Item 3

20th September 2022

Glasgow City Council

Net Zero and Climate Progress Monitoring Committee

Report by Executive Director of Neighbourhoods Regeneration and Sustainability

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UPDATE ON CITYWIDE CO_2 EMISSIONS

Purpose of Report:

To provide Committee with an update on the latest data with regards to CO_2 emissions in the city.

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 In 2010, the Council established Sustainable Glasgow, a partnership that, based on the 2009 Sustainable Glasgow Report commissioned by Glasgow City Council, set out a target of reducing the city's carbon emissions by 30% by 2020 on a 2006 baseline.

1.2 In Autumn 2012, Glasgow, in partnership with three other European Cities (Ghent, Gothenburg & Riga) committed to delivering the EU funded STEP UP (Strategies Towards Energy Performance and Urban Planning) project, which successfully delivered a methodology for enhancing sustainable energy plans for cities across Europe. Through the Step-Up project, the 2010 Sustainable Glasgow Report was enhanced and became the Sustainable Glasgow - Energy and Carbon Masterplan (ECMP).

1.3 The then Executive Committee, now City Administration Committee, approved the Council's Energy and Carbon Masterplan for the City in April 2015.

1.4 The Masterplan set the target for Glasgow to achieve a 30% reduction in carbon emissions by 2020 on a 2006 baseline and identifies 33 discrete actions that, if delivered, would help the City achieve its target.

1.5 In February 2019, a Climate Emergency Working Group (CEWG), which included representation from all political groups of the Council as well as a range of representation from key sectors, was established.

1.6 The CEWG culminated in the declaration of a Climate and Ecological Emergency in 2019, alongside 61 recommendations for Glasgow and the establishment of our Net Zero Carbon by 2030 target.

1.7 In 2021, the City Council unanimously approved our Climate Plan, which set out how Glasgow would reach its Net Zero Carbon by 2030 target, carrying on from the ECMP's 2020 target.

2 Background

2.1 The Department for Business, Energy, & Industrial Strategy (BEIS), formerly the Department for Energy and Climate Change (DECC), releases data on energy consumption and carbon emissions for local authorities annually, two years in arrears. The data available from BEIS is updated due to changes in the carbon equivalent of energy generation each year and the changes backdated from its previous releases.

2.2 This report updates the carbon emissions for Glasgow based on the most recent data, covering the year 2020.

2.3 It should be noted that this paper only assesses emissions in the city from Scope I and II. Scope III emissions have not been quantified to a degree yet reliable at this point. Quantification of Scope III emissions remains a challenge

for all cities, with work currently underway to build better processes by which to confidently quantify them.

2.4 On the 23rd of March 2020, the nation entered the first in a string of lockdowns on normal activity to tackle the emergence of the Covid-19 virus. This had a significant impact on the emissions profile of Glasgow in 2020 and the following report takes cognisance of this.

2.5 CO_2 emissions reductions will most certainly have been positively impacted due to the pandemic which makes it challenging to quantify progress on carbon mitigation made during such an anomalous year. This report seeks to outline and analyse the profile of the changes to Glasgow's carbon footprint in 2020. It would be imprudent to assume these reductions will remain in 2021.

3 Results: Analysis of Emissions Data (2020)

3.1 Glasgow Carbon Dioxide Emissions

3.1.1 Glasgow's CO_2 emissions in 2020 totalled 2,118 kilo-tonnes[1] of carbon dioxide ($ktCO_2$). This represents a 13.3% decrease from the 2019 total of and a **50% decrease from a 2006 baseline**, meaning that having met our target in 2015, Glasgow has exceeded its 2020 target by 20%.

3.1.2 The trajectory of Glasgow's CO_2 emissions reduction is visually represented in Figure 1. Glasgow's target to achieve a 30% reduction in carbon emissions by 2020 from the baseline year (2006) equates to a reduction of 1,264 $ktCO_2$. It is noted that Glasgow has reduced its emissions by 2,097 $ktCO_2$ (50%) between 2006 and 2020.

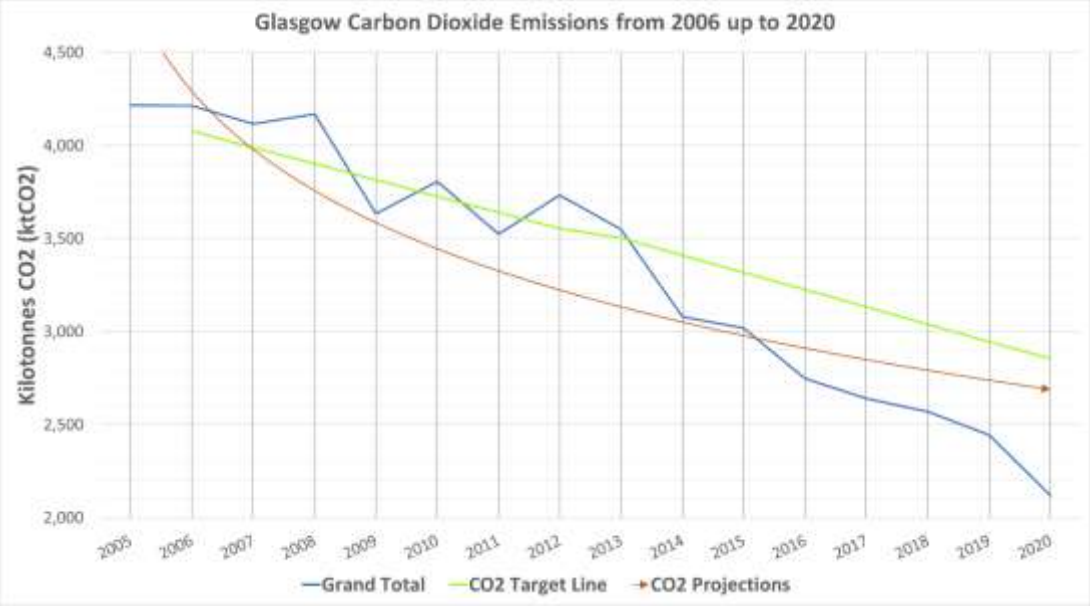


Figure 1 - Carbon Emissions Reductions 2006-2020

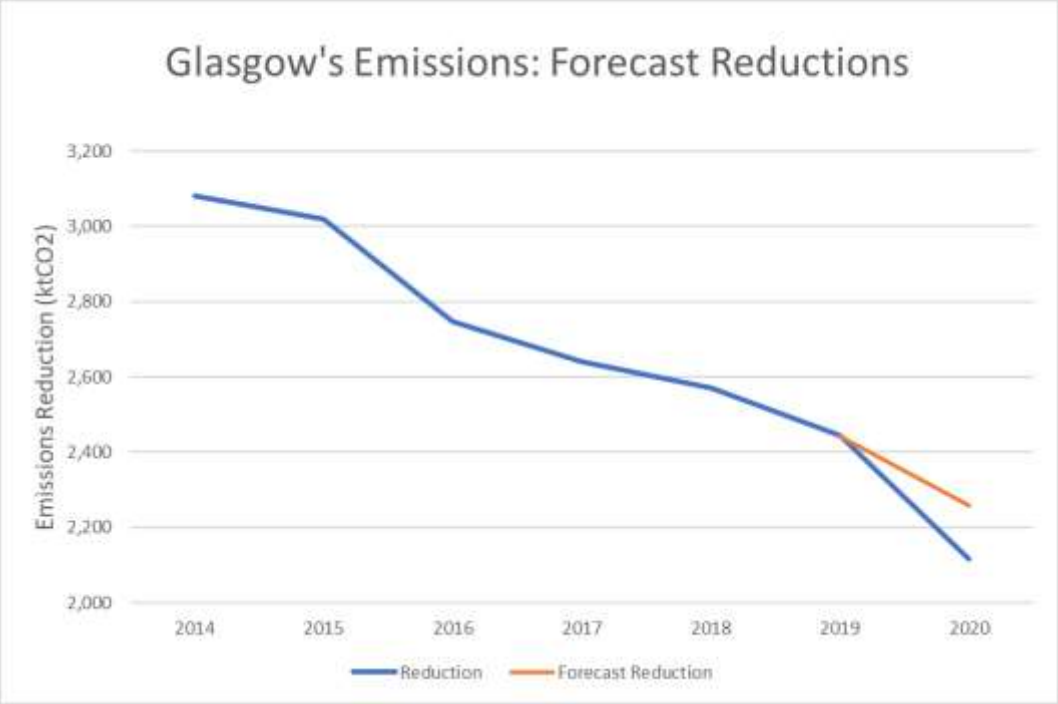
[1] 1 kilotonne (kt) is equal to 1,000 tonnes

3.1.3 The data outlines that in 2020, Glasgow hit a milestone figure of reducing its emissions by 50%. This is a significant achievement but one that comes with strong caveats due to the implications of the Covid-19 pandemic. It is now the responsibility of the city council and partners to ensure we retain as much of the 13.3% drop in emissions from 2019 as we can. Below, Figure 2 shows a projection of what our carbon emissions reduction could have looked like in the absence of a pandemic. Whilst the figures are modelled[2], they indicate the notable impact that the pandemic has had upon Glasgow's emissions.

3.1.4 Using the projected figures, we can estimate that emissions reductions, following a similar course to previous years, may have produced an emissions reduction of approximately 7.6% from 2019 in the absence of the Covid-19 pandemic.

3.1.5 However, in relation to the 30% reduction target by 2020 set out in the Energy and Carbon Masterplan, 2019 figures showed that Glasgow had reduced its emissions by **41%**, 11% ahead of our target and one year before the deadline. Regardless of the impact of the pandemic, we have met and significantly exceeded our target ahead of schedule.

3.1.6 This is highlighted further in looking at the projected emissions reductions in the Energy and Carbon Masterplan, which showed that in 2015, per capita



[2] This projection was modelled using exponential smoothing forecasting in Microsoft Excel which is based on the AAA version (additive error, additive trend and additive seasonality) of the Exponential Triple Smoothing (ETS) algorithm. Exponential Smoothing Forecasting creates a prediction that is a weighted sum of past observations, explicitly using an exponentially decreasing weight for past observations.

emissions were projected to sit at 5.3 tCO_2 in 2020.[3] Figures show this sits at 3.3 tCO_2 for 2020 and 3.9 tCO_2 in 2019.

3.1.7 Using a forecasting model similar to the one shown in Figure 2 above (see Footnote 2) we can project where Glasgow could be in 2030 in terms of absolute carbon reductions. Figure 3 below outlines this. This employs a linear regressive model based on our carbon figures for previous years to project our trajectory to 2030. It employs a 95% confidence interval to create upper and lower limits, meaning that the model projects a range within which emissions can be predicted to lie with 95% confidence.

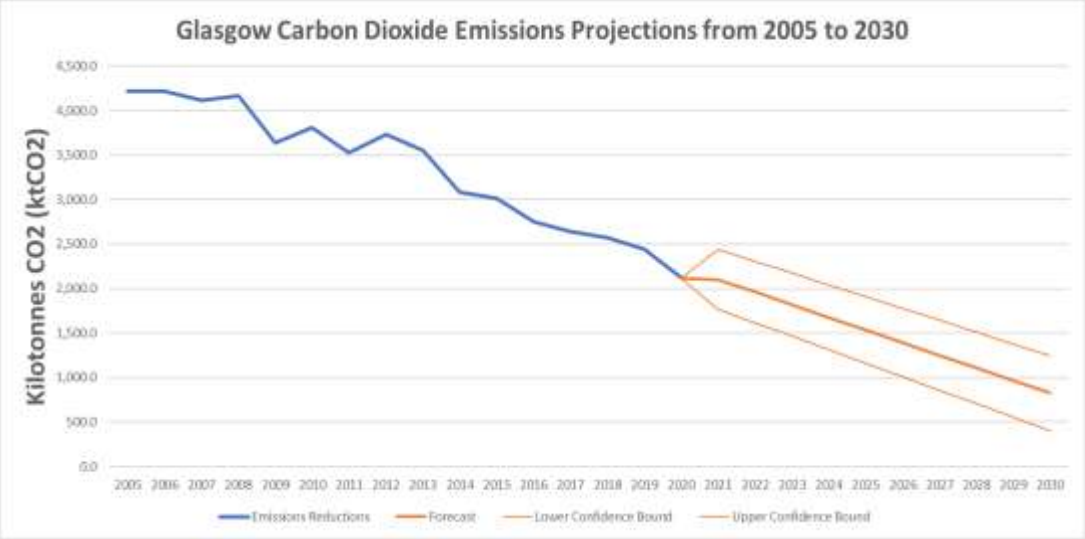


Figure 3 - Projected Carbon Emissions 2030

3.1.8 The median projected figure in 2030 is 824.3 $ktCO_2$ which indicates that the potential amount of residual carbon in the city will be approximately 20% of the 2006 baseline.

3.19 It should be noted that these are high level projections and are based solely on previous figures. The projections through to 2030 will be recalibrated with each annual report to ensure continued understanding of the residual carbon emissions in the city. Furthermore, work to develop a project pipeline of net-zero carbon projects will allow us to develop emissions reduction scenarios and project future reduction based on interventions planned for deployment.

4. Sectoral Emissions

4.1 Glasgow's carbon emissions can be broken down into sectors to allow for further analysis. The sectoral profile for the period 2006 until 2020 can be found in Figure 4 below.

[3] Energy and Carbon Masterplan, Glasgow City Council, 2015, p. 36

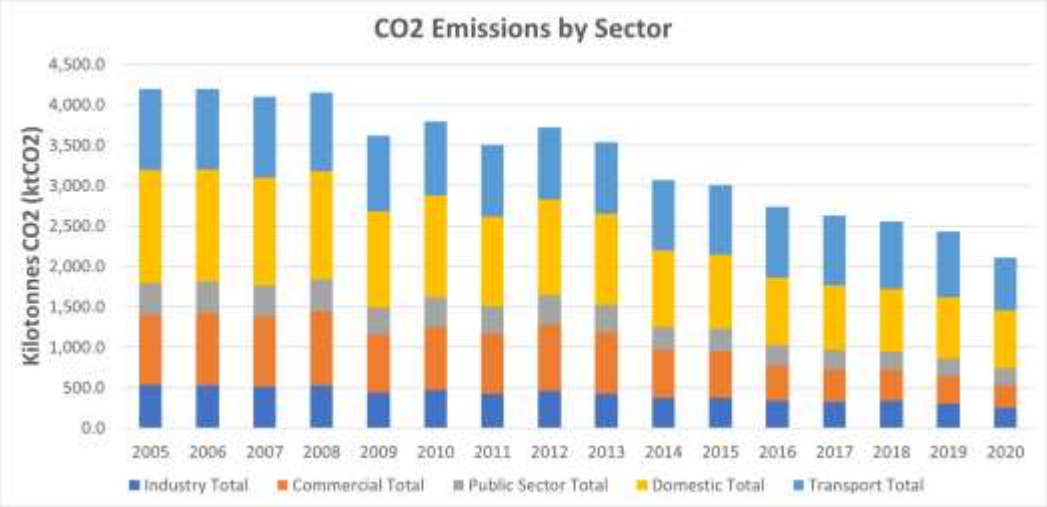


Figure 4 - Sectoral Emissions

4.2 The changes in sectoral emissions between 2019 and 2020 are outlined below:

- The domestic sector: 44 $ktCO_2$ reduction (-6%)
- The transport sector: 162 $ktCO_2$ reduction (-20%)
- The industrial sector: 48 $ktCO_2$ reduction (-16%)
- The commercial sector: 59 $ktCO_2$ reduction (-17%)
- The public sector: 13 $ktCO_2$ reduction (-6%)

4.3 The emissions trend and sectoral mix represented in Figure 3 alongside the figures in 4.2 are indicative of the impacts of the Covid-19 pandemic. The transport sector witnessed a 20% reduction in emissions, which is tenfold higher than the average reduction in emissions of 2% in a sector that can often see emissions levels fluctuate annually. Transport emissions are discussed further in Section 5.

4.4 As 2020 saw millions of people across the country working from home or furloughed and asked to stay home, the respective 16% and 17% drops in industrial and commercial emissions compared to the 6% drop in domestic emissions is reflective of this. Offices, shops, and hospitality venues largely sat empty whilst many found themselves spending considerably more time in their homes. These findings are analysed later in this report.

4.5 Likewise, as many public services were deemed vital (waste collection services, for example) the 6% drop in public-sector emissions compared to the higher drops in industrial and commercial emissions is also expected.

5. Source Emissions

5.1 Figure 4 below outlines the trajectory of our emissions reductions by source from our 2006 baseline.

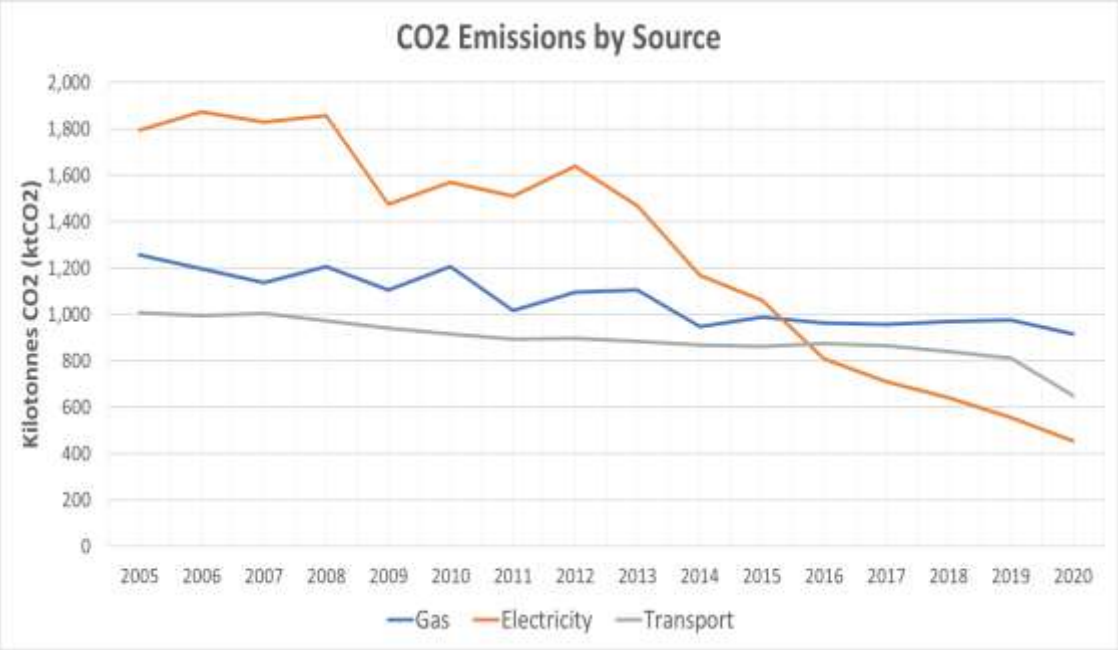


Figure 4 - Source Emissions

5.2 Transport Emissions

5.2.1 As mentioned in Section 4, transport emissions dropped significantly in 2020 by 20%.

5.2.2 The continued rollout of our electric vehicle infrastructure across the city saw significant increases in 2020, with an **124% increase in EV charging**. The jump from 164,452 kWh in 2019 to 367,535 kWh in 2020[4] highlights not only the good work being done to expand the EV network in Glasgow but also, that increased capacity is being met with increased usage. Undoubtedly this will form a portion of the overall reductions in transport emissions in 2020, with continued expansion of the network bringing immediate carbon reductions and making low-carbon transport choices more convenient for the public in future years.

5.2.3 In addition to efforts to decarbonise private vehicles, the city council's policies to support modal shift to forms of active travel also continue to prove successful in 2020. For the city's Next Bike hire scheme, total rentals in Glasgow went up 7.5% from 2019 to 2020. Whilst rentals of standard bikes only rose by 0.6% between 2019-2020, **rentals of E-Bikes rose significantly by 336%** during the same time-period, from 6,153 to 26,861. The number of available E-Bikes did not change between 2019 and 2020 and the number of stations in which you could rent or return an E-Bike only increased from 19 to 21. The standard bike rental increase was statistically insignificant and there was no notable increase in E-Bike availability in 2020, indicating that the increase in rentals in 2020 could be partially down to new users and possibly individuals new to

[4] These figures have been provided to Glasgow City Council by Inspired Energy who supply and manage the energy management software we use alongside doing our bill validation checks.

cycling that principally chose E-Bikes as a more accessible form of cycling, or a ‘starting point’ into the travel mode.

Figure 5 - E-Bike and Standard Bike Rentals 2019-2020

5.2.4 From the data and analysis, it is fair to assume that increased provision of E-Bikes, as a means of convincing less established or able cyclists over to active travel, may be having the desired effect. At a time when people were looking to engage in new activities such as cycling due to lockdown, the availability of E-Bikes allowed this. This may have a significantly positive influencing effect in years to come when addressing behaviour change around transport, an area that poses major challenges in reducing transport emissions.

5.2.5 The Covid-19 Pandemic and the resulting lockdowns also instigated the launch of the city council’s Spaces for People programme in 2020. has delivered a significant number of temporary travel interventions across the city to ease physical distancing in public places, mainly through the provision of widened footways, road closures and segregated cycle lanes. A number of the Spaces for People schemes are now in the process of being made permanent following an independent review which highlighted that the infrastructure could offer long-term active travel and sustainability benefits. Whilst only qualitative estimates can be provided, we would hope that the increased provision of infrastructure to support active travel modes will encourage a modal shift away from private vehicle use and a resultant drop in transport emissions.

5.2.6 Glasgow also continued to progress ambitions to create a Low Emission Zone in the city during 2020. A key output from this is a greener fleet of buses interacting with the city centre. The first round of the Scottish Ultra-Low Emissions Bus Scheme (SULEB) ran from August to September 2020 which was a funding call for electric buses. Within this, First Glasgow received funding for 22 EV buses – totaling £3.8m. The Scottish Environment Protection Agency is due to develop a more detailed dataset on how many miles of bus routes in Glasgow are served by low emissions vehicles each year.

5.2.7 Overall though, the majority of the 20% reduction in transport emissions was a result of the pandemic. We can corroborate this by looking at the drop in vehicle miles travelled in Glasgow between 2019 and 2020, which dropped by 23%, from 2,198 to 1,696 million miles. Furthermore, the influence of the pandemic can be seen in the disaggregation of the transport emissions. Emissions from motorway travel dropped by 28% whilst emissions from travel on minor roads dropped by 15%. The difference indicates that Glaswegians were taking more short distance trips, which matches up with the guidance to stay within the area in which you lived during the lockdowns. Finally, if we look at the drops in transport emissions from other local authorities, we see a similar picture. Figure 6 displays that transport emissions across the four key authorities all dropped by about 20%, a further indication that external factors (the pandemic) were most likely responsible.

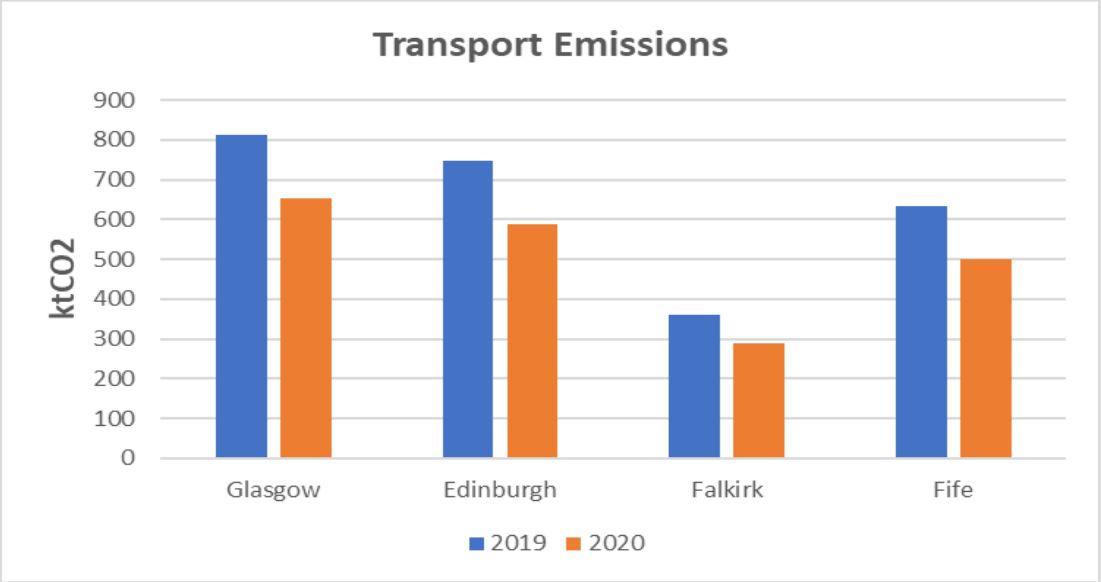


Figure 6 - Transport Emissions Across Local Authorities 2019-2020

5.2.8 Whilst we know that policies relating to reducing transport emissions are having positive effects, focus should now be placed on ensuring we retain as much of the 20% carbon emissions reduction when emissions bounce back after the pandemic. Based on 2020 figures, **Glasgow has reduced transport emissions by 35% from its 2006 baseline**. Next year's data (2021) will provide insight on how emission reductions begin to level out as the influence of the pandemic wanes.

5.3 Gas Emissions

5.3.1 **In 2020, gas emissions dropped by 6%**, from 975 $ktCO_2$ to 916 $ktCO_2$. From our 2006 baseline, gas emissions have dropped 24%, sitting at 1,198 $ktCO_2$ in 2006.

5.3.2 The consumption of gas, fuel oil and electricity for heating is influenced by the external temperature and weather conditions. Hence, in Glasgow, there is

variability between months from a seasonal perspective but there can also be variability between the same month in different years. Degree day analysis uses a simplified form of historical weather data to identify how much energy use buildings require to maintain a certain temperature when external temperatures drop below that threshold. This allows for a production of a weather adjusted energy use. Degree day analysis indicates that **2020 was 3% warmer than in 2019.** As the buildings would have had to work harder in 2019 to keep people warm, this could have contributed to gas emissions only dropping 6% in 2020.

5.3.3 The disaggregation of gas emission drops between 2019-2020 is highlighted in Table 1 below. These figures highlight the impact of the pandemic. For example, domestic gas emissions dropped by 5% whereas industrial gas dropped by 23%. This matches up with the changes seen across Glasgow due to Covid-19 pandemic. As more people worked from home or were furloughed, gas emissions should correspondingly drop further in the industrial sector than domestic. Furthermore, it could be presumed that heating people in individual settings rather than larger shared spaces such as an office or a factory may be a more inefficient method of heating the population as a whole.

$ktCO_2$	Industry Gas	Commercial Gas	Public Sector Gas	Domestic Gas	Total
2018	148.7	127.6	145.9	547.7	969.9
2019	141.7	115.6	157.1	561.1	975.4
2020	109.4	116.9	158.9	531.2	916.4
2019/20 Difference	-32.3	1.3	1.8	-29.9	-59.0
2019/20 Difference (%)	-22.7%	1.2%	1.2%	-5.3%	-6.1%
2018/20 Difference	-39.3	-10.7	13.0	-16.5	-53.5
2018/20 Difference (%)	-26.4%	-8.4%	8.9%	-3%	-5.5%

Table 1- Disaggregation of Gas Emissions

5.3.4 Whilst gas emissions from industrial activity dropped by 23%, emissions from commercial gas rose by 1.2% between 2019 and 2020. This could be due to some commercial premises remaining open during Covid-19 as they were deemed ‘essential’. Unlike for electricity (for which reporting years are more closely aligned to calendar years), a comparison between 2019 and 2020 does not provide a comparison of gas consumption before and after the start of the Covid-19 pandemic. This is because the 2019 gas year (mid-May 2019 to mid-May 2020) includes the first two months of the first national lockdown. Therefore, it may be better to compare 2018 figures to 2020 figures when assessing the impact of Covid-19. Following this methodology, **gas emissions dropped in the commercial sector by 8% between 2018 and 2020.** Domestic gas emissions only dropped 3% (as they rose between 2018-2019), industrial gas dropped by 26% and overall emissions still sits at a 6% drop.

5.3.5 Gas consumption (GWh) across all sectors between 2019 and 2020 increased in Glasgow by 0.65% which, compared to the 6% drop in emissions, may indicate that policies to increase renewable heating systems in the city may be working. Whilst the upcoming Local Heat and Energy Efficiency Strategy (LHEES) will seek to increase the amount of heat networks in Glasgow, there are already several heat networks operational in Glasgow including:

- **Hillpark Drive** - Opened in 2018, the Hillpark Drive heat network provides heating and hot water, via a 400kW air source heat pump, to a total of 350 social homes in the area through a network of underground and overground pipes almost 5km in length. The lower cost of energy has helped alleviate fuel poverty in the homes supplied by the network.
- **Athlete's Village –** Opened in 2014, for the Commonwealth Games, the Athlete's Village heat network supplies heat and hot water to 704 homes, the Emirates Arena, the Sir Chris Hoy Velodrome, a community centre, a nursery, and a 120 bed care home via a 1.68MW combined heat and power (CHP) plant.
- **University of Strathclyde –** Opened in 2018, the University of Strathclyde's heat network and CHP system reduces energy use for the University by around 25% compared to its previous system. The system required the installation of several kilometres of pipework and provides energy to 19 buildings on campus.
- **University of Glasgow –** Opened in 2016, the University of Glasgow's heat network connects 53 buildings on the Glasgow University estate to the new energy centre, which contains five boilers with a combined thermal capacity of 42 MW and a gas-fired CHP engine, producing 3.35 MW electricity and 3.25 MW of heat.
- **Wyndford Estate –** Opened in 2012, the heat network and 1.2 MW CHP system on the Wyndford Estate provides energy to 1,900 homes via around 2.7 kilometres of pipework.

5.3.6 Looking at the domestic sector, total gas consumption has decreased from 2006-2020 by 17% despite a 14% increase in the number of domestic meters. This is most likely due to the 27% decrease in mean consumption per meter. Whilst this could indicate that policies and programmes to retrofit Glasgow's domestic housing stock and expand its district heating networks are seeing success in reducing the demand for gas, decreased gas consumption could also be correlated to increased fuel poverty in the city. Data in the coming years, as the impact of the current cost-of-living crisis becomes clear, will help to identify how gas consumption is being affected by fuel poverty.

5.3.7 Progress on reducing gas emissions can be difficult to quantify due to the impact of the weather. Alongside this, 2020 figures have almost certainly been heavily skewed by the emergence of Covid-19. However, the following can be said:

- The weather did not have a significant impact on gas consumption in 2020 compared to 2019.
- The methodology for reporting on gas means that 2019-2020 reduction figures do not give a full picture on the impact of Covid-19.
- Gas consumption has dropped 16% from our 2006 baseline.

- The drop in industrial and commercial emissions compared to smaller domestic drop is what was expected to be seen as a result of the pandemic.
- Efforts must be made to capitalise on the gas emissions reduction when they face a post-pandemic bounce back.

5.4 Electricity Emissions

5.4.1 In 2020, electricity emissions dropped 18%, from 556 to 456 $ktCO_2$. **From our 2006 baseline, electricity emissions have dropped 76%**, sitting at 1,875 $ktCO_2$ in 2006.

5.4.2 As an increasing proportion of electricity comes from renewable sources, the overall carbon intensity of electricity reduces. This is quantified using conversion factors which highlight how much carbon is attached to each kWh of electricity used. In the 2019 GHG Conversion Factors, there was a 10% decrease in the UK electricity CO_2e factor compared to the previous year because there was a decrease in coal generation and an increase in renewable generation in 2017 (the inventory year for which the 2019 GHG Conversion Factor was derived). Once again in 2020, the **CO_2e factor has decreased (compared with 2019) by 9%,** again, due to a decrease in coal generation and an increase in renewable generation. This explains in part the reduction in electrical emissions in 2020 for Glasgow. Figure 7 below shows the breakdown of electricity consumption by fuel in Scotland in 2020.[5]

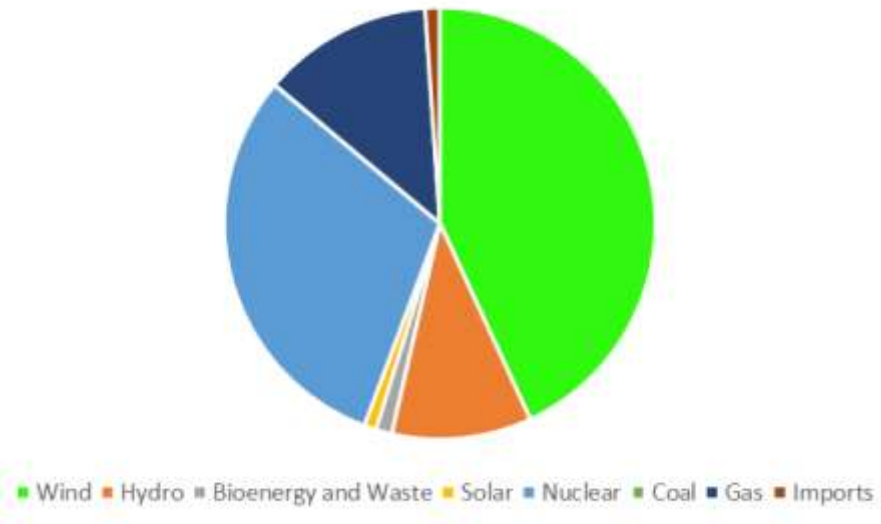


Figure 7 - Electrical Consumption by Fuel (2020)

5.4.3 The disaggregation of emissions from electricity are highlighted in Table 2 below. As expected, emissions from the industrial, commercial, and public sector dropped significantly more than emissions from domestic electricity.

5 https://scotland.shinyapps.io/Energy/?Section=RenLowCarbon&Subsection=RenElec&Chart=ElecConsumptionFuel

Similar to gas emissions, this is most likely due to increased hours spent in domestic settings per capita during the first year of the pandemic. In the figures below in Table 2, domestic electricity emissions have dropped 7.4% whilst industrial and commercial emissions have dropped by 17.8% and 26.8% respectively.

$ktCO_2$	Industry Electricity	Commercial Electricity	Public Sector Electricity	Domestic Electricity	Total
2019	74.2	220.1	68.7	193.0	556.0
2020	61.0	161.2	54.7	178.8	455.7
2019/20 Difference	-13.2	-58.9	-14	-14.2	-100.3
2019/20 Difference (%)	-17.8%	-26.8%	-20.4%	-7.4%	-18.0%

Table 2 - Electricity Emissions

5.4.4 Electricity consumption figures further corroborate both the change in conversion factor (i.e., increase in renewable sources inputting into the grid) and the significant change in behaviour that was brought on by Covid-19. Figure 8 below displays the differences between 2019 and 2020 in domestic consumption versus non-domestic consumption. This shows that **domestic electricity consumption increasing by 3.6%,** from 921.9 GWh to 955.5 GWh and non-domestic electricity consumption decreasing by 14.5%, from 1,736.1 GWh to 1,482.2 GWh. The reason domestic emissions have decreased even though domestic consumption has increased is most likely the 9% increase in the conversion factor. Alongside this, the 3.6% increase in domestic consumption compared to the 14.5% decrease in non-domestic consumption is another indication of the profile shift in energy use witnessed in Glasgow due to the Covid-19 pandemic.

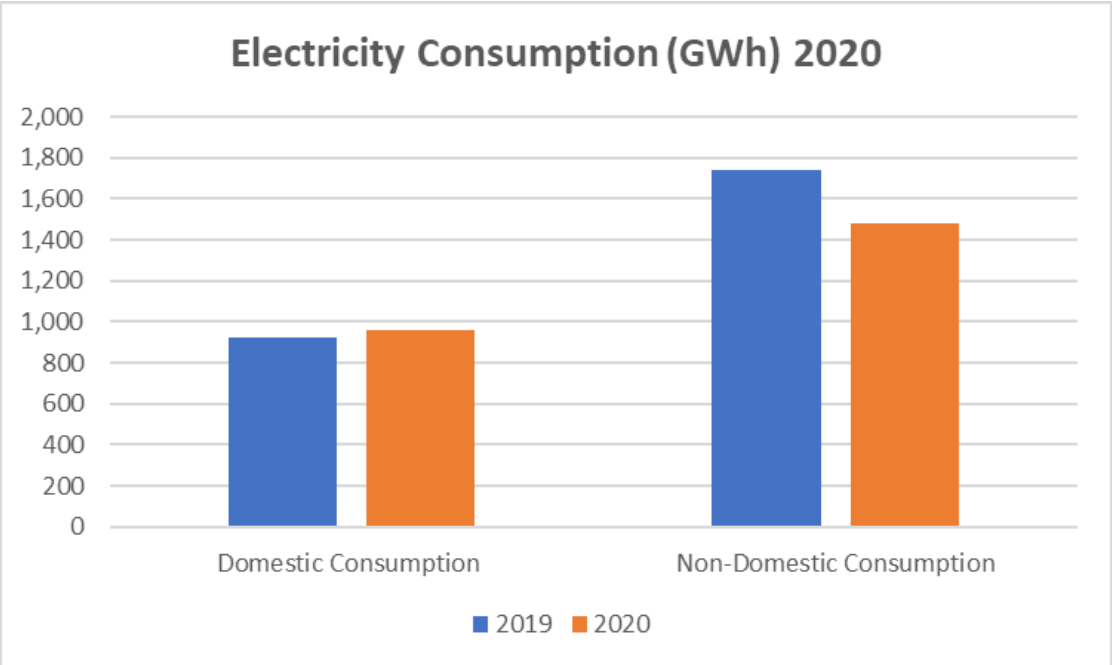


Figure 8 - Electrical Consumption (GWh) 2020

5.4.5 With electricity emissions, it is important to note that a significant proportion of reduction tends to come from action a national level to decarbonise the grid. Nonetheless, Glasgow has been instrumental in the uptake and utilisation of sustainable electricity where able to do so. Examples of this work include:

- The opening of the Glasgow Recycling and Renewable Energy Centre (GRREC) which diverts household waste and create renewable heat and electricity. This was undertaken as part of the delivery of the city's Energy and Carbon Masterplan (ECMP). **For the financial year 2020/21, the GRREC witnessed a 43% increase in electricity generation (from 29,766 MWh to 42,470 MWh).** This was in part due to an investment in an oversize line to capture larger waste fractions which would have otherwise being rejected in the process. This investment accounts for about c.20% increase in energy generation witnessed in FY 19/20. Figures from both financial years have been heavily skewed by Covid-19 but the oversize line investment clearly accounts for a significant portion of the increase in generation.
- The installation of the 3MW wind turbine at Cathkin Braes, also delivered under the ECMP, continues to generate renewable electricity for the grid.
- Significant rollout of solar PV across the Council's estate, the private sector and also the domestic sector.
- The first two solar PV arrays installed by Glasgow Community Energy. Installed at Ashton Secondary School and Glendale Primary School, the two installations generate 79,000 kWh of clean electricity and act as an important step forward for the city in trying to decentralise energy and accelerate community energy schemes.

5.4.6 As a city, Glasgow should seek to maximise on the reductions in electrical emissions brought around by Covid-19 and work to reduce the impacts of a bounce-back after the pandemic. Likewise, work should continue to support the rollout of renewable electricity in the city, via our Sustainable Glasgow partnership and projects with the private sector, and across the Council estate. The Sustainability Team is working to secure additional match funding to compliment the internal capital funding allocated to further roll-out of solar on the Council estate.

6. Glasgow and other Local Authorities in Scotland

6.1 Analysis of the carbon emissions of all the Scottish Local Authorities in 2020, shows that Fife has the largest carbon footprint (2,507 $ktCO_2$), followed by Falkirk (2,133 $ktCO_2$), Glasgow (2,118 $ktCO_2$) and Edinburgh (1,844 $ktCO_2$) as indicated in Figure 9 below.

6.2 Examination of the CO_2 per capita shows that Glasgow emitted 3.3 $ktCO_2$ per capita in 2020 compared to 3.9 $ktCO_2$ in 2019. This is lower than Scotland's average of 4.6 CO_2 per capita and also slightly lower than our closest Scottish comparator, Edinburgh, which sits at 3.5 $ktCO_2$ per capita in 2020.This is a positive indicator. However, these figures need to be tempered with the possibility that they could also reflect an increase of people living in pockets of fuel poverty in the city who cannot afford to switch on electricity or gas appliances.

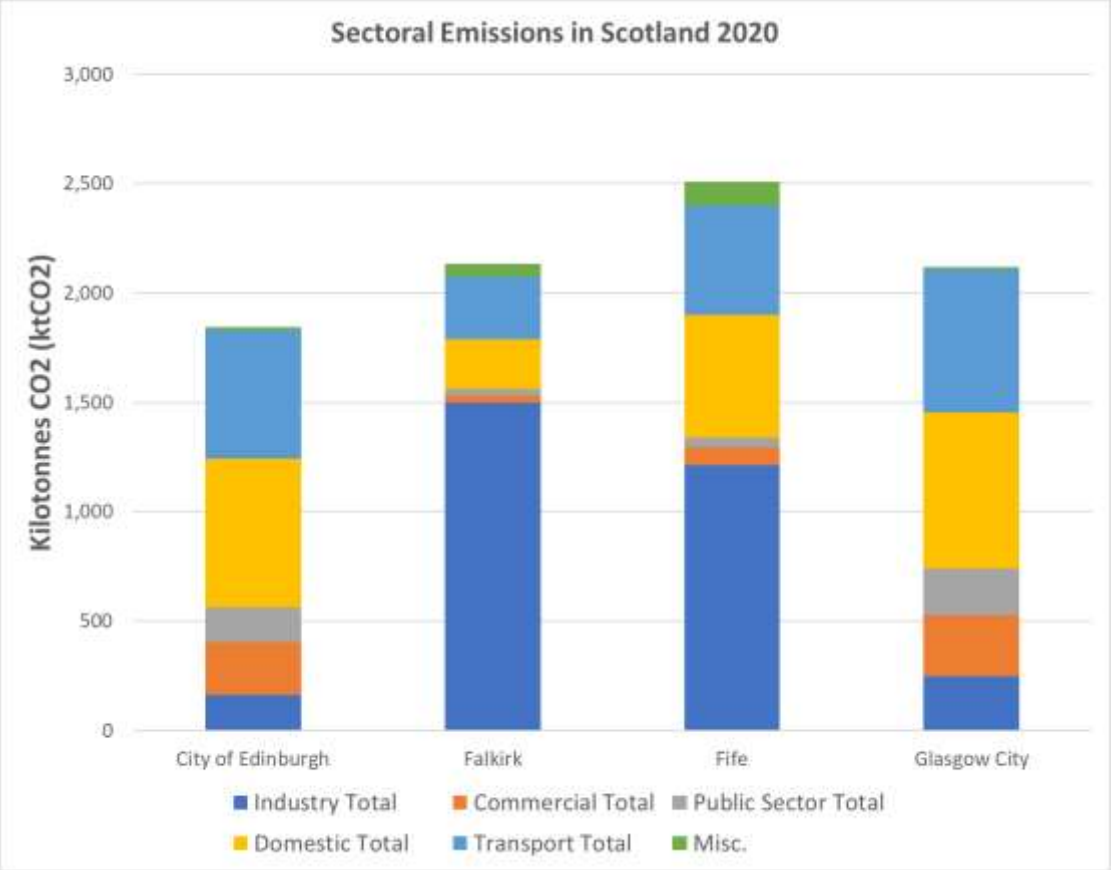


Figure 9 - Local Authority CO_2 Emissions (2020)

7. Conclusions

7.1 With the emergence of the Covid-19 pandemic in 2020, conclusions on Glasgow's progress in reaching our target of Net-Zero Carbon by 2030 are difficult to quantify. The pandemic brought with it a complete upheaval in daily life for all in the city and this is reflected in the significant emissions reductions that 2020 has registered. Overall, **Glasgow's emissions dropped by 13.3% and have dropped 50% from our 2006 baseline.**

7.2 Nonetheless, policies and projects aimed at supporting Glasgow's transition to a net-zero city are having a positive impact. Increased EV charging infrastructure and increased EV Next Bike capacity are creating an environment that is convenient for residents to make low carbon choices. Furthermore, Glasgow continues to contribute to the national shift toward renewable electricity with its continued rollout of solar PV across the city alongside the

contributions from both the GRREC and the Cathkin Wind Turbine. Heating and cooling in the city continues to decarbonise from our 2006 baseline with regional retrofit programmes and district heating expansion forming key parts of the city's approach moving forward.

7.3 Significant challenges remain for Glasgow in reaching its targets, however. A number of complex issues prevail in the decarbonisation of both transport and gas, whilst the importance of doing so only increases. Upcoming strategies such as the Glasgow Transport Strategy and the Local Heat and Energy Efficiency Strategy (LHEES) will seek to address these issues through a range of measures, including the expansion of heat networks in the city, for example.

7.4 In addition to this, the trajectory of Glasgow's emissions reductions will invariably be impacted by the calculation and inclusion of our Scope III emissions. We will continue our work with the Carbon Neutral Cities Alliance (CNCA) and the Gaia consultancy in trying to quantify our Scope III emissions. The council was recently provided figures that served as a rough estimate of what our Scope III emissions **within the council's own estate** could be by data analyst company *CO2 Analysis***.** Further work will be required to increase the confidence in any figures we use however, and these figures were provided as an early indication of the work *CO2 Analysis* could do. We will also need to determine the most appropriate method for reporting on our Scope III emissions as we will not have previous years data suitable for comparison.

7.5 Several infrastructure and behavioural change/education projects are being developed through the Glasgow Climate Plan to mitigate against any bounce-back in emissions as we emerge from the Covid-19 pandemic.

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 Energy and Carbon Masterplan and Climate Plan for Glasgow are managed by the Sustainability team.
Procurement:	No relevant procurement issues.

Equality and Socio-Economic Impacts:

Does the proposal support the Council's	Yes, it is broadly supportive of all the Council's Equality Outcomes.

Equality Outcomes 2021-25? Please specify.	
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.