Policy and Sustainability Committee

10.00am, Thursday, 17 November 2022

City 2030 Net Zero Target Annual Report

Executive/routine
Wards
Council Commitments

1. Recommendations

It is recommended that the Policy and Sustainability Committee:

1.1 Note that it is estimated that the city has achieved emissions reductions of 14 % between 2020/21 and 2018/19, the baseline year; and that this exceeds the indicative target of 13 % which was set to achieve the interim 25 % reduction in 2022/23.

1.2 Note that the main reductions come from a reduction in electricity consumption, the decarbonisation of the electricity grid, and a reduction in road travel (mainly from cars, followed by vans and HGVs).

1.3 Note that figures are provisional pending publication of a final dataset in Q2 of 2023, but it is expected that the impact on the total footprint will be negligible.

1.4 Note that this latest data reflects the significant impact that the Covid pandemic has had on the city; and that to be able to meet future targets, the pace of climate action must significantly accelerate.

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Report

City 2030 Net Zero Target Annual Report

2. Executive Summary

2.1 This report presents the latest emissions inventory of the city of Edinburgh (2020/21), based on the most recent datasets available. The calculation methodology is based on the Global GHG Protocol for Cities (GPC)[1].

2.2 This methodology and the boundary selected to monitor progress against the new net-zero target was detailed in the 2030 City target monitoring approach report brought to the Policy and Sustainability Committee in April 2021.

2.3 The Council's own organisational emissions are additionally monitored and reported through Public Bodies Climate Change Duties reporting (PBCCD). The latest Council's PBCCD report, based on 2021/22 data, is also provided separately to the November Policy and Sustainability committee.

2.4 City emissions have decreased by an estimated 7 % between 2019/20 and 2020/21, based on the most up-to-date data available, or by 14 % since 2018/19, the baseline year. This exceeds the indicative target of 13 % which was set to achieve the interim 25% reduction in 2022/23.

2.5 This latest data reflects the significant impact that the Covid pandemic has had on the city, particularly on electricity consumption and transport. Therefore, to be able to meet future targets, the pace of climate action must significantly accelerate.

3. Background

3.1 The City of Edinburgh Council declared a Climate Emergency in 2019 and committed to work towards a net zero emissions target by 2030 for the whole city.

3.2 As detailed in previous reports, Councils typically contribute to only 1-3 % of their area-wide emissions and no one partner has all the answers, powers or resources to reduce city's emissions to net zero by 2030 acting alone. Thus, the Council has engaged with city partners to develop a city-wide 2030 Climate Strategy, published in December 2021. This strategy sets out the strategic priorities for tackling climate change in the city, with high level strategic actions the Council and key city partners will take to realise the ambition of Edinburgh becoming a net zero and climate resilient city by 2030.

[1] https://ghgprotocol.org/greenhouse-gas-protocol-accounting-reporting-standard-cities

3.3 This dedicated report on city-wide emissions and progress made towards the 2030 net zero target is written every year and brought to the Council Policy and Sustainability Committee, detailing reasons for change. Last year's report can be found in the Background reading section.

3.4 City-wide emissions are accessible on the Council website (Track Edinburgh's progress to net zero) and on the Council intranet, as well as through Edinburgh's CDP disclosure, which provides a very detailed overview of the city's action on climate.

4. Main report

2020/21 Emissions

4.1 The net zero target is monitored using data with a two-year time lag, meaning the most recent data we have is for the year 2020/21, a year after the Council declared a climate emergency and set the net zero target.

4.2 The scope of the emissions reporting is detailed in the City Target Monitoring Approach report, approved by Committee in April 2021. Appendix 1 and Appendix 2 provide a summary of the emission sources included in the calculation.

4.3 Business waste data hasn't been updated because SEPA was cyber attacked in December 2020. There will be a gap in publication until the 2021 dataset is published in 2023. Business waste tonnages have been estimated to be equal to 2018 tonnages (latest data available).

4.4 One of the datasets used to calculate emissions from industrial processes has been delayed and is expected to be published by the second quarter of 2023. In the same way as for business waste tonnages, the previous year's figures have been used in the interim.

4.5 Figures will be updated as soon as data are available, but it is expected that the impact on the total footprint will be negligible as industrial processes account for 1 % of the total city emissions.

4.6 In 2020/21, city emissions totalled an estimated 2.088[2] million tonnes of carbon dioxide equivalent (CO_{2e}). The majority comes from gas and electricity consumption in buildings (domestic, industrial and commercial), representing 70 % of total emissions ('stationary energy'), followed by transport emissions (24 %), as illustrated on Figure 1. This breakdown is consistent with previous year, except the proportion of waste emissions which has increased due to a fourfold increase in the emission factor for landfilled commercial waste. As explained above, 2020 business waste tonnages were not available and assumed equal to 2018, so the increase in waste emissions in solely due to the change in the emission factor.

[2] Provisional figure pending publication of final dataset to update emissions from industrial processes.

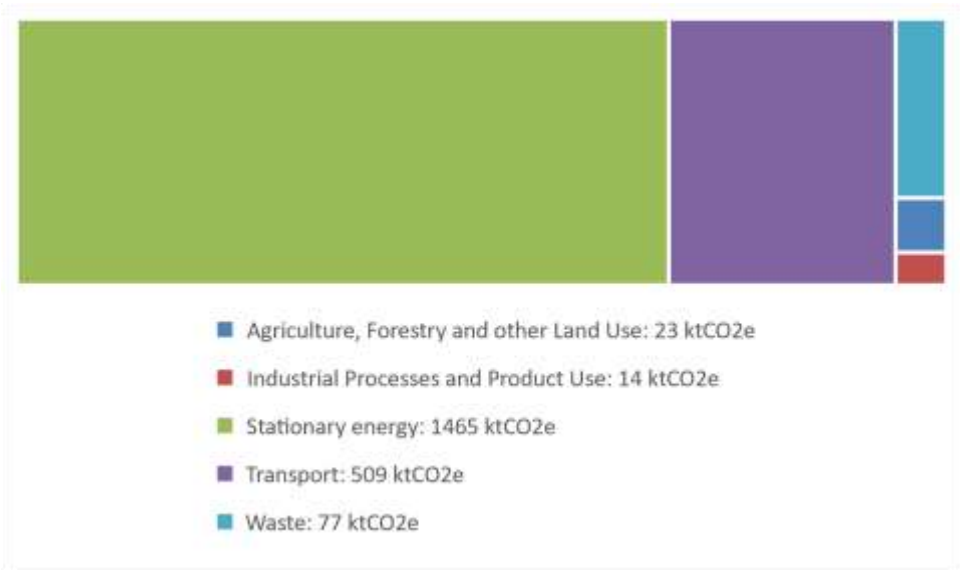


Figure 1: City of Edinburgh emissions inventory 2020/21 (provisional pending publication of final dataset)

4.7 Total emissions can also be broken down per sector, as it can be seen on Figure 2[3]. The share of domestic emissions increased from 53 % to 56 % compared to last year, due to residents spending more time at home during national lockdowns.

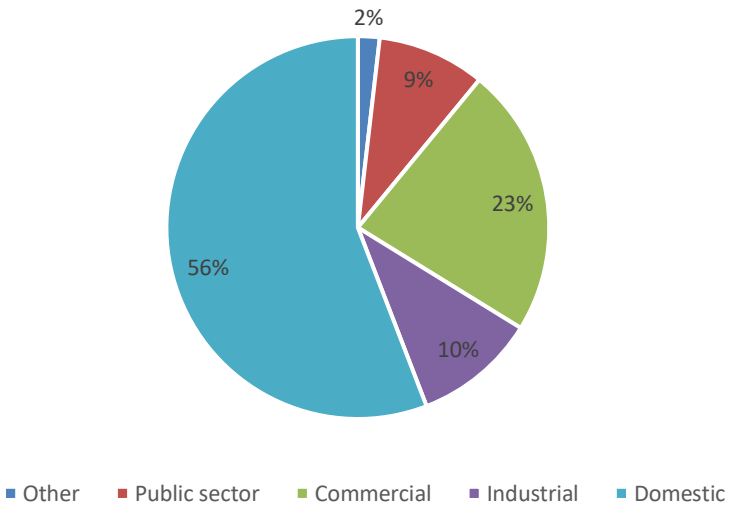


Figure 2: City of Edinburgh carbon footprint per sector – Provisional 2020/21 data

Evolution of emissions

4.8 Total 2020/21 emissions decreased by an estimated 7% compared to the previous year.

4.9 **Energy**-related emissions have dropped by 53 % since 2010/11, predominantly thanks to the decarbonisation of the electricity grid[4] and to energy efficiency improvements[5]. Electricity and gas consumption respectively decreased by 49 %

[3] It is important to note that a simplified approach has been taken to allocate transport emissions: emissions from vans and HGVs have been allocated to the commercial sector, Council's fleet and Council's taxi use to the public sector, and the rest of car emissions has been allocated to the domestic sector. As cars can also be used by businesses, the contribution of the domestic sector is overestimated on this graph.
[4] Between 2010 and 2020, the carbon content of a unit of electricity (in $kgCO_{2e}/kWh$) decreased by 52 %
[5] Between 2010/11 and 2019/20, electricity consumption decreased by 43 %.

and 4 % since 2010/11 but now start to plateau as low hanging fruits like LED replacements have been taken. The evolution of energy emissions between 2010/11 and 2020/21 can be found in Appendix 4, Figure 4.

4.9.1 Between 2019/20 and 2020/21, total **electricity** consumption has dropped by 10 %. As residents were forced to spend more time at home during national lockdowns, electricity use in homes has increased by 4 %. This has been more than compensated by a fall in consumption in non-domestic buildings (- 19 %).

4.9.2 **Gas** consumption has slightly increased (+ 2 %), with a similar increase in domestic and non-domestic buildings.

4.10 The road **transport** sector has directly been impacted by the pandemic and emissions decreased by 17 % compared to the previous year. The reduction in the use of private cars is the main contributor. The evolution of transport emissions between 2010/11 and 2020/21 can be found in Appendix 4, Figure 5. Road traffic data from the Department of Transport shows that road traffic in Edinburgh has increased again in 2021 but remains below 2019 levels. See graph in Appendix 4, Figure 6.

4.11 There are two main levers to shrink emissions from road transport: a) reduce distance travelled by car (Edinburgh has a target to reduce car kilometres travelled by 30 % by 2030), and b) decarbonise vehicles. Together, they could halve emissions from cars by 2030[6]. Figure 7 (Appendix 4) shows that the growth of electric vehicles continues to increase in the city, supported by a growing network of chargers.

4.12 **Land use** emissions have decreased due to significant methodological changes in BEIS datasets, but the impact in the total is negligible (around 1% of total emissions). Municipal **waste** emissions have decreased due to a reduction in landfilled waste tonnages. Overall, these two sectors account for 5% of total city emissions.

4.13 The main reasons for the 7 % emissions reduction between 2019/20 and 2020/21 are summarised in Table 1. Like for the previous year, the main contributing factor is the reduction in electricity consumption and decarbonisation of the electricity grid. The second largest contributor is the reduction in road travel, mainly from cars, followed by vans and HGVs. As explained above, emissions from natural gas have increased (higher consumption), and so have waste emissions (change in emission factor for landfilled business waste).

[6] Assuming a 30 % reduction in car kilometres travelled from 2018/19 level, and that 41 % of the remaining kilometres are travelled by EVs, and 59 % by internal combustion engines. (In line with a forecasting study done by Energy Savings Trust for Edinburgh). BEIS 2019 EEP projections are used to forecast emissions from the electricity grid in 2030 to estimate emissions from electric cars.

Table 1: Factors contributing to the City's 7 % emissions reduction between 2019/20 and 2020/21

Emission source	Emissions 2019/20 (tCO_{2e})	Emissions 2020/21 (tCO_{2e})	Change between 2019/20 and 2020/21		Contribution to total emission reduction	Change between 2020/21 and 2010/11
			tCO_{2e}	%		
Electricity	629,118	514,394	-114,724	-18%	71.4%	**-76%**
Cars	366,817	296,196	-70,621	-19%	43.9%	**-30%**
Vans	104,610	92,125	-12,485	-12%	7.8%	**-11%**
HGV	81,973	72,371	-9,602	-12%	6.0%	**-15%**
Other fuels	83,788	78,446	-5,342	-6%	3.3%	**-5%**
Local bus	35,501	30,356	-5,145	-14%	3.2%	**-23%**
All Other sources	58,275	50,699	-7,576	-13%	4.7%	**8%**
Natural gas	868,420	881,917	13,497	2%	-8.4%	**-6%**
Waste	19,917	71,157	51,241	257%	-31.9%	**-6%**
Total	2,248,420	2,087,661	-160,759	**-7%**	100%	**-46%**

Progress against targets

4.14 Emissions have decreased by 7 % between 2019/20 and 2020/21, based on the most up-to-date data available, or by 14 % since 2018/19, the baseline year. This exceeds the indicative target of 13 % which was set to achieve the interim 25% reduction in 2022/23 (see Table 2). The two interim milestones to 2030 (-25 % by 2022/23 and -50 % by 2026/27) are represented with diamond markers in Figure 3.

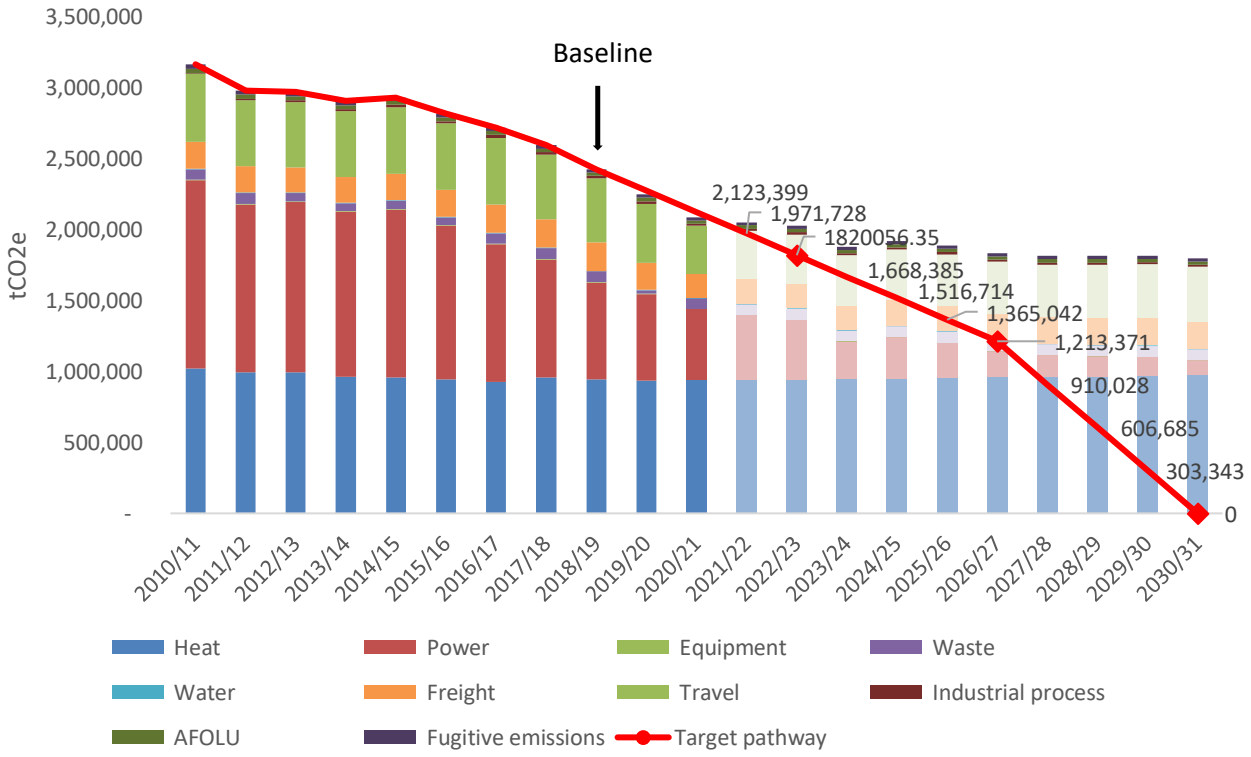


Figure 3: City's emissions based on the new Net Zero boundary. Darker shades represent historic emissions. Lighter shades represent Business As Usual projections based on various factors such as population growth, mileage forecasts, household numbers projections, school rolls projections, and grid decarbonisation (based on UK Treasury Green Book.)

4.15 This latest data reflects the significant impact that the Covid pandemic has had on the city, particularly on electricity consumption and transport. The same level of effort needs to be achieved annually until 2022/23, while activities return to normal. An even greater reduction is required between 2022/23 and 2030, at which point city partner action to deliver the 2030 strategy are expected to be well underway, with new national policies also operational. Therefore, to be able to meet future targets, the pace of climate action must significantly accelerate.

Table 2: Incremental annual targets – City target

Year	Annual target reduction (%)		Actual reduction	
	Compared to previous year	Compared to baseline	$MtCO_{2e}$	% reduction compared to previous year
2017/18	N/A	N/A	2.595	5%
2018/19	Baseline year	Baseline year	2.427	6%
2019/20	6%	6%	2.248	7%
2020/21	7%	13%	2.088	7%
2021/22	7%	19%	*Data available Autumn 2023*	
2022/23	8%	**25%**	*Data available Autumn 2024*	
2023/24	8%	31%	*Data available Autumn 2025*	
2024/25	9%	38%	*Data available Autumn 2026*	
2025/26	10%	44%	*Data available Autumn 2027*	
2026/27	11%	**50%**	*Data available Autumn 2028*	
2027/28	25%	63%	*Data available Autumn 2029*	
2028/29	33%	75%	*Data available Autumn 2030*	
2029/30	50%	87%	*Data available Autumn 2031*	
2030/31	100%	100%	*Data available Autumn 2032*	

Data limitations

4.16 ‘Carbon footprinting’ is not an exact science as the quality of the data depends on the datasets used, as well as the assumptions made.

4.17 Collecting accurate data for transportation activities can be a particularly challenging process. Methodologies vary from using data based on where fuel is consumed, or where it is purchased[7].

4.18 The evolution of city-wide emissions is also impacted by methodology changes in some of the underlying datasets. For example, emissions from the LULUCF sector appear to have decreased by 39 % compared to last year’s dataset due to

[7] For more information, see Figure 7.3 in the Global Protocol for Community-Scale Greenhouse Gas Inventories

methodology improvements[8], when in fact they only decreased by 0.4 % once previous year's figures are recalculated. LULUCF only accounts for 1 % of the city's footprint so the impact on total emissions is negligible.

4.19 For the first time this year, the Department for Business, Energy & Industrial Strategy has published statistics[9] on greenhouse gas emissions at the local authority level (expressed in tons of carbon dioxide equivalent). Consumption data is not available (e.g. kWh of energy used, tons of waste landfilled, etc): the dataset only provides emissions figures.

4.20 A comparison with the overall figure obtained using the Council's approach shows that there are a few discrepancies. For example, gas consumption figures in the BEIS dataset are lower and show a 4 % decrease compared to last year (mainly from commercial and industrial buildings), while the data presented in this report shows a 2 % increase.

4.21 Total emissions are only available for 2018, 2019 and 2020 in the BEIS dataset. As presented on Table 3, BEIS figures are respectively 3 % higher, 6 % higher and 2 % lower than figures published in this report, so the overall gap is acceptable.

Table 3: Comparison of total city emissions with newly published BEIS dataset

Emissions by Methodologies ($MtCO_{2e}$)	2018	2019	2020	% reduction vs previous year	% reduction vs 2018
BEIS dataset	2.491	2.382	2.046	-14 %	-18 %
Edinburgh Carbon Scenario Tool	2.427	2.248	2.088	-7 %	-14 %
Gap between methodologies	-3 %	-6 %	+2 %		

4.22 Officers will continue to reflect on data improvements and changes in all committee reporting and consider how to ensure consistent and transparent reporting.

Reporting arrangements

4.23 In addition to the annual progress report, city wide emissions are reported annually through the Carbon Disclosure Project (CDP), Edinburgh by Numbers and the Annual Performance Report. Council emissions are reported annually through the PBCCD submission in October/November and in July/August via the Carbon Disclosure Project.

4.24 The Council participated in the Carbon Disclosure Project (CDP)[10] for the first time in late 2020, on behalf of the city. The 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.

[8] The most significant improvements made were the use of updated forest planting statistics and a new approach for adjusting reported forest areas to stocked forest, and an update to the land use change activity data. More information available in "Mapping greenhouse gas emissions and removals for the land use, land-use change & forestry sector"

[9] https://www.gov.uk/government/collections/uk-local-authority-and-regional-greenhouse-gas-emissions-national-statistics

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

CDP evaluates the quality of the submission, benchmarks performance against other cities, and finds areas of opportunity for cities.

4.25 Edinburgh is one of 95 global cities named as new generation of climate leaders 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. Edinburgh is the only city in Scotland on the CDP A-list. Less than one in ten cities scored by CDP (9.8 %) received an A.

4.26 The Council signed up to the Global Covenant of Mayors[11] initiative in 2011 and to the Mayors Adapt initiative in 2015. Since 2016, both initiatives have merged within the Covenant of Mayors for Climate and Energy, which is a global coalition of city leaders addressing climate change by pledging to cut greenhouse gas emissions and prepare for the impacts of climate change. Submitting to CDP meets the reporting requirements for the Covenant of Mayors. For three years in succession, 2020, 2021 and 2022, Edinburgh has been awarded with the maximum of six badges recognising its climate mitigation and adaptation efforts. Edinburgh is one of 8 fully compliant local authorities in the UK (out of 63 UK LA who are GCoM members), and the only fully compliant local authority in Scotland (out of 10 who are GCoM members).

5. Next Steps

5.1 Total city emissions will be revised once missing datasets become available.

5.2 The Council will continue to report annually through the Carbon Disclosure Project (CDP) in July/August. This sustainability questionnaire is completed on a voluntary basis and includes both Council and city-wide climate action.

6. Financial impact

6.1 There is no financial impact arising from this report. However, it should be noted that the financial challenges to achieve net zero emissions will be significant. It should be noted that investing in carbon reduction projects often results in wider co-benefits such as the creation of local jobs, improved air quality and public health, or reduced congestion.

6.2 Work with Edinburgh Climate Change Institute and the Place-Based Climate Action Network had shown that we can get over 65 percent of the way to meeting net zero with actions that pay for themselves. This work also shows that Edinburgh can get to net zero by 2030 through ‘stretch’ interventions that will be enabled through innovation, but which are not currently possible to model accurately in economic terms.

6.3 This financial modelling was undertaken in 2020, and it is acknowledged that some of it is now outdated, due to a better understanding of the costs required to retrofit the public sector estate and increases in costs in the supply chain.

[11] https://www.globalcovenantofmayors.org/

6.4 The UK Government estimates that decarbonising UK public buildings would cost between £25 and £30 billion, however local figures suggest this is underestimated. High-level cost estimates indicate that the cost to retrofit the Council's entire operational estate would be around £2 billion.[12]

6.5 Research shows that the cost of inaction for the economy and the society far outweighs the cost of taking action now.[13,14] The Council is working to better understand the cost of inaction locally and some costing for adaptation has been done as part of the Climate Change Risk Assessment which will be presented to elected members at the end of November (see separate Climate change adaptation update report).

7. Stakeholder/Community Impact

7.1 While the financial challenges in achieving net zero emissions will be significant, investing in carbon reduction projects often results in wider co-benefits such as the creation of local jobs, improved air quality and public health, or reduced congestion.

8. Background reading/external references

8.1 City Target monitoring approach

8.2 City Net Zero Target annual report (2019/20)

8.3 Public Bodies Climate Change Duties Report 2020/21

8.4 Edinburgh CDP return

9. Appendices

9.1 Appendix 1 - City-wide carbon footprint boundary.

9.2 Appendix 2 - List of emissions not covered by the net-zero boundary.

9.3 Appendix 3 - Datasets for the calculation of the City's net zero boundary.

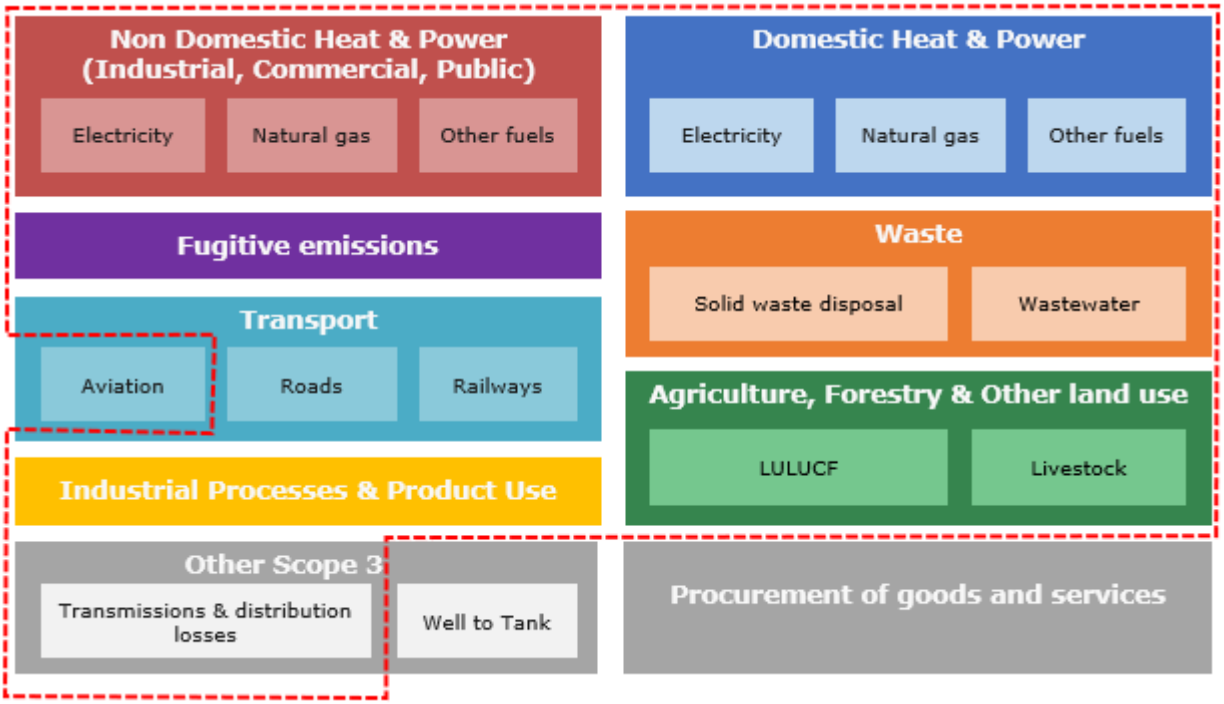
9.4 Appendix 4 – Evolution of transport and energy-related emissions.

[12] This figure has been estimated by extrapolating initial desktop deep retrofit studies on a small sample of buildings. Such a deep retrofit represents a much higher investment but minimizes increases in energy costs and improves comfort levels. Moreover, Edinburgh electricity network is currently at or near capacity therefore reducing energy demand will reduce the need for costly network upgrades. These costs are high-level figures (with 45 % optimism bias), do not account for changes in operating costs after retrofit, anticipated increases in gas and electricity rates, unavoidable decant costs, or the Council's existing budget that is already ring-fenced for investment.

[13] The UK National Audit Office estimates that for every £1 spent on protecting communities from flooding, around £5 in property damages and wider impacts can be avoided. National Flood and Coastal Erosion Risk Management Strategy for England, Environment Agency, 2020

[14] The failure demand costs for various levels of government due to the effects of global warming in Scotland can be estimated at £771 million and £956 million due to air pollution per year. Wellbeing Economy Alliance, "Failure Demand: Counting the costs of an unjust and unsustainable economic system", Mark Anielski, Anna Chrysopoulou and Michael Weatherhead, Sept 2021

Appendix 1 - City-wide carbon footprint boundary



Appendix 2 - List of emissions not covered by the net-zero boundary

Emission source	Rationale
Well-to-tank (WTT)	Well-to-tank emissions are fuel lifecycle emissions, occurring "upstream" from the point of use of the fuel. They result from the extraction, transport, refining, purification or conversion of primary fuels to fuels for direct use by end-users and the distribution of these fuels. They are classed as Scope 3 according to the GHG Protocol. They are considered as out of the net-zero boundary because the latter focusses on territorial emissions and covers Scope 1 emissions (direct emissions occurring within the boundary) and Scope 2 emissions (indirect electricity-related emissions). It also includes some Scope 3 emissions from transmission and distribution losses in the electricity network.
Water supply	The majority of energy consumption for the water network are covered under the stationary energy > non-domestic category, and Scottish Water's transport-related emissions are included in the Transport category. Process emissions from wastewater treatment are included under the wastewater category.
Aviation	The net zero boundary focusses on Scope 1 and 2 emissions only. Aviation emissions include Scope 3 emissions which occur outside of the territorial boundary and are therefore excluded from the baseline. Scope 3 emissions are not under the direct control or influence of the City. However, it is recognised that aviation emissions are significant and that they should be tackled. The Council's "Protocol for long distance UK travel" establishes rail over air as the Council's preferred choice for UK travel on Council business and the 2030 Climate Strategy includes actions to support transport behaviour change, including reducing flying.
Procurement – Consumption of goods and services	Consumption-related emissions consider the carbon impact (manufacture and transport) of all the goods purchased in the city, even if those were manufactured outside of the city. The Council is following a "production-based" approach to calculate the City's carbon footprint, meaning that the scope is focussing on territorial emissions, including from goods that will be exported. The calculation of consumption-related emissions is very complex and there is no standard methodology at the moment. Consumption-based emissions do not have to be reported officially by any country. However, it is acknowledged that these emissions are very significant and that they should still be addressed. Although consumption-based emissions are not included in the net zero boundary, they are still being covered by the Sustainability Programme and the 2030 Climate Strategy includes actions to help tackle these emissions.

Appendix 3 - Datasets for the calculation of the City's net zero boundary

Figures are based on the following publicly available datasets:

- Sub-national electricity sales and numbers of customers, BEIS
- Sub-national gas sales and numbers of customers, BEIS
- Sub-national estimates of non-gas, non-electricity and non-road transport fuels, BEIS
- Road transport energy consumption at regional and local authority level, BEIS
- Household and business waste tables, SEPA
- Scottish Water carbon footprint (published in their annual report)
- Local authority area statistics database, Scottish Government
- Number of livestock by region and sub-region, Scottish Government
- UK local authority and regional CO2 emissions national statistics, BEIS
- Greenhouse Gas Inventories for England, Scotland, Wales & Northern Ireland, NAEI
- Projected Population of Scotland, NRS Scotland

Appendix 4 – Evolution of emissions from energy and transport

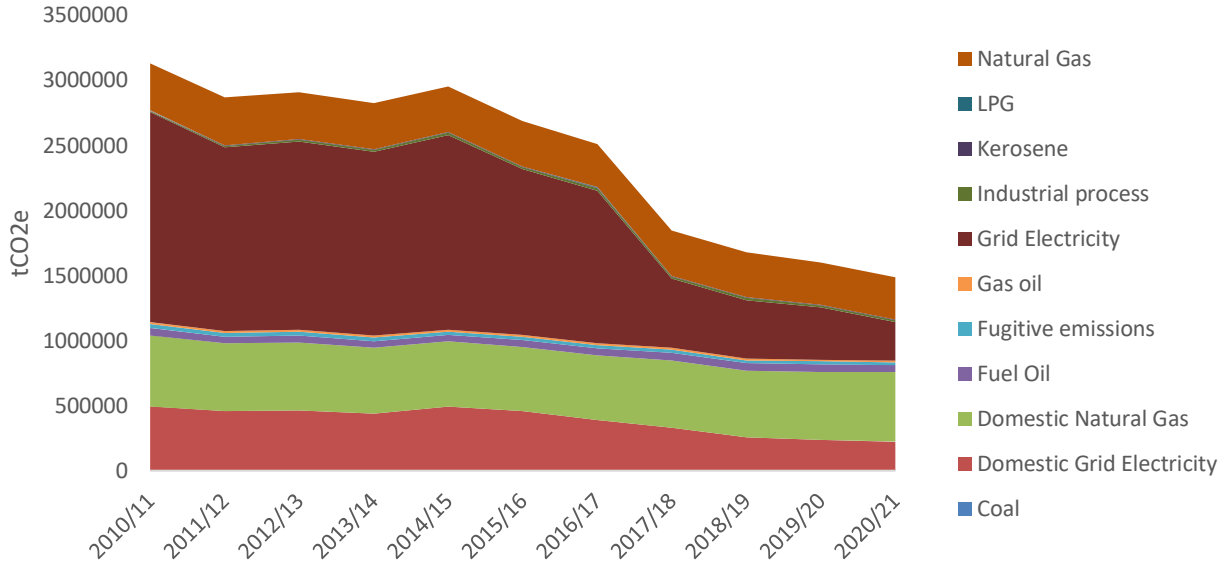


Figure 4: Evolution of energy-related emissions

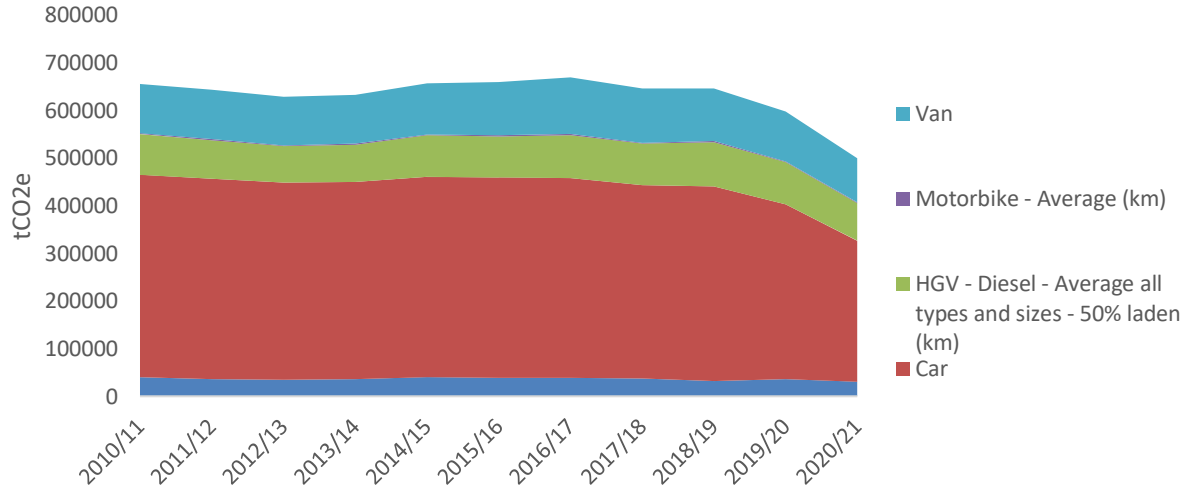


Figure 5: Evolution of transport emissions

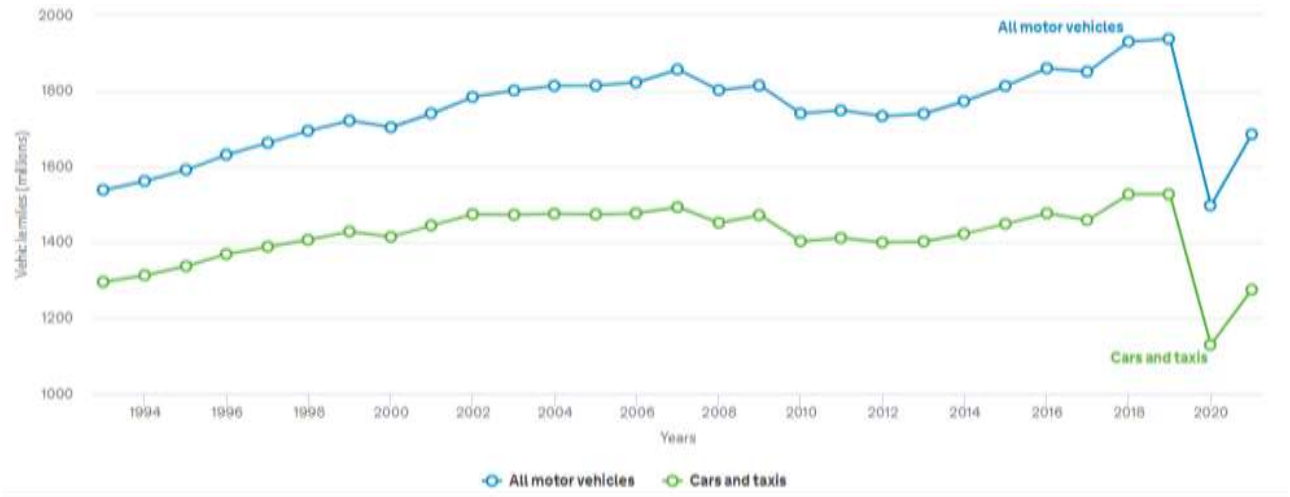


Figure 6: Annual traffic by vehicle type in City of Edinburgh, from 1993 to 2021 in vehicle miles (millions). Source: Road traffic statistics (Department for Transport)

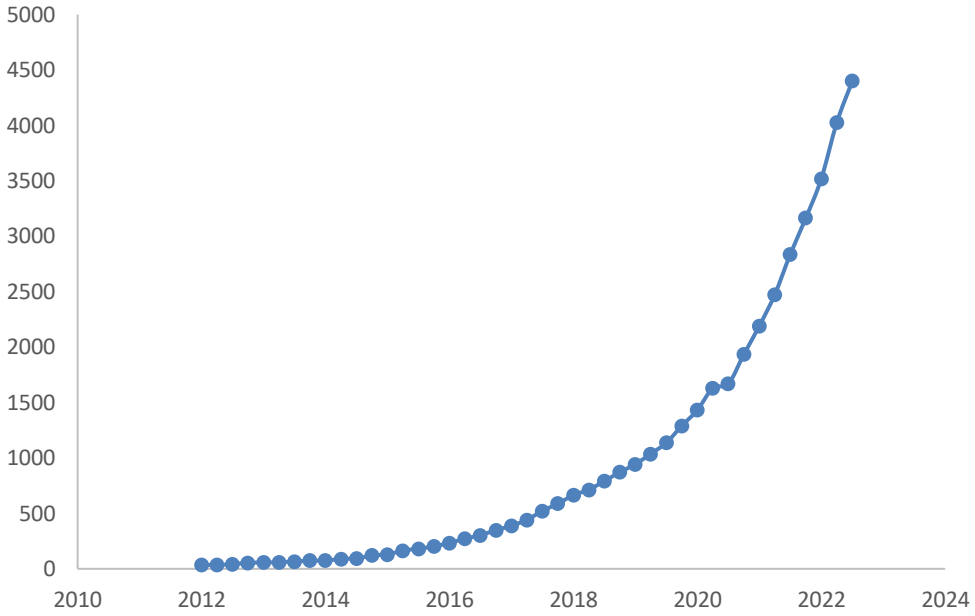


Figure 7: Evolution of ULEV licensed in Edinburgh (Department for Transport Statistics, Q2 2022)