential sector, comprising 44% of total emissions from residential heating and electricity use.

Figure 1: Estimated ktCO_2e emissions for Merton Borough in 2019

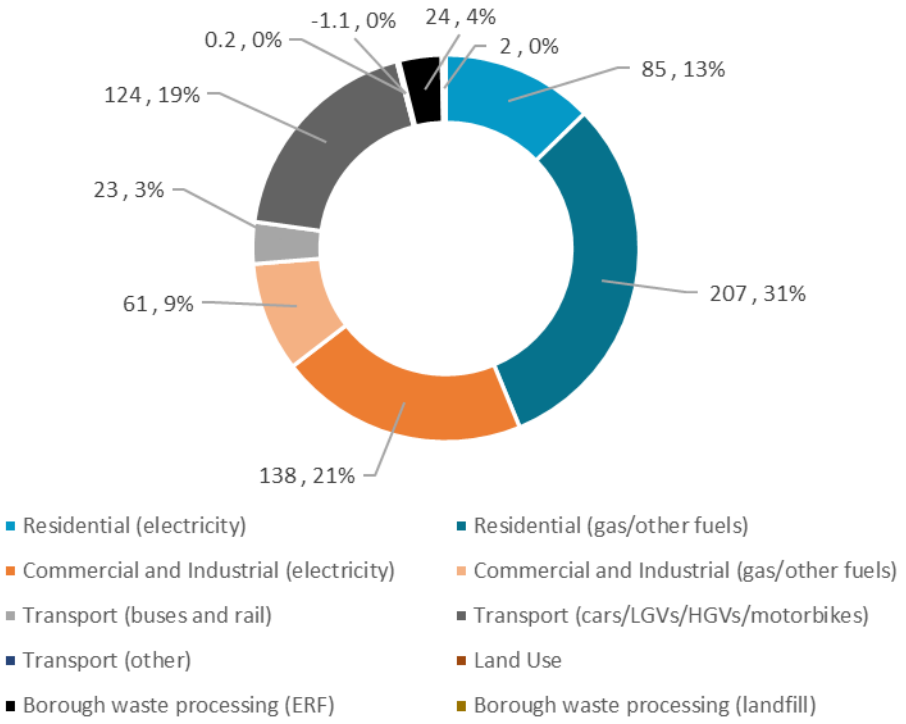


Table 2: Estimated ktCO_2e emissions for Merton Borough in 2019

Sector	2019 (kt CO_2e)	% of total emissions
Residential (electricity)	85	13%
Residential (gas/other fuels)	207	31%
Commercial and Industrial (electricity)	138	21%
Commercial and Industrial (gas/other fuels)	61	9%
Transport (buses and rail)	23	4%
Transport (cars/LGVs/HGVs/motorbikes)	124	19%
Transport (other)	0.2	0.03%
Land use	-1.1	-0.2%
Borough waste processing (ERF)	24	3.6%
Borough waste processing (landfill)	2	0.4%
Total	**663.4**	

Note: numbers may not match totals due to rounding. ERF = Energy Recovery Facility.

The sources of emissions in Merton are dominated by the use of natural gas for heating, and electricity for heating and lighting homes, businesses, and other buildings such as hospitals and schools. There is also a large contribution from transport, the majority of which is emissions from private road transport. Emissions from the collection of waste material by the Council are included in the transport emissions from HGVs.

Emissions from land use and land use change in Merton are currently a small net sink of CO_2 at 1.1 ktCO_2e. This reduced the 2019 emissions from 664.5 ktCO_2e to 663.4 ktCO_2e (0.17% reduction).

In 2020, the South London Waste Partnership (SLWP) set up a carbon working group with the four SLWP boroughs (Croydon, Kingston, Merton and Sutton) and Viridor to agree an approach for baselining, monitoring and reducing emissions associated with the SLWP residual waste treatment contract. This includes emissions from the Beddington Energy Recovery Facility (ERF). Residual Waste treated during 2019-2020 has formed the baseline. A proportion of the carbon emissions from the baseline year have been attributed to Merton based on the amount of residual waste treated through the contract as a proportion of the total. Emissions associated with the processing of Merton's local authority collected waste at Beddington Energy Recovery Facility (ERF), and at landfill when diverted from the ERF, were included in this 2021 inventory for the first time and comprise 4% of the total 2019 borough emissions.

Waste processed at the ERF generates electricity from the combustion of non-recyclable municipal waste. Emissions from processing this waste include:

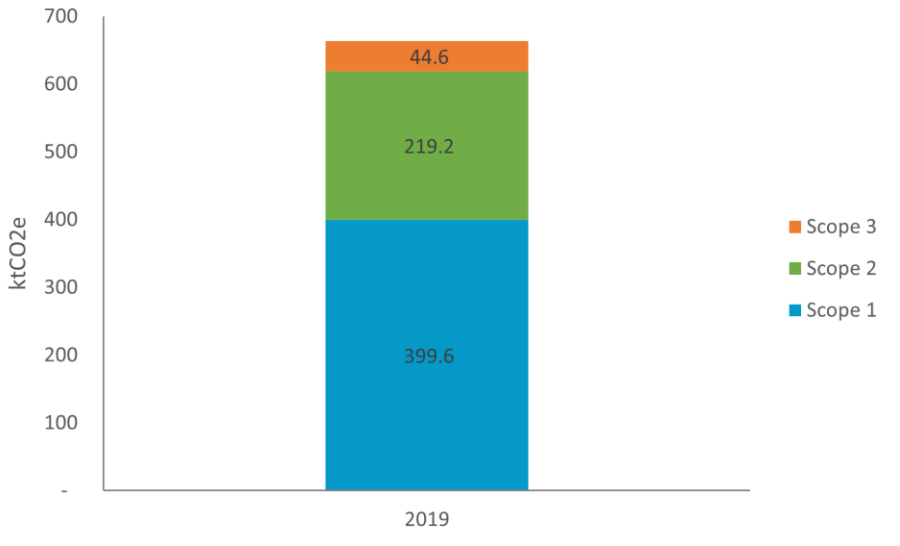
- Diesel used on-site (Scope 1 of the ERF)
- Combustion of fossil derived waste (Scope 1 of the ERF)
- Electricity generated and used onsite (Scope 1 of the ERF)
- Electricity imported into the site (Scope 2 of the ERF)
- Emissions from waste disposal to landfill when the ERF is not in operation (Scope 3 of the ERF).
- Employee travel (home to work only; Scope 3 of the ERF)

The Beddington Energy Recovery Facility & Residual Waste Contract 2019-2043 Carbon Management Plan[3] sets out the methodology used to estimate these emissions.

Figure 2 shows the borough's 2019 GHG emissions split by scope. **Table 1** in the methods section summarises the sources of emissions within each scope. The estimated scope 1 and scope 2 emissions included in the inventory are 60% and 33% of the borough's total GHG emissions, respectively. The estimated scope 3 emissions of the inventory comprise 7% of the total borough's emissions inventory. The scope 3 emissions included in the borough inventory are currently waste processing and the transmission and distribution losses from electricity supply.

[3] https://moderngov.kingston.gov.uk/documents/s92420/2b.%20Beddington%20Carbon%20Management%20Plan%20May%2021%20FINAL.pdf

Figure 2: ktCO₂e emissions for Merton Borough, 2019, by scope



3.2 Change in emissions compared to the 2017 baseline

Table 3 show the emissions for the borough for the years 2017 to 2019. Total emissions decreased throughout the time series, reducing by 11% between 2017 and 2019. At 30%, the greatest reduction in emissions across this period was from electricity use in the residential sector followed by a 22% reduction in emissions from electricity use in the commercial and industrial sector. The reduction in emissions from electricity use was driven by reductions in the carbon intensity of the UK electricity grid (**Table 4**).

Figure 3: ktCO₂e emissions for Merton Borough, 2017 - 2019

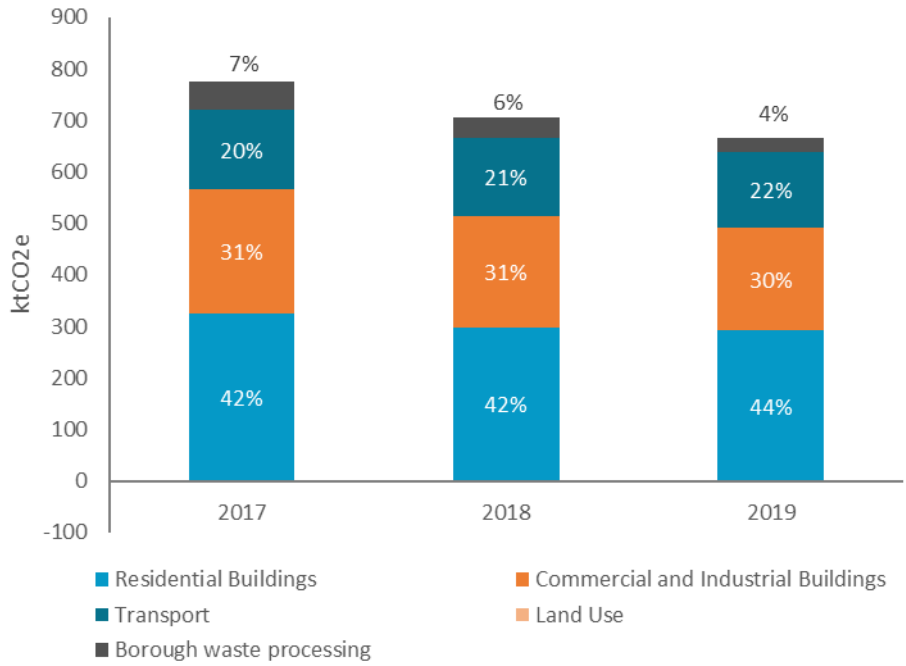


Table 3: Emissions (in $ktCO_2e$) and percentage change in emissions from each sector, 2017-2019

Sector	Scope	Emissions ($ktCO_2e$)			Change between 2017 baseline and 2019 (%)
		2017	2018	2019	
Residential (electricity)	2&3	120	94	85	-30%
Residential (gas/other fuels)	1	204	203	207	2%
Residential buildings total		324	297	291	-10%
Commercial and industrial (electricity)	2&3	178	152	138	-22%
Commercial and Industrial (gas/other fuels)	1	64	65	61	-5%
Commercial and Industrial buildings total		242	217	199	-18%
Transport (buses and rail)	1	30	25	23	-22%
Transport (cars/LGVs/HGVs/motorbikes)	1	124	125	124	0%
Transport (other)	1	0.2	0.2	0.2	-7%
Transport Total		154	151	148	-4%
Land use	1	-1.1	-1.1	-1.1	7%
Borough waste processing (ERF)	3	4	13	24	494%
Borough waste processing (landfill)	3	44	24	2	-95%
Borough Total		**767**	**701**	**663**	**-11%**

Note: numbers may not match totals due to rounding. ERF = Energy Recovery Facility.

Table 4: Activity data and emission factors for residential and commercial & industrial sectors, 2017 – 2019

Emission Source	Year		
	2017	2018	2019
Activity data (GWh)			
Residential (electricity)	313	306	305
Commercial and Industrial (electricity)	462	495	499
Emission factor ($kgCO_2e/kWh$)			
Residential (electricity)	0.352	0.2831	0.256
Commercial and Industrial (electricity)	0.352	0.2831	0.256
Emissions ($ktCO_2e$)			
Residential (electricity)	120	94	85
Commercial and Industrial (electricity)	178	152	138

Note: Emissions include transmission and distribution of electricity (scope 3).

Emissions from transport did not change significantly across the time series, with a small 6 $ktCO_2e$ total decrease between 2017 and 2019. This was mostly due to a 22% decrease in emissions from buses and rail, as the majority of rail emissions in Merton are from electric trains, which reflects the decarbonising of the UK electricity grid (see **Table A2.1** and **Table A2.2** in **Appendix 2)**.

Emissions from private transport using diesel increased between 2017 and 2019 whilst private transport using petrol decreased across the same period, resulting in no

significant net change in emissions. These trends map the change in fuel usage for each transport mode and type, as well as changes to associated emission factors **(Table 5).**

Table 5: Borough private transport emissions and percentage change, 2017-2019

Emission source	Emissions (ktCO2e)			Change from 2017 – 2019 ($ktCO_2e$)	% change 2017 – 2019
	2017	2018	2019		
Cars (petrol)	51.0	50.5	47.9	- 3.2	-6%
Cars (diesel)	37.2	38.4	39.4	2.2	6%
Motorcycles (petrol)	1.7	1.8	2.0	0.3	16%
LGVs (petrol)	0.9	0.8	0.8	-0.1	-16%
LGVs (diesel)	23.9	24.9	25.0	1.1	5%
Total	**114.8**	**116.3**	**115.0**	**0.3**	**0.3%**

Emissions from land use and land use change remained stable across the time series, at a sink of -1.1 $ktCO_2e$. This has changed from the -0.6 ktCO2e reported in the 2020 inventory. See **Appendix 3** for more details.

Total emissions from processing of Merton's waste at the ERF in 2019 were estimated by Beddington ERF at 23,645 tCO_2e. During periods of maintenance of the ERF, and whilst it was in the commissioning phase, non-recyclable material was diverted for disposal at Beddington landfill. Waste processing emissions from Beddington Landfill were also estimated for 2019 by the Beddington ERF[4], estimated at 2,339 tCO_2e.

These figures are based on Merton residual waste tonnages provided by the South London Waste Partnership (SLWP). They differ slightly from the figures that appear in Viridor's Carbon Management Plan (published June 2021) as Viridor's figures include street sweepings (while the SLWP figures do not). The SLWP and Viridor are aware of this minor discrepancy and work will be carried out over the next 12 months to reconcile them. This may result in minor changes to both the Viridor Carbon Management Plan and the next iteration of Merton's greenhouse gas inventory.

Emissions for 2017 and 2018 have been estimated based on the waste tonnage figures for those years and the 2019 carbon intensity of treating waste at the Beddington ERF and the carbon intensity of processing waste at the Beddington Landfill Site. Therefore, the trend in waste processing emissions between 2017 and 2019 is only an approximation and does not reflect efforts to decarbonise the ERF operations. However, it does reveal the reduction in carbon emissions as Merton has transitioned away from landfill and towards ERF since 2017.

Emissions from the waste processing of Merton's local authority collected waste sent to other facilities, including waste sent directly to landfill, food waste to anaerobic digestion plants, and garden waste sent to composting plants, have not been estimated in this inventory. Emissions from the waste processing of commercial waste collected

[4] https://moderngov.kingston.gov.uk/documents/s92420/2b.%20Beddington%20Carbon%20Management%20Plan%20May%2021%20FINAL.pdf

within the borough have also not been estimated. These scope 3 emissions sources should be included in future inventories if data becomes available.

The proportion that each sector contributes to total emissions has subtly changed across the timeseries (**Table 3**). The residential sector is consistently the largest source of emissions at approximately 44%. The reduction in emissions from the commercial and industrial sector has resulted in a lower proportional contribution to total emissions, from 32% in 2017 to 30% in 2019. Whilst emissions from transport have remained steady over the three years, the reduction in emissions from the commercial and industrial sector has resulted in the proportion of transport emissions to the total, specifically private modes of transport, to increase to 22% in 2019.

3.3 Out of scope consumption-based emissions

Scope 3 consumption-based emissions relate to the embedded emissions in the consumption of goods and services by residents within Merton borough[5]. These emissions are presented here to demonstrate the scale of a more complete scope 3 estimate including consumption-based emissions compared to emissions which have been included in the inventory. Methodologies for estimating consumption-based emissions are not yet well established, have a high uncertainty, and will not reliably be updated at the same frequency as the GHG inventory, so are not included in the borough GHG inventory at this time.

The 2021 report by the University of Leeds, commissioned by London Councils, "Consumption-based Greenhouse Gas Household Emission Profiles for London Boroughs"[6] estimated consumption-based emissions for each London borough using an environmentally extended multiregional input-output model (EE-MRIO), apportioning emissions to Merton residents through household spending on each consumption item.

The per-capita consumption estimates include emissions from the full supply chain of the following activities[7]:

- Food & non-alcoholic drinks
- Alcoholic beverages & tobacco
- Clothing & footwear
- Housing & power (excluding direct emissions from the use of electricity, gas and other fuels)
- Furnishings & appliances
- Health
- Transport (excluding direct emissions from the use of fuels in private vehicles)
- Communications
- Recreation & culture

[5]These consumption-based emissions estimates do not include all scope 3 emissions associated with businesses or the Council. Emissions from local businesses are only reflected in the total if the goods sold are purchased by Merton residents and transport emissions are only included if the driver is a Merton resident or the emissions are from the transportation of goods or services that are consumed by Merton residents.

[6] https://londoncouncils.gov.uk/our-key-themes/environment/climate-change/consumption-based-greenhouse-gas-household-emissions

[7] A full detailed breakdown of the sources included in each category can be found in the dataset available at https://www.londoncouncils.gov.uk/our-key-themes/environment/climate-change/consumption-based-greenhouse-gas-household-emissions

- Education
- Restaurants & hotels
- Miscellaneous goods & services

However, a few emission sources in the consumption-based analysis are already included in the emissions that have been estimated in the 2019 borough GHG inventory in **section 3.2.** Therefore, these have been excluded in the consumption-based emissions analysis for Merton to prevent double-counting. These excluded sources were the use of fuels in buildings for heating and power, and the use of fuels for private transport.

Rail and bus related emissions are included in the consumption-based analysis as these emissions cover residential travel outside of the borough. However, inclusion of these figures means there is a small overlap with the existing rail and bus emissions calculated in the borough GHG inventory.

The consumption-based analysis does not include data from waste processing which is in the borough GHG inventory. Removing the overlapping activities from the University of Leeds factors results in consumption-based emissions of 5.4 tCO_2e/capita and 5.2 tCO_2e/capita for the Borough of Merton in 2017 and 2018 respectively. No data are available for 2019 therefore 2018 factors have been used for 2019.

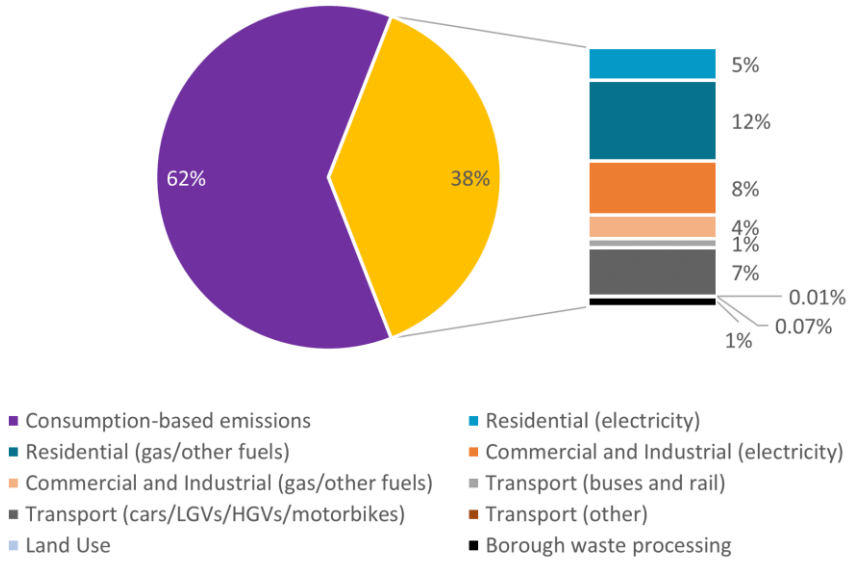
The largest single category of consumption-based emissions for Merton residents in 2018 was international flights (11% of total consumption-based emissions for the borough's residents).

For Merton, with a 2019 population of 206,548, **the total consumption-based emissions are estimated at 1,079 $ktCO_2e$**. If these consumption-based emissions were included in Merton borough's GHG inventory for 2019, this would comprise 62% of GHG emissions. This is smaller than the value calculated from the C40 report used in the previous analysis8 due to a difference in scope and methodology. The analysis used in this report is based on consumption statistics for London boroughs, whereas the C40 analysis used a Europe-wide figure. As such, the estimates by the University of Leeds are considered to be more applicable to Merton.

Figure 4 shows the split of consumption-based emissions (purple) which have been excluded from the 2019 borough inventory versus the direct GHG emissions which have been included in the 2019 borough inventory as detailed in **section 3.1** (yellow).

Figure 4: GHG inventory for Merton Borough, 2019, incl. consumption-based emissions ($ktCO_2e$)

[8] https://www.merton.gov.uk/system/files?file=merton_support-climate-action_v3.1.pdf


62%
38%
5%
12%
8%
4%
1%
7%
0.01%
0.07%
1%
Consumption-based emissions
Residential (electricity)
Residential (gas/other fuels)
Commercial and Industrial (electricity)
Commercial and Industrial (gas/other fuels)
Transport (buses and rail)
Transport (cars/LGVs/HGVs/motorbikes)
Transport (other)
Land Use
Borough waste processing

4 Merton Council GHG Inventory

4.1 Council Inventory for 2020

Estimated GHG emissions for Merton Council in 2020 were 9.0 $ktCO_2e$. This is a 19% decrease (2.1 $ktCO_2e$) from 2018 emissions. Emissions by sector are presented in **Figure 5** and **Table 6.** The most significant source of emissions is from gas consumption in the council's operational buildings and community schools, comprising 49% of the total emissions. Council waste collection emissions were calculated from the mass of waste collected by HGVs, a separate source of emissions from those resulting from waste processing included in the borough inventory (section 3.1).

Figure 5: Estimated $ktCO_2e$ emissions for Merton Council in 2020

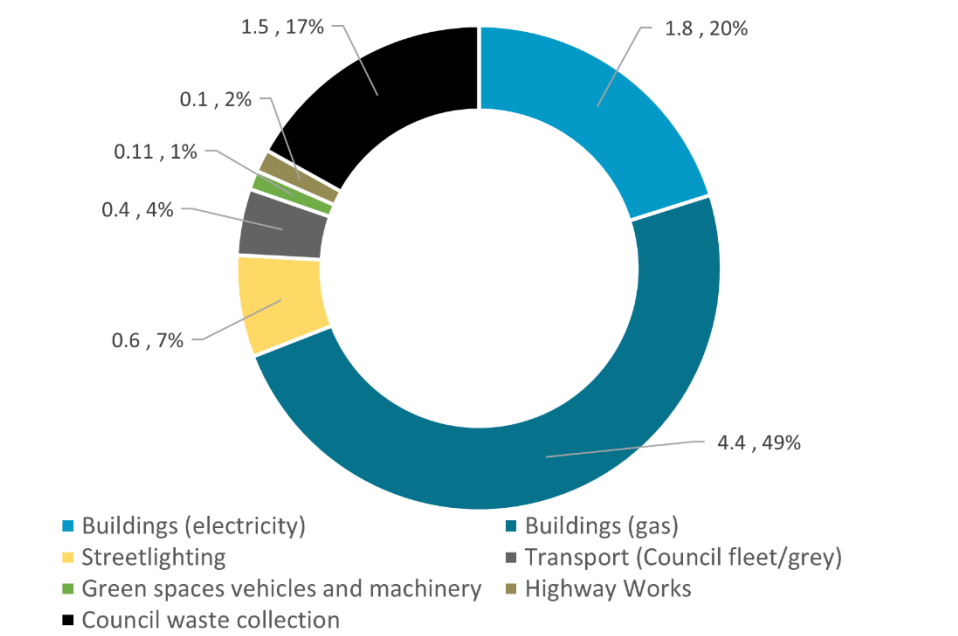


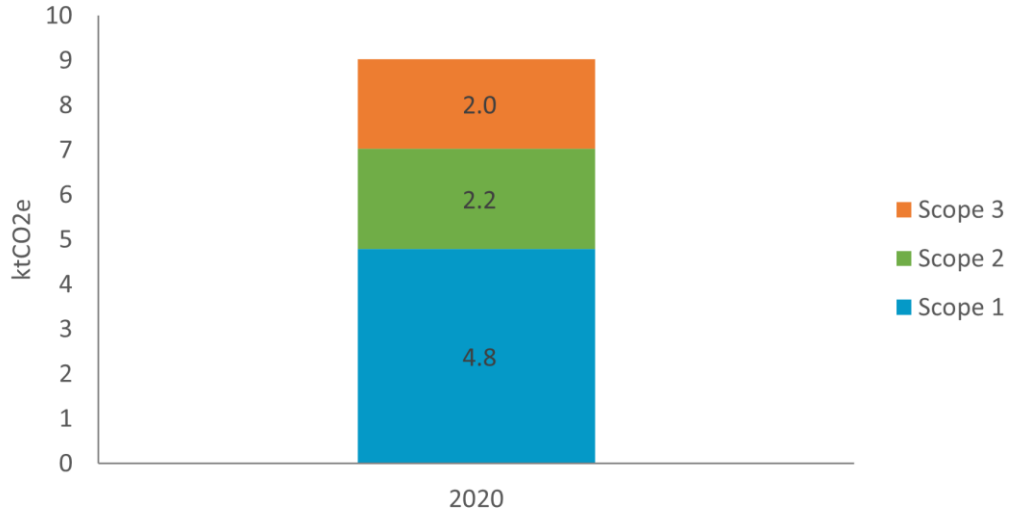
Table 6: Estimated $ktCO_2e$ emissions for Merton Council in 2020

Sector	Scope	2020 ($ktCO_2e$)	% of total emissions
Operational buildings (electricity)	2&3	0.8	9%
Operational buildings (gas)	1	1.8	20%
Community school buildings (electricity)	2&3	1.0	11%
Community school buildings (gas)	1	2.7	29%
Streetlighting (electricity)	2&3	0.6	7%
Council fleet/grey fleet	1,2&3	0.4	4%
Green spaces vehicles and machinery	3	0.1	1%
Highway works	3	0.1	2%
Council waste collection	3	1.5	17%
Total		**9.0**	

Merton Council's GHG emissions for 2020 are shown in **Figure 6** split by scope. The estimated scope 3 emissions from the council included in the inventory are 22% of the council's scope 1-3 emissions.

Some scope 3 emissions sources which are not currently included in the council inventory include emissions from adult social care, staff commuting, other outsourced contracts (besides the waste collection, green spaces maintenance and highways maintenance currently included). These have not been included due to lack of data availability. If data were to be obtained on these sources, then the proportion of scope 3 emissions in the council's inventory would likely rise significantly. Methodologies for estimating emissions from activities funded by pensions and investments are not yet well established, with high uncertainty, and are quite removed from the Council's operations. As such, the Council may wish to monitor best estimates in the Climate Delivery Plan as part of the wider consideration of the Council's climate impact, but it is not yet recommended to be included in the GHG inventory.

Figure 6: $ktCO_2e$ emissions for Merton Council, 2020, by scope



4.2 Change in emissions compared to the 2018 baseline

Estimated emissions for Merton Council for the years 2018 to 2020 are shown in **Figure 7** and **Table 7**. Total emissions decreased by 19% between 2018 and 2020, from 11.2 $ktCO_2e$ to 9.0 $ktCO_2e$. Gas consumption in council owned buildings remain the main source of emissions for the Council across the time series, with council building electricity usage being the second highest.

Figure 7: ktCO₂e emissions for Merton Council, 2018 – 2020

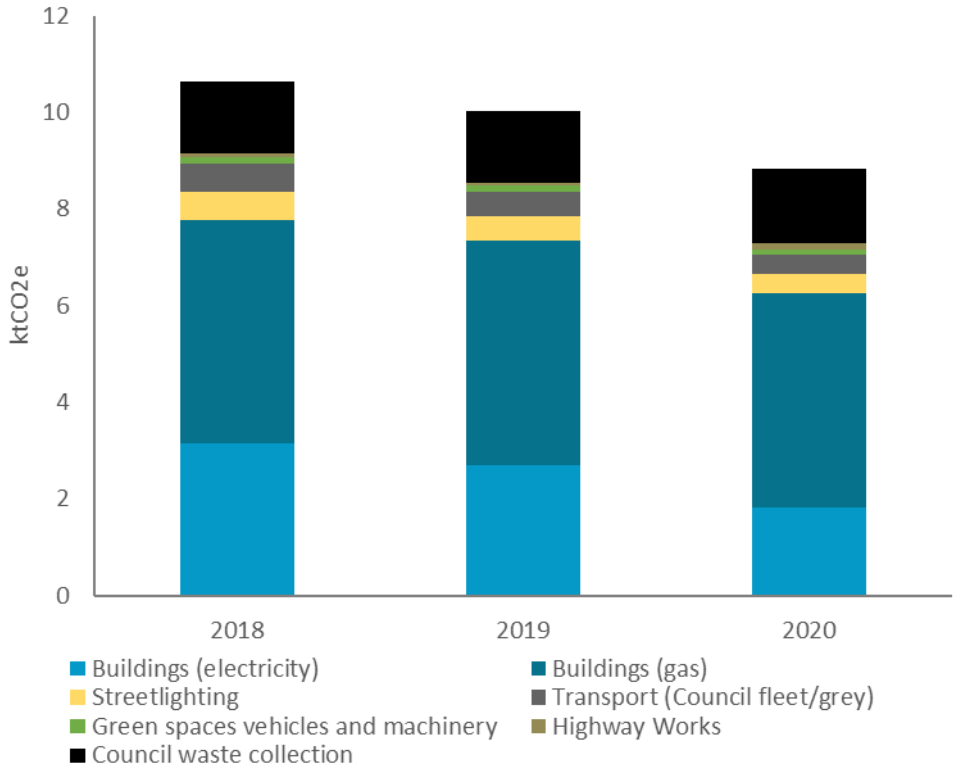


Table 7: Emissions (in ktCO₂e) from each sector, 2018-2020

Sector	Scope	Emissions ($ktCO_2e$)			Change between 2018 baseline and 2020 (%)
		2018	2019	2020	
Operational Buildings (electricity)	2&3	1.6	1.4	0.8	-51%
Operational Buildings (gas)	1	2.1	2.1	1.8	-15%
Community School Buildings (electricity)	2&3	1.6	1.3	1.0	-34%
Community School Buildings (gas)	1	2.5	2.5	2.7	5%
Streetlighting (electricity)	2&3	1.1	0.7	0.6	-43%
Council fleet/grey fleet	1,2&3	0.6	0.5	0.4	-30%
Green spaces vehicles and machinery	3	0.16	0.13	0.11	-27%
Highway Works	3	0.07	0.07	0.14	101%
Council waste collection	3	1.5	1.5	1.5	0.1%
Total		**11.2**	**10.2**	**9.0**	**-19%**

Estimated emissions from electricity consumption in council operational buildings and community schools decreased by 42% between 2018 and 2020 (from 3.2ktCO_2e to 1.8kt CO_2e), whilst emissions from natural gas consumption within the same buildings decreased by only 4% between 2018 and 2020 (from 4.6kt CO_2e to 4.4 ktCO_2e). The reduction in estimated emissions from electricity consumption in buildings is due to a steady decrease in the carbon intensity of the electricity sourced from the National Grid, coupled with a large decrease in electricity use in 2020 (37% decrease in KWh consumption between 2019 and 2020; see **Table A2.3** and **Table A2.4** in **Appendix 2**).

5 Impacts of the COVID-19 pandemic

The COVID-19 pandemic resulted in a disruption to Council activities across 2020, and this has been reflected in the estimated GHG emissions reported for that year.

Emissions from electricity usage in council operational buildings decreased by 43% in 2020, from 1.4 ktCO_2e in 2019 to 0.8 ktCO_2e in 2020. These figures include both emissions from direct consumption and scope 3 emissions from the electricity transmission and distribution. This is in part due to the continual decarbonisation of the National Grid, but also due to reduced electricity consumption which decreased from 5 GWh in 2019 to 3.1 GWh in 2020, reflecting a shift towards working from home (**Table A2.4** in **Appendix 2**). Merton Council purchase 100% Renewable Energy Guarantees of Origin (REGO) backed power, which contributes towards the decarbonisation of the National Grid.

Emissions reductions were less pronounced for natural gas consumption in council operational buildings, at 17%, from 2.1 ktCO_2e to 1.8 ktCO_2e. This decrease is largely due to a reduction in gas consumption by these buildings, from 11.6 GWh in 2019 to 9.6 GWh in 2020. This reduction is likely because staff worked from home and spent less time in offices during the COVID-19 response. However, the emissions related to heating were potentially "outsourced" to staff homes, whether they live in the borough or not. As a consequence of the pandemic, Merton Council is likely to implement hybrid working (a mix of working in office and working from home) for their staff, which may sustain lower levels of gas consumption by council operational buildings.

Gas consumption in school buildings increased from 13.8 GWh in 2019 to 14.7 GWh in 2020. This is likely in response to the requirement of schools to increase ventilation rates to reduce the spread of COVID-19. If confirmed, this would likely explain the increase in gas consumption due to increased heating over the winter period.

Depending on regional differences in the average size of home, heating or cooling needs and the efficiency of appliances, a day of working from home could increase household energy consumption by between 7% and 23% compared to a day working in the office (IEA, 2020). Emissions savings from the reduction in commutes by car that are greater than 3 km (an average figure for Europe) may offset this increase, resulting in a reduction in overall emissions. However, where commutes are less than this distance or are by public transport or active travel, working from home may lead to a net increase in emissions (IEA, 2020). To accurately capture the effect of working from home on Merton Council's emissions, emissions could be calculated using the methodology in the EcoAct homeworking emissions white paper[9].

Emissions from council transport may have also been impacted by the pandemic. Estimated emissions from council fleet and grey fleet decreased by 13% between 2018 and 2019, and by 20% between 2019 and 2020 (**Table 8).** Council fleet vehicle miles were reduced in 2020 (**Table A2.3** in **Appendix 2**). The transition to some services being online because of the pandemic meant fewer vehicles were on the road, and pool vehicles were used rather than individual vehicles when they were necessary.

[9] https://info.eco-act.com/en/homeworking-emissions-whitepaper-2020

Table 8: Emissions from Council/grey fleet and percentage change, 2018- 2020

	Emissions (ktCO2e)			% change 2018 - 2019	% change 2018 - 2020
	2018	2019	2020		
Council/grey fleet	577	500	401	-13%	-20%

Reported emissions from Highway Works vehicles doubled in 2020 compared to 2019. This may have been due to the delivery of Merton's emergency transport response to COVID-19 to improve road safety, support social distancing and provide more space for walking and cycling. There were likely more opportunities for increased roadworks with minimal disruption to the public, particularly during the initial lockdown period, when there were fewer vehicles on the road. However, without vehicle kilometre data for all vehicles in the borough for 2020 these conclusions are limited. Estimated emissions from Highway Works were 67 tCO_2e in 2019 and 136 tCO_2e in 2020.

6 Conclusions and Recommendations

The total reported emissions for the borough of Merton were 663 $ktCO_2e$ in 2019, representing a 26 $ktCO_2e$ decrease from 2018. The residential sector was the most significant source of emissions, comprising 44% of total emissions in 2019. Emissions from the transport sector remained constant between 2017 and 2019. If the trend of decarbonisation of the National Grid continues thereby decreasing emissions from electricity usage, emissions from transport may become more significant in the borough in future years. Waste processing emissions were included in the inventory for the first time, and account for 4% of the total borough emissions.

Reported emissions for Merton Council totalled 9 $ktCO_2e$ in 2020, representing a 12% reduction compared to 2019. Gas consumption in council owned buildings was the main source of emissions, representing 49% of total emissions. The impacts of COVID-19 are reflected in council emissions, as shown by a reduction in energy consumption in council operational buildings and a doubling of emissions from Highway Works.

Council action to replace the light bulbs used in street lighting with LED bulbs has directly resulted in reduced emissions and can be seen in the GHG emissions inventory in the decrease of emissions from streetlighting between 2018 and 2020 (30% reduction in kWh electricity use; see **Table A2.3** in **Appendix 2**). Significant emission reductions also occurred due to the decarbonisation of the National Grid, and potentially impacts of the pandemic, the long-term trends of which remain unclear.

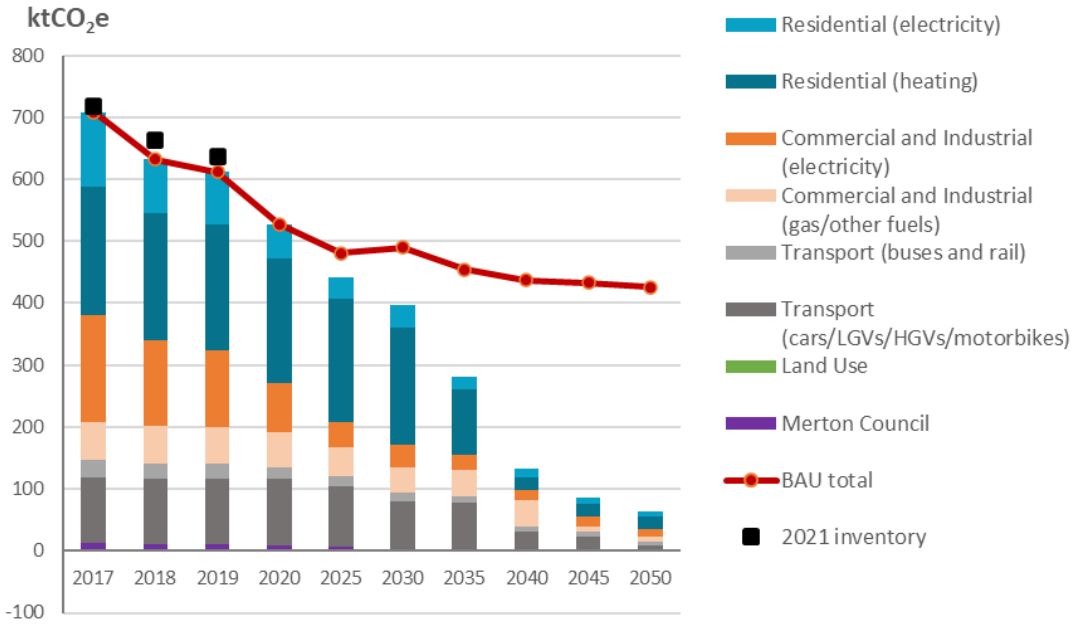
To further improve the inventory, increased engagement with contractors would be beneficial. Further scope 3 sources of Council emissions could be included, such as staff commuting and the procurement of goods and services If council staff continue to work significantly from home, the inclusion of electricity and heating emissions from home offices could be included in the inventory. This could be achieved using the methodology provided in the EcoAct homeworking emissions white paper[10].

Emissions from the waste processing of Merton's local authority collected waste sent to processing facilities besides Beddington ERF and landfill, have not been estimated in this inventory. This covers emissions from commercial waste, food waste to anaerobic digestion plants, and garden waste sent to composting plants. To improve the completeness of the borough inventory, these scope 3 emissions sources could be included in future inventories if data becomes available.

Based on figures from the 2021 inventory for emissions in the years 2017-2019, emissions from Merton Borough are not decreasing as quickly as modelled in the decarbonisation pathway outlined in the 2020 "London Borough of Merton Climate Action Support" report[11]**.** As waste processing emissions from the ERF were not included in the pathways modelling due to lack of data, they have been excluded from the 2021 inventory for comparison in **Figure 8**. However, the comparison should be seen as indicative only, as the 2017 baseline in the model has not been recalculated with the changes described in **Appendix 3.**

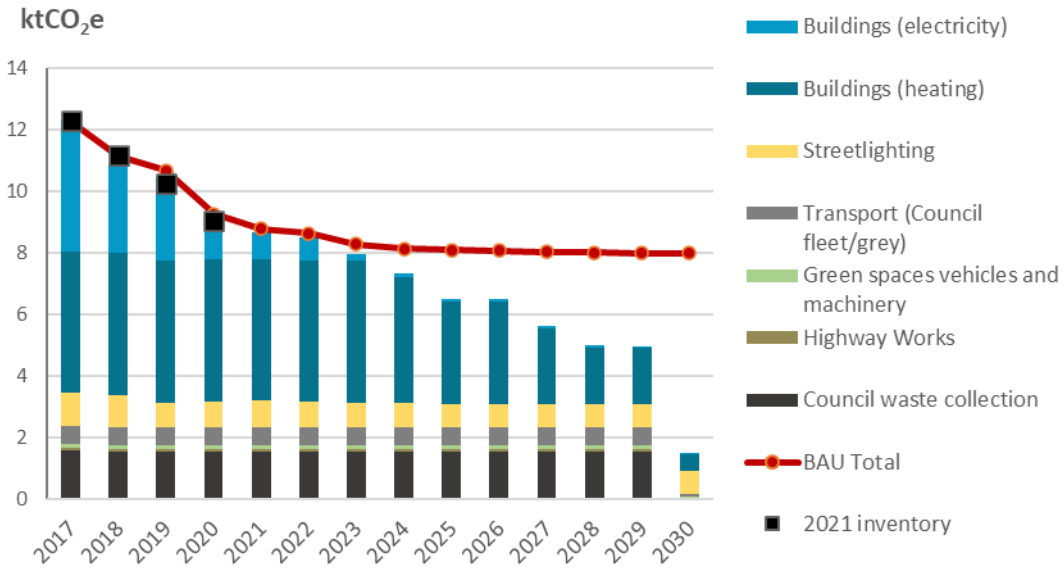
[10] https://info.eco-act.com/en/homeworking-emissions-whitepaper-2020
[11] https://www.merton.gov.uk/system/files?file=merton_support-climate-action_v3.1.pdf

Figure 8: Decarbonisation pathway for Merton Borough, 2017 – 2050



Estimated emissions for Merton Council are decreasing slightly faster than the pathway trajectory outlined in the initial report (**Figure 9**). However, some emissions in 2020 decreased due to the pandemic, so it is unclear if this trend will continue as COVID-19 recovery efforts continue. The pathway model included a project to replace old streetlights with LEDs, with the first full year of carbon savings beginning in the 2017/18 financial year. This was actioned by the council in 2017. It should be noted that the carbon intensity of the UK electricity supply in 2020 was higher than that modelled for 2020 in the initial analysis (Aether, 2020), which would contribute to higher emissions in the inventory despite falls in electricity use in all sources (except electric cars in the council fleet). Comparison results are indicative only, as the 2017 baseline in the model has not been recalculated with the changes described in **Appendix 3.**

Figure 9: Decarbonisation pathway for Merton Council, 2017 – 2030



7 References

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IEA (2020), "Working from home can save energy and reduce emissions. But how much?", IEA, Paris, https://www.iea.org/commentaries/working-from-home-can-save-energy-and-reduce-emissions-but-how-much

Merton Council (2020), Merton Climate Strategy and Action Plan, https://www.merton.gov.uk/system/files?file=draft20climate20strategy20and20action20plan20-20council20v2.pdf

University of Leeds (2021), "Consumption-based Greenhouse Gas Household Emission Profiles for London Boroughs", London Councils, https://www.londoncouncils.gov.uk/our-key-themes/environment/climate-change/consumption-based-greenhouse-gas-household-emissions

Viridor (2021) Carbon Management Plan for the SLWP Residual Waste Treatment Contract and the Beddington Energy Recovery Facility, report to the South London Waste Partnership Joint Committee, 8th June 2021, https://moderngov.kingston.gov.uk/documents/s92419/2a.%20JWC%20Paper%20-%20Carbon%20Management%20Plan%20-%20June%202021%20Final.pdf

Viridor (2020), Beddington Energy Recovery Facility & Residual Waste Contract 2019-2043, Carbon Management Plan, https://moderngov.kingston.gov.uk/documents/s92420/2b.%20Beddington%20Carbon%20Management%20Plan%20May%2021%20FINAL.pdf

Appendix 1

Input data

Table A1.1: Data sources for the borough GHG inventory

Source number	Data Source	Sector	Description
1	Department for Business, Energy and Industrial Strategy (BEIS): 'Sub-national electricity sales and numbers of customers'	Grid electricity; domestic economy, domestic standard and non-domestic	This dataset provides energy consumption data for domestic and commercial electricity use in the borough of Merton.
2	Department for Business, Energy and Industrial Strategy (BEIS): 'Sub-national weather uncorrected gas sales and numbers of customers'	Natural gas; domestic and non-domestic	This dataset provides energy consumption data for domestic and commercial gas use in the borough of Merton.
3	Department for Business, Energy and Industrial Strategy (BEIS): 'Sub-national estimates of non-gas, non-electricity and non-road transport fuels'	Petroleum, coal and manufactured solid fuels consumption	This data set provides consumption data for other fuels, non-gas and non-electricity for domestic, commercial, industrial and non-road transport use in the borough of Merton.
4	Department for Business, Energy and Industrial Strategy (BEIS): 'Road transport energy consumption at regional and local authority level'	Borough bus travel, Borough diesel car travel, Borough petrol car travel, Borough motorbike travel, Borough HGV, Borough LGV diesel and Borough LGV petrol	This dataset provides fuel consumption data (diesel and petrol) for road vehicles in the borough of Merton.
5	Department for Business, Energy and Industrial Strategy (BEIS): 'UK local authority and regional carbon dioxide emissions national statistics'	Borough emissions from land use	This dataset provides net CO_2 emissions from land use, land use change and forestry for the borough of Merton.
6 - 8	Department for Business, Energy and Industrial Strategy (BEIS): 'Greenhouse gas reporting: conversion factors' 2018 - 2020	All sectors	This dataset provides emission factors for all sources covered in this inventory.
9	Greater London Authority: 'London Energy and Greenhouse Gas Inventory (LEGGI)'	Merton passenger diesel, passenger electric, freight diesel, London underground, London tram (kWh)	This dataset provides rail KWh for passenger and freight rail for the borough of Merton. This includes data for the London underground, trams, and national rail sections within the borough of Merton. Data for 2019 was not available at the time of this inventory compilation so 2018 values were used.

Source number	Data Source	Sector	Description
15	Office for National Statistics (ONS): Subnational population estimates	Population of Merton borough	This dataset provides population estimates for the borough of Merton, used as a proxy for estimating emissions from council collected waste sent to landfill, when the Beddington ERF is not operational.
19	Beddington Energy Recovery Facility	Waste	Emissions from diesel and electricity used on site or imported, waste diverted to landfill, and employee travel. Biogenic CO_2 is not included in emissions calculations.

Table A1.2: Data sources for the Council GHG inventory

Source number	Data Source	Sector	Description
10	DECC GHG Report (received from Merton Council)	Energy	Electricity and gas consumption for council owned operational buildings and community school buildings, and electricity consumption for streetlighting, all in KWh.
10	DECC GHG Report (received from Merton Council)	Transport	Distance travelled by the council vehicle fleet, by fuel type and vehicle type.
11	Council staff survey (received from Merton Council)	Transport	Distance travelled by council staff for work trips (grey fleet).
12	Council Waste Tonnages Summary	Waste	Tonnes of commercial waste collected by the council and recycled or sent to Energy Recovery Facility (ERF) plant.
13	Waste Data Flow figures from the South London Waste Partnership (SLWP)	Waste	Tonnes of residential waste collected by the council sent to landfill, EFW, recycled, composted or used in anaerobic digestion.
16	FM Conway (received from FM Conway)	Highway works	Direct emissions from the vehicle operations of FM Conway on highway maintenance in Merton through fuel consumption. Not including the use of red diesel in machinery as that data was not available.
17	ID Verde (received from Merton Council)	Green spaces maintenance and vehicles	Emissions from the vehicles (on and off-road) and machinery from operations of ID Verde for green spaces maintenance in Merton, through fuel consumption data.

Appendix 2

Activity data and emission factors

Table A2.1: Activity data for the borough GHG inventory

Sector	Category	Fuel	Unit	Data Source	Activity data by year		
					2017	2018	2019
Commercial	Non-domestic	Gas	GWh	3	302	306	291
Commercial	Non-domestic	Electricity	GWh	1	462	495	499
Commercial	Public Administration	Petroleum	ktoe	4	0.01	0.01	0.005
Commercial	Commercial	Petroleum	ktoe	4	0.03	0.04	0.03
Industrial	Industry	Petroleum	ktoe	4	2.54	2.63	2.42
Industrial	Industry	Manufactured solid fuels	ktoe	4	0.04	0.04	0.04
Land Use	LULUCF	Net CO2 emissions	kt CO_2	5	- 1.07	- 1.11	- 1.14
Residential	Domestic	Gas	GWh	3	1,087	1,085	1,105
Residential	Domestic	Electricity	GWh	1	313	306	305
Residential	Domestic	Petroleum	ktoe	4	0.37	0.37	0.38
Residential	Domestic	Coal	ktoe	4	0.12	0.12	0.11
Residential	Domestic	Manufactured solid fuels	ktoe	4	0.46	0.48	0.50
Transport	Buses	Petrol	ktoe	2	2,796	2,796	2,295
Transport	Cars	Petrol	ktoe	2	18,800	18,800	18,105
Transport	Cars	Diesel	ktoe	2	13,050	13,553	14,259
Transport	Motorcycles	Petrol	ktoe	2	624	655	731
Transport	HGV	Diesel	ktoe	2	3,074	2,929	3,109
Transport	LGV	Petrol	ktoe	2	336	327	312
Transport	LGV	Diesel	ktoe	2	8,379	8,737	8,964

Sector	Category	Fuel	Unit	Data Source	Activity data by year		
					2017	2018	2019
Transport	Rail	Petroleum	ktoe	4	0.18	0.17	0.17
Transport	Rail - London underground	Electricity	kWh	9	19,031,769	18,906,899	18,906,899
Transport	Rail - trams	Electricity	kWh	9	3,351,411	3,204,820	3,204,820
Transport	Rail - national rail	Electricity	kWh	9	31,000,333	31,000,333	31,000,333
Transport	Rail - Passenger	Diesel	kWh	9	2,430,826	2,430,826	2,430,826
Transport	Rail - Freight	Diesel	kWh	9	261,120	261,120	261,120
Transport	Off-road/agriculture	Petroleum	ktoe	4	0.08	0.08	0.08
Population	Population	Merton total	people	15	206,052	206,186	206,548
Waste processing	ERF	Tonnes of waste treated	Tonnes	19	6,613	22,051	39,314
Waste processing	Landfill	Tonnes of waste treated	Tonnes	19	39,729	21,702	2,102

Table A2.2: Emission factors for the borough GHG inventory

Sector	Category	Fuel	Unit	Data Source	Emission Factors by year		
					2017	2018	2019
Multiple	UK	Grid Electricity	kgCO2e/kWh	UK Government GHG Conversion Factors for Company Reporting - UK Electricity - Electricity generated	0.352	0.2831	0.256
Multiple	UK	Grid Electricity T&D	kgCO2e/kWh	UK Government GHG Conversion Factors for Company Reporting - Transmission and distribution - T&D- UK electricity	0.03287	0.0241	0.02170
Multiple	UK	Natural Gas	kgCO2e/kWh	UK Government GHG Conversion Factors for Company Reporting - Fuels - Gaseous Fuels - Natural Gas - kWh (Gross CV)	0.18416	0.1840	0.18385
Multiple	Industrial & Commercial	Coal	kgCO2e/kWh	UK Government GHG Conversion Factors for Company Reporting - Fuels - Solid fuels - Coal (industrial) - kWh (Gross CV)	0.32442	0.32482	0.33183
Multiple		Gas oil	kgCO2e/kWh	UK Government GHG Conversion Factors for Company Reporting - Fuels - Liquid fuels - Gas Oil - kWh (Gross CV)	0.27588	0.27652	0.25676
Multiple		Solid smokeless fuel	ktCO2e/TJ	NAEI https://naei.beis.gov.uk/data/ef-all-results?q=149740	0.09366	0.09366	0.09366
Residential	Domestic	Coal	ktCO2e/TJ	NAEI https://naei.beis.gov.uk/data/ef-all-results?q=149742	0.09366	0.09366	0.09366
Residential	Domestic	Kerosene (burning oil)	kgCO2e/kWh	UK Government GHG Conversion Factors for Company Reporting - Fuels - Liquid fuels - Burning Oil - kWh (Gross CV)	0.24659	0.24665	0.24675
Transport	Car (average size)	Diesel	kg CO2e/km	UK Government GHG Conversion Factors for Company Reporting - Passenger vehicles - Cars (by size) - Average car - Diesel	0.17887	0.17753	0.17336
Transport	Car (average size)	Petrol	kg CO2e/km	UK Government GHG Conversion Factors for Company Reporting - Passenger vehicles - Cars (by size) - Average car - Petrol	0.18568	0.18368	0.18084

Sector	Category	Fuel	Unit	Data Source	Emission Factors by year		
					2017	2018	2019
Transport	London buses	Petrol	kg CO2e/passenger km	UK Government GHG Conversion Factors for Company Reporting - Business travel-land - Bus - Local London Bus	0.07270	0.07211	0.08208
Transport	HGV (all, average% laden)	Diesel	kg CO2e/km	UK Government GHG Conversion Factors for Company Reporting - Freighting goods - HGV(all diesel) - All HGVs - average % laden	0.87029	0.8452	0.86731
Transport	Motorcycle (average)	Petrol	kg CO2e/km	UK Government GHG Conversion Factors for Company Reporting - Passenger vehicles - Motorbike - Average	0.11662	0.11529	0.11551
Transport	Van (average)	Petrol	kg CO2e/km	UK Government GHG Conversion Factors for Company Reporting - Freighting goods - Vans - Average (up to 3.5 tonnes) - Petrol	0.26206	0.24917	0.23645
Transport	Van (average)	Diesel	kg CO2e/km	UK Government GHG Conversion Factors for Company Reporting - Freighting goods - Vans - Average (up to 3.5 tonnes) - Diesel	0.25749	0.2568	0.25213
Transport	Rail	Petroleum (products)	kg CO2e/tonne	UK Government GHG Conversion Factors for Company Reporting - Freighting goods - Rail - Freight train	0.03394	0.03351	0.03333
Transport	Rail	Diesel	kgCO2e/kWh	UK Government GHG Conversion Factors for Company Reporting - Fuels - Liquid fuels - Gas Oil - kWh (Gross CV)	0.27588	0.27652	0.25676
Consumption	Europe		tCO2e/capita	London Councils consumption-based household emissions profiles for London boroughs - Merton - direct emissions excluded	5.421	5.225	5.225
Waste processing	ERF	Waste treated	tCO2e/tonne waste	Viridor Carbon Management Plan for the SLWP Residual Waste Treatment Contract and the Beddington Energy Recovery Facility, report to the SLWP Joint Committee, 8th June 2021	0.601	0.601	0.601
Waste processing	Landfill	Waste treated	tCO2e/tonne waste	Viridor Carbon Management Plan for the SLWP Residual Waste Treatment Contract and the Beddington Energy Recovery Facility, report to the SLWP Joint Committee, 8th June 2021	1.113	1.113	1.113

Table A2.3: Activity data for the Council GHG inventory

Sector	Category	Fuel	Unit	Data Source	Activity data by year		
					2018	2019	2020
Energy	Operational Buildings	Electricity	KWh	10	5,237,919	5,000,090	3,129,290
Energy	School Buildings	Electricity	KWh	10	5,055,543	4,688,521	4,062,906
Energy	Operational Buildings	Gas	KWh	10	11,316,821	11,559,894	9,632,131
Energy	School Buildings	Gas	KWh	10	13,740,019	13,775,952	14,447,773
Energy	Streetlighting	Electricity	KWh	10	3,486,753	2,583,625	2,423,534
Transport	Cars	Petrol	km	10	41,090	35,747	47,562
Transport	Cars	Diesel	km	10	125,893	69,351	75,978
Transport	Cars	Petrol Hybrid	km	10	8,896	13,369	6,960
Transport	Van	Diesel	km	10	245,459	182,729	234,901
Transport	Van	Petrol	km	10	-	20,851	30,510
Transport	HGV (over 3.5t)	Diesel	km	10	457,126	396,166	311,704
Transport	Cars	Electric	km	10	5,427	2,277	6,375
Transport	Cars	unknown (grey fleet)	km	11	461,984	450,385	258,819
Waste	Municipal refuse to Landfill		tonnes	13	21,702	2,102	-
Waste	Municipal refuse to ERF		tonnes	13	22,051	39,314	43,964
Waste	Kerbside recycling		tonnes	13	13,857	13,765	15,037
Waste	Garden Waste		tonnes	13	4,613	4,995	4,742
Waste	Kitchen Waste		tonnes	13	4,321	5,829	6,381
Waste	Veolia Commercial Waste - Recycling		tonnes	12	540	516	279
Waste	Veolia Commercial Waste - refuse to ERF		tonnes	12	5,446	5,738	3,905
Highway Works	FM Conway	Petrol	litres	16	1,567	3,412	15,028
Highway Works	FM Conway	Diesel	litres	16	23,844	23,091	40,722
Transport (ID Verde)	ID Verde	Petrol	litres	17	9135.63	8,684	7,845

Sector	Category	Fuel	Unit	Data Source	Activity data by year		
					2018	2019	2020
Transport (ID Verde)	ID Verde	Diesel	litres	17	43,129	36,777	31,356
Transport (ID Verde)	ID Verde	Red diesel	litres	17	7,000	5,893	6,463

Table A2.4: Emission factors for the Council GHG inventory

Sector	Category	Fuel	Unit	Data Source	Emission Factors by year		
					2018	2019	2020
Energy	UK	Grid Electricity	kgCO2e/kWh	UK Government GHG Conversion Factors for Company Reporting - UK Electricity - Electricity generated	0.2831	0.25560	0.23314
Energy	UK	Grid Electricity T&D	kgCO2e /kWh	UK Government GHG Conversion Factors for Company Reporting - Transmission and distribution - T&D- UK electricity	0.0241	0.02170	0.02005
Energy	UK	Natural Gas	kgCO2e /kWh	UK Government GHG Conversion Factors for Company Reporting - Fuels - Gaseous Fuels - Natural Gas - kWh (Gross CV)	0.1840	0.18385	0.18387
Transport	UK	Car - Petrol - Average	kg CO2e/km	UK Government GHG Conversion Factors for Company Reporting - Passenger vehicles - Cars (by size) - Average car - Petrol	0.1837	0.18084	0.17430
Transport	UK	Car - Diesel - Average	kg CO2e/km	UK Government GHG Conversion Factors for Company Reporting - Passenger vehicles - Cars (by size) - Average car - Diesel	0.1775	0.17336	0.16844
Transport	UK	Car - hybrid - average mileage (km)	kg CO2e/km	UK Government GHG Conversion Factors for Company Reporting - Passenger vehicles - Cars (by size) - Average car - Hybrid	0.1257	0.1147	0.1156
Transport	UK	Van - Diesel - Average - up to 3.5t (km)	kg CO2e/km	UK Government GHG Conversion Factors for Company Reporting - Delivery vehicles - Vans - Average (up to 3.5t) - Diesel	0.2568	0.25213	0.24710
Transport	UK	Van - Diesel - Average - up to 3.5t (km)	kg CO2e/km	UK Government GHG Conversion Factors for Company Reporting - Delivery vehicles - Vans - Average (up to 3.5t) - Petrol	0.2492	0.23645	0.21962
Transport	UK	HGV - Diesel - Average all types and sizes - average laden	kg CO2e/km	UK Government GHG Conversion Factors for Company Reporting - Freighting Goods - HGV - Diesel - Average all types and sizes - average laden	0.8729	0.8803	0.8654
Transport	UK	Car - battery electric vehicle - Average (km)	kg CO2e/km	UK Government GHG Conversion Factors for Company Reporting - UK electricity for Evs -	0.0599	0.0555	0.0527

Sector	Category	Fuel	Unit	Data Source	Emission Factors by year		
					2018	2019	2020
				Cars (by size) - Average car - Battery electric vehicle			
Transport	UK	Car - battery electric vehicle T&D - Average (km)	kg CO2e/km	UK Government GHG Conversion Factors for Company Reporting - UK electricity T&D for EVs - Cars (by size) - Average car - Battery electric vehicle	0.0051	0.0047	0.0045
Transport	UK	Car - Unknown fuel - Average (km)	kg CO2e/km	UK Government GHG Conversion Factors for Company Reporting - Passenger vehicles - Cars (by size) - Average car - Unknown	0.1806	0.1771	0.1714
Waste	UK	Refuse Municipal to Landfill (tonnes)	kg CO2e/tonne	UK Government GHG Conversion Factors for Company Reporting - Waste disposal - Refuse - Municipal - Landfill	21.3842	21.3538	21.3167
Waste	UK	Mixed recycling (tonnes)	kg CO2e/tonne	UK Government GHG Conversion Factors for Company Reporting - Waste disposal - Refuse - Municipal - Open Loop Recycling	21.3842	21.3538	21.3167
Waste	UK	Organic Garden Waste Composting (tonnes)	kg CO2e/tonne	UK Government GHG Conversion Factors for Company Reporting - Waste disposal - Refuse - Organic: garden waste - Composting	10.2586	10.2039	10.2039
Waste	UK	Organic Food & Drink AD (tonnes)	kg CO2e/tonne	UK Government GHG Conversion Factors for Company Reporting - Waste disposal - Refuse - Organic: food and drink waste - Anaerobic Digestion	21.3842	21.3538	21.3167
Waste	UK	Refuse Municipal to EFW (tonnes)	kg CO2e/tonne	UK Government GHG Conversion Factors for Company Reporting - Waste disposal - Refuse - Municipal - Combustion (EFW)	21.3842	21.3538	21.3167
Transport	UK	HGV - Diesel - Average all types and sizes - average laden (tonne.km)	kg CO2e/tonne.km	UK Government GHG Conversion Factors for Company Reporting - Freighting Goods - HGV - Diesel - Average all types and sizes - average laden (tonne.km)	0.1136	0.1113	0.1065
Waste	UK	Commercial and industrial waste to landfill	kg CO2e/tonne	UK Government GHG Conversion Factors for Company Reporting - Waste disposal - Refuse - Commercial and industrial - Landfill	21.3842	21.3538	21.3167

Sector	Category	Fuel	Unit	Data Source	Emission Factors by year		
					2018	2019	2020
Waste	UK	Commercial and industrial waste to EFW	kg CO2e/tonne	UK Government GHG Conversion Factors for Company Reporting - Waste disposal - Refuse - Commercial and industrial waste - Combustion (EFW)	21.3842	21.3538	21.3167
Transport	UK	Petrol - average biofuel (litres) - Transport	kg CO2e/l	UK Government GHG Conversion Factors for Company Reporting - Fuels - Liquid Fuels - Petrol (average biofuel blend) - litres	2.3053	2.2090	2.1680
Transport	UK	Diesel - average biofuel (litres) - Transport	kg CO2e/l	UK Government GHG Conversion Factors for Company Reporting - Fuels - Liquid Fuels - Diesel (average biofuel blend) - litres	2.6878	2.5941	2.5460
Transport	UK	Gas oil – red diesel	kg CO2e/l	UK Government GHG Conversion Factors for Company Reporting - Fuels - Liquid Fuels - Gas Oil - litres	2.9705	2.7582	2.7578

Appendix 3

Recalculations

The 2020 GHG emissions inventory for Merton detailed emissions estimates for the borough in 2017. The activity data and emission factors used in the inventory have since been revised, altering estimated emissions as outlined below.

Total GHG estimates for the borough in the 2020 inventory for the year 2017 were 708.0 ktCO_2e, which has been revised to 744.6 ktCO_2e for 2017 in this updated inventory. Changes reflect revisions in the activity data provided in national statistics[12], primarily local authority road transport energy consumption statistics, with additional minor changes in residential, commercial and industrial fuel consumption. The road transport figures were published by BEIS, and improvements in methodology resulted in an increase of 3,337 tonnes of oil equivalent (toe) for petrol cars and 1,090 toe for diesel cars for 2017. This is equivalent to an increase of emissions of 9.1 ktCO_2e and 3.1 ktCO_2e, respectively. Waste processing emissions from Beddington ERF were also included in the inventory for the first time and were based on local data, reflecting a 26 ktCO_2e increase to the total emissions compared to the 2020 inventory.

CO_2 sequestered by land use, land use change and forestry has also been recalculated. In the 2020 inventory land use within the borough was reported as sequestering 0.59 ktCO_2e. Changes in the methodology used in the UK local authority and regional carbon dioxide emissions national statistics has resulted in this being recalculated to be a larger sink of emissions, at -1.07 ktCO_2e. Emissions across this sector were mainly due to implementation of emissions from wetland drainage and rewetting[13].

Small recalculations were made to the Council emissions for the year 2018 between the 2020 and 2021 inventory, due to minor revisions of the emission factors. Emissions from red diesel consumption in green spaces vehicles were included for the first time in Merton's GHG inventory, for the full time series. They were based on fuel consumption data provided by ID Verde and reflect a 0.2 ktCO_2e increase compared to initial estimates.

[12] https://www.gov.uk/government/publications/regional-energy-data-guidance-note
[13] https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/996059/local-authority-co2-emissions-technical-report-2019.pdf

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