EDINBURGH NET-ZERO 2030

CITY OF EDINBURGH COUNCIL EMISSIONS REDUCTION PLAN

NOVEMBER 2021

EDINBVRGH
THE CITY OF EDINBURGH COUNCIL

Contents

Foreword

Climate Change is one of the most pressing issues of our time – and one we must all play our part in tackling it.

That is why, as an Administration, we made sustainability one of our key organisational priorities and set a target for Edinburgh to be a net zero city by 2030.

We're under no illusion that this will be a hugely ambitious target to meet, but there is also much to gain as a city being at the forefront of climate action and supporting a truly green recovery from the pandemic.

In the year that COP26 is hosted in Scotland, we will lead by example as the capital city, working to become a net zero organisation by 2030 and deliver on the City Climate Compact, which requires organisations who sign up to take action to reduce their own emissions.

Every step we take to become a net zero organisation will also be an opportunity for the city; creating market demand, stimulating green industries and jobs and contributing to sustainable, healthier and happier communities.

We know we don't have all the answers yet, and there's a long way to go – but the Council Emissions Reduction Plan lays out the strategic approach we will take to tackle our own emissions, which largely come from our buildings, our fleet and our waste.

We will make sure that we don't create new emissions problems by investing now in net zero buildings and ensure capital investment and infrastructure delivers our net zero objectives. We will invest in the improvement of services, advance our readiness, skills and knowledge to deliver change, learn from pilots and prototype projects and we will plan to speed up the actions required to meet our target.

As a major land and asset owner and developer in the city, this Council Emissions Reduction Plan rightly provides a focus on our buildings. As we review and improve our estate to net zero standard, we'll also be thinking about how these buildings best serve the city by aligning our retrofit plans to the development of '20-minute neighbourhoods' and sustainable places.

We've made outstanding progress on reducing our waste emissions, largely thanks to the opening of Millerhill waste plant. We'll continue to make progress by further improving waste services for citizens and promoting the reduce, reuse, repair and recycle approach to minimising unnecessary waste. We'll also continue to build on the progress we have made decarbonising our light fleet with a focus on our larger vehicles.

Funding will continue to be challenge but we are already investing in our Council Emissions Reduction Plan and will work to ensure we are well placed to benefit from funding opportunities from the Scottish Government, UK Government and other national bodies looking to invest in net zero action.

In the end, the success of this plan will be an organisational effort supported by the everyday actions and choices of all colleagues, which is why we're also focussing on developing the skills and knowledge of our teams.

We look forward to continuing this journey towards becoming a net zero organisation by 2030 – leading the way for our city to do the same.

Councillor Adam McVey

Leader of the City of Edinburgh Council
Convener of the Policy and Sustainability Committee

Councillor Cammy Day

Depute Leader of the City of Edinburgh Council
Vice Convener of the Policy and Sustainability Committee

Introduction

Following the publication of an Intergovernmental Panel on Climate Change (IPCC) report,[1] which sent a clear call for climate action to avoid the consequences of global warming of 2ºC, the City of Edinburgh Council declared a Climate Emergency in 2019 and committed to work towards a net zero emissions target by 2030 for both city and corporate emissions.

As noted by the Climate Emergency Response Group, if Scotland is to meet its 2045 target, our cities need to make faster progress. The Council is committed to playing our part by striving to reach net zero by 2030.[2]

This first Council's Emissions Reduction Plan sets out the proposed strategic direction for addressing the Council's major emission sources and the proposed actions the Council will take.

This approach is centred around acting now to ensure efficient service delivery; taking opportunities to reduce emissions; investing in skills and capacity to test new approaches; and maximising external funding to roll out change at scale and pace.

There are a number of drivers for the Council to take climate action:

- **Democratic:** The climate crisis has become an unescapable topic, and our children and our communities are asking us to act.
- **Social:** Tackling climate change provides an opportunity to secure cleaner air, safer routes, cheaper energy, green jobs, thriving wildlife and healthier more sustainable communities, bringing economic and social benefits to Council staff and the communities they serve.
- **Ethical:** Scotland was one of the first nations to sign up to the UN Sustainable Development Goals (SDGs) (*Table 1)* which were adopted to solve global challenges such as poverty, inequality, war, as well as climate change. Tackling climate change is 'the right thing to do' and ensures we deliver on the SDGs.

Table 1: UN Sustainable Development Goals

UN Sustainable Development Goals

1. No poverty	2. Zero Hunger
3. Good health and wellbeing	4. Quality Education
5. Gender Equality	6. Clean water and sanitation
7. Affordable clean energy	8. Decent work and Economic growth
9. Industry, Innovation and Infrastructure	10. Reduced inequalities
11. Sustainable Cities and Communities	12. Responsible consumption and production
13. Climate Action	14. Life below water
15. Life on land	16. Peace, justice and strong institutions
17. Partnerships for the goals	

[1] IPCC Special Report on the Impacts of Global Warming of 1.5 C Above Pre-Industrial Levels. https://www.ipcc.ch/sr15 Accessed. 2019 Oct;1.

[2] *Delivering on Scotland's response to the climate emergency*, Climate Emergency Response Group, September 2021

- **Financial:** The PCAN Achieving Net Zero report[3] has developed an economic case that supports the change required to meet the 2030 target, based on allocating current spending differently. This work has identified a set of interventions that illustrate what it would take to meet the 2030 net zero target for the city and shows that the majority would be cost-effective.

- **Legal:** The Council has a duty to comply with the Public Bodies Climate Change Reporting duties under the Climate Change (Scotland) Act. With a net zero emissions target of 2045, Scotland has some of the world's most ambitious climate change legislation. The Scottish Government "expects Scotland's public bodies to lead by example in combating climate change and making a valuable contribution towards achieving our emissions reduction target"[4].

This plan focusses on the Council's own operations. It shows how we aim to lead by example to accelerate action across the city. The journey to net zero emissions will be challenging, but we know climate action has the potential to deliver wider social, health and economic co-benefits, positively impacting communities and helping to realise the opportunities to reduce inequalities as we recover from the impacts of covid-19 and build back better and greener.

Reducing our emissions can also deliver savings by freeing up resources for reinvestment in services. For example, the electrification of the fleet can yield vehicle maintenance and fuel costs savings. In the same way, the upgrade of lighting and traffic signals to LED deliver electricity savings, but also maintenance savings as this technology needs to be replaced less often.

The investment we make in decarbonising and retrofitting the Council estate will improve energy efficiency but – done at the scale required to deliver a net zero organisation, will also have wider city benefits of green supply chains, green jobs and a green recovery.

Achieving net zero emissions and transitioning to a low carbon economy is a journey and as such the approach laid out in this report will be periodically reviewed and refined, reflecting the organisation's deepening knowledge and learning from the phased approaches.

The Council publicly reports its organisational emissions annually to the Scottish Government through the Public Bodies Climate Change Duty Reporting (PBCCD) since 2010/11. The Council also participated in the Carbon Disclosure Project (CDP)[5] for the first time in late 2020.

CDP is an international non-profit organisation for companies and cities' environmental reporting. It is the largest climate change focused data collection and assessment programme in the world.

[3] A Net-Zero Carbon Roadmap for Edinburgh, Robert Fraser Williamson, Andrew Sudmant, Andy Gouldson & Jamie Brogan, 2020

[4] "Protecting Scotland's Future: The Government's Programme for Scotland 2019-20". Published 3 Sep 2019.

[5] https://www.cdp.net/en/cities

A breakdown of the Council's carbon footprint is presented in *Figure 1*.

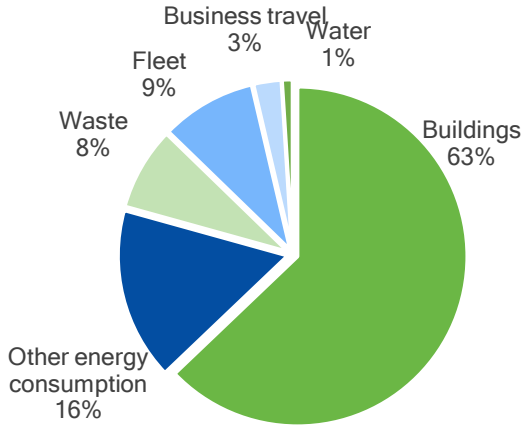

Figure 1: 2019/20 carbon footprint broken down by sector.

It shows the share of the different emission sources pre-COVID (2019/20 data). Emissions breakdown for 2020/21 are not shown as they is not representative of a typical year due to the impact of the pandemic.

Total 2020/21 emissions amounted to 65,647 tonnes of CO_{2e}, a decrease of 11% compared to 2019/20[6]. This is equivalent to the emissions generated by around 33,000 return flights between Edinburgh and New-York City, or by 8,000 average UK citizens annually. The main reason for the decrease is due to the reduction in electricity consumption - mainly due to lighting or other energy efficiency upgrades, property closures during the pandemic, and grid decarbonization. Detailed reasons for change are explained in the Council's latest Public Bodies Climate Change Duties Report.

Council emissions decreased significantly by 66% compared to 2005/06, surpassing our target of achieving a 42% reduction in emissions by 2020/21[7].

This target was met a year early and exceeded, with a 62% reduction being achieved in 2019/20. This was prior to the outbreak of covid-19 and so is not attributable to the changes in energy usage which resulted from the pandemic, but rather to earlier progress achieved through various emissions reduction interventions.

Figure 2 shows that future emissions are forecast to plateau in a business as usual scenario.

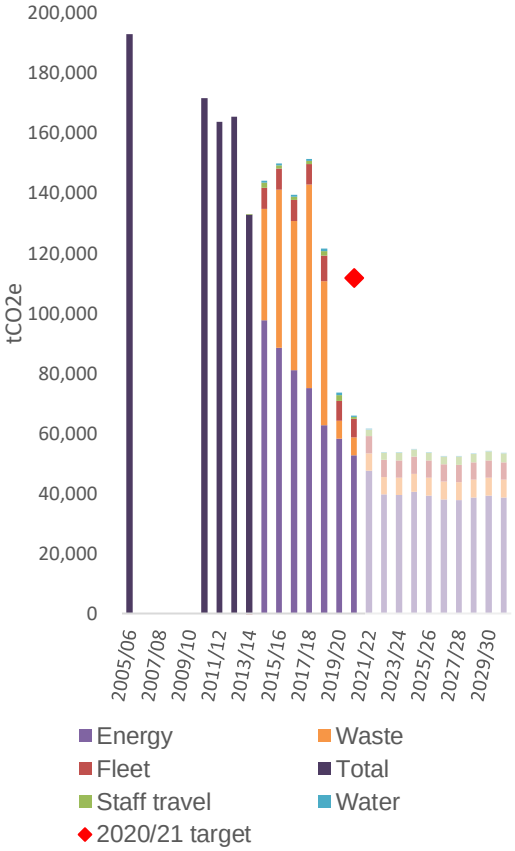

Figure 2: City of Edinburgh Council's carbon footprint: historic and future emissions.

Projections are based on various parameters including expected grid decarbonisation, population growth by age

[6] Note that the unit used throughout this document is tonnes of CO_2 (carbon dioxide) equivalent (abbreviated as CO_{2e}), meaning that all greenhouse gases are taken into account. Refer to the Glossary for more details.

[7] Public Bodies Climate Change Duties Report 2019/20, November 2020

categories[8] and historic Council emissions trend.

This Council Emissions Reduction Plan aims to lay out how the Council will act, across its major emissions sources, to make the necessary reductions to deliver a net zero organisation by 2030.

[8] For example, Age group “over 75 years old” is expected to impact on emissions from care homes. School roll projections are used to model future schools’ emissions.

Carbon budget

This plan sets targets based on 2019/20, rather than on 2017/18 consistent with the city target. This takes account of the fact that there was a 40% drop in Council emissions due to the waste diversion from landfill to the Millerhill Energy from Waste plant between 2018/19 and 2019/20.

The scale of the effort required to bring Council operational emissions down to zero corresponds to an annual reduction of roughly **7,000 tCO_{2e} per year, or 9% per year,** following a linear target pathway by 2030. The Council Emissions Reduction Plan will however, evaluate progress through a carbon budget that operates on three-year phases.

The proposed carbon budgets are shown in *Table 2*.

Table 2: Proposed cumulated 3-years carbon budgets (recalculated to account for increased carbon footprint scope due to inclusion of PPP1 buildings)

Period	Carbon budget (tCO_{2e})
2017/18 to 2019/20 *(cumulated historic emissions)*	345,728
2020/21 to 2022/23	189,553
2023/24 to 2025/26	126,369
2026/27 to 2028/29	63,184
2029/30 to 2030/31	7,020
From 2030/31	0

They outline the total emissions that can be emitted over a three-year period and are based on a linear reduction pathway.

This approach provides more measured assessments of progress, taking account of fluctuations that can exist in single year achievements for example, due to weather.

The 2017/18 to 2019/20 carbon budget has been retrospectively determined for illustration purposes based on cumulated historic emissions.

Carbon dioxide remains in the atmosphere between 300 and 1000 years, reducing one tonne of CO_2 in 2021 does as much for the stock of carbon in the atmosphere as stopping a source 30 times as large in 2051. As well as planning for net zero emissions this plan also seeks to maximise the actions that can be taken now to minimise the cumulative impact of greenhouse gas emissions.

In 2020/21, the Council emitted 65,647 tCO_{2e}, representing 35% (just over one third) of the three-year cumulated carbon budget, *Fig. 3*.

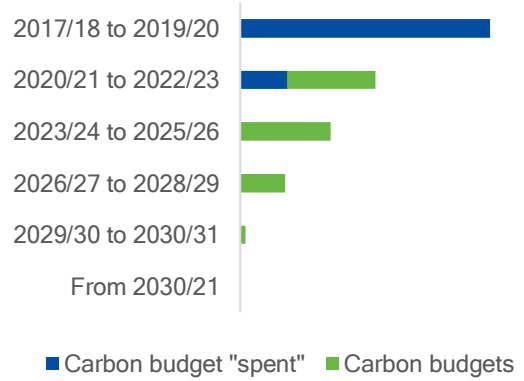

Figure 3: Proposed cumulated 3-year carbon budgets

This means that emissions reductions achieved during the pandemic need to be sustained in the coming years to ensure the Council does not exceed its carbon budget for this period.

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Methodology

The Council's emission reduction plan aims to provide a foundation to achieve net zero emissions by 2030. It presents the scale of the effort required in five key sectors[9]:

Buildings (63%)

Other energy consumption (16%)

Fleet (9%)

Waste (8%)

Business travel (3%)

Net zero ambition has been embedded in numerous Council strategies and programmes currently being developed and which impact the City's footprint, as well as the Council's.

Most of these large-scale projects, such as the City Centre Transformation[10] or the energy-efficient retrofit of 20,000 Council homes[11], are expected to reduce city-wide emissions. These contribute to and are accounted for in the city-wide net zero target, rather than Council's operational emissions and so are not detailed further in this plan.

As a result, this emission reduction plan only estimates carbon savings for projects that will impact on the Council's carbon footprint scope (*Appendix 1*) and where there is sufficient data to carbon cost the project. Three types of projects have been evaluated:

- **"Committed projects"** – which are already underway, or clearly scoped.
- "**Potential projects"** - interventions that would help bring emissions further down, but for which a business case has not been developed yet.
- "**Data not available/ innovation and offsetting"** – which covers projects that cannot be carbon costed as yet, but are expected to contribute to emissions reductions; plus any remaining emissions which will require additional projects, innovation and/or off-setting to remove.

These are presented, for each sector, in a waterfall chart with "committed projects" in solid green, "potential projects" in hatched green, and "data not available/ innovation and offsetting" in orange.

As the Council rolls out its Carbon Scenario Tool and data becomes available, we will revisit this analysis and expect to be able to show further estimated reductions.

[9] Water consumption is not included in this plan due to its small proportion in the Council's carbon footprint (1%). Proportions are based on 2019/20 data – 2020/21 data not representative.

[10] https://www.edinburgh.gov.uk/roads-travel-parking/city-centre-transformation

[11] Housing Sustainability Update, Housing, Homelessness and Fair Work Committee, November 2020

Buildings Energy Consumption

Building energy consumption is the central component of the Council's plan to reach net zero by 2030, representing 63%[12] of the Council's corporate carbon footprint. Building emissions mainly include gas and electricity; with gas oil and LPG[13] contributing to only 1% of the total carbon footprint, *Fig. 4*.

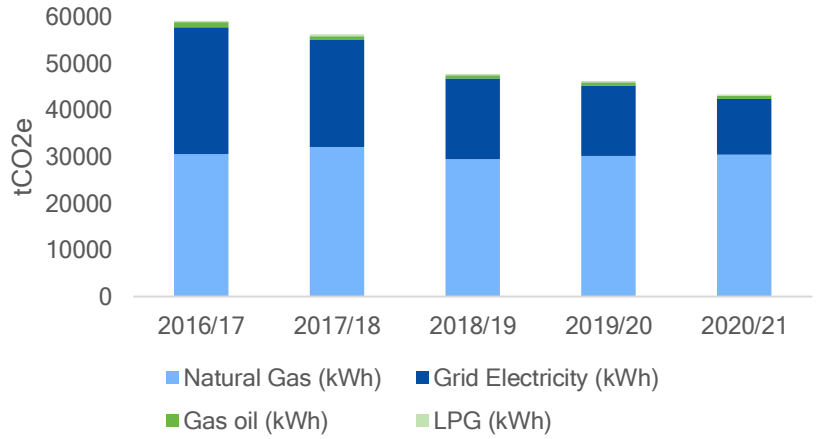

Figure 4: Historic buildings emissions (tCO_{2e})

Buildings emissions have reduced by 27% between 2016/17 and 2020/21, largely due to grid decarbonisation. The grid is expected to decarbonise further with the increase of renewable energy generation. This could reduce Council electricity emissions by almost 10,000 tCO_{2e} compared to 2019/20 based on BEIS projections.[14]

A key chapter of the Scottish Government's Climate Change Plan update[15] focusses on buildings and the main commitments are listed on *Table 3*.

Table 3: Key Scottish Government commitments relevant to buildings

Scottish Government's commitments
Commitment to ensure LHEES[16] are in place for all local authority areas by the end of 2023. Duty on local authorities to consider the designation of heat network zones and assess the suitability of their own estate to connect to heat networks (Heat Networks (Scotland) Act 2021).
Commitment to phasing out the need to install new or replacement fossil fuel boilers in off gas properties from 2025, and in on-gas areas from 2030
invest at least £200m in the Scottish public sector estate over the course of this parliament to improve and reduce energy use and install zero emissions heating systems (new Scottish Green Public Sector Estate Scheme launched in June 2021)
New Net Zero Carbon Standard for new public buildings published in March 2021
Invest £200m of capital funding through the Social Housing Net Zero Fund to support decarbonisation of social housing over the course of this parliament
New Build Zero Emissions from Heat Standard will be introduced from 2024 by which point all new builds will have to have zero emissions heating systems
Accelerate efforts to use 100% renewable electricity on the Scottish public estate.
Bring forward the review of the existing Energy Efficient Standard for Social Housing to conclude in 2023. EESH2 milestone: Social housing to meet EPC B by Dec 2032

[12] In 2019/20. This becomes 66% in 20/21 (not representative due to COVID-19)
[13] Liquefied Petroleum Gas
[14] Department for Business, Energy & Industrial Strategy, Updated energy and emissions projections: 2019.

[15] Securing a green recovery on a path to net zero: climate change plan 2018–2032 – update, Cabinet Secretary for Environment, Climate Change and Land Reform, Dec 2020
[16] Local Heat and Energy Efficiency Strategies

The Council estate:

- There are more than 600 buildings in the Council estate (*Table 4*). Only about 400 of those buildings are heated, the rest being, for example, monuments.
- Primary and secondary schools are the largest component of the Council's estate.
- 35 of these are PPP/DBFM[17] and are unlikely to return to Council ownership before 2030.
- 40% of the Council's operational estate was built within the last 50 years, and 30% is over 100 years old.
- Edinburgh Leisure accounts for 16% of the Council's buildings emissions footprint.
- Domestic buildings[18] account for 4% (this covers housing concierge, communal heating etc.)

Table 4: Repartition of Council buildings – The 665 buildings are spread across 282 sites - 254 Council operational sites and 28 PPP/DBFM sites*

	No of Buildings	Floor area (m2)
Edinburgh Leisure	52	69,152
PPP/DBFM	35	211,348
Council Properties	578	639,999
TOTAL	**665**	**920,499**

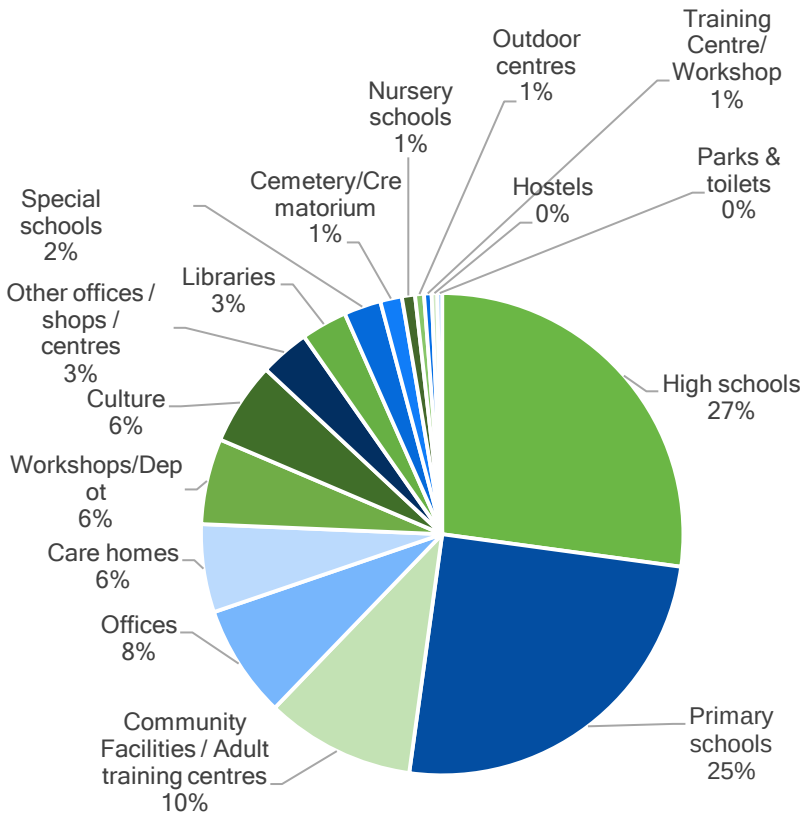

Figure 5: Breakdown of buildings emissions per building type (Includes PPP2 schools but excludes PPP1 schools)

[17] Public Private Partnership and Design Build and Facilities Management

[18] Where the Council is the bill payer

Strategic approach to building emissions reduction

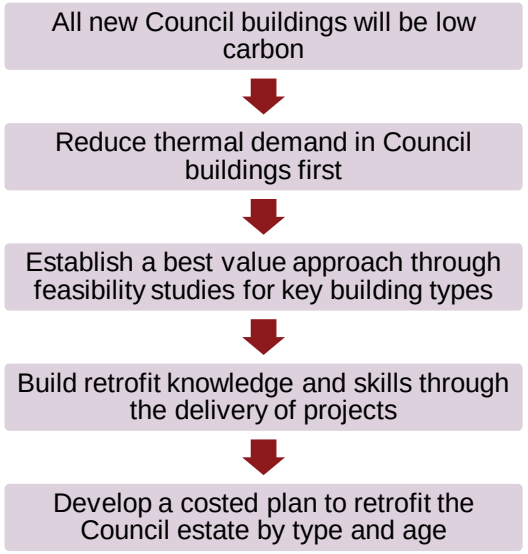

Figure 6: Strategic approach to building emissions reduction

In acting to reduce emissions from its operational estate, the Council will work with its public sector partners to deliver a place-based approach to public service delivery.

This will include ensuring a reduced estate supports a 20-minute neighbourhood model where citizens can access local services within a 10-minute return journey by foot.

In implementing this strategy, the Council will look to use its best assets more efficiently and repurpose existing buildings where possible, within the context of seeking to reduce the overall size of the estate.

Where new buildings are required, the Council will 'lock out' future emissions by committing to ensuring all new builds use alternatives to gas boilers for heat and are built to the highest standards, enabling Edinburgh to become an exemplar early adopter of the Net Zero Carbon Public Sector Buildings Standard.

In re-configuring existing buildings to support 20-minute neighbourhoods, the Council will bring forward a programme of deep energy retrofit of its operational estate, seeking opportunities for collaboration with public sector partners to secure economies of scale and maximise local job creation.

This will require significant levels of resource and the Council's approach is to invest in feasibility studies to scope retrofit requirements across the varied set of building types; build knowledge, skills and supply chains through carrying out pilots; and bring forward a costed plan seeking external funding to deliver a phased programme of retrofits, prioritised by building age and type.

The Asset Management Works (AMW) programme has been identified as the delivery mechanism to implement future EnerPHit works on the Council's operational estate.

The main driver behind the formation of the AMW programme is managing the assets condition of operational buildings and the mitigation of asset risk; this will be augmented by the additional driver of low carbon and energy efficiency considerations.[19]

[19] Asset Management Works Programme – 2020/2021 Update, F&R Committee

Council programmes contributing to net zero

Several key programmes will contribute to the Council's net zero target:

Decarbonisation across the operational estate

Passivhaus standard is the default standard on all new builds across the operational estate. For existing buildings, we aim to roll out a Passivhaus EnerPHit-informed approach focussing on reduction of thermal demand through improving building fabric.

This represents a step change in approach to Asset Management Works (AMW) in the Council and will require significant upscaling of works being undertaken. Interventions will prioritise reducing energy consumption by targeting issues such as insulation, air leakage, ventilation and glazing (a fabric first approach) in addition to the traditional objectives such as improving condition.

To optimise the level of intervention and approach, buildings will be analysed on an individual basis.

A successful bid was made to the Scottish Government's Green Growth Accelerator in October 2021. This could provide up to £10 million to retrofit Council buildings based on a payment in arrears funding model and upon the attainment of certain emissions reduction targets.

In addition, the Scottish Government will provide the Council with an additional grant funding of up to £120,000 to develop the EnerPHit Business Case.[20]

Low carbon heat

We are developing a Passivhaus Enerphit informed approach to demand reduction across Council buildings to facilitate the adoption of low carbon heat. By 2023 it will become a statutory duty for local authorities to designate heat network zones, assess the suitability of its own estate to connect to heat networks, and develop a Local Heat and Energy Efficiency Strategies (LHEES).

Assessing the options for delivering low carbon heat will become central to future strategy for Council buildings. This may involve either local plant and/or connection to heat networks. Low carbon heat will be adopted as the default option for new builds in place of other systems such as gas boilers, and suitability for all replacement works of heat generation plant will be considered. Furthermore, the feasibility of localised heat networks for operational buildings will be examined where they offer the potential to deliver efficiencies on individual plant replacement.

Expansion of solar PV estate

This targets the installation of solar PV on all appropriate new build Council properties based on right sizing for projected electrical load and availability of roof space. In addition, right sized solar PV will be installed (where possible) as standard as part of any suitable roof replacement works. This will align solar PV works with roof warranties and reduce installation costs.

The additional carbon reduction initiatives below will be further developed as part of the wider emissions reduction plan and brought for political consideration as appropriate:

Adopting a circular economy approach to manage the Council's operational estate

[20] Council Leaders welcome investment to make Council buildings greener – The City of Edinburgh Council

A circular economy approach will allow assets (equipment, plant, fabric, etc) which still have residual value to be identified, recovered and where possible reused instead of them being disposed of.

The reuse of assets will not only lead to cost savings but will reduce the carbon footprint of these assets, as well as saving embodied energy. It should also be noted that requirements for Environmental and Sustainability Management are already embedded in the Council's future Repairs and Maintenance contract deliverables.

Investment in 'energy efficiency/demand reduction' innovations and technology to minimise energy use and to reduce overheating

Some energy saving Building Management Systems (BMS) initiatives are already being carried out. This would be an extension to the existing initiatives but on a more granular level and is suggested to look into low-cost 'quick wins'.

The integration of 'Smart' technology can enable better and more efficient control of energy use in our operational buildings.

Embracing the '20-minute neighbourhood' principle

The Council Business Plan places 20 Minute Neighbourhoods at the centre of its approach to improving locally available services, co locating public sector services and reducing the need to travel to access support.

This will have many gains for the city emissions target but also for the Council – particularly where 20-minute neighbourhoods results in a strategic reduction in the Council estate as part of re-configuring it to better meet communities' needs.

Currently there are a number of buildings in the operational portfolio which are redundant/closed or are under-utilised. These buildings still require energy to maintain them, especially during the winter months.

Re-purposing these buildings or decreasing their number, where appropriate, will lead to a reduction in annual energy expenditure and therefore a reduction in carbon.

Case study: Currie High School, the first Passivhaus-designed high school in Scotland

The new school building will be designed in line with the guiding principles of the Scottish Government's Learning Estate Strategy and will be ready in 2024.

The campus will be the first Passivhaus-designed high school in the country, setting a rigorous energy standard which reduces the amount of energy needed for heating by up to 90%. It also lowers the total amount of energy used by around 70% and minimises carbon emissions.

Education, inclusion, outdoor learning, sustainability, digital learning, and community access are the core elements of this new community school.

Table 5 presents a first estimation of the carbon savings resulting from the key programmes listed in this chapter.

The future outcomes of the first pilot study[21] will help to refine the potential achievable energy reduction in the overall building's estate[22]. It should be noted that the school estate is set to expand due to expected population growth and this is reflected in the future emissions.

Table 5: Estimated impact of interventions on buildings emissions projections

Interventions	Working assumptions	tCO2e
Edinburgh Solar Co-op - Phase 2	Installation of solar panels on 3 Edinburgh Leisure buildings - total installed capacity of 0.4 MW (CEC sites of the ECSC Phase 2 are included in the "expansion of solar PV estate")	-27
Estate Remodelling	Estate reduced 50,000m^2 by 2030. Estimated savings based on operational estate benchmark consumption figures	-2,038
Replacement new builds delivered to Passivhaus Standard with ASHP[23]	84,100m^2 of new build delivered to replace existing assets	-2,928
Expansion of estate	38,000m^2 delivered as new/expansion of existing estate	+226
Enerphit based retrofit	Enerphit based retrofit works carried out on half of the retained/existing estate by 2030 (circa 260,000m^2) with a targeted space heating demand reduction of 60%	-3,711
Electrification of heat (via ASHP) and conversion to electricity of other fossil fuel loads	ASHP installed on properties that have undergone an Enerphit based retrofit	-3,601
Electrical efficiencies	Efficiencies through improved control, efficient lighting etc. Estimated at an average of 5% of retained load.	-135
Expansion of solar PV Estate	4000 kWp of additional solar PV by 2030 (estimation)	-268
Grid electricity decarbonisation	BEIS Updated energy and emissions projections: 2019	-10,243
Total reduction	Reduction in 2019/20 buildings emissions based on the above interventions	**-49%**

[21] Asset Management Board, 17 November 2020, Addressing the Net Zero Operational Carbon Target across the Operational Estate

[22] The first pilot only takes two building to feasibility stage only.

[23] Air Source Heat Pump. Note that the electrification of heat with ASHP will lead to an increase in electrical load, compensated by large gas savings.

As outlined previously, buildings will be analysed on case by case basis. It is anticipated that in some cases, applying an EnerPHit approach may not be a suitable option due to the building's construction type, its design/layout or its current condition, leading to high costs or technical constraints. For example, there may be limitation on what can be achieved in a building of significant historic character, and in these cases, other strategies would need to be considered on a case by case basis.

The modelling in *Figure 7 opposite* shows that carrying out Enerphit based retrofits on half of the existing estate by 2030 - which would equate to around 15 properties retrofitted per year - would deliver carbon savings of around 4,000 tCO2e.

Pilot works are at an early stage and no funding is yet available for these retrofits. The introduction of Mechanical Ventilation with Heat Recovery (MVHR) may lead to increased electrical use in some properties but insufficient detail is available at this stage to calculate the potential impact of this.

The carbon savings associated with the installation of ASHP in Enerphit retrofitted buildings have also been modelled with cost models to follow.

It is also anticipated that a degree of non-technological interventions (such as energy efficiency awareness campaigns) will be required to reduce energy demand in the first place. This will be addressed through the Council engagement and behaviour change programme, as detailed in the Staff Engagement section.

The potential for cost increases when switching from natural gas to electricity present a challenge nationally and locally as does the capacity of the city's grid infrastructure. The Council is working closely with Scottish Power Energy Networks as a strategic partner in planning the approach to retrofitting the Council's estate and this will also form a part of the City 2030 Climate Strategy.

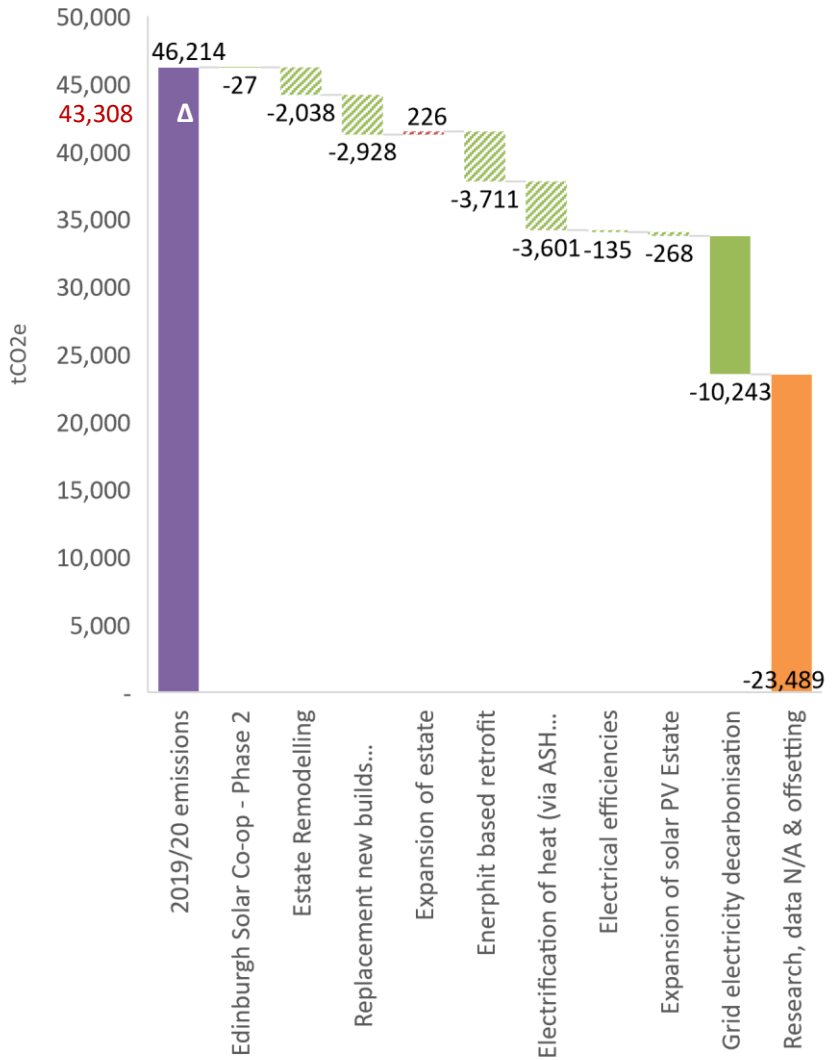

Figure 7: Estimated impact of interventions on buildings emissions. Note that interventions are interrelated: Enerphit based retrofits are necessary to facilitate the deployment of LZC primary plants. Then, large savings from grid electricity decarbonisation can only be achieved if steps have been taken to electrify heat. The white triangle (Δ) shows 2020/21 emissions.

The diversity of the Council estate is also a challenge as it makes a one size fits all approach impossible. Retrofitting to a high standard will help to manage energy cost pressures; however, doing so for the whole estate would require significant investment and is subject to the availability of external funding and development of the required skills and supply chains. The Enerphit pilot will ensure the Council can take an evidence-based approach to understanding the operational and financial implications of retrofitting the Council estate.

In the modelling shown on *Fig. 7* on the previous page, remaining emissions illustrated by the orange bar include:

- **Emissions from Edinburgh Leisure buildings**. Edinburgh Leisure committed to conclude a mapping exercise of all significant existing equipment including their current CO_2 emissions, plans for replacement, carbon savings and cost estimates. Once this exercise is complete it will be possible to model these reductions.

- **PPP and DBFM buildings**, for which no interventions have been modelled as yet. They present a challenge as the Council does not have direct control over the maintenance or replacement of plant/fabric during the contract term.
  The Council has been working with national bodies, and through the Scottish Cities Alliance Energy Efficiency in Public Buildings working group, to explore approaches that could be adopted to support net zero ambitions across the Council PFI estate;

- **Residual emissions from retrofitted buildings** (the emissions modelling assumes a 60% in space heating demand and a further 5% reduction in electricity consumption; thus, these buildings will continue to use energy, albeit to a much lower extent).

- **Remaining emissions from non-retrofitted buildings** (the emissions modelling assumes a retrofit of half of the estate). Note that the modelling on is for illustration purposes, and this proportion is not an agreed target.

Numerous projects will have significant impact on city-wide emissions rather than Council emissions, hence their absence in the present carbon analysis.

These projects include the development of heat-networks and net zero developments at Granton, Bioquarter, Fountainbridge, and Meadowbank; energy-efficient pilots in communities or the Sustainable Housing Strategy.

Table 6: Buildings phased emissions reduction plan (Note: all targets and deliverables are subject to approval and funding).

Resources secured (source)		Costs known (potential source)		Costs unknown (potential source)	

Phase 1: 2021/22 Actions	Resources	Intermediary milestones if relevant	Completion date (MM/YY)	KPI	2020/21	Target	Delivery Lead
B1. Enerphit pilots: Identification of 2 key properties of differing types taking them to Enerphit Retrofit Plan stage with associated mechanical, electrical and plumbing work to deploy LZC primary plant. Feasibility will be costed allowing decision to commence full design and delivery subject to funding. The Pilot will develop Enerphit based methodology for building refurbishment and develop knowledge on best value balance between demand reduction & adoption of low carbon heat.	£100K (Former CEEF funds)	Completion to feasibility stage by mid-October 2021 for investment decision	10/21	N/A	N/A	N/A	Patrick Brown (Sustainable Development)
B2. Pilot study to include a high-level desk exercise to give an indication of cost across the whole building estate.	Same as B1	Early 2022 report on Tranche 1 feasibilities.	Q1 22	N/A	N/A	N/A	Patrick Brown (Sustainable Development)
B3. In-house staff Passivhaus House Design training and knowledge transfer (included as part of Pilot exercise).	Same as B1	4 staff attending Passivhaus Designer training in Nov. 2021 Recruit at least 2 new trainees or apprentices linked to the project	on-going	No. of staff trained	0	TBC	Patrick Brown (Sustainable Development)
B4. Utilise initial funding to initiate first tranche of Enerphit feasibility studies to EnerPHit informed Retrofit Plan stage for 10-12 additional buildings to provide basis for investment decision.	£500K (CEC)	Completion to EiRP or Feasibility Study stage equivalent to RIBA Stage 2	03/22	No. feasibility studies	2	12	Patrick Brown (Sustainable Development)
B5. Commission the full detailed design of 1 or 2 of the initial pilot buildings for selected demand reduction measures (insulation, glazing, air tightness etc). Enabling the preparation of detailed designs would mean that if a decision was made to progress, works could be brought forward to start in 2022/23.	£500K (CEC)	Completion to EnerPHit full detailed design or equivalent to completion of RIBA Stage 4:Technical Design	03/22	No. of pilot buildings (full detailed design)	0	2	Patrick Brown (Sustainable Development)
B6. Seek budget for commencing pilot works of Enerphit based retrofit	Staff time (CEC)	Bid to Green Growth Accelerator Fund for 2 pilots + 10 Tranche 1 buildings Signature of GGA grant agreement – 04/22	07/22	Bid application	Success-full GGA bid	Funding awarded	Alan Chim (Sustainable Development)

Phase 2 - by 2025 Actions	Resources	Intermediary milestones if relevant	Completion date (MM/YY)	KPI	2020/21	Target	Delivery Lead
B7. Develop proposal for enhanced asset management works programme based on Enerphit methodology.	Staff time (CEC)	AMW Programme- 2020/21 Status Update' report - F&R Committee - 12 August 2021 Further presentation on EnerPHit to CLT, then to Elected Members - Sept/Oct 2021	No strategy completion date can be advised at this time as it is dependent on budget approval	N/A	N/A	N/A	Alan Chim (Sustainable Development)
B8. Delivery of first Passivhaus new build secondary school (Currie HS) and first Passivhaus primary school (Mayberry PS)	Both projects are in advanced pre-construction stages. Both CIP funded	Currie HS at RIBA Stage 4 expected to go into construction phase Summer 2022 Mayberry PS at RIBA stage 4 expected to go into construction Q1 2022 Both projects are 2 stage design and build.	Currie HS target completion 08/24 Mayberry PS target completion 08/23	% of new builds in delivery to PassivHaus standard with associated Low and Zero Carbon (LZC) Primary Plant or equivalent*	15%**	100% of conditioned area where Passivhaus is technically appropriate	Patrick Brown (Sustainable Development)
B9. Start construction works on Enerphit Pilot buildings and the first tranche (budget depending).	£tbc (CEC) + £10m (GGA) + £tbc (external)	2 buildings by 12/23 +5 buildings by 12/24 +5 buildings by 09/25 (*subject to approval and funding*)	10/25	# of building delivered to EnerPHit approach	0	up to 12	Patrick Brown (Sustainable Development)
B10. Work with stakeholders, funders and supply chain to set the groundwork for a step change in approach to asset management works**.**	Staff time (CEC)	N/A	on-going	N/A	N/A	N/A	Sustainable Development
B11. Increase installed Solar Photovoltaic capacity across the Council's operational estate	CEC + SALIX funding available (subject to payback)***	1MW over next 3 years (approx. split year 1 - 250kW, year 2 - 300kW, year 3 – 450kW)	12/30	Installed solar PV capacity (MW)	2.092	3.092 MW by 2023/24 6.092 MW by 2030 (+4 MW)	Paul Jones (Operational services)

Phase 3 – by 2030 Actions	Resources	Intermediary milestones if relevant	Completion date (MM/YY)	KPI	2020/21	Target	Delivery Lead
B12. Report on outcomes from Enerphit Pilot and set 2030 plan and funding requirements. Test delivery of Enerphit based retrofit approach.	Staff time (CEC)	Linked to actions B6, B7, B9, B10.	Linked to actions B6, B7, B9, B10.	Linked to actions B6, B7, B9, B10.	Linked to actions B6, B7, B9, B10.	Linked to actions B6, B7, B9, B10.	(Sustainable Development)
B13. Move to delivery of wide scale Enerphit informed basis for building retrofits and scale up in house resource and supply chain for delivery.	£tbc (potential national funding streams tbc in discussion with Operational Services colleagues)[24]	By 12/23 – 3,019m^2 By 12/24 – another 15,190m^2 By 09/25 – another 8,973m^2 retrofitted to an EnerPHit informed approach		Annual total gross internal floor area agreed to undergo low energy retrofit works and conversion to LZC plant (or equivalent)	0 m2	8,973 m2 by 09/25	(Sustainable Development)

*****All projects going forward will be delivered to Passivhaus Std with LZC Primary Plant or equivalent as the default position unless there is technical justification to do otherwise (for example, an unheated facility of a vehicle depot shed).

****** Out of 45 current in-flight projects, 7 are being delivered to Passivhaus Standard with LZC Primary Plant, equating to 15% of projects. This figure will improve as in-flight projects, which predated the requirement, are completed.

******* PV supported through capital works (new build) with SALIX funding available (subject to payback) to support additional PV on both capital and refurbishment projects.

[24]Scottish Government Green Public Sector Estate Scheme and Low Carbon Infrastructure Transition Programme (LCITP) successor fund. Further investment requirements and sources to be scoped by Energy Efficient Public Buildings Partnership

Other energy consumption

In addition to powering and heating operational buildings, 16%[25] of the Council's carbon footprint also includes a range of energy uses from street lighting, stair lighting, alarms, park and ride, trams, through to traffic signals, as illustrated in *Figure 8* below.

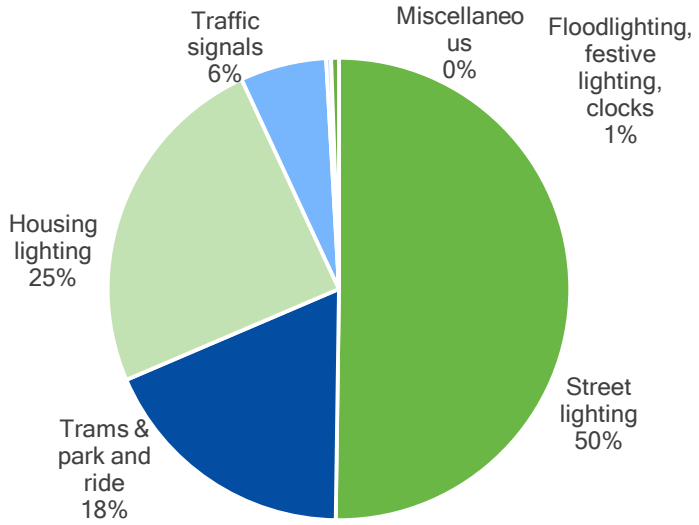

Figure 8: Breakdown of energy consumption, excluding operational buildings (2020/21)

These emissions are directly tied to emissions from the grid, which are forecast to decrease by themselves as a result of grid decarbonisation. Based on BEIS projections, this could lead to a decrease of around 8,000 tCO_{2e}. Should grid decarbonisation rate improve, these emissions will drop to close to zero by 2030, *Fig 9.*

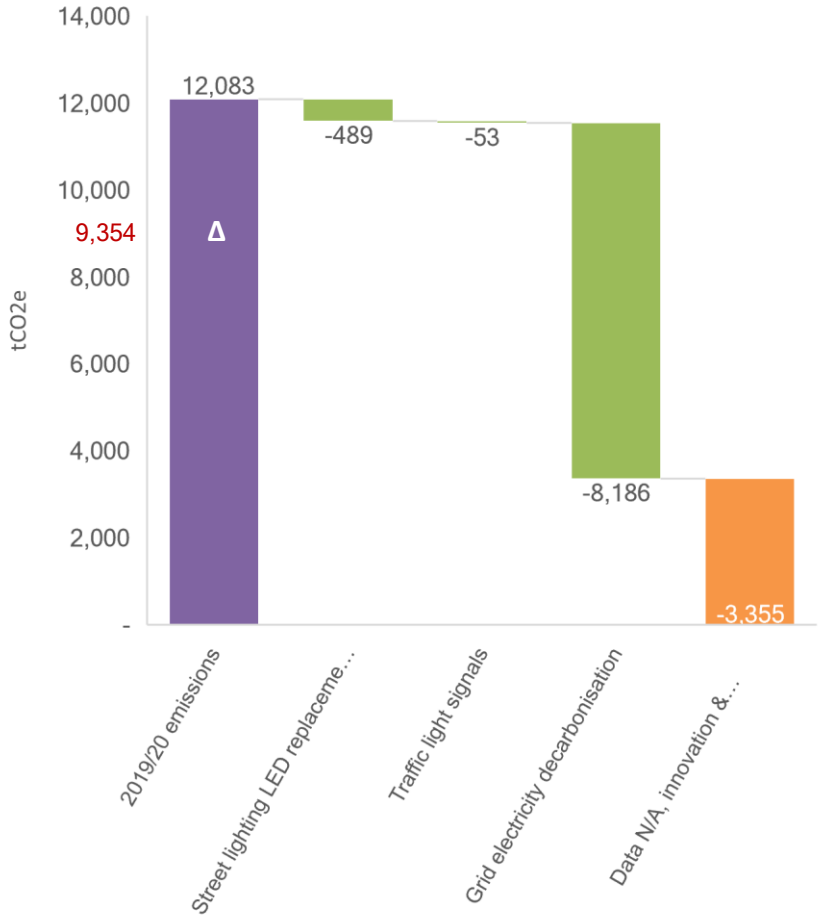

Figure 9: Estimated impact of interventions in 2030, Other energy consumption The white triangle (Δ) shows 2020/21 emissions

[25] In 2019/20. This becomes 14% in 2020/21 (not representative due to covid-19)

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Two projects will contribute to the net zero target:

1. **The street lighting LED replacement programme** is already underway with completion expected in December 2021. Street lighting electricity consumption has decreased by more than 30% in the past three years and (by the end of the project) is projected to decrease by around 52% compared to the energy consumed in 2017/18.

   This programme is expected to reduce emissions by a further 489 tCO2e using projected grid electricity carbon factors in 2030[26].

2. **Traffic signal LED optic replacement:** Currently the council has 610 traffic signal installations, 230 of these are still tungsten Halogen optics which are required to be upgraded to LED optics.

   Not only will the new signals consume about 80% less energy, they are also more reliable and need to be changed less frequently, reducing emissions from vehicle mileage (about 1,350 miles a year, not captured here), maintenance costs, and waste arising. Traffic signal energy consumption has decreased by 10% compared to 2019/20, thanks to crossings upgrades.

These interventions are summarized in *Table 7* on page 23. The budget for the street lighting LED replacement programme covers the full duration (three years) and represents full costs including project management and the introduction of the new Content Management System (CMS).

The resource identified for the traffic light signals replacement is an estimate based on basic upgrade works and doesn't take into account all civil works or traffic management costs.

These costs will be partly covered by funding from other projects if traffic signals replacement is part of future active travel schemes or development works.

[26] Using 2020/21 emissions factors, savings amount to more than 1,000 tCO_{2e}

Table 7: Estimated impact of interventions in 2030, Other energy consumption

Resources secured (source)		Costs known (potential source)		Costs unknown (potential source)	

Interventions	Savings (tCO2e)	Resources	Completion date (MM/YY)	KPI	2020/21	Target	Delivery Lead
Street lighting LED replacement programme	-489	£24.5 m (over 3 years)	11/21	Street lighting electricity consumption (MWh)	18.556	13.085 MWh by 2022/23[27]	Alan Simpson
Replacement of 230 incandescent traffic light installations with LED	-53	£6.5m (estimate)	12/24	Number of sites with Tungsten Halogen Lamps Traffic signal electricity consumption (kWh)	254 sites 2,227,693 kWh	243 sites by 03/22 0 site by 03/31 Decrease	Mark Love
Grid electricity decarbonisation	-8,186	N/A	N/A	N/A	N/A	N/A	N/A
Total reduction	**72%**						

[27] Based on an estimated 52% reduction in electricity consumption compared to 2017/18 figures

Fleet

Transport emissions are Scotland's largest emission source and this area represents a key priority as progress has been historically very slow compared to other sectors.

Although the Council's fleet emissions represent only 10%[28] of the corporate carbon footprint, tackling these is critical in demonstrating that the Council is taking steps to be an exemplar organisation. However, Council fleet emissions have only decreased by 11% since 2014/15, *Fig.10.*

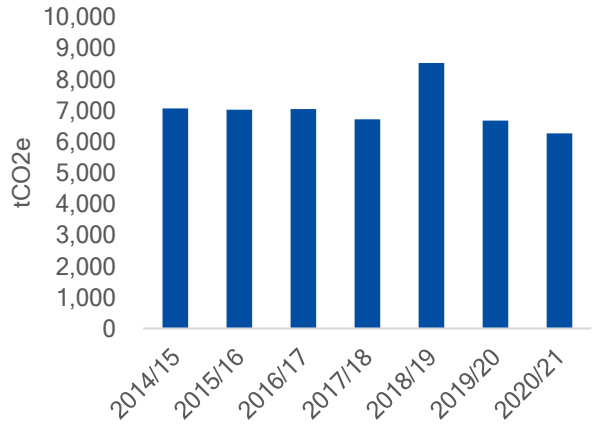

Figure 10: Historic fleet emissions

On the one hand, the first lockdown (April-July 2020) has led to a drop in diesel and gas oil consumption with most trucks delivering essential service only (8% decrease in annual diesel and gas oil consumption). On the other hand, social distancing requirements has led to an increased use of hire cars (mainly petrol cars), as in many cases staff cannot travel together in the same vehicle. Overall, Council's fleet emissions have decreased by 6% compared to the previous year, but this is likely to rise in the next reporting year due to the lifting of restrictions associated with the pandemic. It is anticipated future reductions will come from the continued replacement of vehicles with alternatively powered alternatives.

It is Scottish Government's ambition that the public sector leads the way to decarbonise their vehicle fleet, as mentioned in various key documents such as the latest Climate Change Plan update[29].

Table 8: Scotland's Climate Change Plan update - Key announcements

Scottish Government's ambition	**Target year**
Majority of **new buses** are zero emissions	2024
Need for any new petrol and diesel **light commercial vehicles** in **public bodies** phased out.	2025
Conditions created to phase out the need for **all new** petrol and diesel **vehicles** in Scotland's **public sector fleet.**	2030
Need for **new petrol and diesel cars and vans** phased out	2030

[28] In 2019/20. This becomes 9% in 2020/21 (not representative due to COVID-19)

[29] https://www.gov.scot/publications/securing-green-recovery-path-net-zero-update-climate-change-plan-20182032/

Strategic approach to fleet decarbonisation

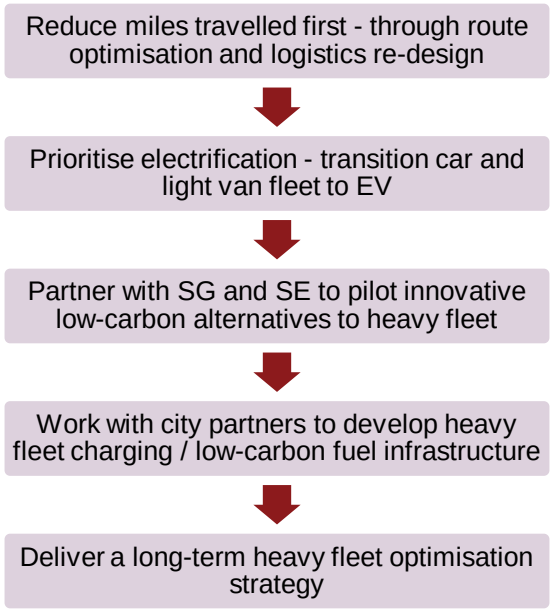

Figure 11: Strategic approach to fleet decarbonisation

In acting to reduce emissions from its fleet, the Council will first act to reduce miles travelled across all vehicle types and reduce the number of vehicles required, by re-designing services and optimising routes.

It will then take a phased approach to replacing remaining vehicles with low emission alternatives, focusing on electrification first and working with partners to develop the required supporting infrastructure.

Over the longer-term, an approach to very heavy fleet will be developed to take account of emerging technologies and circumstances where electrification is not a viable option. The Council will also take steps at every stage to ensure journeys are made by the most sustainable vehicle possible, including for example by e-cargo bike where appropriate.

Council programmes contributing to net zero

Electrification of the Council's car and van fleet will reduce fleet emissions by around 19% but will not be enough to reach net zero. Reducing mileage travelled is a cost-effective way of further reducing these emissions.

For example, the optimisation of the communal service route (12 refuse vehicles) could reduce emissions by at least 87 tonnes of CO2e in 2030. Route optimisation of the Council's Passenger Operations service (75 minibuses) could also reduce emissions by a further 21 tonnes.

More than 98% of the Council's fuel consumption is diesel, of which HGV are the largest consumers (62%), as indicated on *Figure 12 and Table 9*.

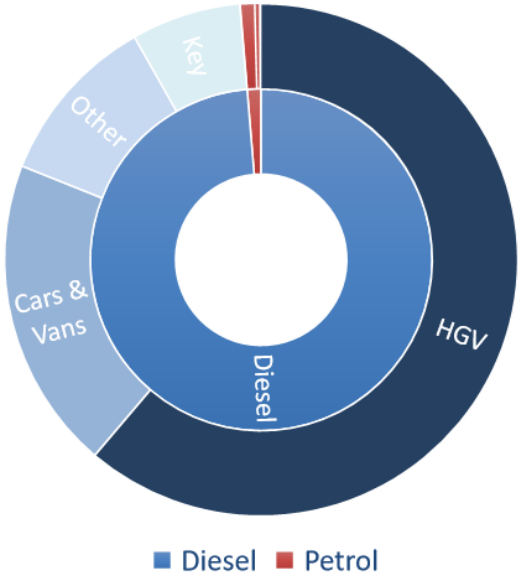

Figure 12: Main fuel users, Council fleet (2019/20 data)

Table 9: Main fuel users, Council fleet (2019/20 data)

	Diesel	Petrol
Cars and vans	20 %	25 %
HGV	62 %	0 %
Key	7 %	70 %
Other	11 %	6 %
Total (litres)	**2,530,054**	**33,250**

To deliver net zero the Council must replace larger vehicles with low-carbon alternatives (hydrogen, electric, biofuel).

Technologies are currently less developed than for cars but are developing quickly and the Scottish Government is committed to support local authorities to "*green their bus, HGV and other vehicle fleets and encourage them to embrace this change*" and to "*continue to work to establish a Zero Emission Heavy Duty Vehicle programme with Scottish Enterprise to support innovation in the Scottish supply chain for HGVs.*[30]" The Council will actively pursue opportunities to participate in this work and pilot new innovations for heavy fleet.

The emissions reduction plan assumes a replacement of around half of these larger vehicles (HGV, 4x4, minibuses, refuse vehicles etc. based on current knowledge of replacement options per vehicle type) with an increased electricity consumption should they be replaced by electric vehicles.

In addition to fleet, 70% of the petrol consumption comes from non-road vehicles such as chainsaws, lawnmowers and other equipment.

The Council will bring forward a plan to upgrade these with non-fossil fuel alternatives. The carbon impact is expected to be marginal as petrol represents about 2% of the total fuel consumption but there are also safety, noise reduction and air quality co-benefits for taking action in this space.

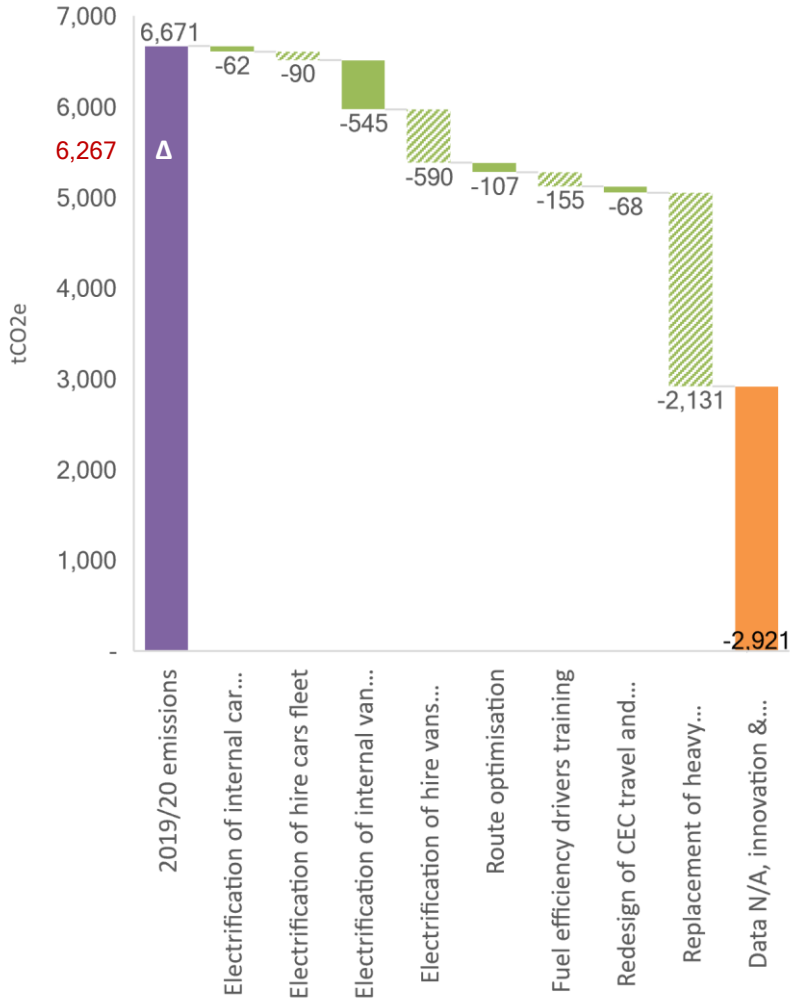

Figure 13: Estimated impact of interventions on fleet emissions. The white triangle (Δ) shows 2020/21 emissions

[30] "Protecting Scotland's Future: The Government's Programme for Scotland 2019-20". Published 3 Sep 2019

The interventions summarised in *Table 10* could reduce fleet emissions by 55%.

Remaining emissions would come from larger vehicles for which low-carbon alternatives are being explored. The phased plan presented on Table 11 aims to close that gap while dealing with current technological uncertainties around the most adequate type of fuel for heavy vehicles (hydrogen, electricity, biofuels).

Other challenges and barriers include ensuring that mobile workers have access to charging infrastructure in their private homes, ensuring that Council locations are equipped with charging points and ensuring that the electricity grid has sufficient capacity to withstand the increased electricity demand.

Work is ongoing to cost transitioning the full fleet to low emission vehicles and further detail will be provided in the final version of this plan. As an example, an electric Refuse Collection Vehicle (RCV) – including charging infrastructure – costs an estimated £500k. For a fully hydrogen powered vehicle, costs can be as high as £600k. This compares with costs of around £160k for a diesel RCV. For smaller vehicles, cost differentials range from £5-12k for cars and small and medium vans. Large electric vans currently cost approximately three times as much as diesel, and electric minibuses cost double their diesel equivalent.

Following work to first redesign services and routes to reduce miles travelled and therefore the number of vehicles required, a costed fleet optimisation strategy will be brought forward. The Council will explore funding opportunities to meet these costs – taking account of potential savings from maintenance (30% estimate) and fuel costs (80% estimate).

Numerous other projects such as the tram network extension to Newhaven, the introduction of a Low Emission Zone, the installation of on-street EV charging infrastructure and the City Centre Transformation Strategy will have significant impact on city-wide emissions rather than Council emissions, hence their absence in the carbon analysis.

Table 10: Estimated impact of interventions - Committed and potential (in italic) - Fleet-related emissions

Interventions	Assumptions	tCO_{2e}
Electrification of internal cars fleet	Assuming 41% of the car fleet is made up of internal cars (rest = hire vehicles) - based on 2020/21 fleet breakdown applied on 2019/20 figures	-62
Electrification of hire cars fleet	*See above assumption*	*-90*
Electrification of internal vans fleet	Assuming 48% of the van fleet is made up of internal vans (rest = hire vehicles) - based on 2020/21 fleet breakdown applied on 2019/20 figures	-545
Electrification of hire vans fleet	*See above assumption*	*-590*
Route optimisation	Route optimisation for communal collection (12 vehicles) + Council's Passenger Operations Service (75 minibuses)	-107
Fuel efficiency drivers training	*Expected savings of 6% in the long term (Energy Saving Trust).*	*-155*
Re-design CEC travel and logistics services	Assuming a mileage reduction of 6,700 miles/week in the long term (approximates at this stage)	-68
Replacement of heavy vehicles*	*Assuming reduction in 50% of diesel & gasoil consumption from diesel, buses, 4x4*	*-2,131*
Total reduction		**-55%**

Table 11: Fleet phased emissions reduction plan

Resources secured (source)		Costs known (potential source)		Costs unknown (potential source)	

Phase 1 – 21/22 Action	Resources	Intermediary milestones if relevant	Completion date	KPI / Target	2020/21	Target	Delivery Lead
F1. Complete 100% electrification of car fleet.	£0.33m[31] (CEC) + £0.22m (SG funding) + Further resources required[32]	Follow evolution of Scottish Government's guidelines to reduce the number of extra vehicles in the fleet to meet social distancing requirements - ongoing	12/21	% EV (total cars)	11/21 data: 70% - internal fleet/ 38% - incl. hire fleet[33]	100% by 12/21	Scott Millar
F2. Commit to 100% electrification of van fleet and develop a business case in consultation with HR & trades unions for the installation of domestic chargers for mobile workers	Staff time (CEC)	Establish working group with HR & trade unions by 03/22 Discuss with procurement a compliant efficient process Business case finalised by 08/22	08/22	Business case developed	0	BC developed by 08/22	Scott Millar
F3. Work with city partners to explore the potential for alternative fuels and scope the feasibility and cost of a joint approach to electric and/or hydrogen solutions for heavy fleet	Pilot costs met by Lothian Buses & suppliers	Work on-going to trial H2 vehicles with Lothian Buses Work with other cities to inform feasibility of alternative fuel use	12/22	N/A	N/A	N/A	Hannah Ross/ Gareth Barwell/ Daisy Narayanan
F4. Work with EST to develop and implement initial route optimisation strategies, including fuel efficiency drivers' training	TBC	Establish a training programme with L&D by 11/22	*Timeline to be established*	TBC	TBC	TBC	Scott Millar

[31] 32 EV cars – Fleet Renewal Programme – F&R Committee – March 2020
[32] Investment will be funded from savings made through the Council's fleet review and supplemented by third party grants for EV and infrastructure – Fleet Renewal Programme – F&R Committee – March 2020
[33] Note that social distancing requirements has led to an increased use of hire cars (mainly petrol cars) and fossil fuel cars have been retained. The percentage of electric vehicles in the fleet should quickly increase as extra fossil fuel cars will be removed from the fleet.

F5. Work with public sector partners to develop a city-wide network of EV charge points/depots to service public sector fleet, to be made available on Chargeplace Scotland for members of the public to use out-of-hours, beginning with 50 additional chargers initially, with 20% being rapid chargers	£250K (CEC)	PO for an initial phase of chargers at Bankhead depot 1x150 kW rapid charger, 2x dual 7 kW chargers, 1x50 kW rapid charger – by Nov-21	Installation of 6 new charge points by 04/22	# of CEC Fleet chargers installed # publicly accessible	86 45	136 chargers by 04/22	Scott Millar

Phase 2 – by 2024/25 **Action**	**Resources**	**Intermediary milestones if relevant**	**Completion date (MM/YY)**	**KPI / Target**	**2020/21**	**Target**	**Delivery Lead**
F6. Develop a fleet optimisation strategy	TBC	Fleet optimisation strategy produced by EST – 06/21 Develop outline business case to resource this project – Summer 2022	Summer 2022	Fleet optimisation strategy	Complete	Strategy developed	Scott Millar
F7. Begin the roll out of alternatively powered van fleet	£0.18m (CEC) + £0.27m (SG funding)[34] + Further resources required[35]	Start of procurement exercise – 01/22 Report to F&R Committee to approve funding – 03/22 Out to tender – 04/22 Consensus meetings – from 06/22 Contract award & order place – 08/22	12/23	% EV (total vans)	11/21 data: 20% - internal fleet, 13% - incl. hire fleet	100%	Scott Millar
F8. Begin the roll out of alternatively powered heavy vehicle fleet	£TBC (ZWS, *awaiting bid outcomes*)[36]	Bid for 5 electric RCVs submitted – 07/21	TBC *subject to bid outcomes*	# of alternatively powered HGV	1	6 *subject to bid outcomes*	Gareth Barwell

[34] 40 electric vans – Fleet Renewal Programme – F&R Committee – March 2020
[35] Investment will be funded from savings made through the Council's fleet review and supplemented by third party grants for EV and infrastructure – Fleet Renewal Programme – F&R Committee – March 20
[36] This only covers 5 electric Refuse Collection Vehicles. Costs involved to transition the full heavy fleet are currently unknown but current prices indicate that the cost of an electric RCV is currently three times the cost of a diesel counterpart.

Phase 3 – by 2030 Action	Resources	Intermediary milestones if relevant	Completion date (MM/YY)	KPI / Target	2020/21	Target	Delivery Lead
F9. Commit to replace equipment such as lawnmowers and chainsaws with non-fossil fuel alternatives when appropriate	50% increase on standard cost	Establish working group with Grounds maintenance team to review small equipment – 11/22	03/25	% of electric small equipment	0%	50% of equipment electric	Scott Millar
F10. Secure external funding to transition the remaining fleet	£TBC	Working with TS and EST for potential future funding opportunities	on-going	N/A	N/A	N/A	Scott Millar
F11. Investigate opportunities for utilising fleet as part of broader approaches to Mobility as a Service (MaaS) within 20 min neighbourhood approach	Staff time (CEC)	Review contract to expand the network of city car club vehicles accessible to staff and vehicle locations by 12/24	2030	N/A	N/A	N/A	Gareth Barwell

Waste

Waste emissions represented as much as 40% of the Council's carbon footprint in 2018/19. This figure dropped significantly to 8% in 2019/20[37], after Millerhill plant became operational, diverting most of the residual waste from landfill to the Energy from Waste facility. Waste emissions have decreased by 84% since 2014/15.

For the purposes of this plan, emissions from waste refuse vehicles are included in the fleet category.

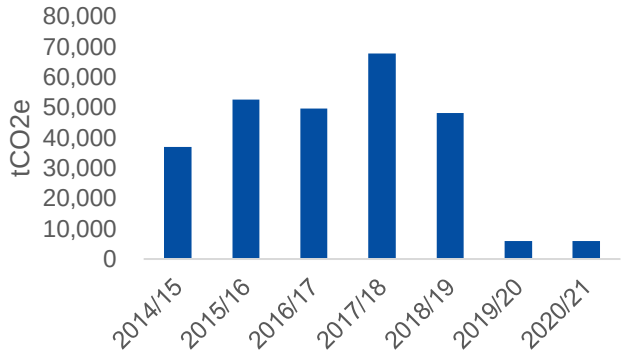

Figure 14: Historic Waste emissions

Total tonnages collected by the Council have increased by 2.3% in 2020/21. This is to be expected considering that during the lockdowns people were eating most of their meals at home and once restrictions were lifted a higher proportion of meals were eaten at home than before the pandemic. There has been a reduction in tonnages collected from Council buildings and litter bins across the city during the pandemic. Overall, waste emissions increased by 1.8% compared to last year.

In the latest Climate Change Plan update, the Scottish Government set ambitious targets to reduce waste related emissions, as indicated in *Table 12*.

Table 12: Waste commitments – Scottish Government's Climate change plan update

	Scottish Government Commitments
Energy from Waste (EfW)	Consider measures to ensure new Energy from Waste plants are more efficient and how waste infrastructure can be 'future-proofed' for CCS technology.
Landfill gas	Double number of landfill gas capture sites that undertake investigative or development work by 2025 & provide funding to support this.
Reductions in waste	- Deposit Return Scheme by 2022 - Ban problematic single use items - Consult on a charge on single use disposable beverage cups + increase the carrier bag charge from 5p to 10p
Increased recycling rates	• 70% of all waste recycled by 2025 • Consult on requirements to separately collect garden waste (by 2023), textiles and hazardous elements of household waste (by 2025). • £70m to improve local recycling collection infrastructure
Food waste	-33% from 2013 baseline by 2025
Biodegradable waste to landfill	Ban by 2025

[37] Waste emissions represented 9% of Council's emissions in 2020/21

Strategic approach to waste emissions reductions

Figure 15: Strategic approach to waste emissions reductions

As the Council provides the domestic waste service for the city, emissions from citizens' waste are included in the Council's carbon footprint. The Council is taking a two-fold approach, focusing on improving the waste collection and recycling offer to citizens, while supporting and encouraging citizens to adopt the 'reduce, re-use, recycle' hierarchy as part of promoting a local circular economy for the city.

In taking this approach forward, the Council will work with Scottish Government and other strategic partners to explore incentivisation models for both citizens and producers of consumer goods to reduce waste, seeking to invest savings from system changes such as the deposit return scheme in the redesign of services and use of SMART technology to improve recycling rates and service efficiency.

Council programmes contributing to net zero

The emission reduction plan considers two measures to reduce waste emissions:

- **Reduce total tonnages of waste arising**. In particular residual waste (landfilled and incinerated), despite the projected increase in population.

- **Divert food waste from incineration to food waste recycling.** It is estimated that roughly one third of residual waste tonnages is food waste. Efforts could be targeted to ensure that this is properly sorted to be recovered through anaerobic digestion.

Reducing waste and improving recycling are in line with the waste hierarchy: "*reduce, reuse, recycle*". Actions are underway to remove single use-plastics in Council buildings and schools (e.g. installing water coolers) and to shift to paperless working across all viable services.

Substantial reduction in paper and envelopes purchased have been achieved with carbon savings estimated at around 25 $kgCO_{2e}$/year. Depending on the numbers of staff working from home, these savings figures could increase further.

Furthermore, the Council is using Warp-it[38], a resource redistribution platform. Since the use of this platform in 2016, a total of 140 tonnes of waste have been saved from landfill, enabling savings of nearly £0.5m to date. This tool meets the Council's three key priorities:

- **Sustainability**, through waste reduction, diversion from landfill and fostering a "circular economy culture".

- **Wellbeing**, through the support of local groups and communities. The platform has already benefited third sector organisations and there is a potential to

[38] https://www.warp-it.co.uk/

- use it more widely in the city, encouraging third sector organisations and business partners to join, thus developing stronger relationships or new partnerships with other local organisations.

- **Poverty prevention and eradication**, through wider engagement with third sector organisations the potential to reuse, refurbish, and redistribute high quality goods and unused items to poorer households.

It should be noted that households waste tonnages are also included in the Council's carbon footprint and dwarf the tonnages generated by Council buildings. Council-specific projects have a negligible impact on overall waste tonnages collected by the Council and are not illustrated on the waterfall chart, *Figure 16*.

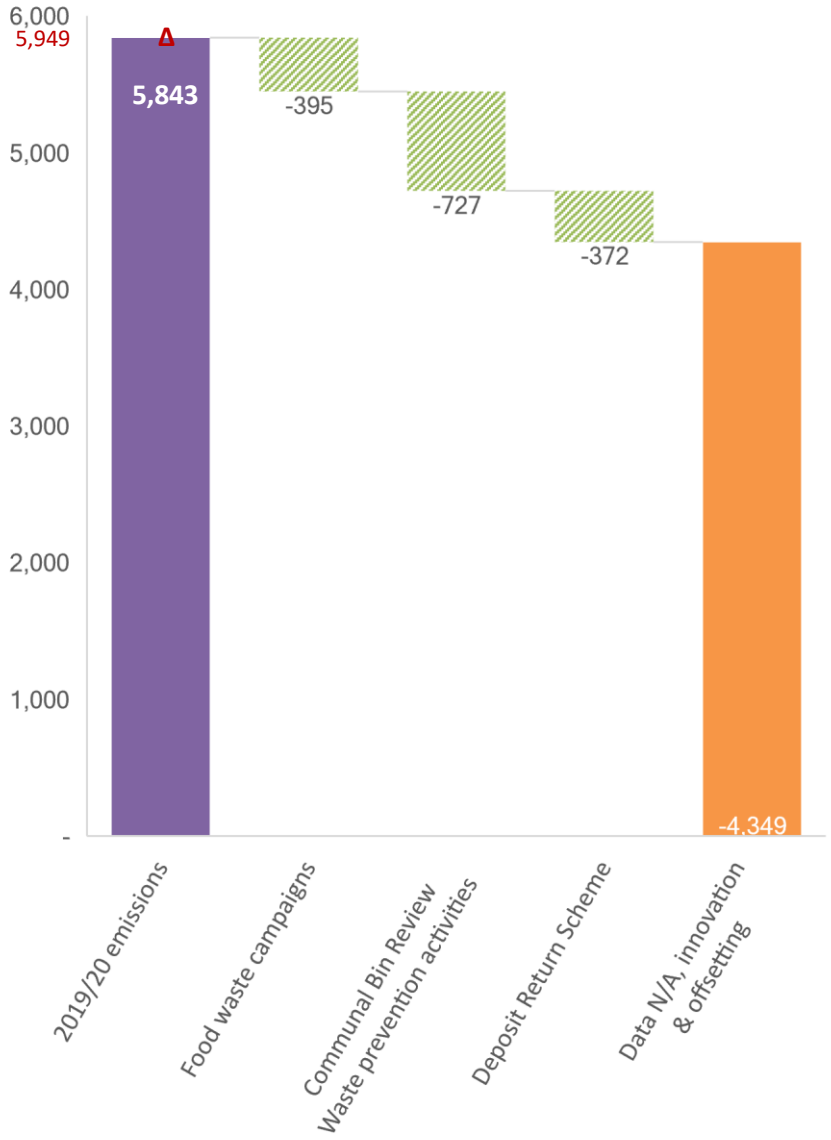

Figure 16: Estimated impact of interventions on Waste emissions
The red triangle (Δ) shows 2020/21 emissions

However, Council based initiatives are cost-effective and key to supporting the Council's city leadership role, including in acting as an exemplar organisation in reducing its own emissions.

Projects that aim to reduce household waste tonnages and increase recycling are:

Communal bin review

Programme to review current bin locations and enhance capacity for recycling across all streams but in particular food and glass.

Waste prevention activities

Pilot to improve segregation of materials for reuse at one or more household waste recycling centres.

Food waste campaigns

Campaigns to encourage uptake of household food waste collection.

Deposit return scheme

The UK and Scottish Governments are developing a deposit return scheme for selected drinks containers. This means that those containers are likely to be significantly diverted from Council waste and recycling streams. Recycling of these materials is expected to increase but will no longer contribute to local authority waste performance.

There are considerable areas of uncertainty in the coming years as a result of legislative changes in the waste arena which make setting targets very challenging. Future improvements are likely to rely heavily on changes to consumer behaviour, development of new recycling markets, and changes to legislation which are either likely to have less impact than the changes undertaken to date or are out of the Council's control.

For example, the UK and Scottish Governments are reviewing the extended producer responsibility (EPR) legislation around packaging waste and potentially other waste streams such as mattresses. These are expected to support an overall reduction in carbon emissions but the impact of these and the scope of the latter are currently unknown.

As with the deposit return scheme, materials which are collected through retailer takeback will not count towards local authority performance measures. Furthermore, the increase of home working during the pandemic has led to an increase in the amount of household waste arisings. Although working patterns post-COVID are still under review, this trend is expected to continue after the pandemic, leading to an increase in emissions versus baseline.

A phased action plan is summarised in *Table 13* and includes the key milestones for the waste and cleansing services to reduce emissions.

Table 13: Estimated impact of interventions - Waste-related emissions. Note that carbon savings are based on working assumptions

Interventions	Working assumptions	tCO_{2e}
Food waste campaigns	Assuming current food waste tonnages in residual waste bins is reduced by 80% and recycled (Anaerobic digestion) instead.	-395
Communal Bin Review and waste prevention activities	Assuming 10% reduction in incinerated waste, 5% reduction in landfilled waste Achieved thanks to waste prevention activities and communal bin review.	-727
Deposit Return Scheme	Assuming that 17 kt of waste will be diverted from Council waste collections and collected by the scheme instead. Estimate based on Zero Waste Scotland model	-372
Total reduction		-26%

Significant resources are in place to support early actions on improving the services in high-density areas of the city and to carry out initial re-design work to reduce the number of vehicles required. For example, the Communal Bin Review budget amounts to £6.7 million.

The later stages of the phased action plan are subject to successful bids to the Scottish Government's Recycling Infrastructure Fund. It is also anticipated that the Extended Producer Responsibility (EPR) for packaging materials will represent a potential source of funding towards a fundamental re-design of local authority waste collection, but the exact scope and scale of this is not clear yet.

Waste is likely a sector where residual emissions will be impossible to fully eliminate as even if 100% of waste tonnages were recycled or composted, emissions would be generated during the process. As such, it is technically impossible to fully eliminate the orange bar on *Figure 16 (on page 33)*, and this sector will probably rely on offsetting, reemphasising the need for other sectors to achiever larger reductions.

Table 14: Waste - phased emission reduction plan

Resources secured (source)		Costs known (potential source)		Costs unknown (potential source)	

Phase 1 – 21/23							
Actions	**Resources**	**Intermediary milestones if relevant**	**Completion date (MM/YY)**	**KPI**	**2020/21**	**Target**	**Delivery Lead**
W1. Provide additional communal re-cycling bins for high-density properties over the next two years to deliver an increase in communal re-cycling bins across the city	£6.7M (total cost): £1.1M (CEC) + £TBC (ZWS – *awaiting bid outcomes*)	Funding application submitted to ZWS – 07/21 on street roll out starting 11/21 (to 04/22 – estimated) off street roll out – on going since 07/21 to 04/22 (estimated) Traffic Regulation Orders (TROs) advertisement – 11/21 (for an average 9 months). Engagement/Information events – in progress (10-11/21) Bin hub location design – in progress	06/23	% of waste recycled	39.6 %[39]	41% by 2021/22	Andy Williams
W2. Implement routing changes for kerb-side food waste collection to support reduction of the fleet by two vehicles	Staff time (CEC)	Project complete	04/21	No. of waste collection vehicles	- 5	- 2	Andy Williams
W3. Deliver awareness raising campaigns to encourage citizens to reduce, re-use and recycle	£90k (CEC)	Food waste social media campaign - 07/21 to 03/22 Start of door to door engagement – 08/21 Festive waste awareness raising campaign – 12/21 Recycling videos/film launched – 03/22	03/22	Food waste presented for recycling in areas targeted by Changeworks campaign	N/A	+10%	Karen Reeves
W4. Improve the recycling infrastructure in schools and explore options to enhance facilities management capacity to support its use to divert further waste towards recycling as opposed to recovery	£100k	Business Case developed – 02/22 Update on approach and progress – P&S Committee – 06/22	12/22	% of educational settings with recycling in place	20%	100% (circa 150) – subject to funding	Mark Stenhouse

[39] Recycling rate for 2020/21 was artificially low due to the pandemic which resulted in the suspension of some recycling services for a few weeks and the closure of the household waste recycling centers for a couple of months. 2021/22 performance is expected to be improved.

Phase 2 – by 2024/25 Actions	Resources	Intermediary milestones if relevant	Completion date (MM/YY)	KPI	2020/21	Target	Delivery Lead
W5. Work with the third sector and Scottish Government to explore incentivisation models for increasing re-use and recycling of bulk items.	£tbc (CEC/ external funding)	Research around re-use hubs – until 03/22 Bid submission for year 2 of ZWS funding – Summer 2022 *(subject to research outcomes and opening of ZWS funding)*	03/23	N/A	N/A	N/A	Andy Williams
W6. Improve the city's domestic recycling infrastructure through expanded household waste recycling facilities and capacity, and the use of smart technology such as RFID tags, near-field communication and smart phone apps, subject to successful bids to the Scottish Government Recycling Infrastructure Fund.	£TBC (ZWS – *awaiting bid outcomes*)	Application submitted -07/21	12/25	*TBC*	N/A	*TBC subject to bid outcome*	Karen Reeves
W7. Begin the implementation of the City Operations Centre by investing in Internet of Things (IoT) bin sensors to monitor communal waste and recycling and litter bins and a new CCTV system to help us to manage the city on a more proactive basis**.**	£1M for 11,000 bin sensors (£305k funded by ERDF; rest = CEC + other funding streams)	Beta-testing of the bin sensors starting Q4 2022	06/23	Number of datasets opened for innovation	0	5 by 2023	Karen Hill
W8. Review dry mixed recycling contract specifications at point of expiry to identify opportunities for requiring contractors to extract more value from materials.	£100k Year 1 + £100k Year 2 (CEC)	Explore the potential for collection of bulky/hard to recycle plastics collected from HWRCs or the addition of another mixed recycling route – Decision by Dec-21	12/25	% of waste recycled	39.6%	41% by 2021/22	Andy Williams
W9. Finalise proposals for the opening of a fourth HWRC at Braehead to manage increased waste resulting from the significant housing developments in the West of the City.	Staff time (CEC)	Outline business case developed by 03/23	03/23 at the latest	No. of recycling centres	3	4	Andy Williams

Phase 3 – by 2030 Actions	Resources	Intermediary milestones if relevant	Completion date (MM/YY)	KPI	2020/21	Target	Delivery Lead
W10. Investigate the potential for a joint authority Materials Recovery Facility to extract more value from materials	Staff time (CEC)	Conclude discussions with Midlothian, Borders and West Lothian Councils – end Summer 22	Decision to go for procurement – 03/23	N/A	N/A	N/A	Andy Williams
W11. Review the impact of the Extended Producer Responsibility and Deposit Return Scheme on the city's domestic waste service requirements and bring forward service redesign proposals which ensure that at least 50% of any savings are re-invested in further actions to reduce the Council's emissions	Staff time (CEC)	July-23: Review impact of DRS (after 1 year of DRS implementation – subject to any DRS delays) Dec-24: Review impact of EPR Q1-25: Bring forward service design proposals (subject to any EPR delays)	03/25	% of savings reinvested	N/A	50%	Andy Williams

Business travel

Business travel accounted for around 3% of the Council's footprint before the pandemic. It does not include employees' commuting to work, which appears in the transport section of the city's footprint. There are significant financial, health and wellbeing benefits associated with staff shifting from cars and taxis and in particular, to active transport such as walking and cycling for both business travel and commuting.

The Council has several schemes in place to support staff in making more sustainable transport choices, many of which have the potential to support shifts in both commuting and business travel behaviour. However, the travel data presented in this plan relates to business travel only, for the purposes of focusing on the emissions within the Council's organisational footprint.

Figures 17 and 18 show the Council's emissions from business travel broken down by transport type and by year.

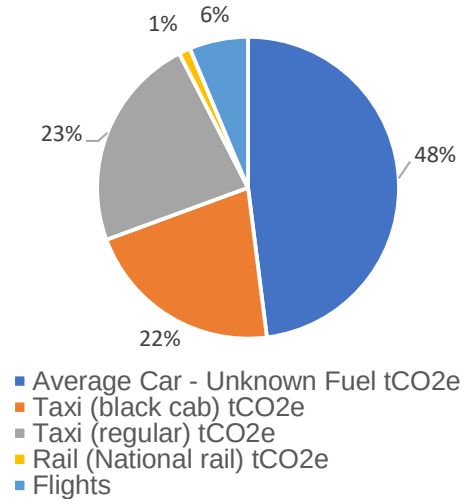

Figure 17: Breakdown of 2019/20 business travel emissions

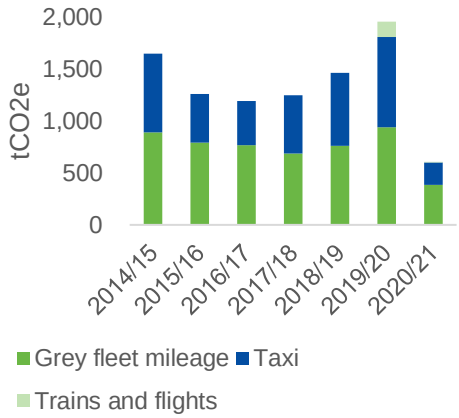

Figure 18: Historic business travel emissions

The Council's business travel emissions have increased by 64% in the four years since 2016 and are 19% higher than 2014/15 levels, mostly due to an increased use of black cabs. Data on trains and flights have only been available since 2019/20 and trend information will be available in future years.

As a direct result of the national lockdowns, the Council's business travel footprint has dropped by 69%, including a sharp reduction in emissions from grey fleet (- 58%), taxis (- 75%); and from rail and flights (-98%) (*Figure 18*)

At present, almost half (48%) of business travel emissions come from 'grey fleet mileage' where staff use their own car for business travel and claim back mileage costs), followed by taxis at 45%, with the majority of use relating to service provision by Health and Social Care and Communities and Families – for example transport for vulnerable adults or home to school transport for children with additional support needs. Grey fleet mileage also predominantly comes from these two directorates (88%) and from Place Management (17%, mostly in connection with inspection activities and site visits).

The Council's Business Travel and Accommodation Guidance requires staff to quantify and consider carbon emissions

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when choosing transport and to prioritise low emission modes. At the end of 2019, the Council agreed to review the guidance to consider extending its scope to Elected Members, but this has been delayed by the impact of Covid and travel by both Elected Members and staff has been significantly reduced as a result of changed working patterns.

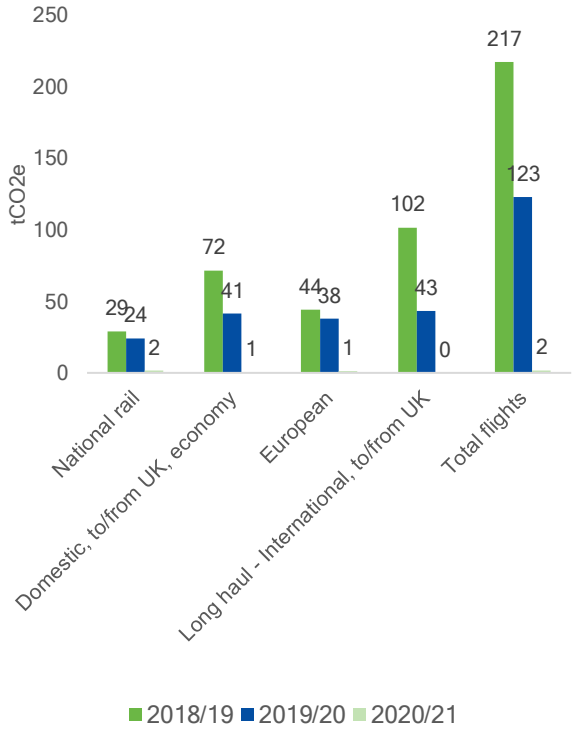

Figure 19: Evolution of business travel emissions

Strategic approach to business travel

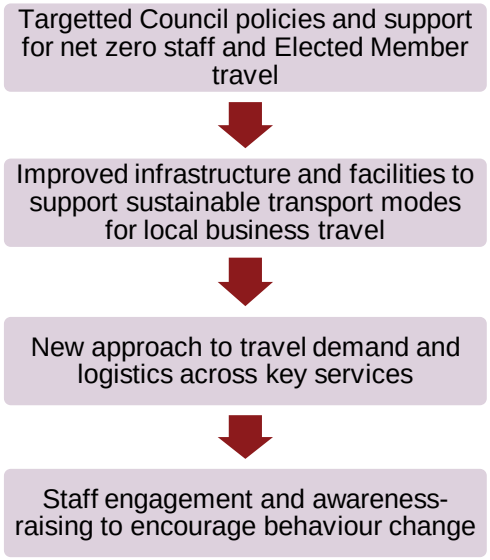

Figure 20: Strategic approach to business travel

In acting to reduce emissions from business travel, the Council's approach is to adopt a 'sustainable first' model - whereby business travel policies, procedures, guidance and benefit schemes are centred around a sustainable travel hierarchy (*Figure 21*), and infrastructure and facilities are improved to make sustainable choices easier.

To build on these foundations, the Council will then bring forward a new travel and logistics service to support citizen's needs and reduce miles travelled by private car or taxi in connection with service provision and support.

To maximise the impact of all these measures, the Council will also focus on enabling activity, including staff engagement and awareness raising to encourage business travel behaviour change.

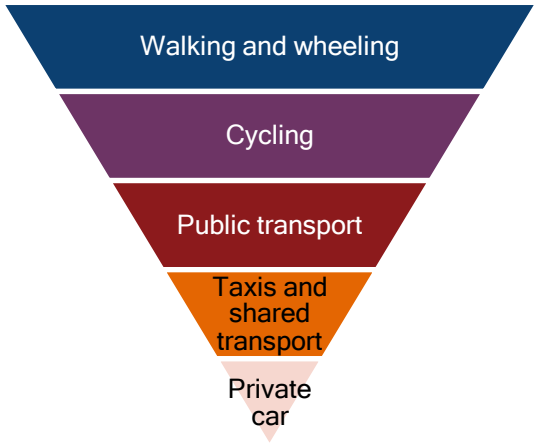

Figure 21: Sustainable transport hierarchy (adapted from City of Edinburgh Council City Mobility Plan 2021-2030)

Council programmes contributing to net zero

Supporting employees to make more sustainable transport choices in both their personal and professional lives is a key priority and the Council has recently put in place a number of new staff benefits schemes which will help facilitate this, including:

The extension of the cycle to work scheme from £1,000 to £3,000, which will allow employees to purchase electric bikes and make cycling an attractive option for a larger number of staff.

The new green car scheme, which will help employees to purchase electric vehicles and contribute to reducing grey fleet emissions, and to a larger extent, city-wide emissions.

In addition to these staff benefits schemes, employees also have access to pool bikes for business travel. Furthermore, supporting employees to work from home and make use of video conferencing is likely to help reduce grey fleet mileage, with these benefits continuing if home working persists at an increased level as part of new ways of working post-Covid. Homeworking will be addressed as part of the Council's '*Our Future Work Strategy*'.

The emissions reductions illustrated at *Figure 21*, plus further emissions reductions which it is not currently possible to carbon cost, will be delivered through a phased emission reduction plan, set out at *Table 15 on the following page.* The plan aims to build on current good practice, increase capacity, and engage staff in Phase 1; focus on service re-design and infrastructure development in Phase 2; and cement the use of electric vehicles in Phase 3.

A 58% decrease in grey fleet mileage from pre-covid levels by 2030 has been assumed, which corresponds to the reduction achieved during 2020/21. It is also likely that the "average car" emission factor per kilometre will become lower over time as electric vehicle uptake increases within the population. This will further reduce business travel emissions.

Interventions that cannot be carbon costed but will contribute to reducing the emissions represented by the orange bar in *Figure 21*, include the revision of the use of Council parking spaces, the revision of the Council business travel policies, or the staff engagement programme.

In addition to the above actions, the work that the Council is doing around transport and infrastructure within the City Plan 2030, City Mobility Plan, and City Centre Transformation puts pedestrians at their core through the 20-minute neighbourhood model. These projects aim to ensure the right infrastructure is in place to encourage business travel as well as commuting to be done on a sustainable way.

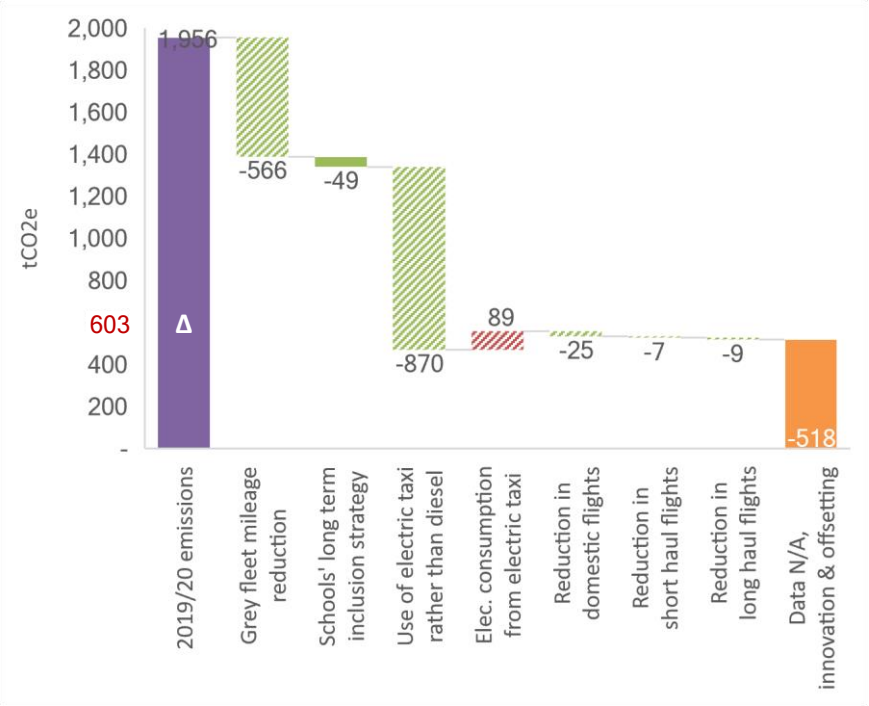

Figure 22: Estimated impact of interventions on business travel emissions. The white triangle (Δ) shows 2020/21 emissions

Lastly, this area of the footprint is heavily reliant on behaviour change and this will be supported by awareness raising and engagement activities, as detailed in the Staff Engagement section of this plan.

It can be seen on *Figure 22* on the previous page that 2020/21 emissions were around the anticipated 2030 levels, showing that a large decrease is achievable. Although taxi mileage is expected to return to pre-pandemic levels, this could be offset using electric vehicles.

Table 15: Estimated impact of interventions - Committed and potential (in italic) – Business travel-related emissions

Interventions	**Assumptions**	**tCO_{2e}**
Reduction in grey fleet mileage	*-58% Grey fleet mileage - more use of fleet cars and more video conferences*	- 566
Schools long term inclusion strategy	*Potential reduction in home to school transport mileage*	-49
Use of electric taxi rather than diesel		-870
Increase in electricity consumption from electric taxi		+89
Reduction in number of domestic flights	*Estimated 60% reduction (less travel overall and train instead of plane)*	-25
Reduction in number of short haul flights	*Estimated 20% reduction*	-7
Reduction in number of long-haul flights	*Estimated 20% reduction*	-9
Total reduction		-71%

Table 16: Business travel - phased emission reduction plan

Resources secured (source)		Costs known (potential source)		Costs unknown (potential source)	

Phase 1 – 21/22 Actions	Resources	Intermediary milestones if relevant	Completion date (MM/YY)	KPI	2020/21	Target	Delivery Lead
T1. Review Council business travel policies, procedures & guidance to ensure they are centred around a sustainable travel hierarchy that takes account of employees' operational base location and incentivises to consider the most sustainable mode of transport first.	Staff time (CEC)	Review of current content, benchmarking and developed proposals by 03/22	06/22	Revised business travel guidance published	-	guidance published	Katy Miller
T2. Re-establish Transport Allocation Panels to support citizens' needs and reduce miles travelled by private car and taxi in connection with service delivery	Staff time (CEC)	C&F TAP meetings in place	On-going	CEC Staff travel emissions – taxis	213 tCO2e (870 tCO2e in 2019/20)	decrease	Crawford McGhie
T3. Finalise a Sustainable Staff Travel Plan and create a new corporate Travel Plan and Research/Monitoring Officer post, funded by Paths for All through the Smarter Choices, Smarter Places programme, to oversee its implementation and monitoring and explore additional grants to support improvement of active travel facilities at council sites.	£50K (P4A SCSP)	Publication of Sustainable Staff Travel Plan	03/22	Staff bike mileage claimed	9984 miles	Increase	Beth Hall with support from HR
T4. Deliver a staff engagement programme to raise awareness of new staff travel plan and policies and encourage uptake of staff benefit schemes supporting sustainable transport modes, to events such as Dr Bike sessions, e-bike pools and sustainable transport subsidies.	Path for All – SCSP funding	Autumn Step Count Challenge 10-11/21 Staff walking webinar as part of Wellbeing Roadshow – 11/21	On-going	Uptake of Cycle to Work scheme	408 users (2020)	Increase	Beth Hall
T5. Develop and implement the 'Our Future Work' strategy which identifies opportunities to support and promote sustainable travel	Staff time (CEC) (+ resources to be secured for further trials)	Strategy approved P&S Cttee – 10/21 Implement Phase 1 new ways of working trials 10/21 to 12/21 Outline business case (for further trials) – 11/21 Feedback survey incl. changes in staff commuting habits – 12/21	On-going	Programme benefits approach & KPI in development	N/A	N/A	Gillie Severin

Phase 2 – by 2024/25 Actions	Resources	Intermediary milestones if relevant	Completion date (MM/YY)	KPI	2020/21	Target	Delivery Lead
T6. Benchmark mileage claims and rates of payment – explore possibility of changing rates, phasing reductions (e.g. diesel cars) and increasing other e.g. bike	£4K[40] (CEC)	Analysis of datasets, external benchmarking and cost modelling – 03/22	03/22	Staff bike mileage claimed	9984 miles	Increase	Katy Miller
T7. Re-design the myTravel booking system to support the new Sustainable Staff Travel Plan and sustainable travel hierarchy	Staff time (CEC)	Project initiation meeting of short-life project team – 11/21	03/22 *(TBC following scoping meeting)*	TBC	TBC	TBC	TBC
T8. Review the designation and use of Council parking spaces to encourage more sustainable transport choices	Staff time (CEC)	Develop general principles for designation of parking spaces – 03/22	06/22	TBC	TBC	TBC	Katy Miller
T9. Commit to phasing out air travel for business as part of an integrated approach to digital innovation in public sector strategic and operational delivery	Staff time (CEC)	Included within scope to review policy guidance – 03/ 22	06/22	Air travel emissions	2 tCO2e (123 tCO2e in 2019/20)	Decrease	Katy Miller
T10. Work with third sector partners to pilot the replacement of business journeys by car with e-cargo bikes and roll-out e-cargo bike training to target staff groups	Path for All – SCSP funding Training delivered by 3rd sector partner (TBC)	Investigate loan of e-cargo bikes from third sector – on-going Cargo-bike loan pilot – 02/03 2022 *(tbc subject to insurance/training requirements)*	TBC with 3rd sector partners	Number of staff receiving e-cargo bike trainings	0	5 for 1st pilot Future target TBC following pilot outcomes	Beth Hall

[40] Estimated costs based on 18/19 and 19/20 data, assuming an increase in the bike mileage rate from 25 to 45 p/mile

Phase 3 – by 2030 Actions	**Resources**	**Intermediary milestones if relevant**	**Completion date (MM/YY)**	**KPI**	**2020/21**	**Target**	**Delivery Lead**
T11. Ensure the Active Travel Action Plan and Investment Programme delivers an active travel infrastructure which contributes to modal shift for business travel	**£117.6m: £20.5m** (CEC to 2025/26 subject to internal allocations) + **£84.5m** (to 2025/26, Sustrans) + **£12.6m** (to 2025/26, SG CWSR grant) + **£0.1m** (SG Place Based Investment Programme in 2022/23)	Ensure CEC work on service redesign and new ways of working Helps to inform future active travel investments Gather data on business travel routes and transport modes to inform future active travel infrastructure investment by 12/23 – *tbc subject to resources*	03/25	Car mileage claims	2.3 million km	decrease	Sarah Feldman / Phil Noble with support from Beth Hall
T13. Commit to 'EV only' for business travel by taxi	Staff time (CEC)	Project initiation meeting of short-life project team (HR/ sustainability team) – 11/21 Review of business travel policy – 06/22	TBC	TBC	N/A	TBC	Katy Miller/ Passenger Operations

Staff engagement

It is estimated that 16% of carbon savings identified in this report will require some degree of behaviour change:

- Staff and school students saving energy at school and in public buildings.
- Staff and Elected Members reducing the amount of flights they take.
- Staff and Elected Members choosing sustainable travel modes when travelling for business.
- Residents reducing the amount of waste they generate and recycling more.

Colleague engagement and empowerment is at the heart of our approach to sustainability. Whilst it is challenging to quantify the impact of individual engagement activities on Council emissions, behaviour change is a key contributor to reaching the Council's 2030 net zero target, even more so for the City target.

Educating, informing and engaging colleagues on the implications specific actions and behaviours can have on Council and city emissions, will empower individuals to make informed choices and take action within the workplace and at home.

The proposed staff engagement programme presented on *Table 17* on the following page includes an objective to roll out 'Climate Literacy' training to 2,250 employees by 2025.

In addition to contributing to the Council's 2030 net zero target, this training will also support the Council's learning and development objectives outlined in the new People Strategy (2021-2024) and the Workforce Plan which underpins it.

This programme also contributes to meeting the Council's commitments as a signatory to the Edinburgh Climate Compact (*Appendix 2*); specifically, to:

- Roll out climate literacy for staff, including the management team as a minimum.
- Promote, support and enable employee choices and behaviours to contribute positively to a net-zero future.

Table 17: Staff engagement programme

Resources secured (source)		Costs known (potential source)		Costs unknown (potential source)	

Actions	Resources	Intermediary milestones if relevant	Completion date (MM/YY)	KPI	2020 /21	Target	Delivery Lead
E1. Climate Literacy training for elected members and colleagues: Support, decision making and scrutiny and enable to make informed choices and act on issues which help to reduce the council's emissions	£40K (CEC)	Contract external provider – 12/21 Deliver training to phase 1 priority groups - 03/22	12/25 *(subject to future funding)*	% of staff who have received CL accreditation % of staff trained to deliver CL training	0 0	15% of staff by 2025 (~ 2,500) *(Silver accreditation)* Minimum 20 by 2025	Beth Hall
E2. Sustainability Network: Collaborative network to harness existing assets and resources for members to enable teams to become more sustainable. Support promotion of best practice across council workstreams.	Staff time (CEC)	Network launched – 03/21 Review of membership and remit – 03/22	On-going	# different departments with sustainability network members	8	16	Beth Hall
E3. Climate lunch and learns: Raising awareness and encouraging action on key issues, such as sustainable staff travel and waste reduction	Staff time (CEC)	First lunch and learn launched: 04/21 Participants feedback survey – 03/22	On-going	# of lunch and learns	3	4 per year	Beth Hall
E4. Supporting colleagues to reduce emissions from energy and waste in the workplace: Promoting and encouraging re-use, repair and recycling.	Staff time (CEC)	Sustainability embedded in Our Future Work pilot workbook Festive waste awareness raising campaign – 12/21	On-going	TBC	TBC	TBC	Beth Hall
E5. Awareness and engagement around procurement strategy: Support decision making & scrutiny and enable to make informed choices in line with the net zero ambition	Staff time (CEC)	*Refer to action P2 on page 52*					Iain Strachan
E6. On-boarding: Refresh sustainability e-learning	Staff time (CEC)	Identification of refreshed content – 12/21 New work module launched – Summer 22 Project initiation meeting of short-life project team (HR/ sustainability team) – 11/21	Summer 22	Number of users who have completed the e-learning module Total e-learning content views on myLearning Hub	N/A	increase	Katy Miller

Actions	Resources	Intermediary milestones if relevant	Completion date (MM/YY)	KPI	2020/21	Target	Delivery Lead
E7. The role of our leaders: Ensure sustainability is embedded in decisions about Our Future Work & service/organisational design principles.	Staff time (CEC)	Sustainability embedded in Our Future Work pilot workbook Project initiation meeting of short-life project team (HR/ sust. team) – 11/21	TBC following scoping meeting	TBC following scoping meeting	TBC following scoping meeting	TBC following scoping meeting	Katy Miller
E8. Employee benefits platform: review current offering to improve alignment benefits with net zero ambition	Staff time (CEC)	Green car leasing scheme launched – 03/21 Benchmark and explore further options with benefits providers – until 03/22	Summer 22	Number of green car leasing scheme users	N/A *(Launched in 03/21)*	increase	Katy Miller
E9. Review and develop coherent intranet content (Orb) and policies to ensure alignment with net zero objectives	Staff time (CEC)	Review and integrate Orb content by 01/22	06/22	Orb content updated	N/A	Orb content updated	Katy Miller (policies)Beth Hall (Orb)
E10. Encourage staff modal shift from vehicle use to active travel through the delivery of 20-minute neighbourhood hubs	Staff time (CEC)	Publication of 20-minute neighbourhood strategy – 06/21 Publication of Sustainable staff travel Plan – 03/22	On-going	Grey fleet mileage claims	2.3 million kms (5.3m in 2019/20)	decrease	Beth Hall

Procurement and circular economy

The annual Scottish public procurement spending power amounts to £11 billion and has a critical role to play in the climate emergency response. Emissions from purchased goods (i.e. 'consumption-related' emissions) are not included in the Council's or the city's carbon footprint, as they are generated out-with the city's territorial emissions boundary. The calculation of procurement-related emissions is complex, and we are working with partners to understand these emissions better.

Although emissions from purchased goods are not included in the city or Council carbon footprint data, the Council is nonetheless working with city partners to reduce these emissions.

The city 2030 Climate strategy seeks to address these emissions and includes the following strategic action for the public sector: "Ensure that all public sector procurement spend actively supports this strategy so that by 2030 all new investment and purchase decisions are net zero". The Council is working to reduce emissions from its procurement activity and engaging with providers to support the reduction of emissions across their supply chains.

The Council has an established internal Sustainability Board which meets monthly to coordinate and prioritise an accelerated reduction in climate emissions, and the procurement team is represented on this board. The Council is a member of the Scottish Government Procurement and Climate Change Forum whose aim is to work towards the Government Commitment to mobilise the £11 billion of annual public procurement to support our climate emergency response.

This includes consulting on legislation to require public bodies to set out how they will meet our climate change and circular economy obligations and to identify and/or commission targeted activities or work streams which will help influence and empower our buyer, supplier and key stakeholder communities. The Council has also been working closely with the Scottish Government's sustainability team and Zero Waste Scotland to look at embedding the circular economy in Council practices.

The Warp-it platform mentioned earlier also contributes to embedding circular economy principles within the organization (see *Figure 23*).

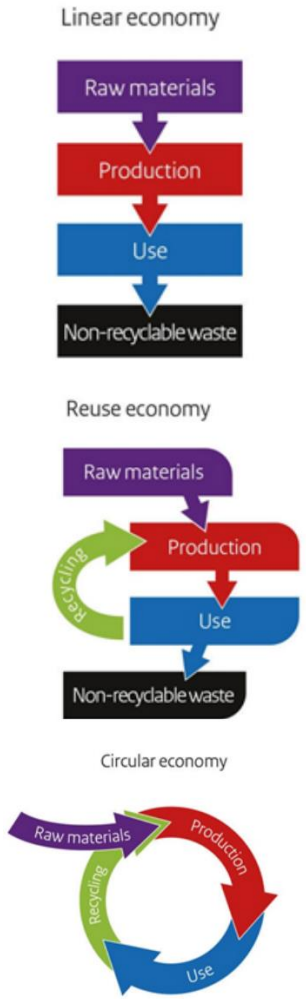

Figure 23: Explainer - from Linear to Circular economy (Source: https://www.government.nl/topics/circular-economy/from-a-linear-to-a-circular-economy)

The Council's Sustainable Procurement Strategy, introduced in March 2020, puts sustainability at the heart of the procurement programme for the next five years and aims to contribute to the city's 2030 target.

Moving forward, the Council will ensure that its net zero commitments remain a central element of its procurement activity. this will include:

- further engagement with suppliers to promote the Council's ambitions and the opportunities it will create,
- closer working with public sector partners to ensure that opportunities for alignment and collaboration in procurement activity are maximised
- focused learning and development opportunities for Council staff to support this work.

The Council's procurement activity directly supports the delivery of Council services, and key Council projects and energy efficiency and carbon reduction is central to initiatives, such as:

- the delivery of new Certified Passivhaus housing and schools,
- the retrofitting of existing Council estate managed print services that will monitor energy usage and planned reductions in volume of printing,
- replacement of more energy efficient street lighting,
- provision of EV charging points for Council fleet and general public access,
- improved public transport and cycling initiatives as well as pedestrian initiatives such as the George Street transformation,
- a collaborative house building framework with emphasis on highly energy efficient homes.

As signatories of the Edinburgh Climate Compact, the Council and Edinburgh Leisure have committed to engaging with the supply chain to drive emissions reduction (*Appendix 2*). This is embedded in the Council's Sustainable Procurement Policy which strives to ensure that "Edinburgh has a more sustainable supply chain". Edinburgh Leisure have also recently committed to revise their Procurement Strategy to "embed the importance of CO2 emissions in procurement practices, including the relative importance of CO2 emissions within tender scoring matrices".

The Sustainable Procurement Policy and objectives are addressed within every procurement plan (including a mandatory sustainability risk assessment of procurement projects), which is at the start of each procurement process. Thus, the policies and Council commitments work to build awareness among staff and stakeholders.

Sustainability is used as selection and award criteria, where for example the use of electric vehicles or local suppliers to reduce transport emissions are encouraged and scored accordingly. The Council is also working with fleet suppliers to ensure they have carbon neutral commitments and specifying Euro 6 standards on new vehicles and a move to hybrid/electric vehicles.

The Council grant funds a number of organisations which, as part of the circular economy commitment, refurbish and repair items such as IT equipment and provide these items to those households most in need. It also funds organisations providing carbon reduction advice and promoting behaviour change in schools, organisations and to individuals.

In accordance with the Scottish Government's SPPN 1/2021 "Taking account of climate and circular economy considerations in public procurement", the Council is working with a wide range of markets to stimulate the development of the circular economy and develop low emission supply chains and solutions. For example in the Council's Hard Facilities Management the Council has worked with Zero Waste Scotland to develop the specification and evaluation documents to embed sustainable development aspirations in the service. Section 28 of the

SPPN[41] makes clear that there is a shared accountability with senior leaders and budget holders to engage early in the planning and development stage of the process with the Council's Commercial and Procurement Services (CPS) on decisions as to whether to buy, what to buy and how to buy allowing sustainability and carbon emissions to be considered at this early stage.

[41] Scottish Procurement Policy Note. SPPN provide advice to public sector organisations and other relevant bodies on procurement policy

Table 18: Key procurement actions

Resources secured (source)		Costs known (potential source)		Costs unknown (potential source)	

Action	Resources	Completion date (MM/YY)	KPI	2020/21	Target	Delivery Lead
P1. Organise 10 engagement events per year with local suppliers to promote opportunities of working with the Council	Staff time (CEC)	On-going	Percentage of total core spend with local suppliers	41%	39% for 20/21 40% for 21/22 41% for 22/23 42% for 23/24	Iain Strachan
P2. Organise 10 procurement strategy/delivery related training events per year delivered to Council service areas	Staff time (CEC)	On-going	Number of events organised per year	10+	10	Iain Strachan
P3. Rollout of new monthly Supplier Engagement Sessions and new Supplier Newsletter	Staff time (CEC)	12/22	Number of monthly engagement sessions	12+	12	Iain Strachan
P4. Annual Report on Council performance against Strategy to Finance & Resources Committee	Staff time (CEC)	08/22	Report published	Report published	N/A	Iain Strachan

Note that new targets for sustainable procurement will be announced by the Scottish Government later in the year and will be reflected in the CERP progress report in 2022.

Investment plan

Table 19: Net-zero investment approach

1. Core council service budget alignment and Council budget investment	2. Maximise the opportunity for external grants	3. New models for funding change	4. Offsetting
Maximising core service investment plans to deliver net zero objectives. Additional 2021/22 budget investment for pilots and feasibility studies. Seeking efficiencies through collaborating with city partners. Aligning the current and future Council Capital Plan to net zero objectives	Invest in capacity and skills to develop the Council's project pipeline. Target innovation partnerships with national and local partners; sharing risk and reward. Target known and substantial funding announcements – Green Growth Accelerator; SG Climate Plan Grants and funds; National agencies.	Scope new models of funding public sector investment in net zero; e.g. mixed models for private and public investment; sharing of risk; community wealth building. Pilot new funding models.	At the appropriate time, offset those emissions that cannot be easily or affordably reduced.

Becoming a net zero organisation will have significant capital and revenue implications for the Council, and the Council will re-visit these annually through its budget processes, as further carbon and cost analysis of proposed projects and programmes is undertaken.

This first Council Emissions Reduction Plan is presented to set out the proposed strategic direction for addressing the Council's major emission sources and the current and proposed actions the Council will take. The action plan tables throughout this plan show current and future agreed Council investment, and the additional external funding streams to be targeted, to support delivery of actions – along with the key performance indicators that will be used to track progress.

In developing its approach to investment, the Council will focus on investing in readiness through work to understand the projects and programmes that will deliver the greatest emissions reductions; carrying out feasibility studies and developing pilots to test delivery models; and then scaling and accelerating delivery towards net zero across all Council emissions.

Wherever possible, programmes will be developed jointly with key public sector partners to achieve economies of scale and secure maximum co-benefits – for example through job creation from operational estate retrofit. This is reflected in the City 2030 Climate strategy published in November 2021.

Across all activity, the Council will seek to maximise external funding and revenue generation opportunities. We will work with Scottish Power Energy Networks to align their investment in the grid with the Council's plans, in order to support lower

energy costs, maximise opportunities to return locally-generated energy to the grid, and secure income generation in support of increased spend-to-save initiatives.

There is also significant opportunity to increase capital and revenue resources through external funds, with several additional funding streams to support the transition to net zero recently being announced. These are detailed at Appendix 3 and include, for example Green Growth Accelerator; Solar PV Fund; Green Jobs Fund.

The Council is working with partners, including the Scottish Government, to provide dedicated capacity for developing project proposals, identifying funding opportunities and co-ordinating the development of bids. This will help ensure the Council is able to access the additional resources required to invest in readiness and ensure the Council is well-placed to draw down additional resources as soon as new funding streams are open for bids.

In the interim, the Council brought forward an additional £500,000 in 2021/22 to support additional feasibility work across its operational estate, which accounts for the greatest portion of Council emissions. This is in addition to £600,000 previously identified and is being used to expand and accelerate work to establish which approaches to energy efficient retrofit will deliver best value across the many differing building types which comprise the Council's estate.

The results of this work will inform bids for external investment to support targeted retrofit pilots within a range of building types to both secure emissions reductions and inform the roll-out of further retrofit works across the wider estate. A successful bid to the Green Growth Accelerator fund could provide up to £10 million to retrofit Council buildings (based on a payment in arrears funding model and upon the attainment of certain emissions reduction targets); and additional bids to wider funding streams will also be developed. Further details are provided in the Energy chapter of this plan.

Offsetting

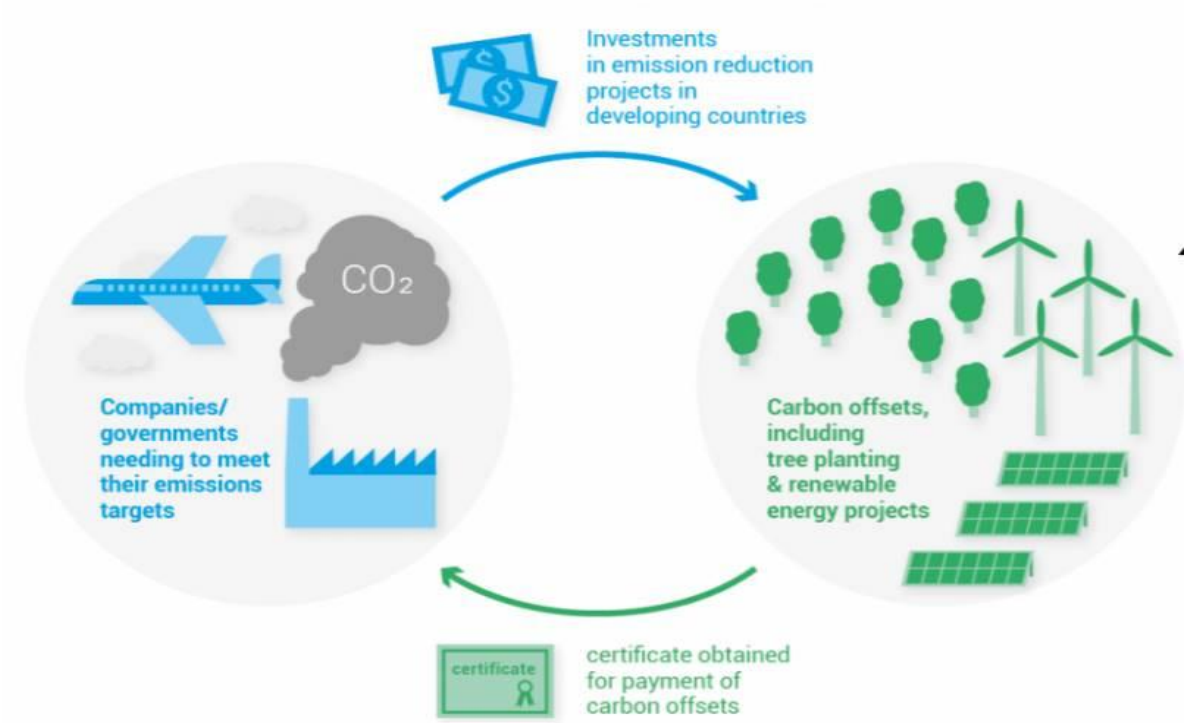

Figure 24: Explainer of carbon offsetting. (Source: https://www.unep.org/news-and-stories/story/carbon-offsets-are-not-our-get-out-jail-free-card)

The scale of the net zero challenge is such that it is very likely some residual emissions will remain, for example from waste management or from electricity, as it is likely the grid will not be fully decarbonised by 2030. Therefore, the Council will need to identify and agree strategies for achieving net zero by balancing these residual emissions with carbon uptake activities (for example the purchase of offsets). Spending on projects that reduce emissions as much as practically possible will be prioritized and offsetting will generally only be considered as a last resort.

There may be circumstances where offsetting could be considered when further emissions reductions would be technically possible but would come at significant financial cost. This extra cost could potentially impact on the resources available to support other elements of climate action, such as adaptation work to improve climate resilience.

Where offsetting is required, there is a need to consider the form this could or should take. Wherever practicable, the

Council will aim for offsets that are as local as possible.[42] In an urban location such as Edinburgh, off-setting measures which require a lot of land present challenges for the Council and for other city partners. According to the Royal Society, the best solution is to use a portfolio of approaches and the Council will explore this with key city partners as part of its role in helping to implement Edinburgh's 2030 Climate Strategy.

This will include jointly considering a policy position, strategy and budget for off-setting that clarifies when off-sets would be used and which quality principles must be met, including the standards of verification that would be applied to different types of off-sets.

[42] SSN, Offsetting – its Role in the Roadmap to a Net Zero Carbon Scotland 2045

Governance

The organisational chart at *Figure 25* illustrates the governance structure that will provide political oversight, strategic direction and delivery capacity for this plan to ensure it meets its overall objective of the Council becoming a net zero organisation by 2030.

The Policy and Sustainability Committee has responsibility for formally adopting this plan and will provide political oversight and scrutiny of progress. Progress will be reported to this Committee annually in autumn. It will be accompanied by the Council's statutory Public Bodies Duties Annual Report, which will detail the Council's emissions for the previous financial year. Further detail is provided in the 'Performance Monitoring and Reporting' section below.

The Sustainability and Climate Emergency All Party Oversight Group (APOG) will act as a political sounding board for key decisions and will be able to focus in on aspects of the plan on a thematic basis. It will ensure Elected Members are able to engage in the detail of the plan, and explore any challenges relating to delivery in collaboration with relevant officers.

The Sustainability Board, chaired by the Council's Chief Executive, will provide strategic oversight and have operational accountability for the plan's delivery, the development of future iterations, and the coordination of wider Council projects and programmes in support of the plan's aims and objectives. The Sustainability Board will receive regular updates on progress and will have a specific remit for ensuring Council plans, strategies, and budgets, support the Council's ambition of becoming a net zero organisation by 2030.

The Corporate Sustainability Team will provide policy co-ordination and support, working with relevant service area leads to ensure the plan's delivery. The team will also lead and co-ordinate annual progress reporting and be responsible for ensuring the Sustainability Board, APOG, and Policy and Sustainability Committee are provided with appropriate updates and officer support. The Corporate Sustainability Team will work with service area leads to support the development of further interventions to reduce the Council's emissions and will co-ordinate the refresh of the Council Emissions Reduction Plan as appropriate.

Service area leads will provide support to ensure delivery of service commitments within the plan, and lead the development of further actions, working with the Corporate Sustainability Team to ensure the Sustainability Programme Board is provided with the information required to fulfil its strategic oversight function.

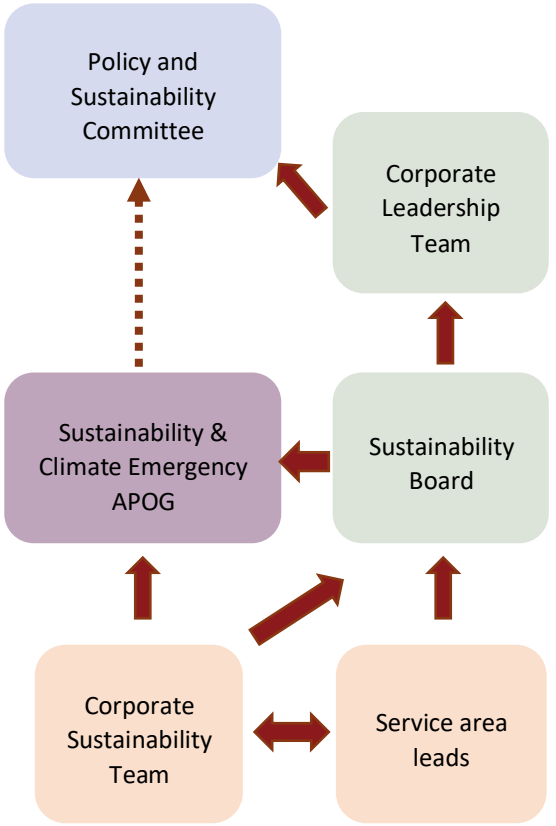

Figure 25: Council's Sustainability Governance structure. (Purple: Political oversight, Green: Strategic oversight, Orange: Delivery)

Performance monitoring and reporting

The Council will continue to publicly report its organisational emissions annually to the Scottish Government through the Public Bodies Climate Change Duty Reporting (PBCCD).

Figure 26: Map of UK local authorities who reported through the CDP-ICLEI Unified Reporting System in 2020

The Council also participated in the Carbon Disclosure Project (CDP)[43] for the first time in late 2020. CDP is an international non-profit organisation for companies and cities' environmental reporting organisation. It is the largest climate change-focused data collection and assessment programme in the world.

In 2021, Edinburgh was one of 95 global cities on **CDP 2021 A-List**; meaning it has been recognized by CDP as a city that is taking bold leadership on environmental action and transparency.

The reporting arrangements for the monitoring of Council emissions are listed in *Table 20, right.*

Table 21 on the following page summarizes the key performance indicators which will be used to track progress against of the actions identified in each section of this plan. The CERP annual progress reports will provide regular updates against these KPIs.

Table 20: Reporting calendar, Council emissions

Report	Key dates	Schedule
Carbon Disclosure Project	Jul 2021	Annual
Public Bodies Climate Change Duties report	Nov 2021	Annual
Council Emissions Reduction Plan Annual Progress Report	Nov 2021 - Finalised plan Nov 2022 - Report against the actions laid out in the phased action tables in each chapter.	N/A Annual
City of Edinburgh Council Annual Performance report	Jun 2022	Annual

[43] https://www.cdp.net/en/cities

Table 21: Summary of key performance indicators

Sector	KPI	2020/21	Target
All	Total Council emissions (tCO2e)	65,647	Net 0 by 2030
All	3-years carbon budget spend	66 ktCO2e (35% spent)	190 ktCO2e (cumulated from 2020/21 to 2022/23)
Buildings	Total Buildings emissions (tCO2e)	43,308	0 by 2030
Buildings	Installed solar PV capacity (MW)	2.092	3.092 MW by 2023/24 6.092 MW by 2030 (+4 MW)
Buildings	Percentage of new builds in delivery to PassivHaus standard with associated Low and Zero Carbon (LZC) Primary Plant or equivalent	15%	100% of conditioned area where Passivhaus is technically appropriate
Buildings	Annual total gross internal floor area agreed to undergo low energy retrofit works and conversion to low and zero carbon plant (or equivalent)	0 m2	By Dec 2023 – 3,019m2 By Dec 2024 – another 15,190m2 By Sept 2025 – another 8,973m2
Other energy	Total emissions from other energy consumption (tCO2e)	9,355	Net 0 by 2030
Other energy	Electricity consumption from street lighting (kWh)	18,556,408	13,0852,393 kWh by 2022/23
Other energy	Number of sites with Tungsten Halogen Lamps	254	243 sites by 03/22
Other energy	Traffic signal electricity consumption (kWh)	2,227,693	decrease
Fleet	Total fleet emissions (tCO2e)	6,267	Net 0 by 2030
Fleet	Percentage of Electric vehicles in the total cars fleet (internal + hire fleet) (as of Nov 2021)	38%	100% by 12/2021

Sector	KPI	2020/21	Target
Fleet	Percentage of Electric vehicles in the total vans fleet (internal + hire fleet) (as of Nov 2021)	13%	100% by 12/2023
Fleet	Number of CEC Fleet chargers installed	86	136 by 04/2022
Fleet	Number of CEC Fleet chargers which are publicly accessible	45	
Waste	Total waste emissions (tCO2e)	5,947	Net 0 by 2030
Waste	Percentage of waste recycled	39.60%	60% by 2022
Waste	Total waste tonnages collected	209,878	decrease
Waste	Total food waste tonnages collected	10,966	increase
Waste	Percentage of educational settings with recycling in place	20%	100% (circa 150) - subject to funding
Business travel	Total business travel emissions (tCO2e)	603	Net 0 by 2030
Business travel	Air travel emissions (tCO2e)	2	decrease
Business travel	Staff bike mileage claimed	9,984	increase
Business travel	Uptake of Cycle to Work scheme	408	increase
Business travel	Number of staff receiving e-cargo bike trainings	0	5

Sector	KPI	2020/21	Target
Engagement	Number of Climate lunch and learns	3	4 per year
Engagement	Percentage of staff who have received Carbon Literacy accreditation	N/A	15% of staff by 2025 (approx 2,500)
Engagement	Percentage of staff who have been trained to deliver Carbon Literacy training	N/A	Minimum 10 by 2025
Engagement	Number of different departments with sustainability network members	8	16
Engagement	Grey fleet mileage claims (million km)	2.3	decrease
Engagement	Number of green car leasing scheme users	Launched end of 03/21	increase
Procurement	Percentage of total core spend with local suppliers	41%	39% for 20/21, 40% for 21/22, 41% for 22/23, 42% for 23/24
Procurement	Number of events organised per year	10+	10 per year
Procurement	Number of monthly engagement sessions	12+	12 per year

Evidence-based decision making

The climate emergency requires a change in organisations' culture to ensure decisions consider potential carbon impacts and wider sustainability implications such as air quality or wellbeing, alongside financial and other considerations.

This requires sustainability to be mainstreamed throughout all that the Council does, ensuring that supporting the organisation's transition to net zero by 2030 becomes 'everyone's business'. What this means for different groups of staff and teams within the Council will depend on their role and remit; similarly, the processes applied to different decisions, projects or proposals will depend on their size, scope and potential impact.

The Council has therefore developed a tiered approach designed to ensure that decision-making at every level is supported by proportionate processes and staff have the awareness, knowledge and skills appropriate for their role.

Table 22 below provides an overview of the main corporate measures in place; however individual service areas also make use of further custom processes, such as sustainable procurement toolkits or geographical information systems.

Table 22: Considering carbon impact in decision-making. Processes that relate to policies and strategies are highlighted in purple, to projects in orange and to both policies and projects in blue.

For major change projects	**Change portfolio:** Enhanced project management and monitoring of major change projects with positive negative environmental impacts.		
For major projects	**Quantifies carbon impact analysis to assess major project:** Use of the City of Edinburgh Council Carbon Scenario Tool or engage consultancy support as appropriate.		
Pre-approval stage. Early consideration of CO2 impact	**Business Case process:** Considering carbon impact before projects are agreed for implementation.	**Integrated Impact Assessment:** Identifying potential environmental impacts of policies and strategies.	**Strategic Environmental Assessment:** In depth assessment of policies/ strategies flagged as potentially having significant positive or negative environmental impact.
Foundations	• **Committee reporting templates and framework** ensure decisions taken at Committee consider environmental impact. • **Climate Literacy training:** Targeted accreditation for key staff. • **Programme and Project Management training:** Mainstreaming sustainability in all that we do. • **Sustainability learning modules**		

Focus on residual emissions

Residual emissions illustrated with the orange bars on the waterfall charts across the emissions chapters include:

- Emissions that will be reduced by current or planned interventions, but where it is not possible to quantify the reductions they will achieve due to a lack of data or too high a level of uncertainty to be able to estimate the effect.
- Emissions that cannot fully be eliminated based on today's technologies (for example, there is currently no zero-carbon alternative for all heavy vehicles of the fleet).
- Emissions that will probably never be fully eliminated (for example, waste emissions cannot reach zero as long as the city generates waste).
- Residual emissions from the electricity grid (projections indicate a sharp decrease in the carbon intensity of the grid, but unless the UK meets 100% of its electricity demand with renewables supported by storage technology, there will be residual emissions).
- Emissions for which a reduction intervention is yet to be identified.

Table 23 on the following page details residual emissions for each emission source.

Table 23: 2030 Residual emissions per sector

Sector	Residual emissions sources	Non carbon costed interventions expected to provide emissions reduction
Buildings	- Edinburgh Leisure buildings emissions, - PPP and DBFM buildings emissions, for which no interventions have been modelled as yet, - Residual gas emissions from retrofitted buildings (the emissions modelling assumes a 60% in space heating demand) - Residual emissions from electricity grid, based on carbon intensity projections in 2030 (the emissions modelling assumes a 5% reduction in electricity consumption) - Remaining emissions from non-retrofitted buildings (the emissions modelling assumes a retrofit of half of the estate. Note that the modelling on Figure 7 is for illustration purposes, and this proportion is not a set target.	- New contractual arrangements with DBFM/PPP buildings which require energy efficiency improvements - Edinburgh Leisure commitment to conclude a mapping exercise of all significant existing equipment including their current CO_2 emissions, plans for replacement, carbon savings and cost estimates. Once this exercise is complete it will be possible to model these reductions; - Reduction in energy use in buildings from behaviour change - Potential lower space heating, cooling and lighting energy use in workplaces due to increased home working and lower use of office buildings - Increased domestic emissions due to home working (outside of Council's carbon footprint scope)
Other energy	- This sector is entirely made up of electricity consumption - The street lighting and traffic signals upgrades will drastically reduce electricity consumption but won't eliminate it. As mentioned above, there will residual emissions from the electricity grid in 2030 - Emissions from other electricity consumption such as from housing stair lighting, trams, park and ride are difficult to reduce, (and are likely to increase with the uptake of EVs), and are directly dependent on grid decarbonisation	- Further grid decarbonisation with renewables penetration exceeding current projections
Fleet	- Remaining emissions from half of the heavy vehicle fleet (the emissions modelling assumes a theoretical electrification of half of the heavy vehicle fleet) - Emissions from electricity used by electric vehicles	- Edinburgh Leisure plans to conclude a review of its vehicle fleet with an aim to optimise the proportion of electric vehicles. There is currently no data to quantify the emissions impact, however Edinburgh Leisure's consumption represents less than 0.5% of the total fuel consumption reported in the Council's carbon footprint, so the impact on the emissions modelling is expected to be negligible.
Waste	- Small fraction of food waste in residual bins, despite campaigns to increase food waste recycling	- Anticipated increases in zero-waste & repair shops in the city, as well as new post-covid working patterns could potentially help to further reduce waste generated

	- Waste generation always leads to greenhouse gas emissions. Even if 100% of the tonnages were recycled (which is often energy-intensive), there would still be emissions linked with waste management.	- There are significant uncertainties linked with the evolution of waste due to Covid, population growth, online deliveries, and evolving legislation such as the future Deposit Return Scheme, and the ban of certain single-use plastics from 2022
Business travel	- The modelling assumes reducing grey fleet mileage by 59% by 2030 (same as 2020/21 levels during the pandemic), so remaining emissions include the rest of grey fleet - Remaining emissions from trains and flights after an estimated 60% reduction in domestic flights and a 20% reduction in long distance flights. - Electricity consumption from electric taxis.	- There are measures in place which support employees to travel more sustainably (Step count challenge, awareness raising campaigns, pool bikes), but no figure/target to help quantify emissions. - Impact of the sustainable staff travel plan on staff travel emissions - More sustainable commuting to the workplace with dedicated engagement as part of the “Our Future Work” programme - Reduced commuting to the office due to increased home working (outside of Council’s carbon footprint scope)

Glossary

Term	Meaning
Carbon Dioxide (CO_2)	A naturally occurring gas and one of the most abundant greenhouse gases in the atmosphere. Carbon dioxide is also a by-product of industrial processes, burning fossil fuels and land use changes.
Business as usual Scenario	A description of what would most likely occur in the absence of a carbon reduction project, also referred to as the 'baseline scenario'.
Carbon Dioxide Equivalent (CO_2e)	Universal unit of measurement used to compare the relative climate impact of the different greenhouse gases. The CO_2e quantity of any greenhouse gas is the amount of carbon dioxide that would produce the equivalent global warming potential.
Carbon footprint	A carbon footprint is the sum of all emissions (in CO_{2e}), which were produced by an individual or organisation in a given time frame. Usually a carbon footprint is calculated for the time period of a year.
Carbon neutrality	When CO_2 emissions caused by humans are balanced globally by CO_2 removals over a specified period *(Source: IPCC SR15).* This does not apply to other greenhouse gases.
CCC	Committee on Climate Change.
Circular economy	A circular economy is based on the principles of designing out waste and pollution, keeping products and materials in use, and regenerating natural systems. Looking beyond the current take-make-waste extractive industrial model, a circular economy aims to redefine growth, focusing on positive society-wide benefits. *(Source: Ellen MacArthur Foundation)*
EnerPhit/Passivhaus	EnerPHit is the established standard for refurbishment of existing buildings using the Passive House basic principles and components. The Passivhaus Standard for new construction is not always achievable for works to existing buildings. For this reason PHI (Passive House Institute) developed the 'EnerPHit – Quality Approved Energy Retrofit with Passive House Components' certification process for existing buildings. Significant energy savings of between 75% and 90% can be achieved even in existing buildings. The basic 5 principles of the Passivhaus Standard are still used to achieve the EnerPHit Standard; • optimising thermal insulation levels • reduction of thermal bridges • high thermal performance windows • considerably improved airtightness • good indoor air quality maintained by a ventilation with heat recovery system with highly efficient heat recovery levels
Fabric first	An approach to building design which involves maximising the performance of the components and materials that make up the building fabric itself, before considering the use of mechanical or electrical building services systems. *(Source: Carbon Futures)*
Greenhouse gas (GHG)	The collective term for emissions which contribute to the greenhouse effect by trapping heat from the sun. Carbon dioxide is a greenhouse gas, but other gasses such as methane also contribute to the greenhouse effect.

Grid decarbonisation	Decarbonising the grid means decreasing the emissions per unit of electricity generated. The electricity grid will decarbonise over time due to the UK generating more and more energy from renewables and at the same time closing coal power plants.
Heat network	Heat networks (also known as district heating) supply heat from a central source to consumers, via a network of underground pipes carrying hot water. Heat networks can cover a large area (including even an entire city) or be local (supplying a small cluster of buildings). *(Source: Department for Business, Energy and Industrial Strategy)*
IPCC	Intergovernmental Panel on Climate Change, a research group created by the World Meteorological Organization and the United Nations Environment Programme, responsible for surveying and synthesising scientific work on climate change.
Landfill	Disposal of waste material by burying it under layers of earth.
Net-zero emissions	According to the Scottish Government, a situation in which any greenhouse gas emissions put into the atmosphere are balanced out by the greenhouse gases removed from the atmosphere, so that the "net" effect is zero emissions. Edinburgh has committed to 'net zero' emissions by 2030. To achieve this, we must reduce the emissions we produce to a minimum and capture any greenhouse gases we cannot avoid emitting through initiatives like tree planting.
Offsetting	Designs the process of trying to reduce the damage caused by releasing carbon dioxide into the environment by doing other things that remove carbon dioxide, for example, by planting trees". *(Source: Cambridge Dictionary)*
Retrofit	Modifications to existing buildings that improve energy efficiency or decrease energy demand and may include installation of low carbon heating systems.

Appendix 1: Council organisational carbon footprint boundary

Scope 1		Scope 2		Scope 3		
Transport	Controlled fleet	**Electricity consumption**	Bus stations, tram stops, substations, cabinets and Park & Ride	**Electricity T&D losses**		
	Edinburgh Roads services		Care homes	**Water**	Edinburgh Leisure	
	Edinburgh leisure		Cemetery		Council estate	
Gas consumption	Bus stations, tram stops, substations, cabinets and Park & Ride		Community / Family / day / education centres	**Waste**	Landfill Recycling Incineration Composting (includes households + Council buildings + litter (bins in parks and in the city) + Edinburgh Leisure).	
	Care homes		Energy centre	**Staff travel**	Car mileage Air and rail travel (including Edinburgh Leisure)	
	Cemetery		Offices	**Taxi**	Black cab	
	Community / Family / day / education centres		Culture, arts, theatres and sports, libraries		Regular taxi	Health & social care
	Energy centre		Farmhouses			Communities & families
	Offices		Hostels			
	Culture, arts, theatres and sports, libraries		Housing services / Domestic			
	Farmhouses		Parks			
	Hostels		Schools			
	Housing services / Domestic		Workshop / Depots			
	Parks		Toilets			
	Schools		Street lighting			
	Workshop / Depots		Christmas lighting			
Oil consumption	Workshops/depots		Traffic signals			
	Buildings (community centres, cemetery…)		Housing stair lighting			
LPG	Edinburgh leisure		Lothian Pension Fund			

Appendix 2: Edinburgh Climate Compact Commitments

Climate Compact commitments	Council's progress
1.1 Operations	
Share within a month of signature what action we are currently taking to address climate change and our current emissions.	City and Council emissions, as well as action the Council is taking are published through the Carbon Disclosure Project (CDP) and the Public Bodies Climate Change Duties reports
Take demonstrable actions to contribute to the reduction of carbon emissions (by COP26 in November 2021 and beyond).	Key strategies which will be pivotal to deliver the city's net zero target: - The 2030 Climate strategy published in Nov. 2021. - The present Council's emissions reduction plan - The Council's business plan, published in February 2021, had sustainability at its core - The City Mobility Plan, published in February 2021, provides a strategic framework for the safe & effective movement of people & goods up to 2030. - Edinburgh's City Centre Transformation is an ambitious plan for a vibrant and people-focused capital city centre which seeks to improve community, economic and cultural life. - City Plan 2030 sets out locations for new homes and businesses, protect places of value, and ensure essentials for a good quality of life are in place - such as public transport, schools and green space. The vision of the City Plan is to ensure Edinburgh is a sustainable city which supports everyone's wellbeing, in which everyone lives in a home they can afford, where you don't need to own a car to move around, and where everyone shares its economic success.
Publish online (by Nov 2021 latest) our plan to cut carbon emissions within our organisation with identified [annual/biannual/other] target dates for progress.	Publication of present Council Emissions Reduction Plan
Include in this plan a commitment to engage across the whole value chain to drive emissions reduction	Detailed in procurement section of this plan. This will also be addressed within Council actions as part of the city's climate strategy
Set out how we will embed assessment of climate impact into all organisational and investment decisions.	The Council is taking a wide range of actions to identify the risks and adapt to the impacts of climate change. A citywide climate change risk assessment is currently being undertaken. Outcomes from this will provide evidence and inform decision-making on future climate change adaptation action

1.2 Influence and Leadership	
Communicate our approach to tackling climate change and promote the importance of greater efforts to tackle climate change.	Development of a new net zero sustainability mark/branding Comprehensive issues-based citizen engagement and awareness raising programme in place for delivery 2021 onwards
Share learning with members of the Edinburgh Climate Compact and other city organisations looking to accelerate action on climate change.	Co-sponsorship of the Edinburgh Climate Commission The Council will be hosting one of the Climate compact's quarterly meetings later in the year Ongoing collaboration with city partners on climate strategy development and implementation
Roll out climate literacy for staff, including the management team as a minimum.	Detailed in staff engagement section of this plan
Promote, support and enable employee choices and behaviours to contribute positively to a net-zero future.	Detailed in staff engagement section of this plan
Maximise the impact of procurement across the value chain to accelerate emissions	Detailed in procurement section of this plan
1.3 Transport	
Integrate the sustainable travel hierarchy into our organisation's operations, future business planning and lock out a return to the levels of business travel prior to 2020.	Detailed in business travel section of this plan
Prioritise sustainable and active travel choices by our workforces, limiting the need to travel for work wherever possible.	Detailed in staff travel section of this plan
Invest in a switch to zero emission company owned vehicles.	Commitment to electrify the Council's cars and vans fleet, detailed in fleet section of this plan
1.4 Buildings	
Commit to a clear programme of deep retrofit of the owner organisational estate.	Detailed in buildings section of this plan
Maximise and optimise energy use from sustainable energy sources.	Detailed in buildings section of this plan
Explore the potential of the organisational estate to generate renewable and sustainable energy and contribute to increased greenspace, biodiversity and sequestration.	Detailed in buildings section of this plan

Appendix 3: Scottish Government funding streams

Table 24: Applications submitted

Area	Fund	Bid (£)	Project	Service area	Status
Heat and energy	Low Carbon Transition Fund (LCITF)	£3.9m	Western Villages: ~450 homes with >50% for affordable rent. Includes a communal air and water source heat pump farm combined with solar PV arrays to bring the development to net zero carbon. Total cost ~£7.8m.	Place / Housing	Bid through to final assessment stage, awaiting feedback from LCITF
Domestic building retrofit	HEEPS: ABS	£4.8m for this financial year	Retrofit 622 private homes	Place / Housing	Bid successful
Core sustainability team	EIT / ClimateKIC	£200,000 (pot available tbc)	Climate KIC partnership – reduced level from 2020; contribution to core team costs only	Strategy & Communications	Resubmission required due to Brexit, awaiting feedback from EIT
Regeneration	Regeneration Capital Grant Fund	£2.8m in total for two projects	Seven bids submitted	Place / Commercial development	Awaiting updates
Active Travel Investment Programme	Levelling Up Fund	£38.6m	City wide active travel infrastructure, total cot projection of £172.8m 2019-2026, with £134.2m already committed	Place	Bid submitted
Major sustainability programmes	Green Growth Accelerator	Up to £10m per project, designed to leverage up to £200m of additional investment	EnerPhit approach to Council Operational Buildings	Place / Resources	Bid successful
Energy efficiency	Local Heat and Energy Efficiency Strategies (LHEES)	£50,000	Business case development	Corporate Services	Bid submitted

Waste	Household recycling collection infrastructure Fund	£70m	All Scottish LAs can apply for the fund, either individually or in partnership with other LAs, commercial or third sector partners.	Waste	Bid submitted for Communal Bin Review, awaiting feedback
Green urban regeneration	Vacant & Derelict Land Fund	£50m over 5 years	Western Villages at Granton Waterfront	Place	One bid submitted.

Table 25: Funding Opportunities

Area	Fund	Amount available (£)	Proposed project(s)
Active travel	Cycling Facilities Investment Fund	£8m across Scotland	To be rolled out before 2023
Active travel	Active travel investment outlined in Programme for Government	£320m across Scotland 2024-25	TBC
Air pollution	Air Quality Action Plan Measures	£1m total fund across Scotland	Council making annual bids. Fund expected to stay in place for future years
Biodiversity	TBC	£150m across Scotland by 2024 for tree planning.	To accelerate progress towards the commitment for 18,000 hectares of tree planting a year by 2024
Biodiversity / adaptation	Nature Climate Bonds	Suitable for smaller amounts initially of £1m or less, but is scalable and has no closing date.	A pipeline of nature-based projects across the city are being developed that are suitable for financing using nature climate bonds
Biodiversity, urban trees	Trees for Cities	TBC	TBC.
Domestic building retrofit	TBC	£1.8bn to decarbonise 1 million homes by 2030	Includes a minimum of £465 million to support those least able to pay for home energy improvements, and £400 million for large scale heat decarbonisation projects.
Energy – district heating	District Heating Loan Fund	Feasibility studies of up to £20k.	District heating projects
Energy - renewables	Solar Photovoltaics (PV) Fund	TBC	Spend to save money to install solar panels on roofs of suitable properties or land. Upfront investment would be provided from the fund, with payment then received from the Council and/or its ALEOs for energy used

Energy – renewables	Heat Network Early Adopter Challenge	£50m across Scotland	TBC
Energy - renewables, scalable finance	Community Municipal Bonds	£1m is proposed amount for first tranche.	Suitable for commercial-scale solar installations, battery storage, energy efficiency improvements to Council estate
Energy efficiency	Non-Domestic Energy Efficiency (NDEE)	Project value must be over £1m per application.	retrofit of public sector buildings with energy efficiency assets
Finance	Green Investment Portfolio	£3bn across Scotland	Bring investment proposals (including renewable energy) to market by 2022
Green jobs	Green Jobs Workforce Academy	£45m across Scotland	Provides a single solution for those looking to transition into green jobs, will include a skills guarantee for those in carbon intensive industries
Green jobs	Scottish Government Vocational Training programme	£400,000 across Scotland	TBC
Infrastructure	Infrastructure Investment Plan	£2bn across Scotland	Low carbon infrastructure, details TBC
Institutional finance	TBC	Minimum £50m per tranche	Work in progress. Would involve a blended finance approach that leverages significant cash injection from strategic partners such as pension funds for long-term, place-based investment green finance partnerships.
Public sector estate retrofit	Scottish Green Public Sector Estate Scheme	£95m across all LAs in Scotland	TBC
Public transport	Zero Emission Bus Challenge Fund (ScotZEB)	£50m for public transport operators	Linked to Bus Decarbonisation Taskforce, funds will be available 2021-22
Public transport	Bus Partnership Fund	£3.03m from Transport Scotland	For business case and appraisal work 2022-23
Public transport	Future Transport Fund	£287m investment through to 2025-26 across Scotland	Focused on public sector fleet investment in alternatives to petrol and diesel
Regeneration	Place Based Investment Programme (previously the Town Centre Fund)	TBC	Report will be taken to committee in November 2021 with updates