ITEM 3

6th February 2018

Glasgow City Council

Environment Sustainability & Carbon Reduction City Policy Committee

Report by Acting Executive Director, Land and Environmental Services

Contact: Gavin Slater Ext: 78347

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 Master Plan 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 Land and Environmental Services (LES) in reducing Glasgow's CO_2 emissions and environmental impact, including the associated financial burden.
- request a further update on the city's progress towards the 30% carbon dioxide reduction target 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 (ECM).

1.3 The Executive 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 these actions, are those 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 - a voluntary organisation of over 7,700 EU cities committed to exceeding the CO2 reduction targets set by the European Commission - 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. The changes between BEIS data in 2014 and DECC data realised in 2017, has a minimal variation of 0.1% for the period 2006-2015 as per data in Appendix 1.

2.2 The information used in the ECM (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 LES. 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 2015 was 10,953 Giga-Watt hours[1] (GWh) which represents a 2.2% reduction (247.3 GWh) from 2014. The main sectors contributing to this energy reduction in 2015 were: the domestic sector, which reduced by 20 GWh; and the industrial and commercial sector reduction by 248 GWh; while the transport sector decreased by 40 GWh. From analysing the energy sources, the largest reduction in consumption was from electricity, reducing by 151 GWh, and from gas, reducing by 100 GWh."

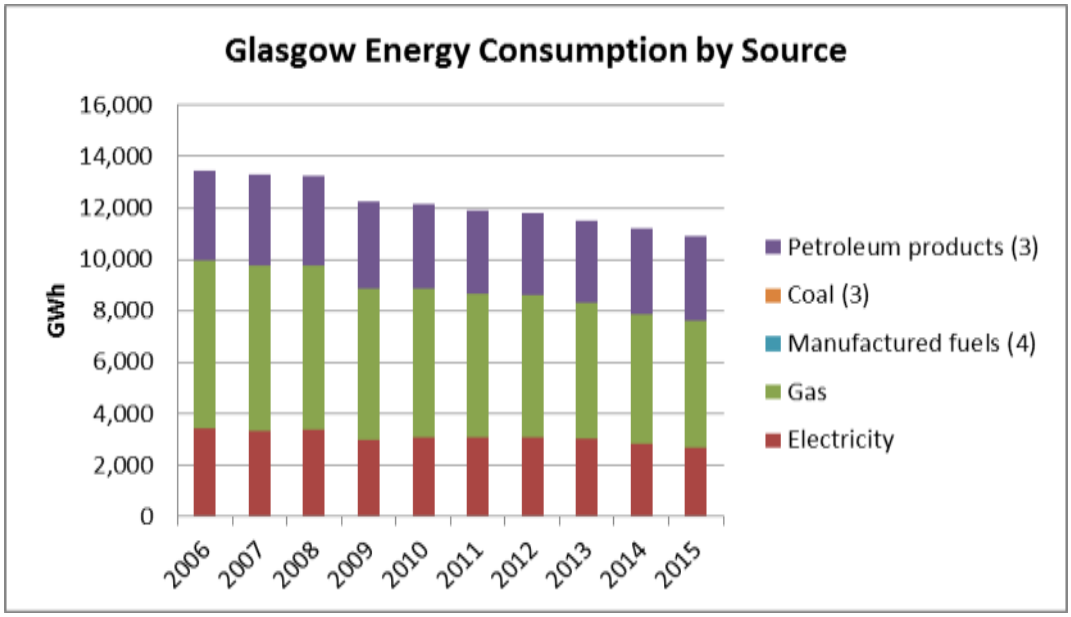
3.1.2 Although a steady reduction trend is evident in transport emissions, the results of the energy consumption analysis from 2015 compared to 2014 highlights the significant need to reduce energy use in the Transport sector. The continuation of projects, such as the increased deployment of electric vehicle infrastructure, and developing projects aimed to achieve this, such as the Low Emission Zone, should be supported in 2017/18 and onwards. The reduction in gas consumption is welcome in terms of CO_2 reduction however, it is a smaller reduction than in previous years (225 GWh from 2012 to 2013, and 245 GWh from 2013 to 2014). This could be a result of the annual mean temperature in Glasgow being quite low in 2015. Degree Day heating data, which illustrates how cold the weather is, confirms that 2015 was colder than 2014.

3.1.3 The city's total energy use has declined by 19% (2,517 GWh) from baseline year (2006) to 2015 as per shown in Figure 1 This is attributed primarily to a decrease in gas consumption (1,616 GWh), from which the main reduction is in the domestic sector (845 GWh), followed by the industrial and commercial sector (770 GWh). Glasgow City Council works closely with the Resident Social Landlords in the city to help deliver energy reduction measures in the domestic sector.

Figure…

Figure 1. Glasgow's energy consumption by source (2006 – 2015)

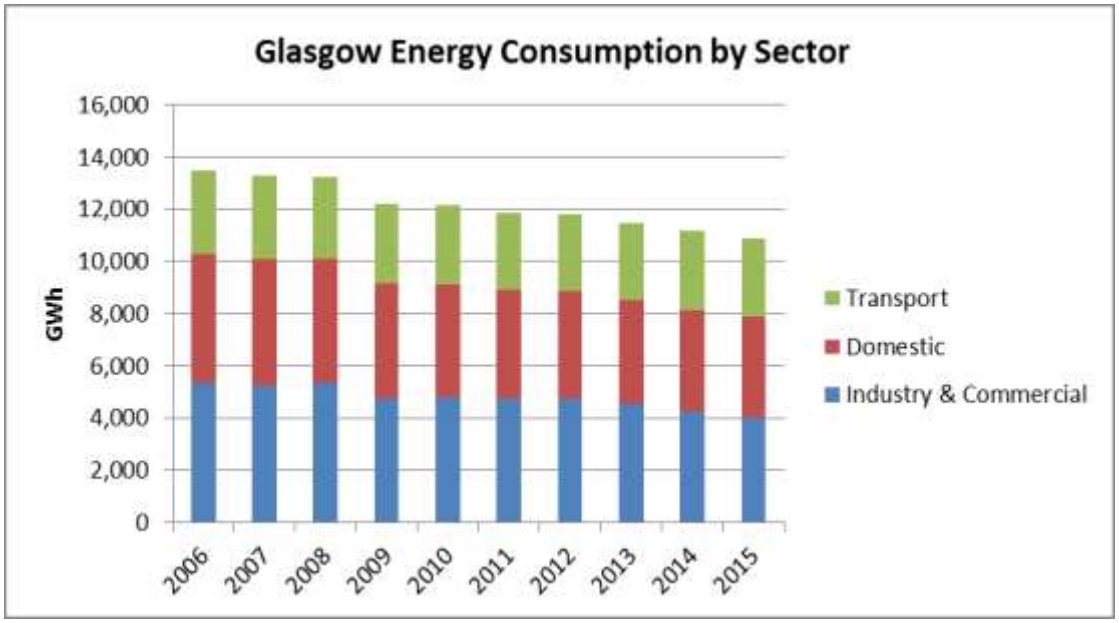
[1] 1 Giga-Watt hours (GWh) is equal to 1,000 Mega Watt hours or 1,000.000 kilo Watt hours



Source: BEIS. 2017 sub-national final energy consumption statistics.

3.1.4 By analysing the difference in energy consumption from 2006 to 2015, it is apparent that the sectors that experienced the biggest reductions were the industrial and commercial sector (1,332GWh) and the domestic sector (1,102 GWh), a reversal of 2013 when the domestic sector showed the biggest overall reduction. However, despite these 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 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.

Figure 2. Glasgow's energy consumption by sector (2006–2015)



Source: BEIS. 2017 sub-national final energy consumption statistics for 2015.

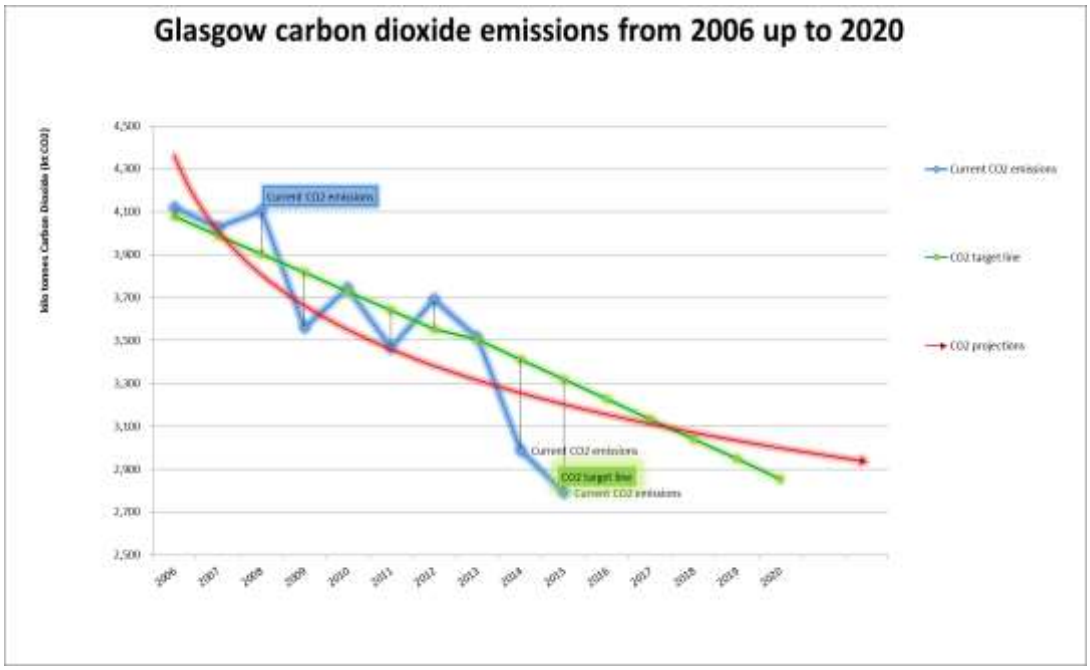
3.2 Glasgow Carbon Dioxide Emissions

3.2.1 Glasgow's CO_2 emissions in 2015 totalled 2,791.4 kilo-tonnes[2] of carbon dioxide ($ktCO_2$). This represents a 7% decrease from 2014 and a 32.12% decrease from baseline, meaning that **Glasgow has met and exceeded its 2020 target of 30% 5 years early.** 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. 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 main sectors contributing to this reduction were: the industrial and commercial sector (151 $ktCO_2$); and the domestic sector (41 $ktCO_2$); while the transport sector demonstrated the smallest reduction (5 $ktCO_2$). The majority of carbon savings by energy source were seen in electricity (225 $ktCO_2$) when compared with 2014. It is important to note that CO_2 emissions from gas consumption in the Industrial & Commercial, and Domestic sectors had increased marginally in 2015 however this increase was mitigated by the larger reduction in emission from electricity consumption. This does reinforce the need for more effort to reduce heating related emissions.

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

Figure 3. Glasgow carbon dioxide emissions



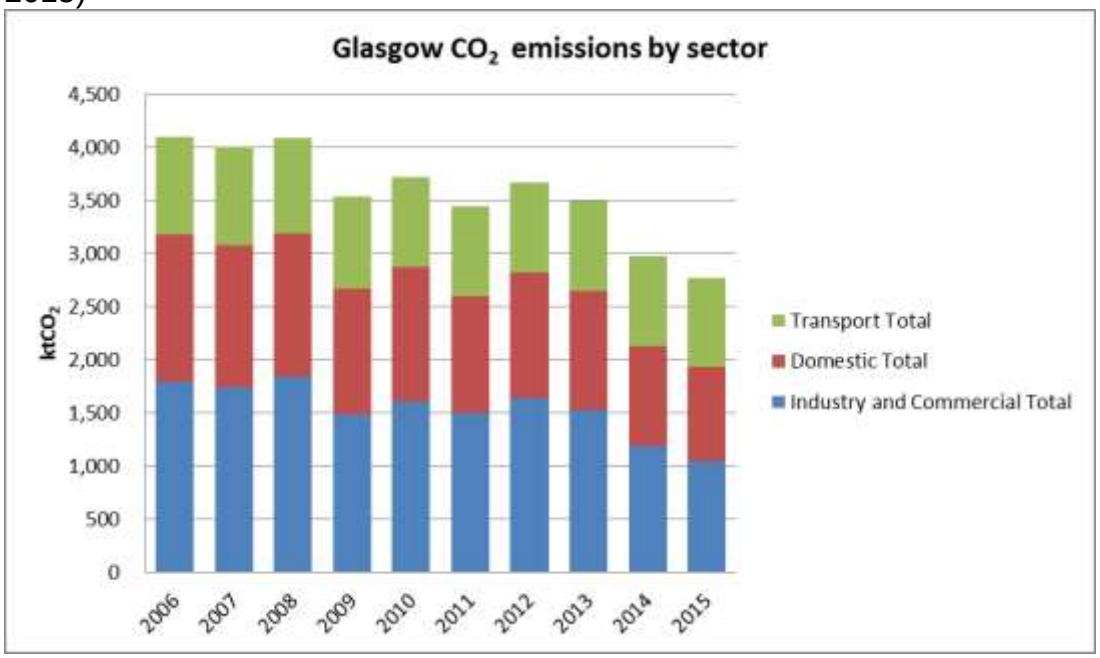
Source: BEIS. Local CO_2 emission estimates 2005-2015.

3.2.2 The overall target for Glasgow is to reduce 1,237 $ktCO_2$ by 2020, from the baseline year (2006). Comparing the carbon dioxide emissions in 2015 against 2006 reveals Glasgow has reduced its emissions by 1,321 $ktCO_2$. This equates to a 32% reduction in total emissions indicating that the city has made a massive leap in progressing towards a 30% reduction (Figure 3) although, as previously stated in this report, this is the result of local and national efforts.

3.2.3 The red line in figure 3 shows the trend line for CO_2 emissions based on the actual data recorded up to 2015. If efforts to reduce CO_2 were to slacken, and business was to follow a business-as-usual approach, emissions should be expected to rise again and the city would fall behind target. To ensure success by 2020, and beyond, it is crucial that efforts to continue to reduce CO_2 emissions continue to be supported by Glasgow City Council.

3.2.4 The sectors responsible for emitting the most CO_2 in 2015 were: the industrial and commercial sector by 1,047 $ktCO_2$/year and the domestic sector by 891$ktCO_2$/year. This trend is similar to previous years as seen in Figure 4.

Figure 4. Breakdown of Glasgow's carbon dioxide emissions by sector (2006 - 2015)



Source: BEIS. Local CO_2 emission estimates 2005-2014.

3.2.5 The sectors achieving the biggest carbon reductions from 2006 to 2015, are the industrial and commercial sectors with reductions of 150 $ktCO_2$, followed by 41 $ktCO_2$ from the domestic sector. The sector with least carbon reductions is the transport sector by 5 $ktCO_2$. This illustrates the need for continued effort in identifying and implementing carbon saving actions in the transport sector.

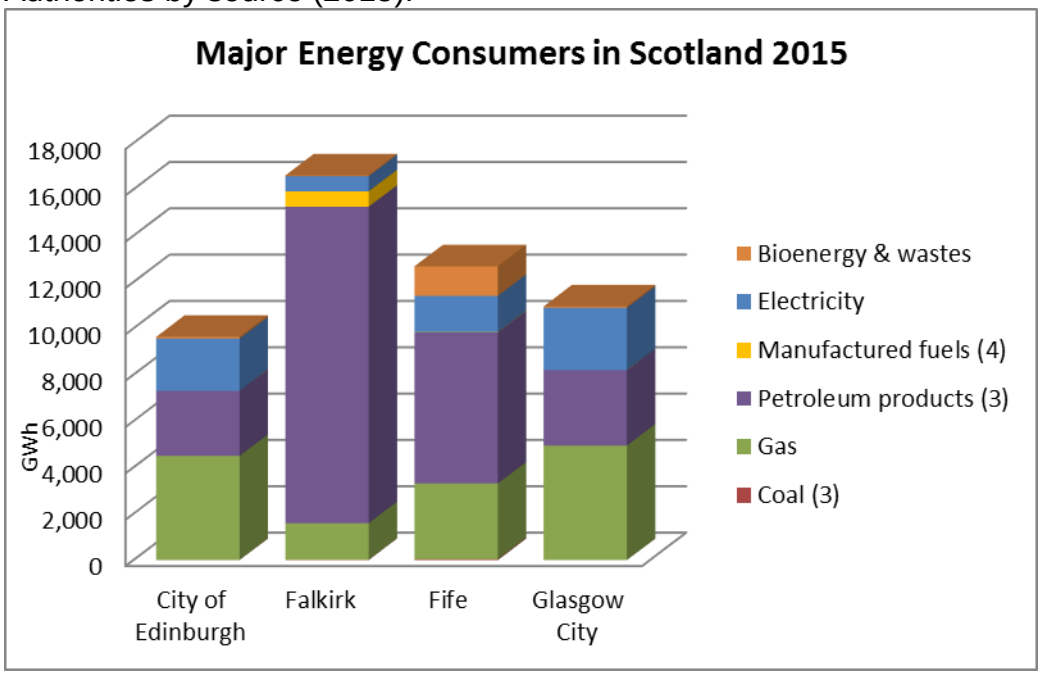
3.2.6 Combining the outcomes from the carbon emissions section (section 3.2.5) and the energy consumption section (section 3.1.4), highlights that, even though the city has, in 2015, exceeded its 2020 CO_2 target, continued action is required in reducing energy consumption in the three main sectors. Efforts should be focussed mainly on 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 & 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 2014, shows that Falkirk continues to be the biggest consumer of energy (16,606 GWh), followed by Fife (12,682 GWh), Glasgow (10,953 GWh) and

Edinburgh (9,639 GWh) as indicated in Figure 5. Of the four cities, Edinburgh is the only city to show an overall increase in energy consumption from 2014.

Figure 5. Breakdown of energy consumed by top four Scottish Local Authorities by source (2015).



Source: BEIS. Local CO_2 emission estimates 2005-2015.

3.3.2 Examination of the CO_2 per capita shows that Glasgow was 4.5 in 2015 compared to 4.9 in 2014. This is lower than Scotland's average CO_2 per capita (6.6). This is a positive indicator, however it could also reflect that there is an increase of people living in pockets of fuel poverty in the city who cannot afford switching on electricity or gas appliances.

4 Projects

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

4.2 Successful 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 LES 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 ECM 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.

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 for Meat Market site on Duke Street. This will act as a demonstrator and catalyst for further low carbon districts in the city. Furthermore, two bids submitted to the Scottish Governments Low Carbon Infrastructure Transition Programme Demonstrator fund in 2016 were successful. These two projects will demonstrate new and renewable ways to heat buildings in the city, directly tackling the issues related to gas consumption and building comfort previously referred to.

4.6 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.

4.7 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 Smart Bins project and the MACH Bike/Cycling Infrastructure projects.

4.8 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 sectors work with the council to make their activities more sustainable and to use energy and resources more efficiently. The Sustainable Glasgow partnership remains a viable method of marshalling these stakeholders and motivating change as we approach 2020 and beyond.

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 the City Energy Team.

Procurement: No relevant procurement issues.

Council Strategic Plan: The report supports the following strategic themes and outcomes:

A Thriving Economy

Outcomes are;

- a resilient, growing and diverse city economy where businesses thrive,
- Glasgow is rated highly for its business innovation and digital skills

A Vibrant City

Outcomes are;

- Glaswegians are active and healthier

A Sustainable and Low Carbon City

Outcomes are;

- the city is clean and public spaces are well maintained
- we have a low carbon footprint as a council and as a city
- we have more sustainable, integrated transport networks across the city and less congestion
- citizens use active travel including walking and cycling

Equality Impacts:

Does the proposal support the Council's Yes

Equality Outcomes 2017-22	
What are the potential equality impacts as a result of this report?	An EQIA screening was undertaken (link shown below). The screening noted that, as this report details statistics from two years ago, and illustrates reductions in CO_2 emissions in the city that are beneficial to citizens of all genders, races, religions, and physical abilities, a full EQIA was not required. https://www.glasgow.gov.uk/CHttpHandler.ashx?id=40244&p=0

Sustainability Impacts:

Environmental:	This report describes the cumulative reductions in carbon emissions and energy consumption.
Social:	This report details the success of actions undertaken by local communities in reducing carbon emissions and energy consumption.
Economic:	This report details the success of actions undertaken by local business & communities in reducing carbon emissions and energy consumption.

6. Recommendations

The committee is asked to –

- note the content of this report;
- continue to support the work of LES in reducing Glasgow's CO_2 emissions and environmental impact, including the associated financial burden;
- request a further update on the city's progress towards the 30% carbon dioxide reduction target in 12 months.