Carbon Management Plan

2020/21 -2029/30

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Checked by	Ian Campbell
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Executive Summary

The University of Glasgow declared a climate emergency in May 2019 and has since published a Climate Change Strategy, which commits the University to be 'net zero' for greenhouse gas (GHG) emissions by 2030.

The University has committed to setting a GHG reduction target that aligns with the UN Environment Programme Emissions Gap Report (to prevent global warming greater than 1.5^{o}C); currently a 7.6% reduction in GHG emissions per year, for the next decade. Over the period 2020/21 to 2029/30 this translates to a reduction in GHG emissions from 60,358 to 27,000 tonnes CO_2e per annum. If the University maintained its pre Covid-19 trajectory, our carbon footprint would rise to 64,940 tonne CO2e by 2035 and to 75,366 tonne CO2e by 2045.

The 2021/22 carbon footprint for UofG (40,803 tonne CO2e) was greater than that reported for 2020/21 by ~7,000 tonne CO_2e, however this increase in emissions was largely due to post-Covid resumption of business travel (+4,000 tonne CO_2e) and staff/student commuting to and from campus (+6,500 tonne CO_2e). In the coming years we must take steps to minimise the rebound that we are seeing in emissions from staff and student commuting and business travel. We must continue to make it easier for staff and students to access the campus using active travel or via public transport, support more agile/flexible working patterns and ensure that emissions from flight-related business travel are minimised. In addition, we must make it a priority to develop and then install low carbon heating solutions across our estate.

This Carbon Management Plan highlights various and often challenging interventions around the University, that we will need to take if we are to reach our stated emissions target of 27,000 tonne CO_2e by 2029/30. The forecast position in 2029/30 is 24,000 tonne CO_2e and thus below our current target of 27,000 tonne CO_2e, per annum. However, it is recognised that given cultural and financial factors outlined in the paper, achieving that position will remain challenging.

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1.0 Introduction

This Carbon Management Plan (CMP) follows on from both our declaration of climate emergency in May 2019 and our published Climate Change Strategy, which commits the University to becoming 'net zero' for greenhouse gas (GHG) emissions by 2030.

Furthermore, we have committed to setting ourselves a GHG reduction target, which aligns with guidance in the United Nations Environment Programme (UNEP) Emissions Gap Report, aimed to prevent global warming greater than 1.5°C; currently an average 7.6% reduction in GHG emissions per year, for the next decade. This CMP will be updated annually, highlighting action taken by the University which will deliver emissions reductions, making it clear how we will reach our emissions target of ~27,000 tonne CO_2e by 2030/31[1].

1.1 Global Context

- The Paris Climate agreement, drafted in 2015, saw 195 countries reach consensus on the need to keep global temperature rises this century to well below 2°C, while pursuing efforts to limit the increase to 1.5°C[2].

- The Intergovernmental Panel for Climate Change (IPCC) has published a special report which indicated that limiting global warming to 1.5°C would require 'net zero' carbon emissions by around 2050 (IPCC, 2018); any additional warming above 1.5°C would significantly worsen the risk of drought, floods, extreme heat and poverty for hundreds of millions of people, globally[3].

- More recently, the UNEP Emissions Gap Report stated that to meet the 1.5°C temperature goal of the Paris Agreement, GHG emissions would need to be cut by 7.6% a year, each year, for the next decade[4].

- COP27 was recently hosted in Sharm el-Sheikh, Egypt (November 2022). The conference achieved limited progress around the mitigation of GHG emissions, with participating nations unable to agree on a timetable for phasing out the use of coal and other fossils fuels. Nationally determined contributions (NDCs) or emissions reductions currently pledged are estimated to have us on a trajectory for 2.0°C of warming by 2050, however an analysis of existing national policies and actions suggests that 2.7°C of warming may be more likely, over that timescale.

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[1] The University reports its annual carbon footprint in tonne CO_2e. This means that we account for our production of a range of GHGs, beyond just CO_2. Therefore, to be clear, when we refer to our carbon emissions or our carbon footprint, this will also include the impact of methane, nitrous oxide, sulphur hexafluoride, HFC and PFC production.

[2] https://unfccc.int/sites/default/files/english_paris_agreement.pdf

[3] https://www.ipcc.ch/sr15/

[4] https://www.unep.org/news-and-stories/press-release/cut-global-emissions-76-percent-every-year-next-decade-meet-15degc

1.2 Organisational Profile

- The University of Glasgow (UofG) was founded in 1451 and is a world-class learning and research higher education institution. The University's mission is: "to bring a community of world changers together" (University Strategy – World Changers Together 2025).

- The University currently has 34,335 FTE students, 7273 FTE staff and with its main campus located in the West End of Glasgow. The University estate includes 335 buildings (>100 listed buildings) ranging from 19th to 21st century.

- Currently expansion of the University estate is taking place, with a £1 billion redevelopment underway at the former Western Infirmary site, adjacent to the Gilmorehill campus.

- Aligned with the University Strategy, both student and staff numbers and the size of the estate will continue to increase in the coming years, adding further pressure to the organisation's carbon footprint.

1.3 Legislative Context

- The UK Climate Change Act 2008 commits the UK government to reducing greenhouse gas (GHG) emissions by at least 80% of 1990 levels be 2050[5]. This has been put into Scottish legislation through the Climate Change (Scotland) Act 2009 which commits Scotland to an 80% reduction by 2050[6].

- Section 44 of the Climate Change (Scotland) Act 2009 also places duties on public bodies such as UofG to contribute to carbon emissions reduction targets; climate change adaption; and to act sustainably.

- In 2015, the Scottish Government introduced an order requiring all public bodies (including UofG) to report annually to Scottish Ministers on their compliance with the climate change duties.

- In April 2019, the Scottish Government declared a global climate emergency.

- In May 2019, the Committee on Climate Change published their report 'Net Zero – The UK's contribution to stopping global warming'. This report recommended that Scotland adopt a target of reaching net-zero greenhouse gas emissions (GHGs) by 2045[7]. Subsequently, the Scottish Government amended the Climate Change Bill to set a target of net-zero emissions by 2045 at the latest.

[5] http://www.legislation.gov.uk/ukpga/2008/27/pdfs/ukpga_20080027_en.pdf
[6] http://www.legislation.gov.uk/asp/2009/12/pdfs/asp_20090012_en.pdf
[7] https://www.theccc.org.uk/publication/net-zero-the-uks-contribution-to-stopping-global-warming/

1.4 University Context

1.4.1 University Strategy- World Changers Together 2025

The University strategy states that we will:

- Actively adopt and advance the United Nations' Sustainability Development Goals.
- Create greener, healthier and more sustainable campuses within our communities.
- Evolve our operations and ways of working to meet our commitment of being a carbon neutral organisation by 2030.

1.4.2 Glasgow Green (Climate Change Strategy 2020)

The Glasgow Green Strategy sets out how the University will deliver our climate change commitments, which are to:

- **Engage and empower our community**; we will ensure that the climate emergency is placed at the heart of what we do over the next 20 years. We will strive ensure a whole-of-institution approach to sustainability.

- **Promoting efficiency**; our estate and infrastructure will be optimally organised to reduce our carbon footprint and minimise harm to the environment.

- **Improve governance and policy**; we will structure our governance and management and allocate appropriate resource under both capital and revenue to initiatives that make a significant impact on our carbon footprint.

- **Undertake continuous improvement initiatives**; we will take forward a range of initiatives which help us reduce waste and contribute to the wider sustainability agenda.

- **Build resilience through partnerships**; we will lead or contribute to a range of initiatives which help prepare us for the effects of climate change over the decades to come.

1.4.3 Estates Strategy (2021-2026)

The Estates Strategy commits the Estates Directorate to:

- Ensure sustainability is at the centre of all our projects.

- Engage staff and students in our environmental actions.

- Strengthen the GUEST (student intern) network.

- Plan future energy use and generation in line with our sustainability goals

- Implement a Travel & Transport Plan which aligns to our operational needs and sustainability goals.

1.4.4 Carbon Management Plan in relation to other University environmental strategies

The Carbon Management Plan is not a stand-alone document but works in unison with other University plans and strategies, to help deliver our Climate Change Strategy, as shown in Figure 1 below.

Figure 1 – Environmental strategies, in relation to our Climate Change Strategy

2.0 Carbon Management

2.1 Carbon Reporting

UofG will be transparent in the reporting of its environmental performance data, with relevant information readily accessible via our sustainability webpages. We will continue to return data on an annual basis, to both the Scottish Government (in line with requirements under the Public Sector Climate Change Reporting Duty) and the Higher Education Statistics Agency (HESA).

2.2 Carbon Footprint Data

Figure 2 below summarises the annual carbon footprint data for the University of Glasgow, over the period 2018/19 to 2021/22. The footprint includes Scope 1 emissions (gas consumption, fugitive [refrigerant] emissions, fleet vehicles), Scope 2 emissions (electricity consumption) and Scope 3 emissions (water consumption, waste production, business travel, staff/student commuting).

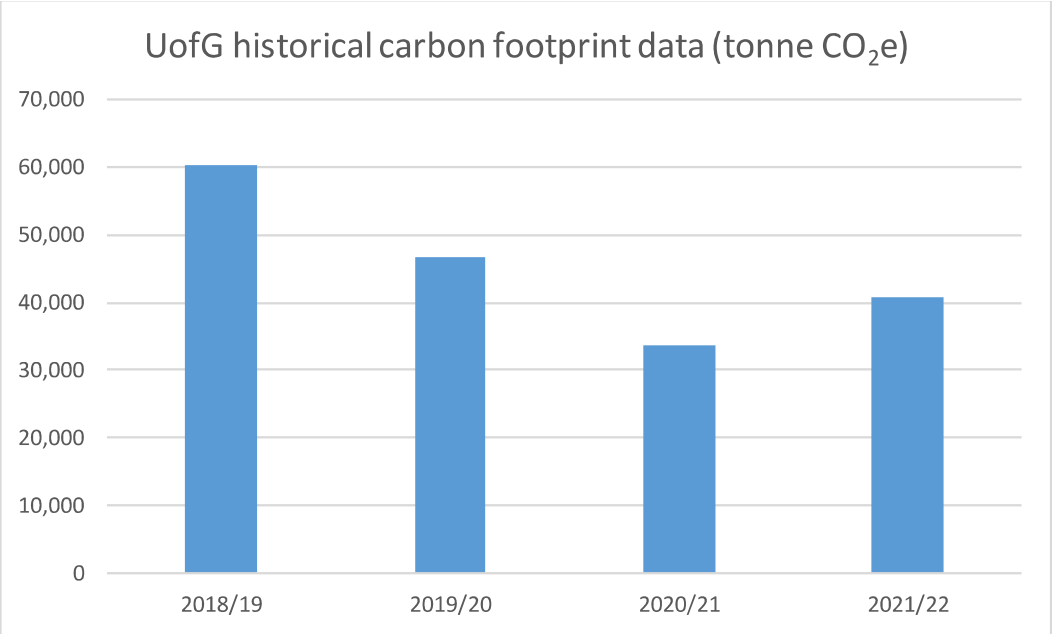

Figure 2 – Historical Carbon Footprint Data for the University of Glasgow

2.3 Carbon Footprint Breakdown

Table 1 below shows a breakdown of the UofG carbon footprint, based on our data returns to Scottish Government, under the Public Sector Climate Change Reporting Duty over the past four years.

Scope 1 emissions have fluctuated over this period, depending on the extent to which our gas-fired CHP engine has been in operation.

At the same time, **Scope 2** emissions have significantly decreased, because of the continued decarbonisation of the national grid.

Scope 3 emissions from flight-related business travel have been steadily increasing over the years, with the exception of the period between 2020 and 2022 when coronavirus-related travel restrictions prevented business travel for a significant proportion of the reporting years. Similarly, emissions due to staff/student commuting were also significantly reduced during 2019/20 and 2020/21. In 2021/22 we saw a significant rebound in emissions from both business travel and staff/student commuting albeit still well below 2018/19 levels.

	2018/19 emissions (tonne CO_2e)	**2019/20 emissions (tonne CO_2e)**	**2020/21 emissions (tonne CO_2e)**	**2021/22 emissions (tonne CO_2e)**
Gas Consumption	17,500	19,779	18,652	15,551
Fleet Vehicles	430	130	104	155
Refrigerant Emissions	1265	333	207	468
Electricity Consumption	16,990	12,185	11,253	11,645
Business Travel (Flight Related)	13,194 (13,009)	7,322 (7,111)	245 (220)	4,212 (4,020)
Staff/Student Commuting (Car Related)	10,021 (6,015)	6,216 (3,780)	948 (582)	7,654 (4,872)
Waste Production	685	505	304	201
Water Consumption	273	315	1	89
Home Working	-	-	1,845	829
Annual Total	**60,358**	**46,785**	**33,558**	**40,803**

Table 1- Carbon Footprint Breakdown for years 2015/16 through to 2020/21

2.4 Future Carbon Footprint Projections

The University commissioned ARUP to carry out a projection study in 2020, to gain an understanding of what the University's annual carbon footprint projections would be 2045, taking into consideration growth in staff and student numbers, the campus redevelopment and the impact of future grid electricity decarbonisation. Two different scenarios were considered: business as usual and an intervention scenario where significant investment was made across the estate (in energy efficiency improvements, low carbon heating and renewable energy technologies) and reductions in both commuting and business travel-related emissions were delivered.

According to the consultants, if the University maintained its pre Covid-19 trajectory, **our carbon footprint would rise to 64,940 tonne CO_2e by 2035 and to 75,366 tonne CO_2e by 2045**.

2.5 Carbon Reduction and Net Zero Targets

Over the period 2020/21 to 2030/31 we plan to reduce our organisational carbon footprint to 27,000 tonne CO_2e per annum[8].

We will set ourselves an interim carbon reduction target of 47,000 tonne CO_2e per annum, by 2025/26.

The University has also committed to being net zero for GHG emissions by 2030. As such, we will focus on reducing our carbon footprint as much as possible over this decade, but we will phase in the use of offsetting to achieve net carbon neutrality by 2030.

All targets have been rounded to the nearest 100 tonne CO_2e.

2.6 Carbon Offsetting Strategy

We will phase in the use of offsetting, where required, to help reduce our net carbon footprint during the 2020s and achieve net carbon neutrality by 2030. In addition, we have also committed to address the carbon impact of international student travel by offsetting one return flight a year for every student from outside Europe, from 2025 onwards.

The University's carbon offsetting strategy will be two-pronged. We will identify partners to develop a scheme, or schemes, that generate nature-based carbon offsets (either tree planting or peatland restoration) and deliver co-benefits that align with our objectives. In this regard, we have also committed to participating in the Clyde Climate Forest initiative. Any requirement to purchase additional carbon offsets will be carried out via collaboration across the higher education sector and mediated by the Environmental Association of Universities and Colleges (EAUC).

Beyond 2030, as we decrease our emissions further, we will reduce our reliance on offsetting.

[8] We have used the 2018/19 footprint, as a proxy baseline from which to calculate our targeted emissions reductions over the next decade. This is because the actual 2019/20 footprint was markedly affected by the coronavirus pandemic and not representative of normal business operations.

2.7 Engaging with our Community

To better facilitate a 'whole institution' approach to tackling the climate emergency, the University has established a Centre for Sustainable Solutions which aims to connect services and disciplines across the University and create a single point of contact for strategy, policy, research, teaching, estates and other services (https://www.gla.ac.uk/research/az/sustainablesolutions/). The Centre will help to link the creative energy and expertise within the University to the wider sustainability agenda and provide resources and networks to help staff and students progress towards sustainable practices.

The Centre for Sustainable Solutions works in partnership to develop and deliver short courses around Sustainability, Climate Change and Carbon Literacy.

2.8 Environmental Communications

The University has an Environmental Communications Strategy which seeks to deliver clear and coherent communication, with respect to both environmental performance and action at UofG. Communication activities will showcase progress and highlight the commitment and contributions of staff and students involved with environmental issues, thus encouraging others to increase their own involvement. Further work is required to ensure coherent implementation of this strategy.

2.9 Governance and Delivery of the Carbon Management Plan

Oversight of the CMP will be conducted by members of the Sustainability Working Group, which has the following remit:

- To oversee implementation of the University's Climate Change Strategy and Action Plan, of which the CMP is an integral part.
- To raise awareness of and engagement with the Strategy and Action Plan across the University community.
- To make recommendations about future amendments or revisions to the Strategy and Action Plan.
- To enhance the University's reputation and profile as an institution that is committed to the sustainability agenda.
- To provide reports periodically to SMG and to Court via the Estates Committee.

Responsibility for the delivery of our various emissions reduction strategies is outlined as follows:

Area	Senior Responsible Officer
Energy	Director of Sustainability
Strategic Transport and Travel	Chief Operating Officer
Waste Management	Director Facilities Services
Soft Landings	Director of Facilities Services
Design Standards	Director of Projects

Environmental Communications	Director of Communications and Public Affairs

3.0 Carbon Reduction Plans

The carbon footprint for 2022/23 reporting year is yet to be determined. The extent to which we have used our CHP engine to generate both heat and electricity, combined with rebounding post-pandemic travel-related emissions make predicting the 2022/23 footprint very difficult. As such, we have assumed a worst-case scenario for 2022/23, in which emissions rebound back to 2018/19 levels; this will be updated in version 1.3 of the plan in 2024.

3.1 Gas and Electricity Consumption

Decarbonising the supply of heat to our complex estate in the coming years will be very challenging. We are currently investigating a range of options to meet our future heat demand.

The national electricity grid is expected to further decarbonise in coming years. Current grid carbon intensity is 0.19 $kgCO_2e/kWh$ and this is projected to fall to 0.09 $kgCO_2e/kWh$ by 2030.[9] Thus, we expect to see a 53% reduction in Scope 2 carbon emissions reduction by 2030, which equates to a net carbon saving of 5,263 tCO_2e.

The range of planned energy efficiency interventions and investments in renewable energy technologies across the estate, along with the estimated carbon savings are summarised in Table 2, below.

Action	23/24	24/25	25/26	26/27	27/28	28/29	29/30	Total savings (tonne CO_2e)
National Grid Decarbonisation	-752	-752	-752	-752	-752	-752	-752	-5263
Solar PV	-5	-5	-227	-209	-42			-488
LED installation and controls	-255	-300	-300	-300	-200	-150	-100	-1605
Low carbon heat					-4,963	-1,389	-5,658	-12,010
Heat & Ventilation optimisation	-37	-42	-34	-19	-19	-14	-19	-184
Fabric improvements	-29	-21	-31	-21	-31	-31	-36	-200
Life cycle replacement	-80	-50	-50	-50	-50	-50	-50	-380
Annual carbon savings (tCO2e)	**-1,158**	**-1,170**	**-1,394**	**-1,351**	**-6,057**	**-2,386**	**-6,615**	**-20130**

Table 2 – Energy efficiency and renewable energy emissions savings to 2030

[9] https://www.gov.uk/government/publications/updated-energy-and-emissions-projections-2019

For deployment of solar PV systems, an assessment of suitable space across the estate will be performed. Consideration will also be given to the potential for ground-mounted solar PV arrays.

With respect to energy efficiency, there are a range of current and planned building-level LED upgrade projects that will be delivered in collaboration with our property maintenance partner, CBRE. In addition, improvements to our Building Management Systems (BMS) and the outputs from our various Digital Twin projects should allow us to realise significant emissions savings from adjustments to heating/ventilation controls. Fabric improvements, such as glazing replacements, draught proofing and roof/wall thermal insulation upgrades will also help us to realise emissions savings and will be continuously delivered, along with heat recovery projects, as part of our ongoing asset management programme. Lastly, our ongoing asset life cycle replacement programme will be underpinned by a sustainable design approach involving the following steps:

- Verification that system is required,
- Accurate design and equipment sizing performed to reflect the needs.
- Consideration given to other non-energy demanding solutions.
- High energy efficiency specification equipment selected.
- Good quality installation and maintenance plan developed.

In conclusion, our current emissions in relation to energy consumption are 26,920 tCO_2e. Successful project delivery within the above-identified areas should deliver total carbon emissions savings of 20,130 tCO_2e by 2030.

3.2 Sustainable Laboratories

As a research-intensive institution, UofG operates a large numbers of laboratories (989 at the time of writing), which are amongst the most energy intensive spaces on the estate and take up a total of 41,865m^2 (7.8% of total space).

Until recently there has been no co-ordinated attempt to ensure that these spaces are run in an efficient and sustainable manner. As a result, practices varied widely across the campus, sustainability of the operations was often not considered, and there was significant room for improvement. Recruitment of a full-time Sustainable Laboratories Co-ordinator has brought about a considerable improvement in awareness, alignment to the Laboratory Efficiency Assessment Framework (LEAF) programme and enabled identification of a range of carbon reduction programmes as set out in Table 3, below.

Action	2023/24 reduction (tCO_2e)	2024/25 reduction (tCO2e)	2025/26 reduction (tCO2e)	2026/27 reduction (tCO2e)	Total reduction (tCO_2e)
Ultra Low Temperature Freezer Replacement	-10	-20	-20		-50
Fume Cabinet Recommissioning and Refurbishment	-100	-200	-150	-150	-600
Rollout of LEAF	-200	-400	-600	-250	-1,450
Annual carbon savings (tCO2e)	**-310**	**-620**	**-770**		**-2,100**

Table 3 – Identified interventions for sustainable laboratories to 2030

A programme of fume hood/cold storage/technical equipment replacement, in combination with operational efficiency savings driven via staff engagement with the Laboratory Efficiency Assessment Framework (LEAF) will enable us to realise additional emissions savings of 2,100 tonne CO_2e per annum in the coming decade.

3.3 Commuting Emissions

We estimate that there is significant potential to reduce the carbon emissions associated with staff and student commuting over the coming decade.

For this to be achieved, leadership, partnership working, and behavioural change will be required to support sustainable travel modes. Many of the infrastructure improvements required to improve sustainable travel are out with the campus and are the responsibility of external organisations, such as the City Council. Individual level behavioural change is also needed to drive modal shifts, however changing peoples' behaviour is challenging, can take time to take effect and is often reliant on having the correct infrastructure, policies, and incentives in place.

Our analysis has shown that if staff continue to work from home for two days per week, and students studied from home for an extra day each week (compared to the base year), savings of 4,000 tonne of CO_2e per annum could be realised from avoidance of commuting. Set against this saving, we estimate that emissions of 2,700 tonne CO_2e would be generated from the additional requirement to heat domestic residences during the daytime. Thus, we believe that the net carbon saving would be 1,300 tonne CO_2e, per annum.

In addition, we estimate a further emissions savings of 1,000 tonne CO_2e from increased adoption of electric vehicles for commuting travel.

Table 4 below, details a list of the priority actions that need to be taken, if we are to encourage beneficial modal shifts and achieve the required emissions reductions from commuting travel.

Action	2023/24 reduction (tCO_2e)	2024/25 reduction (tCO2e)	2025/26 reduction (tCO2e)	2026/27 reduction (tCO2e)	2027/28 reduction (tCO2e)	2028/29 reduction (tCO2e)	2029/30 reduction (tCO2e)	Total reduction (tCO_2e)
Maintain Hybrid working	-1300							-1,300
Increase electric vehicles for commuting				-100	-200	-300	-400	-1,000
Improvement plan for active travel						-100	-100	--200

Improve public transport		-40	-40	-40	-40	-40	-40	-240
Extend bike hire		-40	-40	-40	-40	-40		-200
Promote sustainable travel	-40	-40	-40	-40	-40			-200
Improve bicycle facilities	-250	-250						-500
Other active travel	-100	-100	-100	-100	-100	-100	-50	-650
Annual carbon savings (tCO_2e)								-4290

Table 4 – Priority interventions for reducing carbon emissions associated with staff/student commuting

If the University continues with transport modal shifts, then we will deliver emissions savings of ~4290 tonne CO_2e per annum by 2030.

3.4 Business Travel Emissions

During the academic year 2018/19, business travel by university staff accounted for 13,194 tonne CO_2e, with the vast majority of this attributable to air travel. We need to reduce this amount by ~55% by 2030.

UofG has recently published detailed guidance for business-related travel, which highlights the need to significantly reduce the carbon impact associated with this source of emissions[10], however adherence is not currently mandatory.

It is uncertain how quicky levels of business travel will return to 2018/19 levels, post-pandemic, however a steady increase in demand is expected in the mid-term (2025-2030). We have already seen a significant rebound in business travel-related emissions during the 2021/22 academic year. Additional policies and interventions will be required to suppress this increase in demand such as the continued use of software to facilitate online meetings. These will include removing the option of air travel for trips within the UK and setting firm targets for business travel at School level (including the requirement to pay for offsets where Schools exceed targets)

Table 5 below, details a list of the priority actions that need to be taken, if we are to achieve the reductions in business travel emissions described above.

[10] https://www.gla.ac.uk/myglasgow/sustainability/travel/business/

Action	2023/24 reduction (tCO_2e)	2024/25 reduction (tCO2e)	2025/26 reduction (tCO2e)	2026/27 reduction (tCO2e)	2027/28 reduction (tCO2e)	2028/29 reduction (tCO2e)	2029/30 reduction (tCO2e)	Total reduction (tCO_2e)
Set annual School business travel targets	-1222	-1107	-1003	-910	-824	-747	-677	-6500
Remove option for UK air travel		-800	-500	-500				-1800
Campus Travel Plan	-20	-20	-20	-10	-10	-5	-5	-90
Annual carbon savings (tCO2e)								**-8390**

Table 5 – Priority interventions for reducing carbon emissions associated with business travel

If we undertake these measures to reduce business travel, then we will deliver emissions savings of 8,390 tonne CO_2e by 2030.

3.5 Waste Management

In addition to facilitating more efficient servicing of our buildings, the rollout of improved internal recycling across the estate could deliver in the region of 160 tonne CO_2e in emissions savings per annum by 2030.

The success of the UofG WARPit asset reuse portal should also be noted. Since its launch 7 years ago, we have been able to divert around 170 tonne of surplus furniture from landfill, accounting for around 75 tonne CO_2e in emissions savings per annum. We estimate that a re-launch of the portal, with a wider focus (i.e. not just furniture reuse) could help to realise a further 3 tonne CO_2e, in emissions saving per annum.

A summary of planned waste management interventions can be found in Table 6, below.

Action	2023/24 reduction (tCO_2e)	2024/25 reduction (tCO_2e)	2025/26 reduction (tCO_2e)	2026/27 reduction (tCO_2e)	Total reduction (tCO_2e)
Improved internal recycling facilities	-160				-160
Deposit Return Scheme		-1			-1
Polystyrene recycling facilities		-1.5			-1.5
Recycling laboratory waste			-1.5		-1.5
Improved recycling facilities			-4		-4
Relaunch of WARPit	-3				-3
Annual carbon savings (tCO2e)	-163	-2.5	-5.5	0	-171

Table 6 – Identified waste management interventions to 2030

In total, we believe we will be able to realise carbon emissions savings of ~170 tonne CO_2e per annum, relating to improved waste management processes by 2030.

3.6 Information Technology

The Saughfield Centre, created in 2020 to centralise and update university servers has delivered a welcome improvement in the quality of data provision on campus. However, Information Services still host server rooms in both the James Watt North and Boyd Orr Buildings that are hugely inefficient when compared to modern standards. Information Services have recently made progress in identifying a power-efficient server hosting facility (best-in-class PUE of 1.18) to complement the Saughfield Centre and plan to migrate their on-campus servers to a 3rd party co-location site over the latter-half of 2023. This will result in all Information Services computer and storage workloads being hosted in energy efficient facilities, and emissions savings of ~ 270 tonne CO_2e p.a. to the University.

The identified service provider also has capacity to host additional workloads, including those processing sensitive data. Thus, there is potential for Colleges and Schools, who control 31 other largely inefficient server rooms across the campus, to decant to the co-location facility.

Work is now underway to begin metering these College and School server rooms, to better understand current operating costs and any emissions savings that might be achieved by improving efficiency in the future.

Other ways identified by Information Services to reduce energy consumption and associated emissions by ~100 tonne CO_2e p.a. are as follows:

- Introducing more modern ways of working – moving to laptops / docking stations, reducing the widespread use of multiple devices and enabling home working without infrastructure on campus – the Modern Desktop programme has progressed significantly to provide all staff with a laptop device and move away from desktop class machines.
- Network Investment Programme - this has retired the first core networking hardware in favour of modern more efficient units.
- Upgrading campus printing devices to more modern equipment.

Currently, IT-related efficiency savings should deliver ~370 tonne CO_2e p.a. by 2030. Further detailed work will be required to understand the potential for emissions reductions, associated with the improved management of College/School run server rooms.

3.7 Space Utilisation

The University estate currently comprises 71,032m^2 of office space, supporting a staff complement of 6,934 FTE. Based on 100% allocation per FTE, this equates to an average of 10.2m^2 per person.

We anticipate that increased agile working over the next decade (on average, 2 days per week working from home @ 60% allocation), will reduce our requirement for staff office space to 42,432 m^2.

However, current growth projections for both PGR students and staff over the next decade will require us to provide an additional 17,400m^2 of office space (again assuming that both groups will also work from home 2 days per week) over the period.

Therefore, by 2030, we anticipate that our requirement for office space on the estate will be reduced by around 11,000m^2, equating to a carbon saving of ~1,000 tonne CO_2e per annum.

3.8 Property Divestment

The UofG estate has a diverse mix of buildings, some of which are less energy efficient than others. A programme of divesting from buildings that have the worst performance from an energy perspective, could also help us to deliver carbon emissions reductions.

The projected disposal of buildings by 2030 will reduce our carbon emissions by ~500 tonne CO_2e per annum.

3.9 New Build, Refurbishment & Asset Maintenance

The University has a set of Design Standards which help to ensure that our new buildings, refurbishments and asset maintenance activities are delivered to the highest achievable standards by setting out guidance on space standards, maintenance and access, servicing & deliveries, estates & operations, security, ICT, fire, sustainability, inclusive design, grounds & landscaping, signage and business continuity. These standards are live documents and are regularly updated to reflect developments in best practice.

Whilst the Design Standards are key policy for the University, the setting of project specific targets at project inception is key to driving sustainability into future projects. By setting targets early project teams have the greatest influence on successful implementation, since as a project progresses the cost of change is likely to increase. Targets will be set on a project-by-project basis with the Sustainability Design Guardian, a party independent of the design team, responsible for setting these at challenging levels relative to the project scope. As an example, current targets for new labs build target a 50% reduction in embodied carbon (from 1400kgCO_2/m^2 to 700kgCO_2/m^2) and a 60% reduction in operational energy (from 600kWh/m^2/annum to 250kWh/m^2/annum).

A Measurement and Verification (M&V) process will be utilised throughout a project's design, construction, and in-use stages, to document the setting, monitoring, and evaluation of the project's sustainability in line with the agreed Key Performance Indicators (KPIs). M&V will be carried out by the appropriate members of the project team and monitored by the Sustainability Design Guardian.

It is important that targets are set proportionally to the scale and scope of the project to reduce unnecessary use of resources and the risk of increasing project cost. The targets set for any project are under the umbrella of Key Performance Indicators which reflect some of the aspirations and principles of the UN Sustainable Development Goals and the RIBA Sustainable Outcomes. These KPIs encompass the goals as set out within the University Design Standards.

Soft Landings is a process that recognises the ongoing maintenance/operational costs of a building during its lifecycle far outweigh the original capital cost and carbon impact of construction. Application of and adherence to the soft landings processes should ensure that in-use performance

of the buildings is optimised, through early engagement with both building managers and end users in the design process and by learning from previous experience, to reduce cost and carbon impact.

Implementation of the above processes should help to minimise the impact of our evolving estate but will not in every case deliver emissions reductions, particularly where additional space is created.

3.10 Carbon Accounting

The Governance and Policy section of our Climate Change Strategy requires that reports to Court, its subcommittees and Senior Management Group need to consider the sustainability impact of activities, policies and inventions.

The carbon impact of our future strategic and investment decisions must be quantified and then accounted for in any future projections of our carbon footprint. This will be implemented in 2023/24.

3.11 Summary

To conclude with, Table 7 below summarises the carbon emissions savings that we can expect to achieve, from each of the different interventions described previously.

Intervention	**Emissions savings achievable by 2030 (tonne CO_2e)**
Gas & Electric	20,130
Sustainable Laboratories	2,100
Commuting	4,290
Business Travel	8,390
Waste Management	171
Space utilisation	1,000
Property divestment	500
IT infrastructure	370
Total savings to 2030 (tonne CO_2e)	**c 37,000**
New build emissions to 2030 (tonne CO_2e)	715
Remaining emissions in 2030 (tonne CO_2e)	**c 24,000**

Table 7 – potential carbon emissions savings by intervention, to 2030

Not all these interventions will be straightforward to deliver, and each comes with its own set of challenges with respect to implementation.

Table 8 below, summarises the level of difficulty associated with the various interventions described in this carbon management plan, using red, amber and green signifiers. Broadly speaking, the wider strategic alignment of the proposed interventions is strong. Conversely, cultural readiness for change may be somewhat weaker.

	Financial	Cultural	Control	Technological	Strategic
Energy Efficiency					
Solar PV					
Low Carbon Heating					
Sustainable Laboratories					
Commuting Emissions					
Business Travel Emissions					
Waste Management					
Information Technology					
Space Utilisation					
Property Divestment					
New Build, Refurbishment & Asset Maintenance					
Carbon Accounting					
Carbon Offsetting					

Table 8 – Ease of implementation for interventions described in this Carbon Management Plan.

Figure 3 below, projects what our carbon footprint might look like in 2029/30, if we were successful in implementing all of the changes that have been described in this section of the Carbon Management Plan.

It must be repeated that the carbon footprint for 2022/23 reporting year is yet to be determined. The extent to which we have used our CHP engine to generate both heat and electricity, combined with rebounding post-pandemic travel-related emissions make predicting the 2022/23 footprint very difficult. As such, we have assumed a worst-case scenario for 2022/23, in which emissions rebound back to 2018/19 levels; this will be updated in version 1.3 of the plan in 2024.

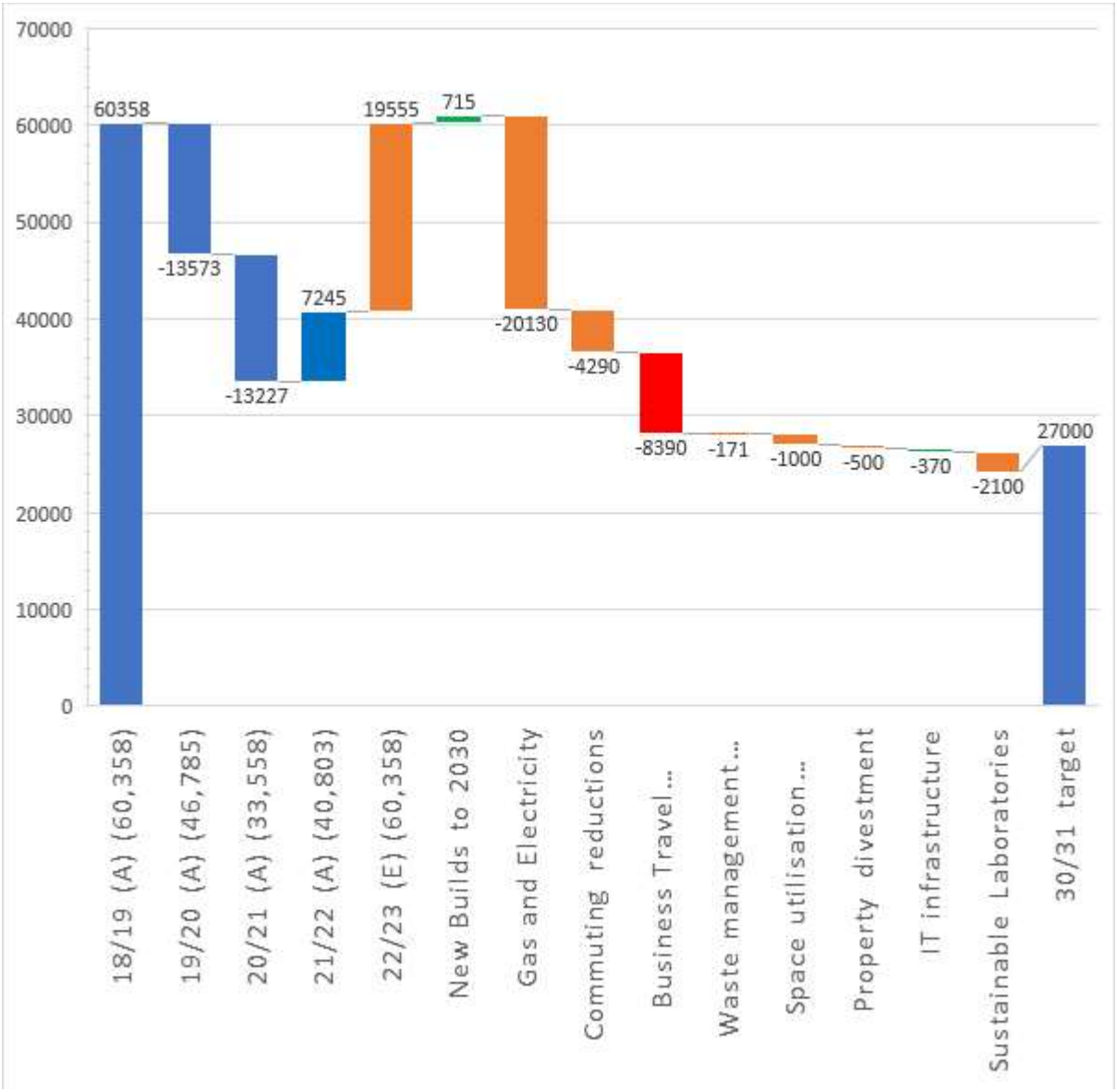

Figure 3 – Pathway to University of Glasgow 29/30 carbon footprint target

The projected outtake position in 2029/30 is 24,000 tonne CO_2e and is below our current target of 27,000 tonne CO_2e, per annum. However, it is recognised that given the cultural factors outlined in table 8 that achievement remains challenging.

3.12 Concluding remarks

Delivery of this CMP will be monitored by the Sustainability Working Group over the course of 2023/24 and progress will be reported back to both University Court and Scottish Government. We commit to updating the CMP on an annual basis.