Glasgow City Council

Environment, Sustainability and Carbon Reduction City Policy Committee

Report by Executive Director of Neighbourhoods & Sustainability

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Item 6

24th November 2020

UPDATE ON CITY WIDE ENERGY CONSUMPTION AND CARBON EMISSIONS

Purpose of Report:

To provide Committee with an update on energy consumption and carbon emissions in Glasgow since the baseline year of 2006.

To analyse the city's progress towards the 30% carbon dioxide (CO_2) reduction by 2020 target, which informs the annual monitoring to the Energy and Carbon Masterplan and reporting to the European Covenant of Mayors office.

Recommendations:

The Committee is asked to –

- Note the contents of this report;
- Continue to support the work of Neighbourhoods & Sustainability (NS) in reducing Glasgow's CO_2 emissions and environmental impact;
- Notes that a further update on the city's progress towards the 30% carbon dioxide target will be provided in 12 months.

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 Sustainable Glasgow Report commissioned by the Council, set out a target of reducing the city's carbon emissions by 30% by 2020 in 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 retains the commitment to achieve a 30% reduction in Glasgow's carbon emissions on a 2006 baseline and identifies 33 discrete actions that, if delivered, would help the City achieve its target. Contained within the 33 actions are actions pertaining to the development of renewable energy generation assets.

1.5 The Energy and Carbon Masterplan has two main submissions –

(a) Glasgow City Council's on an annual basis;
(b) the Covenant of Mayors, due every two years from the resubmission date (February 2014).

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 has been updated from its previous releases.

2.2 The information used in the ECMP (and previous STEP UP project documents) is based on 2014 DECC datasets. This report updates the carbon emissions and energy consumption figures for Glasgow based on most recent BEIS data.

2.3 The legacy of the STEP UP Project is managed by NS. This includes compiling data from various stakeholders (private, public, residential, industrial/commercial and transport sectors) and analysing the energy consumption and carbon emissions at city wide level.

3. Results: Analysis of energy consumption and emissions data

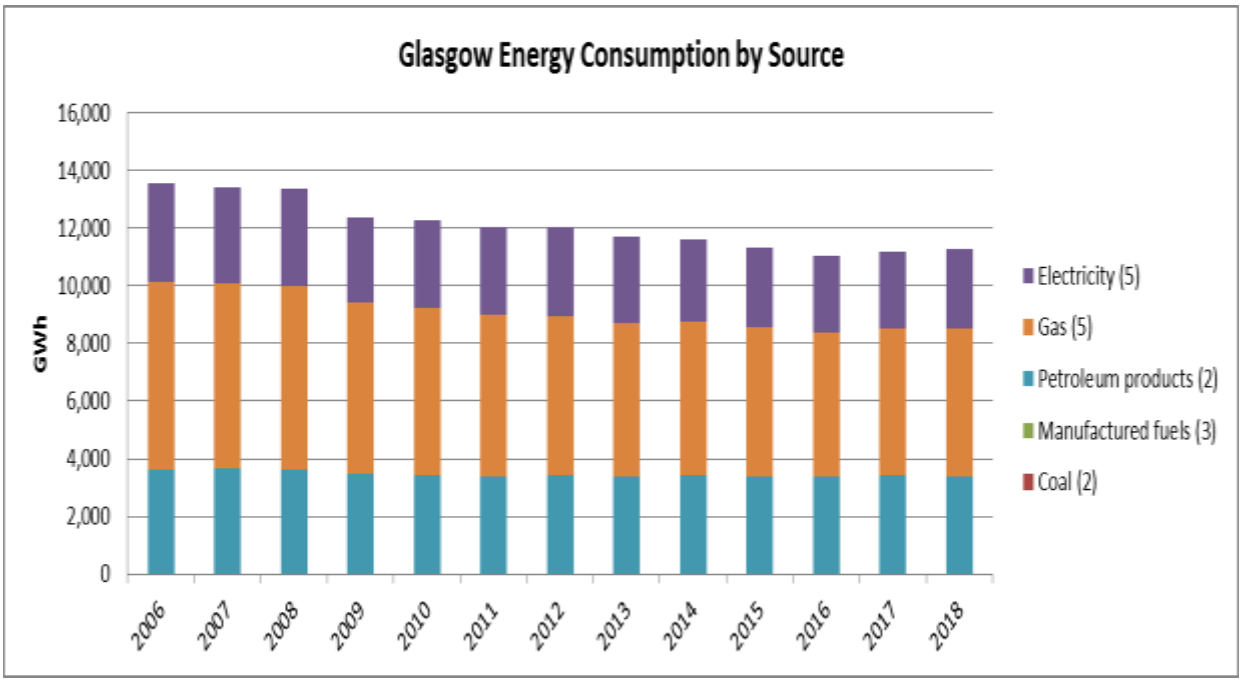
3.1 Glasgow Energy Consumption

3.1.1 Glasgow's total energy consumption in 2018 was 11,343 Giga-Watt hours[1] (GWh) which represents a 0.6% increase (77 GWh) from 2017. This increased consumption is a trend that is apparent in almost every sector, with the highest increase in consumption being 56 GWh from the electricity sector. The gas sector saw an increase of 38 GWh whilst petroleum products saw a **decrease** of 23 GWh in its energy consumption. Notably again in the electricity sector, domestic electricity use fell by 32GWh whilst commercial use increased by 88GWh.

3.1.2 2018 witnessed substantially adverse weather at the start of the year in the form of extremely cold temperatures and heavy snowfall, dubbed 'the Beast from the East'. This could account for the both the increases we see in domestic and commercial gas (19GWh and 18GWh respectively) through increased heating requirements and also the decrease in road transport petroleum products (falling by 36GWh) as a result of decreased traffic due to the snow.

3.1.3 The city's total energy use has declined by 16.5% (2,245 GWh) from baseline year (2006) to 2018 as shown in Figure 1. This is attributed primarily to a decrease in gas consumption (1,410 GWh), from which the main reduction is in the domestic sector (715 GWh), followed by the industrial and commercial sector (695 GWh). The biggest percentage decrease from the 2006 baseline was seen in domestic electricity, which has seen a 28% drop in energy use levels.

Figure 1. Glasgow's energy consumption by source (2006 – 2017)

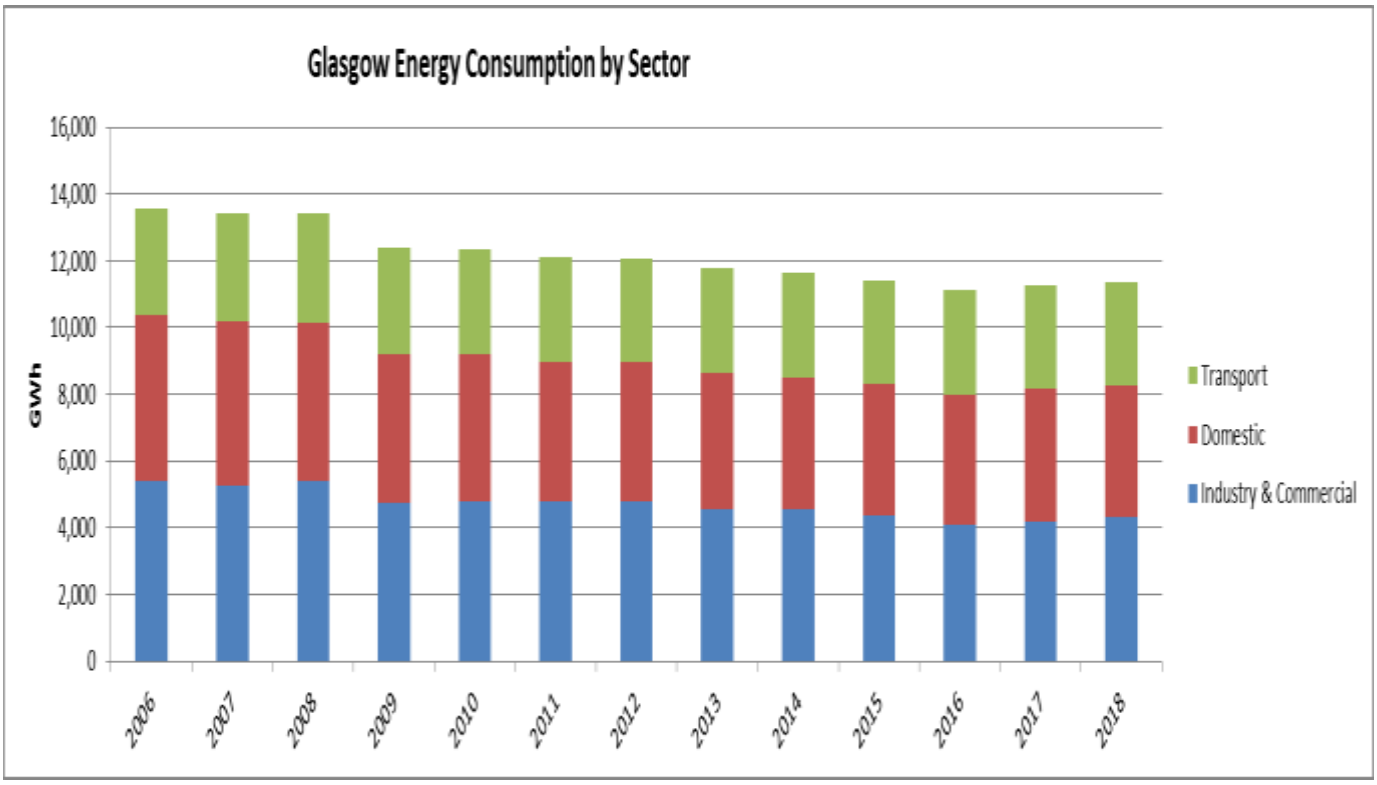


Source: BEIS. 2020 sub-national final energy consumption statistics.

[1] 1 Giga-Watt hours (GWh) is equal to 1,000 Mega Watt hours or 1,000.000 kilo Watt hours

3.1.4 By analysing the difference in energy consumption from 2006 to 2018, we see that the sectors that experienced the biggest reductions were the industrial and commercial sector (1,088GWh) and the domestic sector (1,036 GWh). However, despite these overall reductions, these two sectors continue to be the highest energy consumers in Glasgow (Figure 2) and efforts to reduce their energy consumption should be maintained. Previous ECMP reports have pushed for most effort to be directed at reducing electricity however, due to the decarbonisation of the electricity grid, and the fact that most energy is used in heating, increased effort should be concentrated on reducing gas consumption. These efforts can be seen through the Council's Affordable Warmth Strategy, Local Housing Strategy and our upcoming Local Heat and Energy Efficiency Strategy which all aim to provide decarbonised, affordable heat and energy to the city.

Figure 2. Glasgow's energy consumption by sector (2006–2018)



Source: BEIS. 2020 sub-national final energy consumption statistics.

3.2 Glasgow Carbon Dioxide Emissions

3.2.1 Glasgow's CO_2 emissions in 2018 totalled 2,591 kilo-tonnes[2] of carbon dioxide ($ktCO_2$). This represents a 0.13% decrease from 2017 and a **37%** decrease from baseline, meaning that having met our target in 2015, **Glasgow has continued to exceed its 2020 target of 30% ahead of schedule.** This is a significant achievement, and testament to what the city can achieve with regards to its ambition of becoming one of the most sustainable cities in Europe.

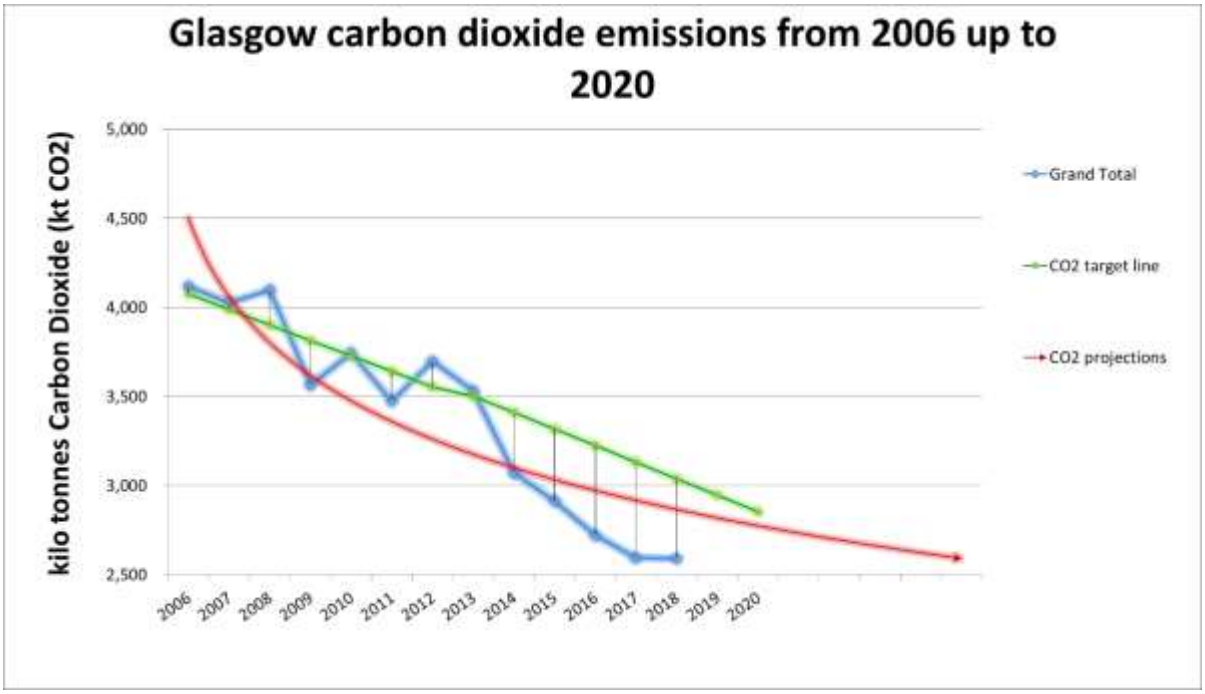
[2] 1 kilotonne (kt) is equal to 1,000 tonnes

Despite this success, it is imperative that efforts to reduce carbon emissions do not falter, and that this success serves to motivate continued efforts to exceed the 2020 target by as much as possible.

3.2.2 The breakdown of the figures for the 2018 reduction are:

- The domestic sector (4 $ktCO_2$ from 2017 – 2018 and 606 $ktCO_2$ from 2006 – 2018); and
- The transport sector (16 $ktCO_2$ from 2017-2018 and 55 $ktCO_2$ from 2006-2018
- While the industrial and commercial sector witnessed an increase of 17 $ktCO_2$ from 2017 with an overall reduction of 858 $ktCO_2$ from 2006.
- It is important to note that these emissions statistics do not represent progress made to date on electric vehicles and the low emission zone, which should have a positive impact.

Figure 3. Glasgow carbon dioxide emissions



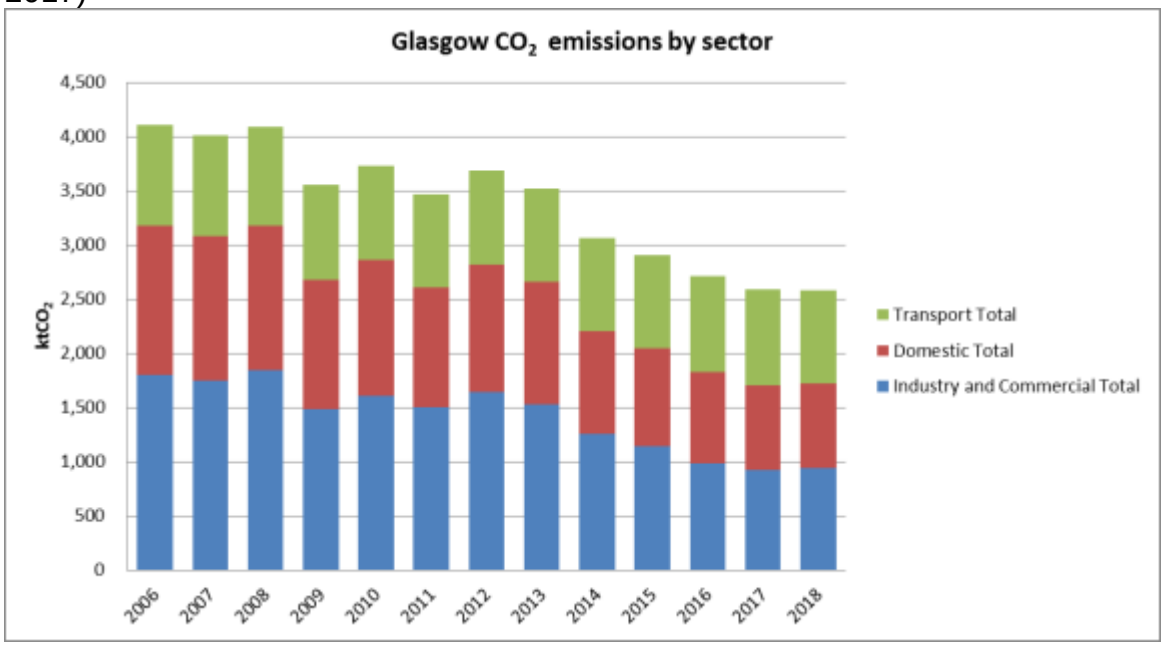
Source: BEIS. Local CO_2 emission estimates 2005-2018.

3.2.3 The overall target for Glasgow is to reduce emissions by 1,237 $ktCO_2$ by 2020, from the baseline year (2006). Comparing the carbon dioxide emissions in 2018 against 2006 reveals Glasgow has reduced its emissions by 1,526 $ktCO_2$. This equates to a 37% reduction in total emissions indicating that the city has continued to reduce emissions ahead of target. Demonstrated via Figure 3 above.

3.2.4 The red line in figure 3 shows the trend line for CO_2 emissions based on the actual data recorded up to 2018. If efforts to reduce CO_2 were to slacken, and business were to follow a business-as-usual approach, emissions should be expected to rise again and the city would fall behind target.

3.2.5 The sectors responsible for emitting the most CO_2 in 2018 were: the industrial and commercial sector by 938 $ktCO_2$/year and the transport sector by 867 $ktCO_2$/year. This continues the momentum of 2016 that showed for the first time since 2010, that the domestic sector has emitted less CO_2 than the transport sector. Whilst 2017's figures highlighted that the reduction rate for transport was slow compared to the other sectors (1 $ktCO_2$ between 2016-2017), the 16$ktCO_2$ drop seen between 2017-2018 in the sector show that efforts to reduce the carbon intensity of the transport sector are working to a degree.

Figure 4. Breakdown of Glasgow's carbon dioxide emissions by sector (2006 - 2017)



Source: BEIS. Local CO_2 emission estimates 2005-2017.

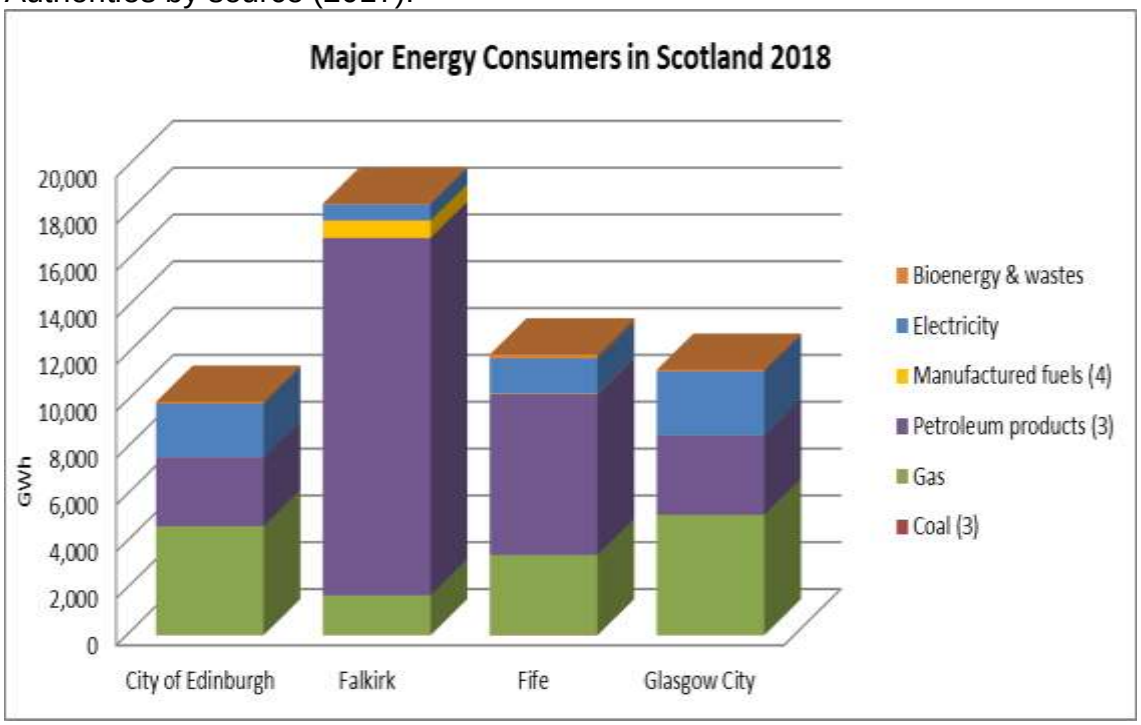
3.2.6 Combining the outcomes from the carbon emissions section (section 3.2) and the energy consumption section (section 3.1), highlights that, even though the city has, in 2018, exceeded its 2020 CO_2 target, continued action is required in reducing energy consumption in the three main sectors. For a second year in a row, the city's total energy use has increased and these are significant results. Only when data from proceeding years can be analysed will we be able to determine whether this increase stands as an outlier or whether it is part of a concerning trend. Efforts should be focused upon reducing heat demand in buildings in Glasgow, both from gas and electricity, as well as concentrating efforts on reducing emissions from transport. Continued support for the development of renewable energy projects and other low carbon projects will facilitate a secure energy future for Glasgow and its citizens, and will contribute to successfully achieving and exceeding the carbon targets by 2020.

3.3 Glasgow and other Local Authorities in Scotland

3.3.1 Analysis of the energy consumption of all the Scottish Local Authorities (LA's) in 2018, shows that Falkirk continues to be the biggest consumer of energy (18,443 GWh), followed by Fife (11,995 GWh), Glasgow (11,343 GWh) and

Edinburgh (9,977 GWh) as per indicated in Figure 5. Of the four largest consumers, only Glasgow and Falkirk have shown increased demand. This points to the possibility that increased energy demand for Glasgow and Falkirk is not part of a wider national trend.

Figure 5. Breakdown of energy consumed by top four Scottish Local Authorities by source (2017).



Source: BEIS. Local CO_2 emission estimates 2005-2018.

3.3.2 Examination of the CO_2 per capita shows that Glasgow's was 4.1 in 2018 compared to 4.2 in 2017, this is lower than Scotland's average CO_2 per capita (5.3) and also our closest Scottish comparator, Edinburgh's per capita which sits at 4.4. 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.

4 Projects

4.1 The Energy and Carbon Masterplan (ECMP) has outlined 33 Key Actions aiming to reduce carbon emissions across the three main sectors (transport, domestic, and industrial/commercial sectors) and ensure Glasgow successfully reduces CO_2 emissions by 2020.

4.2 Successful and continued delivery of these 33 key actions requires the support and collaboration of public sector, private sector, community groups and citizens, particularly those involved in the industrial, commercial and transport sector, due to the Council's limited influence on these sectors.

4.3 Neighbourhoods and Sustainability is responsible for monitoring these key actions on an annual basis and identifying further opportunities, especially through renewable energy projects.

4.4 The essential projects in the ECMP include:

- Increase of renewable energy production in the city (wind turbines project; solar PV panel arrays);
- District Heating networks;
- Increase of sustainable transport modes (i.e. shifting from private cars to car-share, public transport, cycling, walking);
- Decarbonisation the transport sector (electric buses, electric vehicles, etc.);
- Generation of energy from waste (GRREC project);
- Behavioural change.

As of 2018, there are 18 schools and 13 social work buildings in the city with solar PV installed. This generates over 650,000kWh annually. In addition, there are large numbers of housing stock in the city with solar panels.

4.5 In addition to the projects mentioned in the Energy & Carbon Masterplan, further efforts are being made to successfully deliver large-scale projects. In 2015, the city was successful in a bid for EU Horizon 2020 funding for the RUGGEDISED (Rotterdam, Umea, Glasgow: Generating Exemplar Demonstrations in Sustainable Energy Districts), which will enhance energy security, deployment of renewables and electric vehicles, district heating, and energy storage in a city district extending from George Square to the former Meat Market site on Duke Street. This will act as a demonstrator and catalyst for further low carbon districts in the city. The project is now into its 4th year, when the physical interventions will be deployed and the project will become a visible beacon of sustainability in the city.

4.6 In February 2019, a working group was formed to accelerate action towards the city's existing sustainability objectives and potentially to set more demanding targets. Glasgow declared a climate emergency in May of the same year. Subsequent to this, the working group produced 61 recommendations for how the city can respond to the climate emergency. These recommendations have been evaluated and incorporated into our Climate Emergency Implementation Plan, currently in draft format. The high level strategic plan will help guide the city towards it sustainable ambitions, including drastically lowering our carbon emissions.

4.7 In parallel with the above projects, ongoing and emerging projects, such as the Intelligent Street Lighting and Low Emission Zone, will make sizeable contributions to CO_2 emissions reductions as well as providing enabling infrastructure for expanding existing innovations, such as smart sensors and electric vehicle penetration in the city. There also exists an overlapping human element to reducing emissions. Projects such as the Avenues, the Circular Economy Routemap and the ongoing work on active travel will have a direct benefit to the health and wellbeing of the citizens of Glasgow whilst also contributing to the decarbonisation agenda.

4.8 Projects designed with primary goals other than CO_2 reduction will also make significant contributions to reducing CO_2 emissions in the city, such as the increased use of data and smart systems to manage council assets and their performance, as illustrated by the developing data-based decision platform being delivered through the RUGGEDISED project.

4.9 To build upon the commitment of the Council, it is important that stakeholders from the different sectors, such as the transport sector (public transport, private transport); residential sector (private and social housing); commercial and industrial sector work with the Council to make their activities more sustainable and to use energy and resources more efficiently. The Sustainable Glasgow board was relaunched recently at a successful event in the SEC. The event invigorated the need for a continued, multi-stakeholder approach to addressing climate change and decarbonisation in Glasgow and the board will provide the tools in which to do so.

4.10 This year, the city has witnessed drastic impacts from both the outbreak of the Covid-19 pandemic and the responding measures taken by the government to slow the spread of the virus. There has been significant drops in pollution levels from vehicle use in the city due to lockdown measures and we can assume that there will be an impact on carbon emissions as a result of the pandemic and the resulting lockdown measures. However, as the data we receive comes to us two years in arrears, we will not be able to determine any specific impacts on the carbon footprint of the city as a result of Covid-19 until 2022.

5. 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 staff managing the Energy and Carbon Masterplan for Glasgow is City Energy and Sustainability Team.
Procurement:	No relevant procurement issues.
Council Strategic Plan:	The report supports the following strategic themes and outcomes:

A Sustainable and Low Carbon City

- Priority 54: Invest in roads and pavement maintenance, improving conditions,

residents' satisfaction and contributing to active travel networks. Ensure community involvement in local decision making about this investment.

- Priority 55: Prioritise sustainable transport across the city.
- Priority 62: Review the affordable warmth scheme and consider how to make best use of current resources to support as many older peoples' households as possible.
- Priority 65: Build high quality, inclusive active travel infrastructure, investing a minimum of 10% of our transport infrastructure budgets in cycling and walking to make Glasgow an excellent cycling and walking city.
- Priority 66: Improve the efficiency of our services through the development of smart technology, including for refuse collection and street lighting.
- Priority 67: Become a carbon neutral city by 2037, reviewing our energy carbon masterplan in 2019, and investigating membership of international networks, the Carbon Neutral Alliance and C40.
- Priority 68: Meet our commitments to the national target of ensuring heat, transport and electricity needs are met by renewables by 2030.
- Priority 69: Explore ways of accelerating our work on green energy initiatives, and review the possibility of doing so through an ESCO.

Equality and Socio-Economic Impacts:

Does the proposal support the Council's Equality Outcomes 2017-22	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 cheaper energy, and increased social inclusion through improved public transport infrastructure.

Sustainability Impacts:

Environmental:	This report describes the cumulative reductions in carbon emissions and energy consumption. This report details the success of actions undertaken by local communities in reducing carbon emissions and energy consumption.
Social, including opportunities under Article 20 of the European Public Procurement Directive:	This report describes progress on efforts to reduce carbon emissions and energy consumption and these efforts more often than not are linked to equality and social justice.
Economic:	This report details the success of actions undertaken by local business & communities in reducing carbon emissions and energy consumption.
Privacy and Data Protection impacts:	This report presents analysis of publically available data and does not represent any privacy or data protection issues thus a Data Protection Impact Assessment (DPIA) has not been carried out.

6. Recommendations

The Committee is asked to –

- Note the contents of this report;
- Continue to support the work of Neighbourhoods & Sustainability (NS) in reducing Glasgow's CO_2 emissions and environmental impact.
- Notes that a further update on the city's progress towards the 30% carbon dioxide target will be provided in 12 months.