

Brighton & Hove City Council – Carbon Footprint Report 2020/21

1.0 Introduction & Report Context

This report provides a breakdown of Brighton & Hove City Council's internal Carbon Emissions for the 2020/21 financial year. Emissions were calculated using consumption figures taken from utility supplier billing as well as automatic meter read data when available, manual, and estimated meter readings.

The scope of the report covers internal organisational emissions, which comprises electricity, gas, and oil use in corporate buildings (Including Offices, Social Care, Libraries, Park Property, Children's Centres and Museums); schools and housing (Public Ways Lighting and Shared Gas Boilers). Additionally, the report includes carbon emissions resulting from street lighting and vehicle fleet fuel consumption. Carbon emissions resulting from energy consumption in tenanted Commercial & Housing properties, where occupants are solely responsible for usage, are excluded from the scope of this report.

Emissions figures are presented in CO₂e (Carbon Dioxide Equivalent), the standard unit for measuring carbon footprints. The raw consumption data has been converted to CO₂e using the annual Greenhouse gas reporting conversion factors, calculated by BEIS (Department for Business, Energy & Industrial Strategy). The conversion factors for 2020/21 used in this report, are included in **Appendix B**.

The methodology applied in this report is defined in the Greenhouse Gas Protocol Standard (GHGP). The reported emissions totals include Scope 1 (Direct emissions), relating to activities owned or controlled by your organisation that release emissions straight into the atmosphere e.g. combustion for heating purposes and fleet vehicles; and Scope 2 (Energy indirect) Emissions being released into the atmosphere associated with the consumption of purchased electricity from the National Grid. Emissions defined as Scope 3 under the GHGP relating to emissions from purchased goods and services, employee travel and leased assets are currently not included in this report. A full list of the emissions areas included in this report are included in **Appendix A**.

From October 2020 all electricity procured by the council through its corporate contracts were determined to be 100% renewable by the supplier and backed by REGO Certificates (Renewable Energy Guarantee of Origin). This has not directly impacted the emissions from electricity sources outlined in the report but does highlight the council's support for the development of additional renewable generation capacity across the UK energy mix.

In the 2020/21 reporting year, council operations were heavily effected by Covid-19 service adjustments and lockdowns, and therefore the changes to carbon emissions outlined in this report need to be viewed in this context.

2.0 Total Annual CO₂e Emissions 2020/21

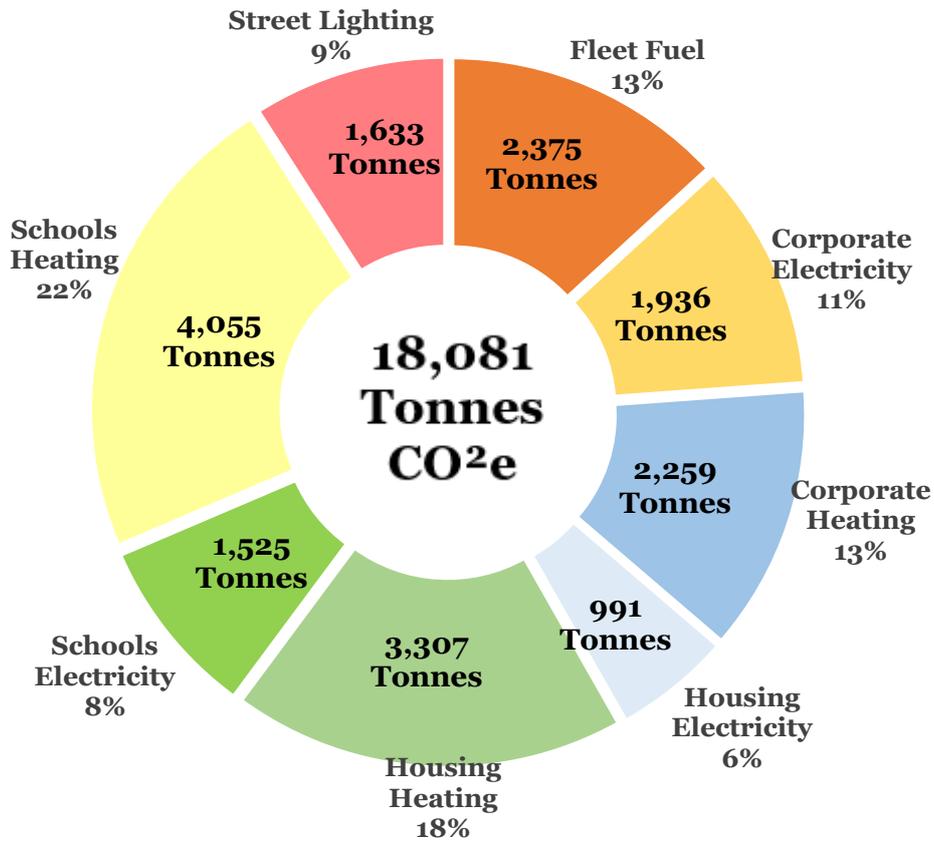


Figure 1- Total Annual CO₂e Emissions 2020/21 broken down by area of the council and fuel type CO₂e

Brighton & Hove City Council's total internal Carbon emissions for 2020/21 were **18,081 tonnes CO₂e**, **Figure 1** shows a breakdown of the total footprint by fuel type and area of the council. When compared to the council's 2019/20 footprint of **19,626 tonnes CO₂e** represents a total overall annual reduction of **1,545 tonnes CO₂e** (7.87%). A comparison of the Council's footprint when compared to emissions in 2019/20 have been outlined in **Table 1** below.

Report Year	Corporate Emissions (Tonnes Co ₂ e)	Housing Emissions (Tonnes Co ₂ e)	Schools Emissions (Tonnes Co ₂ e)	Street Lighting Emissions (Tonnes Co ₂ e)	Fleet Fuel Emissions (Tonnes Co ₂ e)	Total Annual Emissions (Tonnes Co ₂ e)
2020/21	4,195	4,298	5,580	1,633	2,375	18,081
2019/20	4,706	4,413	6,012	2,136	2,359	19,626
Year On Year Emission Change	-511	-115	-432	-503	16	-1,545
	10.9% Reduction	2.6% Reduction	7.2% Reduction	23.5% Reduction	0.67% Increase	7.87% Reduction

Table 2- Total Annual CO₂e Emissions comparison by area of the council

Annual 'Corporate' Emissions 2020/21

Property categorised as 'Corporate' showed a total year-on-year carbon emission reduction across all fuels of **10.9%** (511 tonnes CO₂e).

Emissions related to electricity Consumption reduced by **25.6 %** (667 tonnes CO₂e) and were realised by a reduction in consumption of **1.9mWh** (18% of total consumption) as well as an improved carbon conversion factor for electricity from the grid in 2020/21.

Emissions from heating fuels increased by **6.9%** (156 tonnes CO₂e) due to an increase of heating consumption of **0.8mWh**. This is likely to have been driven by the increased requirement for natural ventilation due to Covid 19 mitigations, and the additional heating demand required to get buildings back to a comfortable temperature.

Annual 'Housing' Emissions 2020/21

Housing sites showed a total year-on-year Carbon emission reduction of **2.6%** (114 tonnes CO₂e).

Emissions related to electricity Consumption reduced by **8.7 %** (94 tonnes CO₂e) and were realised by an improvement in the grid electricity emission factor for 2020/21, whilst year on year consumption remained broadly similar.

Heating emissions reduced very slightly by **1.8%** in 2020/21 (20 tonnes CO₂e), due to a modest reduction in communal gas consumption of around **0.1mWh**

Annual 'School' Emissions 2020/21

School sites showed a total year-on-year Carbon emission reduction across all fuels of **7.2%** (433 tonnes CO₂e).

Reductions in electricity emissions of **33%** (757 tonnes CO₂e) were realised by a reduction in consumption of **2.4mWh** (27% of total consumption), and improvements to the grid electricity conversion factor for 2020/21

Emissions from heating fuels increased by **8%** (324 tonnes CO₂e) due to an increase of heating consumption of **1.8mWh**. This is likely to have been driven by the increased requirement for natural ventilation due to Covid 19 mitigations, and the additional heating demand required to get buildings back to a comfortable temperature.

Annual 'Street Lighting' Emissions 2020/21

Street Lighting supplies showed a total year-on-year Carbon emission reduction of **23.5%** (503 tonnes CO₂e). This is due to reductions in annual consumption of **1.35mWh** (16% of total consumption) and improvements to grid electricity Carbon Emissions Factors for 2020/21.

Annual 'Fleet Fuel' Emissions 2020/21

Fleet Fuel emissions have increased by **0.67%** (16 tonnes CO₂e) in 2020/21 due to an estimated increased consumption of 99,000 litres of fuel. However, actual data for 2019/20 was unavailable and estimates were modelled for last year's emission report based on historic data. New equipment is now in situ for monitoring fuel consumption at Hollingdean Depot, and the emissions data for the 2021/22 report should provide a more reliable indication of performance.

2.1 CO²e Emissions by Utility - Electricity

2020/21 - Electricity Emissions						
Area of Council	Consumption (kWh)	Consumption Change (kWh)	Annual % Change	Emissions (Tonnes CO ² e)	Emissions Change (Tonnes CO ² e)	Annual % Change
Corporate	8,305,744	-1,881,811	-18.47%	1936.4	-667.5	-25.64%
Housing	4,251,654	5,231	0.12%	991.2	-94.2	-8.67%
Schools	6,539,785	-2,387,695	-26.75%	1524.7	-757.2	-33.18%
Street Lighting	7,005,332	-1,350,966	-16.62%	1633.2	-502.6	-23.53%
Total	26,102,515	-5,615,241	-17.70%	6085.5	-2021.5	-24.94%

Table2- Total Annual CO²e Emissions from Electricity Consumption 2020/21

- Total CO²e emissions from electricity consumption in 2020/21 reduced by around **25%** when compared to 2019/20.
- Electricity consumption reduced by around **18%** across the same period, and emissions reductions were furthered by improvements to carbon intensity of grid electricity.

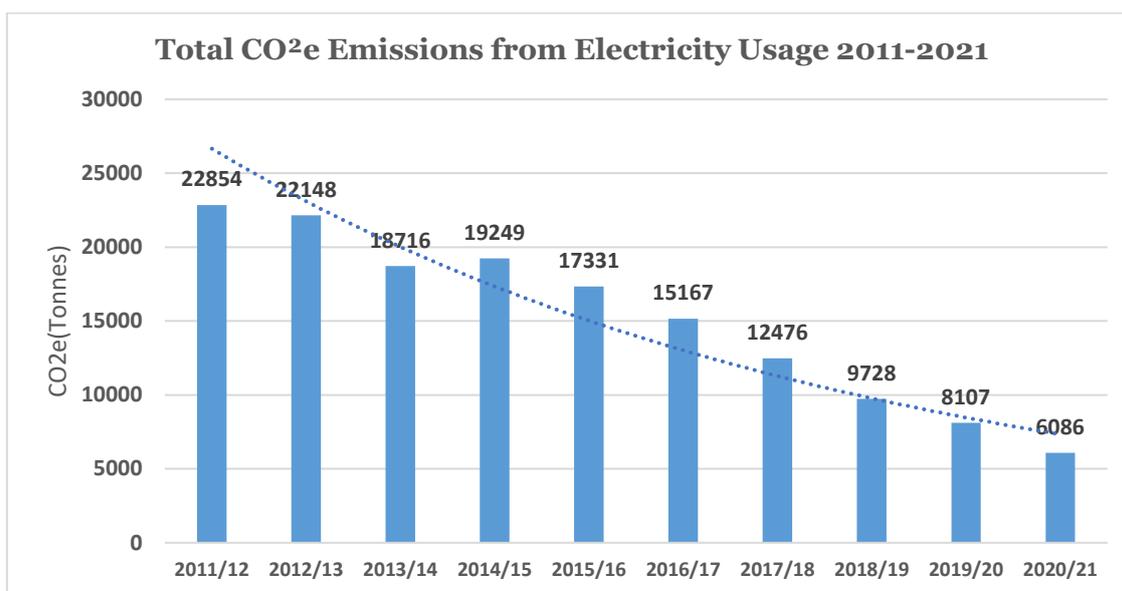


Figure 2- Total CO²e emissions from electricity consumption over last 10 years of operation.

- Total CO²e emissions from council electricity usage have reduced by over **73%** in the last ten reporting years. In real terms electricity consumption has fallen by **40%** over the same period and with emissions reductions boosted by vastly improved emissions factors from the national electricity.
- If the trend in reductions continue, it is likely that the total contribution to council's carbon footprint from electricity emissions will be minimal by 2030 target date (<10%). However continued efficiency measures and commissioning of renewable technologies will be required to free electrical capacity for the implementation of Low Carbon Heating alternatives to existing gas heating.

2.2 CO²e Emissions by Utility - Gas

2020/21 - Year Heating Emissions						
Area of Council	Consumption (kWh)	Consumption Change (kWh)	Annual % Change	Emissions (Tonnes CO ² e)	Emissions Change (Tonnes CO ² e)	Annual % Change
Corporate	12,266,598	871,845	7.11%	2258.8	156.3	6.92%
Housing	17,985,708	-111,359	-0.62%	3307.0	-20.1	-0.61%
Schools	21,779,895	1,811,109	8.32%	4054.9	324.3	8.00%
Total	52,032,201	+ 2,571,595	+ 5.2%	9620.8	+ 460.6	+5.03%

Table3- Total Annual CO²e Emissions from Gas Consumption 2020/21

- Total CO²e emissions from gas consumption in 2020/21 increased by around 5% when compared to 2019/20 figures, due an increase in consumption at schools and corporate sites.
- It is likely that increased requirement for natural ventilation due to Covid-19 mitigations may have resulted in an increased demand of heating systems across the winter period.

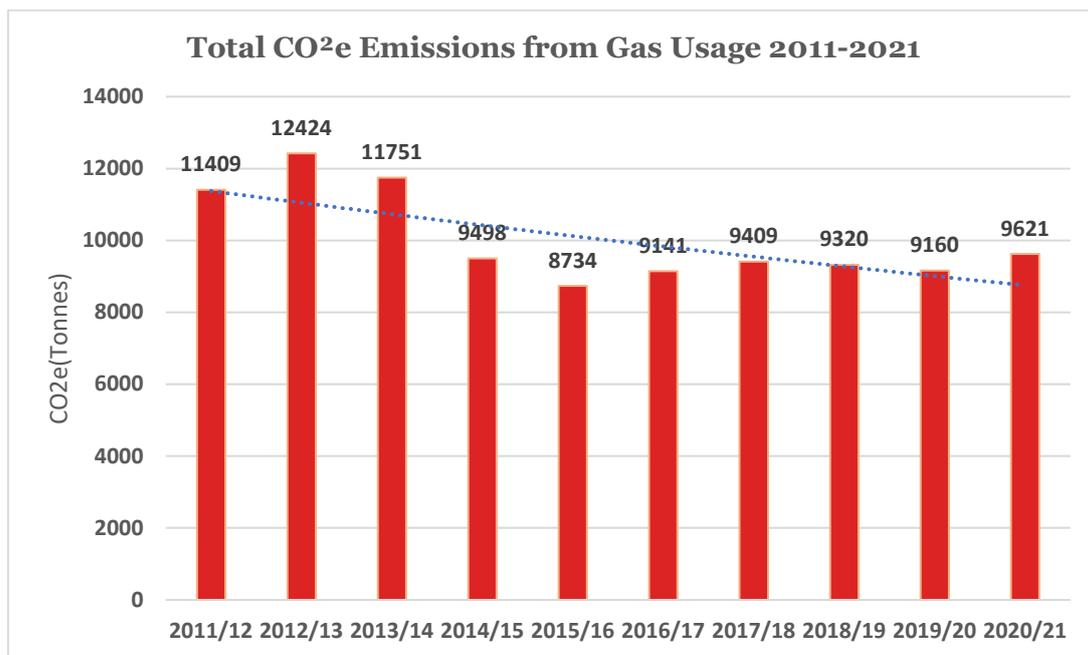


Figure 3- Total CO²e emissions from gas consumption over last 10 years of operation.

- Whilst Total CO²e emissions from council gas usage have reduced by around **16%** in the last ten reporting years, annual emissions and consumption have remained steady in the last seven reporting years. Improvements to the carbon intensity of natural gas are unlikely to materialise on the supply side, and therefore any efficiencies will have to be driven by reductions in consumption.
- The council are currently in the process of carrying our 'Decarbonisation' studies across the operational portfolio to identify opportunities for replacing existing fossil fuel heating systems with 'low carbon' alternatives to help address emissions from gas consumption.

2.3 CO²e Emissions by Utility – Fleet Fuel (Diesel & Petrol)

2020/21 - Fleet Fuel Emissions				
Area of Council	Consumption (Litres)	Emissions (Tonnes CO ² e)	Emissions Change (Tonnes CO ² e)	% Change
Vehicle Fleet	948,948	2375	16	0.67%
Total	948,948	2375	+16	+0.67%

Table 4- Total Annual CO²e Emissions from Fleet Fuel Consumption 2020/21

- Fleet Fuel emissions have increased by **0.67%** (16 tonnes CO₂e) in 2020/21. However, actual data for 2019/20 was unavailable and figures were modelled for last year's emission report based on historic data. New equipment is now in situ for monitoring fuel consumption at Hollingdean Depot, and the emissions data for the 2021/22 report should provide a more reliable indication of performance.

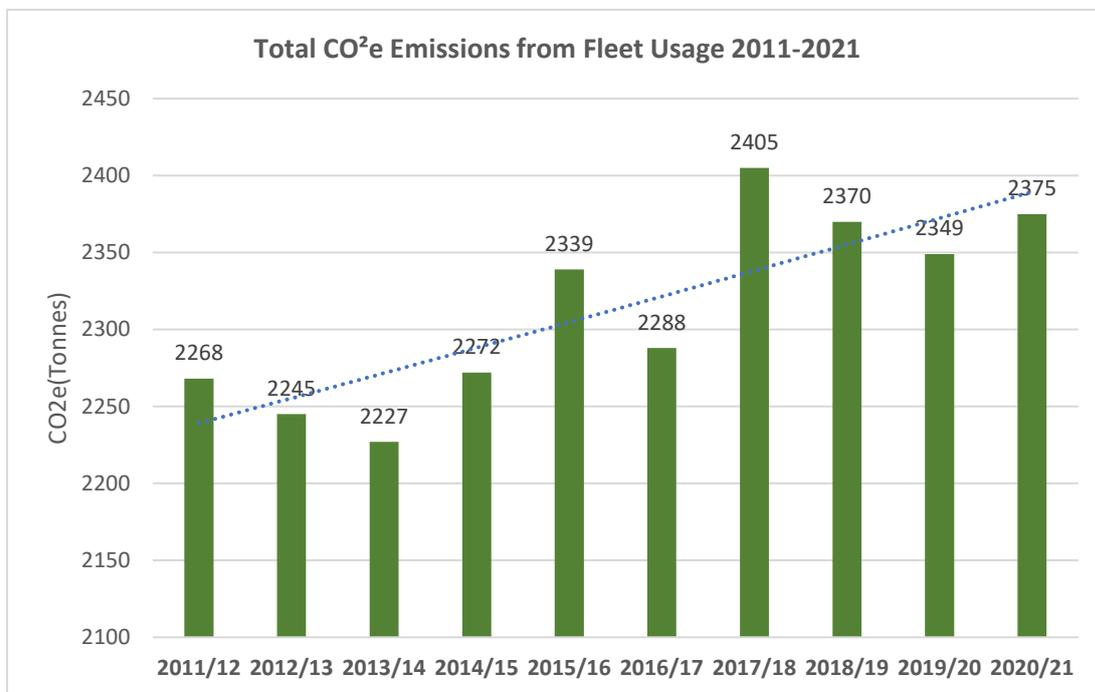


Figure 4- Total CO²e emissions from Fleet Fuel consumption over last 10 years of operation.

- Reported CO²e emissions from Fleet fuel usage have remained consistent since the reporting baseline year (2009/10), with only slight fluctuations showing historically. A Fleet Strategy has now been developed with the aim of replacing council-owned diesel and petrol vehicles with electrical equivalents. Plans are currently underway to phase in electric vehicles and fast charging points to replace refuse collection vehicles at Hollingdean Depot.

3.0 Working Towards Carbon Neutrality 2030

Figure 5 and Table 5 below show the council’s total annual emissions over the last ten years, and annual performance against our internal emission reduction targets. CO₂e emissions within the operational scope have reduced by a total of **52.6%** across the last 10 years, with an average annual reduction of **7.63%**

For the 2020/21 reporting year, Internal reduction targets were adjusted to align with the Council’s Citywide Carbon Neutral aims. The Tyndall Centre for Climate Change calculated that Brighton & Hove City Council needs to cut its carbon emissions by 12.7% per year starting in 2020.

Year	Total Emissions CO ₂ e	% Annual Reduction Target	% Annual Change	Total Aggregate Reduction
2011/12	38,428	-	-	-
2012/13	38,654	4.0%	0.59%	0.59%
2013/14	34,095	4.0%	-11.79%	-11.28%
2014/15	32,510	4.0%	-4.65%	-15.40%
2015/16	29,214	4.0%	-10.14%	-23.98%
2016/17	27,377	4.0%	-6.29%	-28.76%
2017/18	24,966	4.0%	-8.81%	-35.03%
2018/19	21,793	4.0%	-12.71%	-43.29%
2019/20	19,626	4.0%	-9.94%	-48.93%
2020/21	18,081	12.7%	-7.87%	-52.95%

Table 5- Annual Co₂e Emissions (Tonnes) & percentage change over last 10 years of operation.

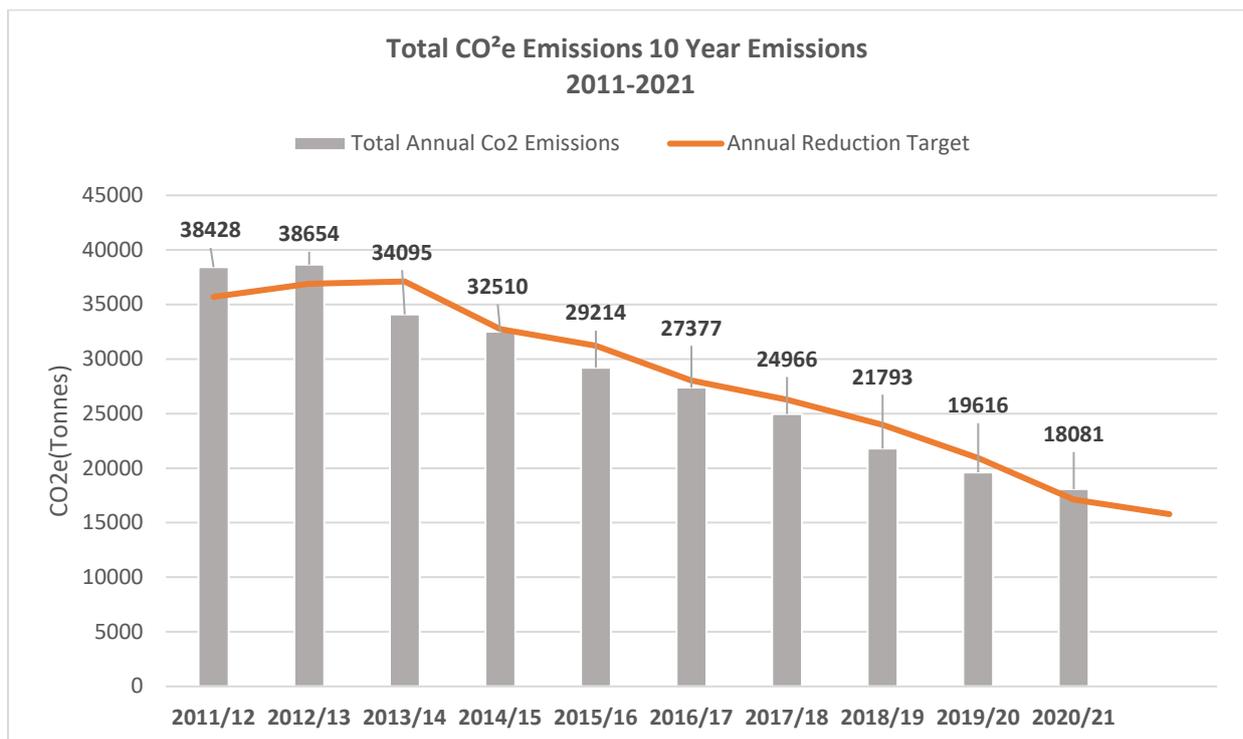


Figure 5- Annual Co₂e Emissions (Tonnes) over last 10 years of operation Vs Reduction Targets

Key Challenges

- A considerable proportion of achieved reductions are due to improved emissions factors in the grid. This is a result of an increase of renewable energy in the fuel mix and the closure of power stations using 'dirtier' fuels such as coal. Improvements to the carbon intensity of Grid provided power may not be as significant in the lead up to 2030.
- Emissions from gas sources remain consistently at around 9-10,000 tonnes CO₂e per annum. Gas consumption remains stable particularly in the schools & corporate portfolio and the only way to generate carbon reductions in this area is to further replacement of existing fossil fuel heating systems with low carbon alternatives like heat pumps. De-carbonisation audits conducted across the largest carbon emitting sites in March 2022 should provide a targeted list of priority sites.
- Emission from fleet fuel consumption have also been consistent in the last 10 years of operation. The work underway to start electrifying the fleet and the more accurate monitoring available at the depot pumping station should yield noticeable improvement over the next few reporting years.

4.0 Current Solar Photovoltaic Capacity on Council Buildings

The table below shows a breakdown of currently commissioned Solar Photovoltaic (PV) panel installations across council buildings as of March 2022. An estimate of the total yield has been provided, including the amount annual Carbon emissions avoided and a percentage of the total electricity consumption covered by the generation.

PV installations on School buildings encompass arrays that are owned outright by the schools, and panels that are owned by a third-party provider ('Rent-a-Roof' arrangement). The arrays in the latter category still impact directly on our Carbon footprint, however the schools buy the electricity produced by the panels at a discounted rate via a Power Purchase Agreement (PPA).

PV arrays on housing property are also split into two sections; installations that provide electricity to communal areas and ones that are connected to the tenant's personal supply. In the latter category the panels produce the same Carbon saving, but this does not directly impact the council's internal Carbon footprint as tenanted supplies are outside of reported scope.

Area	Est Annual Solar Yield (kWh)	As % of Annual Electricity Consumption 2020/21	Total Estimate Carbon Savings (Tonnes CO ₂ e)
Corporate	313,231	3.80%	73.03
Schools	643,099	9.84%	149.93
Housing (Communal)	273,703	6.43%	63.81
Total	1,230,033	6.44%	286.77

Table 6- Estimate Annual Impact of Solar PV Installs on Emissions within Scope of report 2020/21

Area	Est Annual Solar Yield (kWh)	Total Estimate Carbon Savings (Tonnes)
Housing (Tenanted Property)	712,390	166.09

Table 7- Estimated generation of Solar PV on tenanted housing stock

5.0 Conclusion

Whilst the council fell short of its **12.7%** emissions reduction target for 2020/21, the outcomes should probably be considered in isolation due to the atypical consumption profiles around Covid-19 lockdowns. Global patterns indicated an initial reduction in emissions from the outset of the emergence of Covid, although this proved temporary, and emissions quickly increased when lockdown measures were lifted. This was played out in our emissions data where gas consumption across the heating season in 2020/21 increased by **5%** year-on-year, despite building closures and reductions in occupancy.

Good progress was made in the reduction of Carbon Emissions relating to electrical equipment and street lighting, with reductions of around **25%** year-on-year, and a total **73%** over the last decade.

Reductions of emissions relating to fossil fuel heating and vehicle fuel have been limited in the last few reporting periods, and the council will have to continue to take steps to de-carbonise it wishes to meet its Carbon Neutral 2030 targets. The following ongoing carbon reduction activities should help the council tackle these specific emissions:

- A decarbonisation plan covering 50 operational and school buildings was developed in 2021/22. Energy efficiency audits were carried out across these sites to identify opportunities for Low Carbon Heating (Air Source Heat Pumps), improvements to building fabric, lighting upgrades and feasibility of renewable technologies. A pipeline of feasible projects was developed from this work to help focus available carbon reduction investment. The hope is to extend the Heat decarbonisation plan to cover a further 40-50 buildings in 2022/23.
- A Continuing programme of commissioning Solar PV and LED lighting retrofits to ease electricity demand. This will drive additional Carbon savings in the short term, but also free capacity in the electricity network to enable implementation of Low Carbon Heating alternatives.
- Electrification of the council's vehicle fleet to reduce reliance on diesel engines. Work is currently underway to install 10 rapid electric vehicle chargers at a Hollingdean depot and a programme for replacing waste collection vehicles with electric alternatives has been developed.

Appendices

Appendix A – Detailed Breakdown of Scope of Emissions Included/Excluded in this report

Operational Scopes	Emissions included in our reporting	Specific emissions excluded from our reporting
Scope 1 (Direct)		
Gas consumption: in buildings we fully own and control	Yes - Civic buildings, schools, and council housing communal areas (and all other buildings owned by BHCC)	Council Housing (Tenant level – household energy bills)
Gas consumption: in buildings we own and lease out to others	Mostly excluded, but some sites where a council appointed managing agent has been appointed are included.	Commercial property portfolio, unless included on corporate utility contracts
Gas consumption: in buildings we lease in from others	Yes leased-in properties	
Other fuel consumption (in owned transport – diesel, petrol, LPG)	Yes - vehicle fleet	
Process emissions (e.g., waste processing)	No	This is contracted out
Fugitive emissions (e.g., air conditioning and refrigeration leaks)	No	Emissions from air conditioning refrigerant have been excluded due to the nature of data collection – we will be looking to improve data collection going forward
Scope 2 (Energy Indirect)		
Purchased electricity: in buildings we fully own and control	Yes - Civic buildings, schools, and council housing (communal areas) (and all other buildings owned by BHCC)	Social Housing (Tenant level – household energy bills)
Purchased electricity: in buildings we own and lease out to others	Mostly excluded, but some sites where a council appointed managing agent has been appointed are included.	Commercial property portfolio, unless included on corporate utility contracts
Purchased electricity: in buildings we lease from others	Yes leased-in properties	
Purchased electricity: street lighting and illuminated bollards	Yes - street lighting and traffic signals	
Other fixed power sources	Yes - electric vehicle charging points	
Scope 3 (Other Indirect)		

Indirect emissions from purchased energy and fuels ¹	No	
Procured goods and services	No	We do not have monitoring systems in place
Sold goods and services e.g., emissions related to local people's use of local authority services	No	We do not have monitoring systems in place
Business travel	No	We no longer have monitoring systems in place
Commuter travel	No	We do not have monitoring systems in place
Waste disposal	No	We do not have monitoring systems in place
Water usage	No	We do not have monitoring systems in place
Leased assets and franchising, outsourced activities e.g., Leisure and swimming pools	No	We do not have monitoring systems in place

Appendix B – Annual Carbon Emissions Factors for 2020/21 published by Department for Business, Energy & Industrial Strategy

Fuel	Conversion Factor 2020/21 (KG CO₂e)	Unit
Elec	0.23314	Per kWh
Gas	0.18387	Per kWh
Diesel	2.54603	Per Litre
Gas Oil	2.75776	Per Litre
Unleaded Petrol	2.16802	Per Litre

[Greenhouse gas reporting: conversion factors 2020 - GOV.UK \(www.gov.uk\)](https://www.gov.uk/government/publications/greenhouse-gas-reporting-conversion-factors-2020)
