Item 5

23rd September 2025

Glasgow City Council

Net Zero and Climate Progress Monitoring City Policy Committee

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UPDATE ON CITYWIDE CO_2 EMISSIONS

Purpose of Report:

To provide Committee with an update on CO_2 emissions in the City following publication of the 2023 dataset by the Department of Energy Security and Net Zero.

Recommendations:

The Committee is asked to:

1) Note the contents of this report;
2) Note that this report will be updated annually.

Ward No(s):	Citywide: ✓
Local member(s) advised: Yes ☐ No ✓	consulted: Yes ☐ No ✓

1. Introduction

1.1 The Department for Energy Security and Net Zero (DESNZ), formerly the Department for Business, Energy and Industrial Strategy (BEIS), releases data on carbon emissions for local authorities annually, two years in arrears.

1.2 Each year, in addition to providing new data, the historic data available from DESNZ is updated due to recorded changes in the carbon intensity of the energy supply grid as a result in changes to the energy sources feeding into it, this is referred to as the 'carbon equivalent'.

2 Background

2.1 The previous report to Committee (August 2024) detailed the annual carbon emissions data for 2022. It highlighted that significant global events had resulted in high variability in the trend of emissions data across 2020-2022, with emissions dropping significantly in 2020 as a result of the Covid-19 pandemic, to then bounce-back up in 2021. The report outlined that in 2022,emissions reductions from the domestic sector in Glasgow contributed the most to the overall reductions and that this was likely influenced by the emerging cost-of-living crisis, which was characterised by high and volatile energy prices.

2.2 While this report provides information on Glasgow's CO_2 emissions in 2023, with comparisons against both baseline and the previous year's emissions, it should be noted that this paper is focused on scope 1 and 2 emissions in the city. Scope 3 emissions have not been fully quantified to a degree yet reliable due to the absence of a consistent and agreed methodology or baseline for comparison.[1] An agreed method for quantifying scope 3 emissions is being explored by Glasgow City Council in line with the development of a National approach by Scottish Government.

2.4 Waste emissions, which are considered under scope 3 emissions are currently included within the DESNZ dataset. However, waste emissions data was only made available in 2020 and as such was not available or included during the baseline year of 2006. As such it is not included in this reporting. In addition, waste emissions account for a small proportion of total carbon emissions in Glasgow (0.004%). Glasgow City Council continues to prioritise action to reduce the impact of waste through the Circular Economy Routemap and the Resource and Recycling Strategy.

3. Analysis of Emissions Data (2023)

3.1 Glasgow's CO_2 emissions in 2023 totalled 2,170.4 kilo-tonnes[2] of carbon dioxide ($ktCO_2$). This represents a **6.2% reduction from the 2022 total of**

[1] The DESNZ dataset includes (i) scope 1 emissions relating to gas consumption and transport (ii) scope 2 emissions relating to electricity consumption (iii) scope 3 emissions relating to waste generation and (iv) emissions generated or sequestered through Land Use, Land-Use Change and Forestry (LULUCF). As Glasgow currently reports on carbon emissions and not the full range of greenhouse gases, carbon emissions from waste generation are minimal as they do not consider methane which is the primary greenhouse gas emitted through waste disposal.

[2] 1 kilo-tonne (kt) is equal to 1000 tonnes.

2,314.1 ktCO₂ and a **49.3% reduction in emissions from the baseline** year of 2006. More data on this can be found in Appendix A within this report.

3.2 The trajectory of Glasgow's CO_2 emissions reduction is represented in Figure 1 below, including a 'projected pathway' and 'accelerated pathway', both developed as outputs of the recently completed Net Zero Routemap.[3] The 'projected pathway' plots a course for Glasgow to reduce absolute emissions by 60% by 2030 whilst the 'accelerated pathway' plots a course for Glasgow to reduce absolute emissions by 80%. Work is ongoing at present to onboard both the Net Zero Routemap and the Climate View tool– both of which will support Glasgow in its prioritisation of action toward net zero carbon by 2030. Remaining emissions will require to be sequestered[4] to achieve a 'net zero' position, but at present there is no established methodology locally or nationally to do so. Future committee papers will incorporate this analysis once available.

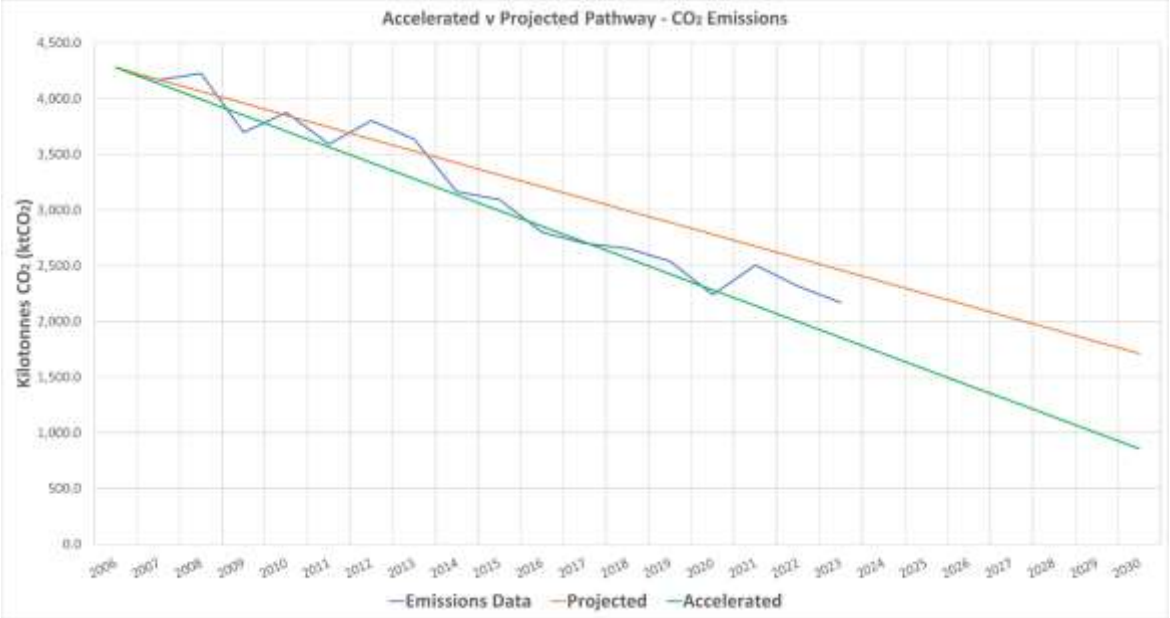


Figure 1 - Glasgow CO_2 Emissions 2006-23 and Projected/Accelerated Pathways

3.3 As a percentage of the baseline year of 2006, in 2023 Glasgow reduced its emissions by **3.4%**. Since 2006, Glasgow has reduced its emissions on average, as a percentage of the baseline year, by **2.9%**. These figures are outlined further in Appendix A. Given that emissions have reduced in 2023 by 49.3% from 2006, if the 2.9% average was to be maintained, emissions will have reduced by **69.6%** by 2030 against the baseline year – exceeding the projected pathway discussed above but falling short of the accelerated pathway. The impact of diminishing returns should be noted however as remaining emissions will become more difficult to abate.

[3] The Net Zero Routemap constitutes a technical assessment of how Glasgow as a city can reach net zero carbon by 2030 – outlining a projected pathway involving a 60% absolute reduction in emissions alongside an accelerated pathway involving an 80% reduction in emissions.

[4] Carbon sequestration is the capturing, removal and permanent storage of CO_2 from the earth's atmosphere.

3.4 The City Council, and city stakeholders, continue to drive progress towards net zero through (i) the delivery of our Climate Plan (currently under revision), (ii) our recently completed Net Zero Routemap, which provides a technical framework to support prioritisation towards net zero by 2030 and (iii) our third Carbon Management Plan which focuses on reducing GCC emissions and using such interventions as catalysts for wider climate action across the city.

3.5 The approach has manifested itself in several successful initiatives including, though not limited to, (i) installation of solar PV across the Council estate, (ii) increased cycle lane infrastructure, (iii) the Low Emissions Zone and (iv) the ongoing electrification of the city's bus fleet

4. Sectoral Emissions

4.1 Glasgow's carbon emissions can be broken down into sectors for further analysis. The sectoral emissions profile for the period 2006 until 2023 can be found in Figure 2 below.

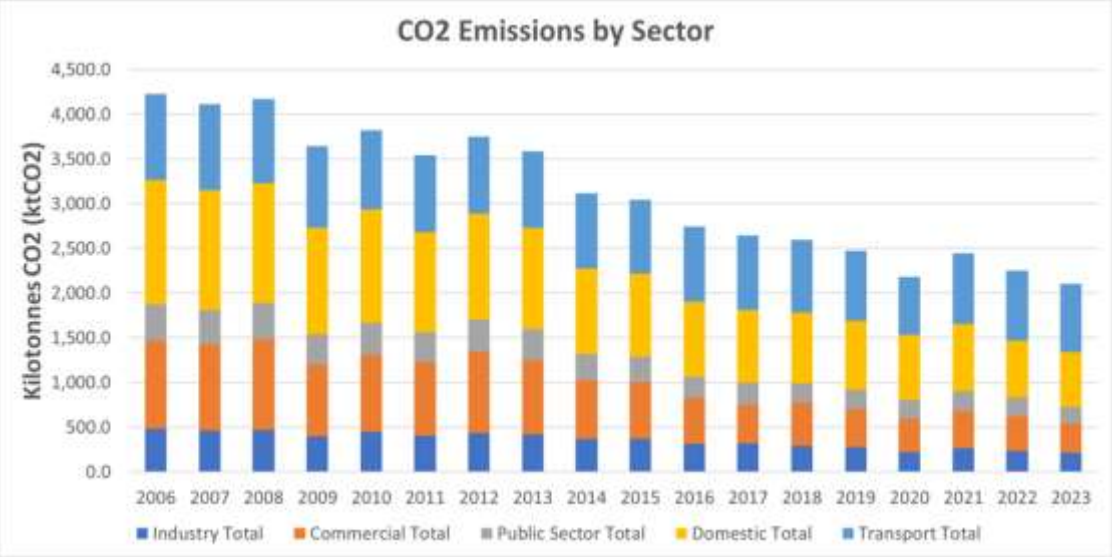


Figure 2 - CO_2 Emissions by Sector (2006-2023)

4.2 Table 1 below outlines total emissions per sector in 2023, following with reductions between 2022-23 and reductions from the baseline year of 2006. It highlights that:

- Emissions from Transport (i) were the highest of any sector in 2023 at **765 $ktCO_2$** (ii) witnessed the lowest reduction of any sector since 2022 (of 2.3%) and (iii) have reduced the least since baseline – by 20.2%.
- The biggest reduction of emissions between 2022-23 was from the Commercial sector at **55.8 $ktCO_2$ (14.5%)** and
- That the Commercial sector has seen the biggest percentage reduction from the 2006 baseline at **66.8%,** with Industrial and Domestic emissions having the second and third biggest reductions **(56.2% and 56.1% respectively)**.

Sector	Total emissions 2023	2022-23 emissions reduction ($ktCO_2$)	2022-23 emissions reduction (%)	2006-2023 emissions reduction (%)
Domestic	610.8	20.5	3.3%	56.1%
Transport	765	18.2	2.3%	20.2%
Industrial	210.5	25.6	10.8%	56.2%
Commercial	328.1	55.8	14.5%	66.8%
Public Sector	190.3	24	11.2%	53.2%

Table 1 - Sectoral Emissions decreases 2022-23/2006-23

4.3 Figure 3 below displays each sectors emissions reductions between 2022-23 as a percentage of the total emissions reduced during this period. It highlights that Commercial emissions[5] reductions accounted for 39% of overall reductions in 2023 with Industrial emissions[6] accounting for 18% of total reductions

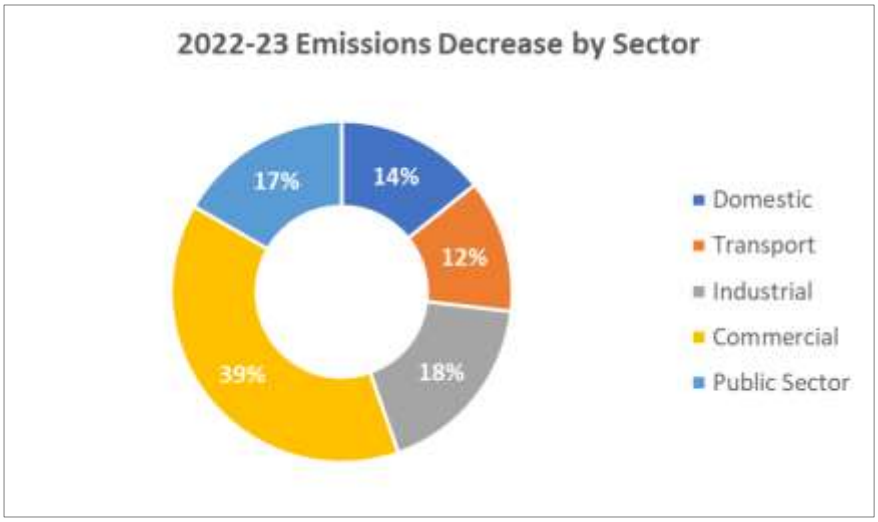


Figure 3 - Sectoral emissions decrease 2022-23 as a percentage of overall emissions reductions in the same period

4.4 The figures in Table 2 and Figure 3 above highlight that the Commercial sector was the largest contributor to total emissions reduced between 2022-23, whilst also reducing emissions the most relative to its own baseline year. This is likely due to a higher reliance of electricity over gas for heating within the commercial sector coupled with increased import of electricity from France during 2023[7] which would have lowered emissions more in sectors that have a higher

[5] Emissions from activity relating to business operations and public use, such as offices, retail stores, and restaurants.
[6] Emissions from activity related to manufacturing, production, storage, and distribution of goods, like factories, warehouses, and power plants.
[7] "UK Local and Regional Greenhouse Gas Emissions Statistics" , 2005-2023, DESNZ, pg. 1 https://assets.publishing.service.gov.uk/media/686538ace6c3cc924228943a/2023-local-and-regional-greenhouse-gas-emissions-statistics-statistical-release.pdf

reliance on electricity for heating.[8] Figure 4 below outlines the ratio of gas and electricity consumption per sector, clearly showing a higher reliance on electricity within the Commercial sector.

4.5 Data provided by NOMIS UK Business Counts highlights that there were 19,590 total enterprises during 2022 in Glasgow, which fell to 19,435 in 2023. This represents a 0.8% reduction, which could account for a small fraction of the emissions reductions from the commercial sector recorded over period from 2022-23 but most likely had a negligible effect on overall emission reductions in the city.

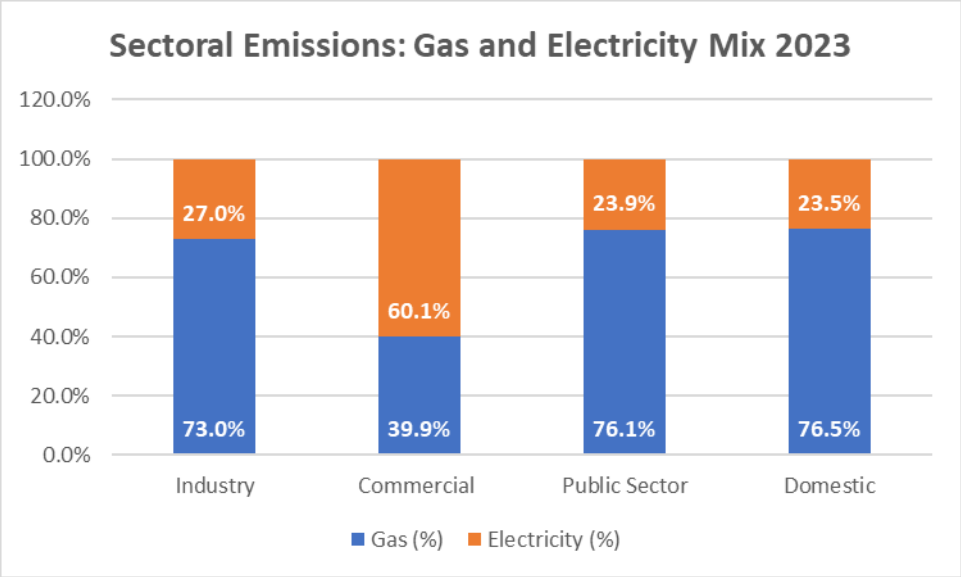


Figure 4 - Gas and Electricity mix per Sector 2023

[8] France has a lower emissions factor for its electricity than the UK due to higher proportion of nuclear energy in their power mix.

4.5 Figure 5 below tracks emissions reductions per sector from 2006 to 2023. It shows that domestic emissions have continued to fall since the 2006 baseline year, largely a result of the ongoing decarbonisation of the electrical grid. As reported in the previous year's citywide emissions Committee Paper, there was a sharp downturn in domestic emissions between 2021-22 which was likely a result from the onset of the cost-of-living crisis. Due to the financial impacts linked to the increase in energy prices, many residents likely sought to use less energy within the home, resulting in drop in emissions from the domestic sector in 2022. Whilst challenging to draw concrete conclusions from the DESNZ data, it is possible from looking at the 2023 data that the impact of the energy crisis may have become established as domestic emissions are not bouncing back in

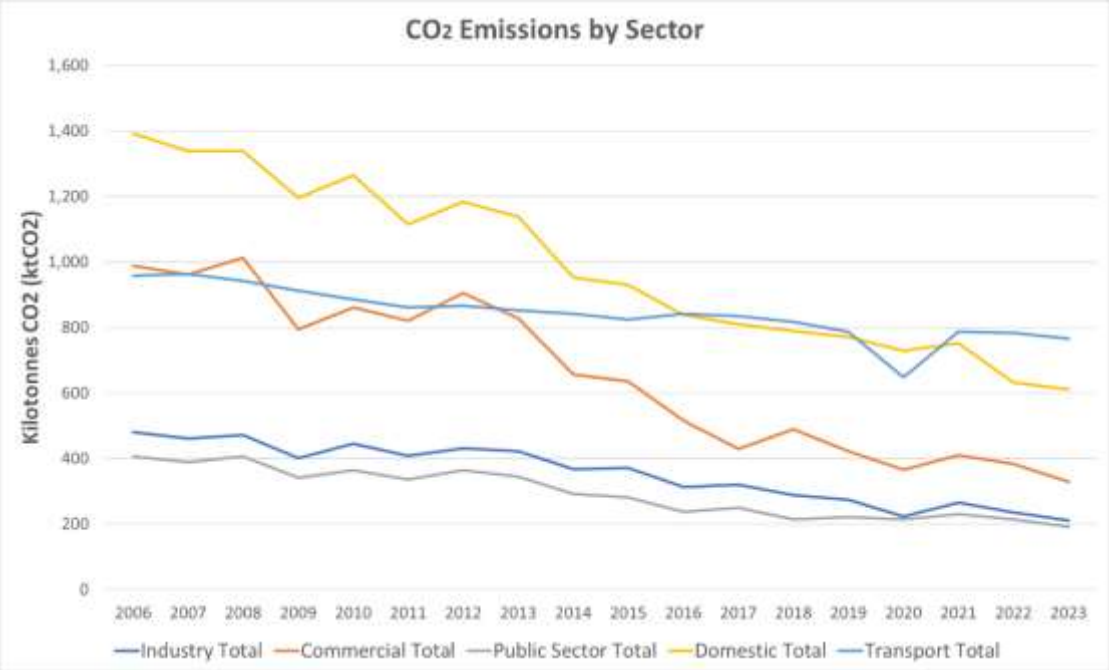


Figure 5 - CO2 Emissions by Sector

2023 in the same way transport emissions bounced back in 2021 after the first year of the pandemic.[9]

4.6 Energy consumption, particularly for heating and electricity, has decreased in part due to the cost-of-living crisis in previous years. However, transport levels have not seen a comparable drop. People still need to travel for work, school, essential services, etc, and many may lack viable alternatives to personal vehicles if they are not located in areas well serviced by public transport. The trend shown in Figure 5 above shows small reductions from the transport sector compared to notable drops in domestic emissions over the last three years which were likely partly in response to volatile energy prices. From 2022 to 2023, vehicle kilometres on local authority roads and motorways have remained roughly the same – increasing by 1.3% and 2.9% respectively. The number of licensed private diesel vehicles has reduced between 2022-23 by 6.9% whilst the number of plug-in vehicles (private and company owned) has increased by 38.6% in the same period.

[9] Domestic gas emissions have increased in 2022-23, suggesting there may be a slight bounce back from the drop seen in domestic gas emissions in 2022 (18%). This is discussed further in Section 5 of this report.

4.7 The data above highlights that vehicle kilometres and transport emissions witnessed no significant change between 2022 and 2023 but that there is also a positive upwards trajectory regarding the number of plug-in vehicles in the city – a trend that will hopefully persist in future years.

4.8 Whilst Transport and Domestic emissions tracked each other with relative proximity since around 2016, the Transport sector is now the highest emitting sector as of 2021, remaining the case in 2023.

4.9 During 2023, Glasgow also hosted the UCI Cycling World Championships in August which was reported to was have brought around 1 million spectators into the city. In addition, the artist Banksy held their 'Cut and Run' exhibition in the Gallery of Modern Art (GOMA) during the whole month of August – with the GOMA remaining open 24hrs a day for the whole month. The was reported to have brought 180,000 attendees into the city to see the exhibition. Both events will have resulted in significantly higher-than-average transport volumes across the city whilst they were on and any analysis of transport emissions in 2023 should be cognisant of this. Additionally, during the Banksy exhibition electricity consumption in the GOMA increased by 66% compared to the same period in 2022[10] – highlighting the impact that such events can have on consumption profiles across the Glasgow City Council estate and beyond.

5. Source Emissions

5.1 Figure 6 below outlines the trajectory of emissions reductions by source from the 2006 baseline, showing the 2023 decreases across all sources. Emissions associated with electricity consumption have had the largest reduction between 2022-23 (84.3 $ktCO_2$, 17.3%), followed by emissions from gas (43.7 $ktCO_2$, 5.1%) and then transport (18.2 $ktCO_2$, 2.3%). Emissions from electricity have reduced by 78.5% from 2006 (by 1,475.7 $ktCO_2$), something to remain cognisant of in the context of plans for increased electrification of heat and transport. Figure 7 then highlights how emissions in 2023 are split by source.

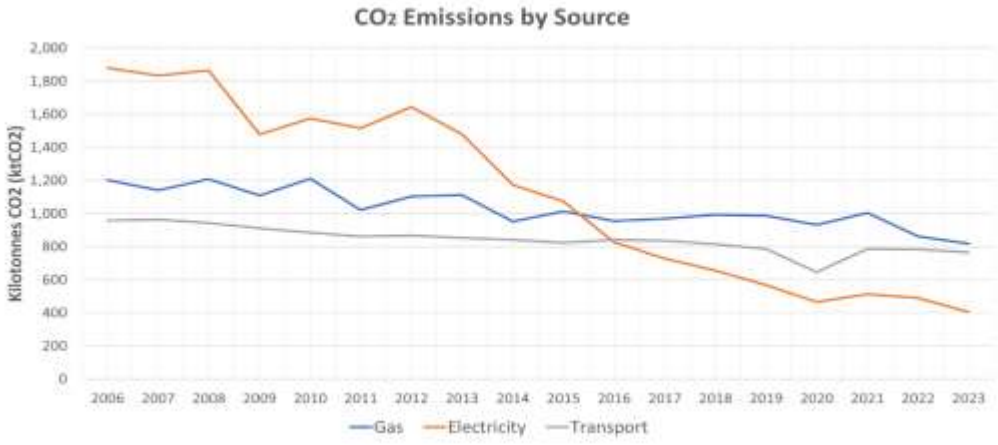


Figure 6 - CO_2 Emissions by Source 2006-23

[10] August 2023 GOMA electricity consumption: 62,876 kWh, August 2022 GOMA electricity consumption: 37,779 kWh

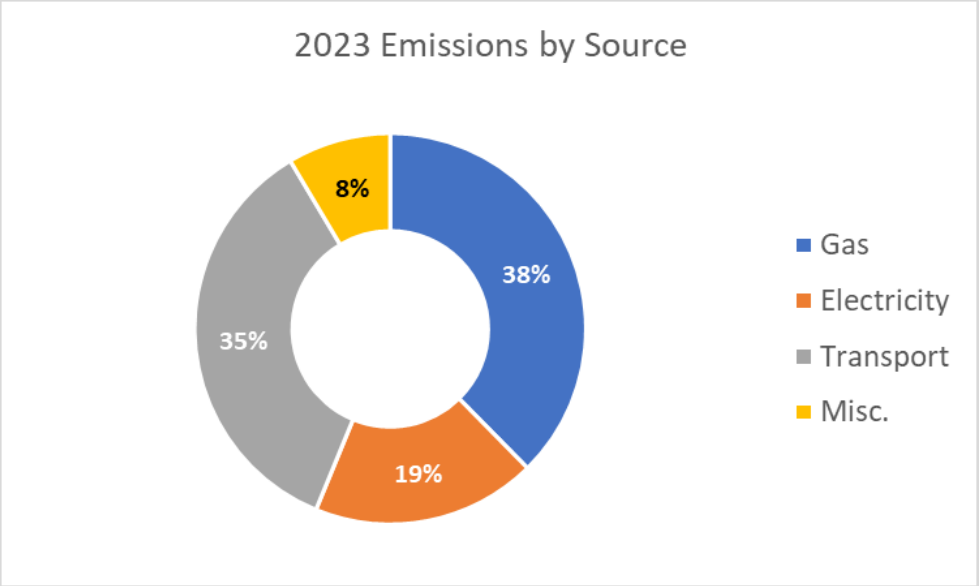


Figure 7 - CO_2 Emissions by Source 2023

5.2 Gas Emissions

5.2.1 In 2023, gas emissions dropped by 5.1% from the previous year, reducing by 43.7 $ktCO_2$. From baseline (2006), gas emissions have reduced by 384.4 $ktCO_2$ (32%). The annual reduction of 5.1% is a lower drop than seen in 2022, where gas emissions dropped by a significant 14.4%. By comparison, gas consumption (GWh) reduced by 4.3% between 2022-23 – highlighting that the majority of emission reductions (5.1% reduction) seen from gas in 2023 likely came from a reduction in consumption of gas via existing heating systems rather than building owners opting for alternative, low-carbon, forms of heating such as heat pumps or connection to a heat network. It should be noted however that domestic consumption of gas increased between 2022-23 by 1.8%, from 2,530.9 GWh to 2,560.6 GWh.

5.2.2 Degree Day analysis highlights that 2023 was 1.9% colder than 2022, which could correlate to the 1.8% increase in domestic gas consumption between 2022-23, though this is difficult to confirm as many different variables will influence gas consumption profiles across Glasgow.

5.2.3 Table 2 below shows gas emissions per sector and shows that domestic gas emissions increased slightly in 2023 by 1.2% (increasing by 5.4 $ktCO_2$). This could be correlated to the 1.9% increase in temperature in 2023 relative to 2022, or could indicate a small bounce back from the drop in gas emissions reported in 2022 as being potentially related to the energy crisis. However, domestic gas emissions have not bounced back to the same degree that transport emissions had done between 2020 and 2021[11], indicating that the impacts of the energy crisis upon households' energy consumption profiles may last into the longer term.

[11] Transport emissions dropped by 139 ktCO2 between 2019 and 2020, from 786 ktCO2 to 647 ktCO2. They then increased by 139 ktCO2 between 2020 and 2021.

Gas Emissions per Sector (ktCO2)					
	Industry	**Commercial**	**Public Sector**	**Domestic**	**TOTAL**
2006	209.3	146.8	177.3	667.5	1,200.8
2022	118.3	138.5	146.6	456.8	860.1
2023	100.8	121.1	132.4	462.1	816.4
22/23 DIFF	17.5	17.3	14.3	-5.4	43.7
22/23 % DIFF	14.8%	12.5%	9.7%	-1.2%	5.1%
06/23 DIFF	108.5	25.7	44.9	205.3	384.4
06/23 % DIFF	51.8%	17.5%	25.3%	30.8%	32.0%

Table 2 - Gas emissions per sector 2022-23/2006-23 ($ktCO_2$)

5.2.4 All other sectors reduced their gas-related emissions, with industry gas emissions dropping the most by 14.8% between 2022-23. Domestic gas

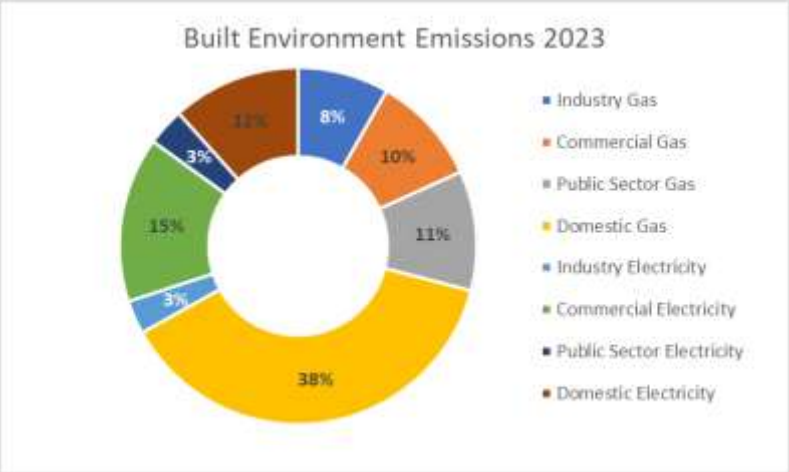


Figure 8 - Built Environment Emissions 2023

remains by far the biggest source of emissions from the built environment, as shown in Figure 8 below, underscoring the need to ensure that domestic properties are a key focus of any strategy or initiative to decarbonise heat in Glasgow.

5.2.5 Glasgow City Council continues to progress the retrofit of domestic properties through the Area Based Schemes (ABS) initiative which saw around 3,130 properties retrofitted across the financial years of 2021/22, 2022/23, and 2023/24. Whilst bringing notable socio-economic benefits in terms of tackling fuel poverty, ABS also contributes to the downward trend in gas consumption in Glasgow, which reduced by 4.3% between 2022-23 (from 4,707 GWh to 4,505.6 GWh). From the baseline year of 2006 to 2023, Glasgow has reduced its gas consumption by 31.3% (from 6,555 GWh to 4,505.6 GWh). Appendix B,

contained within this report, includes a graph of Glasgow's gas and electricity consumption since 2006.

5.3 Electricity Emissions

5.3.1 In 2023, electricity emissions dropped by 17.3% from the previous year, reducing by 84.3 $ktCO_2$. From the baseline, electricity emissions have reduced by 1,475.7 $ktCO_2$ (78.5%). Figure 9 below highlights the sectoral split in total electricity emissions reductions over the last data year (2022-23) – highlighting that the Commercial sector contributed the most to overall reductions in electricity emissions between 2022-23 (37.5 $ktCO_2$, 44%), with Domestic electricity emissions contributing 30% (25.2 $ktCO_2$) to overall electricity emissions reductions in the same period.

5.3.2 By comparison, electricity consumption dropped by 1.7% between 2022-23. This confirms that reduced electricity emissions are related more to the reduced carbon intensity of the grid during 2023 rather than individuals consuming less electricity. The view that electricity consumption per capita remained largely static across 2022-23 is supported by assessing domestic electricity consumption against population growth, both of which saw similar increases of 2.2% and 2.7% respectively[12]. It should also be noted that individuals on Economy 7 tariffs[13] reduced their total consumption by 4.8% during the same period.

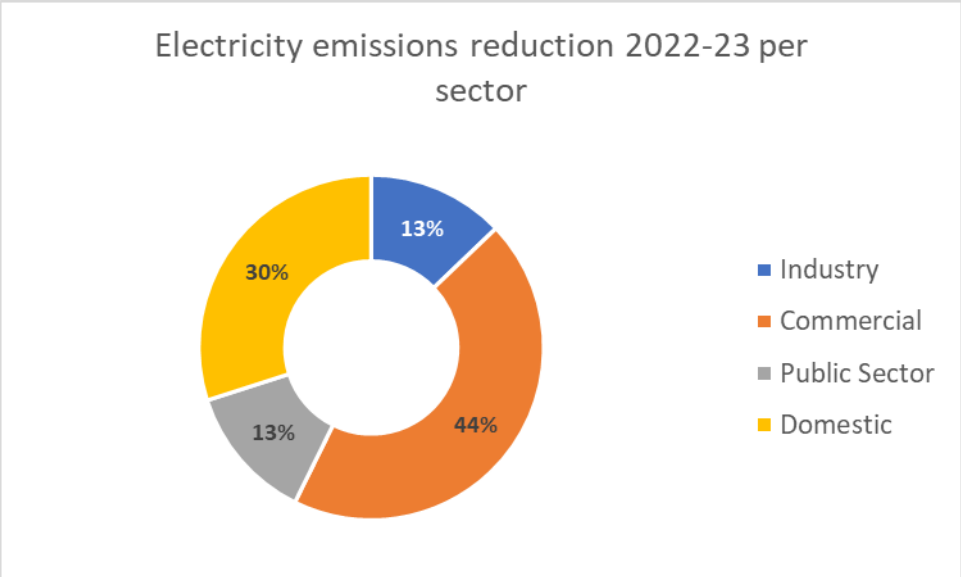


Figure 9 - Electricity emissions reduction 2022-23 per sector

5.3.3 Non-domestic consumption of electricity dropped 3.1% between 2022 and 2023. During 2023, 22 commercial buildings was constructed compared to 23 in 2022 – one less. Additionally, the annual rate of business closures increased by 0.8%. These statistics account could account for a portion of the reduced electricity demand witnessed in the non-domestic sector in 2023, but it is likely

[12] Total domestic electricity consumption in Glasgow rose from 665.4 GWh in 2022 to 680.2 GWh in 2023. During the same time, the population of the city grew from 622,050 to 638,760.

[13] "Economy 7" offers a cheaper electricity tariff for 7 hours during the night to try and reduce challenges with peak demand on the electricity grid.

that the 3.1% drop is related more to reduced demand for electricity at building level. The consumption of electricity has reduced by 30.6% (1,043.3 GWh) from the baseline year of 2006 (in which consumption totalled 3,405 GWh). Appendix B, contained within this report, includes a graph of Glasgow's gas and electricity consumption since 2006.

5.3.4 Table 3 below provides an overview of electricity emissions in 2006, 2022, and 2023 per sector to understand both the annual reduction between 2022-23 and also progress against the baseline year of 2006. It shows that Industrial electricity emissions have reduced the most since 2022, by 22.6%, followed by Public Sector electricity emissions which reduced by 20.6% in the same period. Domestic electricity emissions reduced by the least in the same period, reducing 15.1%. Assessing progress from the 2006 baseline, all sectors have reduced by over 75% - a significant milestone for the city. Whilst Domestic electricity emissions have reduced the most since baseline (80.1%), there is only a 3.6% difference between the largest and smallest reductions, with the smallest being the Industrial sector which has reduced by 76.5% since baseline.

Electricity Emissions per Sector (ktCO2)					
	Industrial	**Commercial**	**Public Sector**	**Domestic**	**TOTAL**
2006	158.1	813.4	193.8	713.9	1,879.2
2022	48.0	220.2	52.2	167.4	487.9
2023	37.2	182.7	41.5	142.2	403.6
22/23 DIFF	10.9	37.5	10.7	25.3	84.3
22/23 % DIFF	22.6%	17.0%	20.6%	15.1%	17.3%
06/23 DIFF	120.9	630.7	152.3	571.7	1475.7
06/23 % DIFF	76.5%	77.5%	78.6%	80.1%	78.5%

Table 3 - Electricity emissions per sector 2022-23/2006-23 ($ktCO_2$)

5.3.5 Emissions from electricity since the baseline year have reduced significantly. This can be attributed to both the ongoing decarbonisation of the electricity grid, which has seen the carbon intensity of the electricity grid fall 56.4% from 2006 to 2023, and the local influence that Glasgow City Council and city stakeholders have had in delivering renewable energy projects and energy efficiency measures across the city. In the UK, emissions from electricity have reduced by 76.14% since 2006 which could indicate that local progress on decarbonisation is making a difference in Glasgow which has seen electricity emissions reduce by slightly more (78.5%) in the same period.

5.3.6 Glasgow City Council continues to contribute positively to the downward trend witnessed in emissions from electricity through increased penetration of local

renewables into the grid through initiatives such as the recently installed solar array on the roof of Kelvinhall in 2024, something that will be reflected in next year's report to committee.

5.3.7 Emissions from electricity generation in 2023 generally decreased across the UK due to (i) increased share of renewable meeting demand and (ii) lower gas use in UK power stations, reflecting higher electricity imports from France[14] (unlike 2022 when the UK had higher than usual exports).

5.4 Transport Emissions

5.4.1 In 2023, transport emissions dropped by 2.3% from the previous year, reducing by 18.2 $ktCO_2$. From baseline (2006), transport emissions have reduced by 193.4 $ktCO_2$ (20.2%). The total drop in emissions from 2022-23 and 2006-23 is outlined in Table 5 below. Table 4 shows that, in 2023, emissions from 'A Roads', 'Diesel Railways' and 'Other' all increased slightly whilst emissions from Motorway and Minor Road use reduced (by 3.9% and 2.8% respectively). From the 2006 baseline year, emissions from A Road use has reduced the most (34.5%) with emissions from Minor Road use reduced by the second most (25.1%).

Transport Emissions (ktCO2)						
	Road Transport (A roads)	**Road Transport (Motorways)**	**Road Transport (Minor roads)**	**Diesel Railways**	**Transport 'Other'**	**TOTAL**
2006	225.0	306.9	417.0	3.3	6.1	958.4
2022	145.8	305.7	321.5	2.8	7.4	783.2
2023	147.5	293.9	312.5	3.0	8.1	765.0
22/23 DIFF	-1.7	11.8	9.0	-0.2	-0.8	18.2
22/23 % DIFF	-1.2%	3.9%	2.8%	-5.9%	-10.2%	2.3%
06/23 DIFF	77.5	13.1	104.5	0.4	-2.0	193.4
06/23 % DIFF	34.5%	4.3%	25.1%	10.9%	-31.9%	20.2%

Table 4 – Transport emissions 2022-23/2006-23 (ktCO2)

5.4.2 Figure 10 below shows the three highest emitting categories of transport in Glasgow from 2006 to 2023. It shows that transport on minor roads was the highest emitter in 2006 and has since reduced the by the most until 2021 when there was a post-Covid spike. Transport on A roads has always been the lowest emitter of the three and also did not witness as pronounced a drop as Motorway and Minor Road travel did in 2020 due to Covid-19. Motorway transport has seen a generally increasing trend since 2006 before seeming to peak in 2017

[14] France has a lower emissions factor for its electricity than the UK due to higher proportion of nuclear energy in their power mix.

and then witnessing a sharp downturn in 2020 due to Covid-19. Emissions from motorway transport appear to now be travelling in a downwards trend but future years' data is required to confirm that this is not a temporary change.

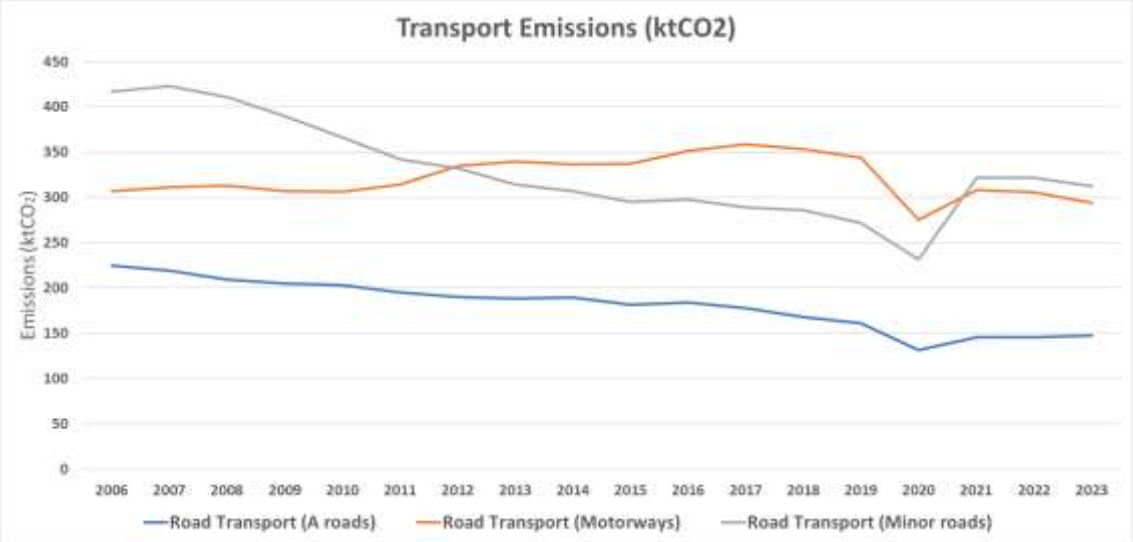


Figure 10 - Transport emissions (ktCO2) 2006-23

6. Local Authority Comparison

6.1 Analysis of the carbon emissions of the four biggest emitting local authorities in Scotland, set out in Table 5, shows that Fife continues to have the largest carbon emissions in 2023, followed by Glasgow, Edinburgh then Falkirk. Glasgow has the lowest emissions per capita at 3.4 tCO_2 (reducing from 3.7 tCO_2 in 2022) and has reduced the most from the 2006 baseline and second most since 2022.

	Total emissions ($ktCO_2$)	Per capita (t)	Reduction 2006-23	Reduction 2022-23
Glasgow	2,170.4	3.4	49.3%	6.2%
City of Edinburgh	1,950.9	3.7	47.7%	3.2%
Falkirk	1,914.9	12.1	45.2%	10.6%
Fife	2,897.6	7.8	38.1%	-0.8%

Table 5 - Local Authority Emissions Data

7. Conclusions

7.1 Glasgow in 2023 has reduced its emissions by 49.3% from our baseline year of 2006 and by 6.2% from 2022 (3.4% as a percentage of the baseline year). After witnessing a significant drop in emissions during 2020 due to Covid-19, and then a 'bounce-back' as normal life resumed in 2021 – **Glasgow's emissions in 2023 are now lower than they were in 2020, during the first year of the pandemic** (2,170 $ktCO_2$ and 2,242.1 $ktCO_2$ respectively).

7.2 The data and analysis provided in the report demonstrate that policies and projects aimed at supporting Glasgow's transition to a net zero carbon city are likely having a positive impact. The Council continues to deliver work which is aimed at reducing transport emissions This includes (i) expanding the active travel infrastructure in the city through the City Network, (ii) the Liveable Neighbourhoods and Avenues programmes, (iii) working with transport operators to enhance public transport service provision in the city through the Glasgow City Region Bus Partnership & City Centre Taskforce groups, (iv) behaviour change initiatives such as annual campaigns and funding for communities to increase access to active travel choices and (v) targeting higher levels of publicly accessible ECVI[15] through regional collaboration. Initiatives such as these will continue to contribute to an environment where it is convenient for citizens to make lower carbon transport choices as well as reducing transport inequality. Additionally, Glasgow continues to support the national shift towards renewable electricity with the rollout of solar PV across the estate alongside the contribution of low carbon or renewable electricity into the national grid through the GRREC[16] and the Cathkin wind turbine.

7.3 Last year's Committee paper suggested that emissions may rise in coming years after being depressed by the pandemic, the energy crisis and the corresponding cost-of-living crisis. However, 2023's data suggests differently – that Glasgow continues on a trend towards net zero carbon, currently with less emissions than during 2020 – a year that brought significant disruption to normal life because of the pandemic. Gas consumption continues to be the highest source of emissions in the city, with Transport and Domestic being the highest emitting sectors. **Domestic gas consumption in 2023 accounts for more emissions in Glasgow than all electricity consumption combined**. The data and analysis provided in this report underscores the need for continued focus on transport policy in the coming years alongside a delivery of a heat decarbonisation strategy which has a strong focus on the domestic sector. The ambition of the city to deploy heat networks as a mechanism of reducing fuel poverty and heating-based emissions will not only help to reduce our hard-to-decarbonise sectors but, by utilising locally available heat sources, will provide greater energy security for the city – minimising the impacts from the types of global economic shocks that continue to cause fluctuating energy prices.

7.4 Work continues to progress the establishment of a Model for Climate Investment which will help to unlock delivery of net zero at the pace and scale required for Glasgow – something that future years of emissions reporting will reflect. The Model for Climate Investment will support the continued delivery of Glasgow's LHEES[17] which outlines City Council intentions to roll out district-scale heat networks to address heating-based emissions and tackle fuel poverty, as well as addressing the energy efficiency of the Council's estate.

[15] Electric Vehicle Charging Infrastructure
[16] Glasgow Recycling and Renewable Energy Centre
[17] Local Heat and Energy Efficiency Strategy

7.5 Robust climate governance is in place across the city to facilitate and steer our journey towards net zero carbon – with the internal Climate and Sustainability Board alongside the citywide Sustainable Glasgow Partnership helping to ensure the costs and benefits of the transition are shared equitably across the city in coordination with key city stakeholders.

8 Policy and Resource Implications

Resource Implications:

Financial:	There are no new financial implications arising from the report.
Legal:	The report raises no new legal issues.
Personnel:	The Climate Plan for Glasgow is managed by the Sustainability team.
Procurement:	No relevant procurement issues.

Equality and Socio-Economic Impacts:

Does the proposal support the Council's Equality Outcomes 2021-25? Please specify.	Yes, it is broadly supportive of all the Council's Equality Outcomes.
What are the potential equality impacts as a result of this report?	No significant impact - an EQIA screening has been undertaken. Climate Change impacts all of society, however this can disproportionately impact on those most vulnerable communities. We must ensure that our actions minimise the negative impacts that climate change has on our most vulnerable communities, while also maximising their ability to participate and benefit from our just transition to a low carbon economy.
Please highlight if the policy/proposal will help address socio-economic disadvantage.	Yes. Examples would be reduced fuel poverty through localizing energy supplies and providing some protection against increasing energy costs, and increased social inclusion through improved public transport infrastructure.

Climate Impacts:

Does the proposal support any Climate Plan actions? Please specify:	Yes. This report supports the Climate Plan ambition of attaining Net Zero Carbon by 2030.
What are the potential climate impacts as a result of this proposal?	This report describes the cumulative reductions in carbon emissions until 2020. The progress demonstrated in this report contributes to less damage to the environment and contributes directly to lessening the pace of climate change. This report also describes progress on efforts to reduce carbon emissions. Many of the projects currently underway, as well as those in development will help sustain existing and create new jobs and require investment, thus contributing to the growth of a greener economy in Glasgow.
Will the proposal contribute to Glasgow's net zero carbon target?	Yes. This report highlights the emissions of the city and supports the Climate Plan ambition of attaining net zero carbon by 2030.
Privacy and Data Protection Impacts:	No data protection or privacy implications. This report presents analysis of publicly available data and does not represent any privacy or data protection issues.

9 Recommendations

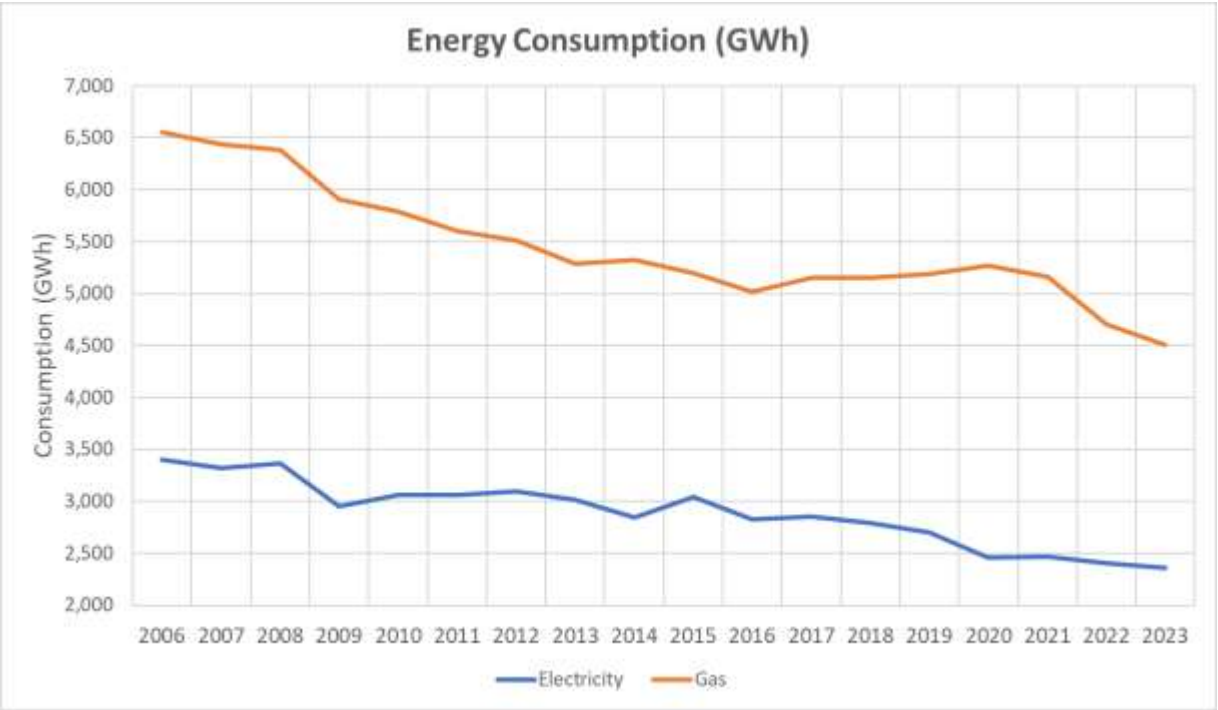
The Committee is asked to:

1) Note the contents of this report;
2) Note that this report will be updated annually.

Appendix A – Glasgow Carbon Emissions

Calendar Year	Grand Total ($ktCO_2$)	Reduction (per annum) ($ktCO_2$)	Reduction (as % of baseline year)
2006	4,279.3		
2007	4,169.9	109.4	2.6%
2008	4,228.1	-58.2	-1.4%
2009	3,697.6	530.5	12.4%
2010	3,874.8	-177.2	-4.1%
2011	3,593.4	281.4	6.6%
2012	3,805.2	-211.8	-4.9%
2013	3,637.0	168.2	3.9%
2014	3,167.2	469.8	11%
2015	3,095.0	72.2	1.7%
2016	2,800.1	295	6.9%
2017	2,700.3	99.8	2.3%
2018	2,656.2	44.1	1.0%
2019	2,539.7	116.5	2.7%
2020	2,242.1	297.6	7.0%
2021	2,505.0	-262.9	-6.1%
2022	2,314.1	190.9	4.5%
2023	2,170.4	143.7	3.4%
Average		**124.1**	**2.9%**

Appendix B – Electricity and Gas Consumption from Baseline


Energy Consumption (GWh)
Consumption (GWh)
7,000
6,500
6,000
5,500
5,000
4,500
4,000
3,500
3,000
2,500
2,000
2006 2007 2008 2009 2010 2011 2012 2013 2014 2015 2016 2017 2018 2019 2020 2021 2022 2023
Electricity
Gas