

# Carbon Assessment of the Scottish Budget 2023-24

# High Level Carbon Assessment of the 2023-24 Budget

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## 1. Introduction

1. This assessment is based on the expenditure data presented in the 2023-24 Budget and fulfils the statutory requirement under Section 94 of the Climate Change (Scotland) Act 2009 to report upon the emissions impact of expenditure proposals.
2. It provides a limited overview of emissions and does not, for example, provide any indication as to the consequential impact of specific policies. As a result, policies and expenditure which have emissions reducing lifetime impacts may appear in this assessment as generating emissions due to short run impacts. Care should therefore be taken in interpreting this assessment. For example, the construction of a cycleway may generate emissions in construction which would be reflected here, but a reduction in emissions from modal shift would not.
3. This assessment is presented in the backdrop of the ongoing work driven by the Scottish Government and Parliament's Joint Budget Review in relation to incorporating Climate Change in budget decisions as well as Advice from the Committee on Climate Change on the scale of transformation needed to achieve future targets.

### 1.1. Scope of Assessment

4. The assessment of the Budget captures the emissions associated with the Scottish Government's purchase of goods and services. It is a consumption-based measure that covers direct emissions (e.g. the production of gravel for roads constructed by the Government or generation of electricity used by Government) and also any imported emissions that are generated in producing the direct and indirect goods and services that the Government purchases.
5. The assessment does not take account of 'second-round' emissions. While we do include emission impacts associated with Government spend and its supply chain, we do not count the emissions or savings associated with all of the outcomes arising from this spending. For example, while the Carbon Assessment could include an estimate of the carbon associated with the cost of constructing a road, the carbon associated with the subsequent use of the road is not included.
6. The Scottish Government uses a range of other tools, during the policy development stage, to quantify emissions impacts over the policy/project lifetime. These tools include Strategic Environmental Assessments. The Environmental Assessment (Scotland) Act 2005 requires that every qualifying public plan, programme and strategy is considered for its likely environmental effects and, where likely to be significant, opportunities to avoid adverse impacts are sought and positive ones enhanced. Results are published in the Environmental Reports within the Strategic Environmental Assessment database: [Environmental assessment: Strategic Environmental Assessment \(SEA\) - gov.scot \(www.gov.scot\)](https://www.gov.scot/policies/environmental-assessment/strategic-environmental-assessment-sea)<sup>1</sup>

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<sup>1</sup> <https://www.gov.scot/policies/environmental-assessment/strategic-environmental-assessment-sea/>

7. Further tools include Environmental Statements, which are required to assess the environmental effects of certain public and private projects under the Roads (Scotland) Act 1984 (Environmental Impact Assessment) Regulations 2017, which update the requirements in the Roads (Scotland) Act 1984. The Carbon Account for Transport also provides a balance sheet for Scotland's greenhouse gas emissions, and the expected emissions impacts of major transport infrastructure projects and regulatory measures. The latest Transport Carbon Account is available at the following link: [Carbon Account for Transport - No. 12: 2020 Edition<sup>2</sup>](#)
8. The combined effect of Scottish Government policies to reduce emissions over the period to 2032 is set out in the Climate Change Plan update, published in December 2020. This is due to be updated in the draft Climate Change Plan which will be laid in Parliament by the end of 2023.
9. Although the methodology underpinning the Carbon Assessment of the Budget remains the same as for the Carbon Assessment of the 2022-23 Budget, the base year of Environmental Input-Output (EIO) model itself has been updated from 2017 to 2018. This is possible because of the newly available input-output analytical tables covering the year 2018 for Scotland and the UK. As usual the model has also been updated to use the latest available Greenhouse Gas emissions ratios and HM Treasury deflators. More information about these changes and their effects on the overall GHG estimates can be found in Annex A.

## 1.2. Key Results

10. The conclusions below are made in the context of the limitations of the assessment process. The Scottish Government have publicly acknowledged the current process of carbon assessment has limited value in allowing meaningful scrutiny of the Budget or in supporting the alignment of spending choices with our climate ambitions. These limitations are being addressed through a Scottish Government and Parliament Joint Budget Review on matters climate change matters.
11. In the meantime this assessment should be read alongside the Climate Change Assessment of the Budget (annex G of the Budget) which sets out increased investment in low carbon activity and a shift in balance from high carbon to low carbon investment
12. Following the approach set out in section 1.1, it is estimated that total emissions attributed to the 2023-24 Budget amount to 8.8 million tonnes carbon dioxide equivalent (MtCO<sub>2</sub>e).
13. This has increased slightly from 8.6 Mt when applying the updated Environmental Input-Output model to last year's 2022-23 Budget. This is in line with the change in published budgeted spend, with a very slight reduction in emissions per pound spent. Once changes in the level of spend are taken into account, emissions are broadly stable.

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<sup>2</sup> <https://www.transport.gov.scot/publication/carbon-account-for-transport-no-12-2020-edition/>

14. Details on the various sources of emissions show that some 26 per cent of the Scottish Government's carbon footprint is caused by the use of Energy, Water and Waste, followed by Manufacturing (20 per cent) and Agriculture, Forestry and Fishing (18 per cent).
15. It is estimated that total emissions attributed to capital investment plans of £6.4 billion of investment in 2023-24 amount to 1.0 MtCO<sub>2</sub>e. Note that these are the emissions associated with putting the capital investment in place and not their long term use. Emissions associated with resource spend amount to 7.8 MtCO<sub>2</sub>e.

### 1.3. Budget Context

16. Budget for 2023-24 contains details of Total Managed Expenditure (TME) of £59.8 billion across portfolio areas. Expenditure is split between resources and capital expenditure, and Annually Managed Expenditure (AME). This is illustrated in Table 1.

### Summary

It is estimated that total emissions resulting from the 2023-24 Budget will be 8.8 Mt CO<sub>2</sub>-equivalent.

This has increased slightly from 8.6 Mt when applying the updated Environmental Input-Output model to last year's 2022-23 Budget. This is in line with the change in published budgeted spend, with a very slight reduction in emissions per pound spent.

Emissions remain broadly proportional to spend, except for Rural Affairs and Islands, where emissions per unit of spend are higher.

'Second-round' emissions that may result from Government spending and the *use* of public goods and services, whether beneficial in terms of reducing emissions (e.g. spending on energy efficiency or afforestation) or negative in terms of increasing emissions (e.g. road use) are not captured. The separate Climate Change Assessment annex of the Budget sets out increased investment in low carbon activity and a switch in balance from high carbon to low carbon investment.

**Table 1: Total proposed budget for 2023-24**

	Resource	Ring-fenced	Capital	Financial Transactions	Total	UK Funded AME	Total
	£m	£m	£m	£m	£m	£m	£m
<b>2023-24 Budget</b>							
Health and Social Care	18,176	301	578	5	19,061	100	19,161
Social Justice, Housing & Local Government	13,765	67	1,333	85	15,250	3,047	18,297
Finance and Economy	595	50	577	258	1,480	6,921	8,401
Education and Skills	3,059	194	551	15	3,820	421	4,241
Justice and Veterans	3,006	156	203	0	3,366	0	3,366
Net Zero, Energy and Transport Portfolio	1,795	197	2,596	61	4,648	0	4,648
Rural Affairs and Islands	889	11	65	0	965	0	965
Constitution, External Affairs & Culture	304	17	26	0	347	0	347
Deputy First Minister and Covid Recovery	45	0	0	0	45	0	45
Crown Office and Procurator Fiscal Service	182	7	8	0	197	0	197
<b>Scottish Government</b>	<b>41,816</b>	<b>1,000</b>	<b>5,938</b>	<b>424</b>	<b>49,178</b>	<b>10,489</b>	<b>59,667</b>
Scottish Parliament and Audit Scotland	128	15	1	0	144	2	146
<b>Total Scotland</b>	<b>41,944</b>	<b>1,015</b>	<b>5,939</b>	<b>424</b>	<b>49,322</b>	<b>10,491</b>	<b>59,813</b>

**Table 2: Portfolio expenditure<sup>3</sup> (TME excluding non-cash items) and emissions**

Portfolio	Spend £m	Estimated GHG emissions (thousands of tonnes of CO <sub>2</sub> equivalent)			
		Domestic		Imported	Total
		Direct	Indirect		
Health and Social Care	£18,759	374.9	484.2	983.6	<b>1,842.7</b>
Social Justice, Housing & Local Government	£17,525	977.6	539.3	1,602.9	<b>3,119.8</b>
Finance and Economy	£8,351	25.8	156.5	386.8	<b>569.1</b>
Education and Skills	£4,782	92.9	96.1	304.4	<b>493.3</b>
Justice and Veterans	£3,287	71.5	86.2	184.0	<b>341.6</b>
Net Zero, Energy and Transport Portfolio	£4,402	449.6	115.9	586.5	<b>1,152.0</b>
Rural Affairs and Islands	£955	896.2	140.0	198.9	<b>1,235.1</b>
Constitution, External Affairs & Culture	£330	4.3	13.9	18.1	<b>36.2</b>
Deputy First Minister and Covid Recovery	£45	1.1	1.2	2.5	<b>4.7</b>
Crown Office and Procurator Fiscal Service	£190	4.4	5.2	10.9	<b>20.5</b>
Scottish Parliament and Audit Scotland	£129	3.3	3.2	9.5	<b>16.0</b>
<b>Total</b>	<b>£58,755</b>	<b>2,901.5</b>	<b>1,641.6</b>	<b>4,288.0</b>	<b>8,831.1</b>

<sup>3</sup> Non-cash items are excluded from the assessment where they do not lead to extra demand for goods and services. Because these items are excluded, the Budget total shown here is lower than that in the Budget itself, and lower than in Table 1.

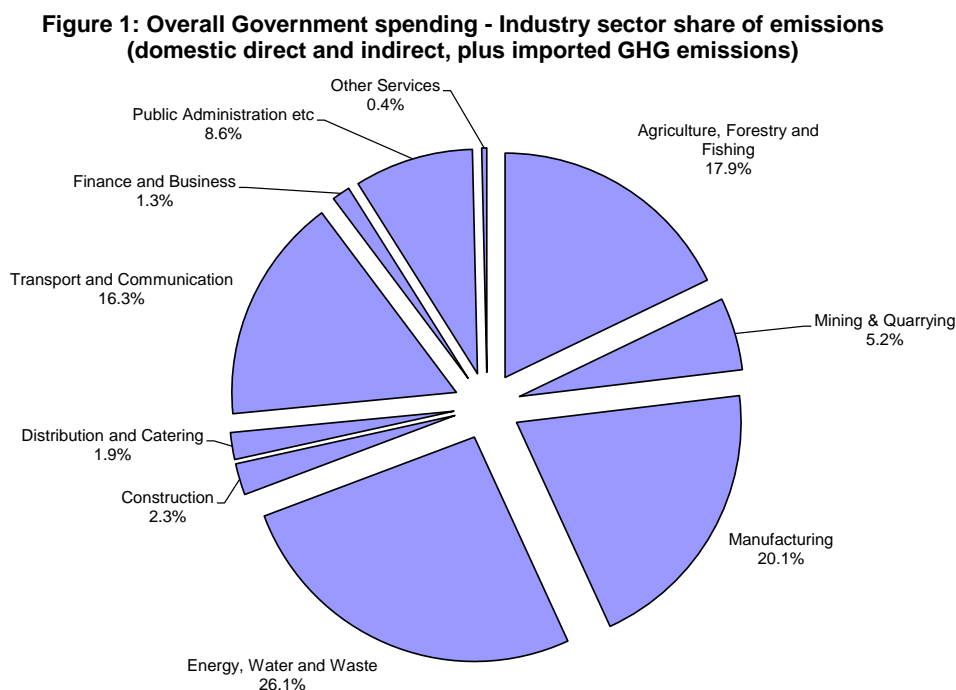
## 2. High-level Carbon Assessment of 2023-24 Budget

### 2.1. Portfolio Expenditure and Associated Emissions

17. Total estimated emissions attributable to the 2023-24 Budget are 8.8 Mt CO<sub>2</sub>-equivalent. Table 2 shows overall spend and emissions by the individual portfolios and how these emissions arise. Emissions remain broadly proportional to spend, except for Rural Affairs and Islands, where emissions per unit of spend are slightly higher. Social Justice, Housing and Local Government, as well as Health and Social Care are the largest Budget items, with the highest emissions.
18. Expenditure is shown net of income, in line with the Budget, and emissions are calculated on that basis.<sup>4</sup>
19. Direct emissions account for 33 per cent of the total; indirect emissions for a further 19 per cent. Around 48 per cent of emissions attributable to Budget expenditure are generated outside Scotland and are embedded in imported goods and services.

### 2.2. Emissions by Industry Source

20. Total emissions broken down by industry are shown in Figure 1. Some 26 per cent of the Scottish Government's carbon footprint is caused by the use of Energy, Water and Waste, followed by Manufacturing (20 per cent) and Agriculture, Forestry and Fishing (18 per cent).



<sup>4</sup> See the accompanying document "Annex B – Level 3 details" for more details.



### **2.3. Domestic and Imported Emissions**

21. In addition to direct and indirect domestic emissions, the assessment takes into account the emissions generated outside of Scotland in the production of imported goods purchased as a result of Government spending (e.g. food, machinery, IT equipment).
22. Figure 2c demonstrates that imported emissions make up around a half of emissions from Budget spend. There is however a difference between the sources of domestic and imported emissions. Expenditure on Energy, Water and Waste accounts for the largest share of domestic emissions (followed by Agriculture, Forestry and Fishing), while expenditure on Manufacturing generates the largest share of imported emissions (followed by Energy, Water and Waste).

## Figure 2: Domestic and Imported Emissions - All portfolios

Figure 2a: Domestic emissions by industrial sector

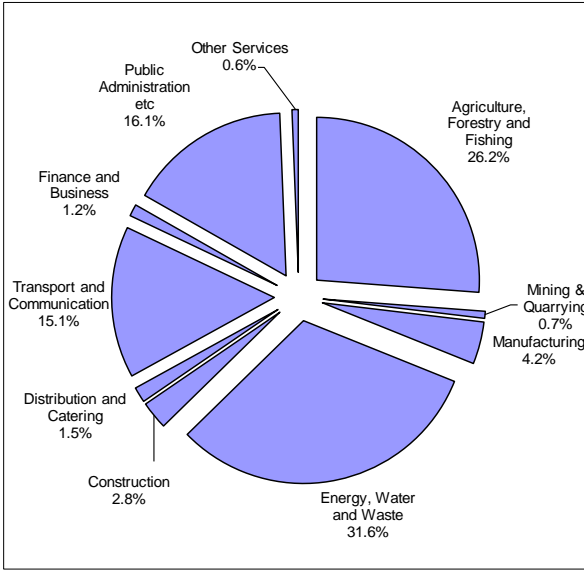


Figure 2b: Imported emissions by industrial sector

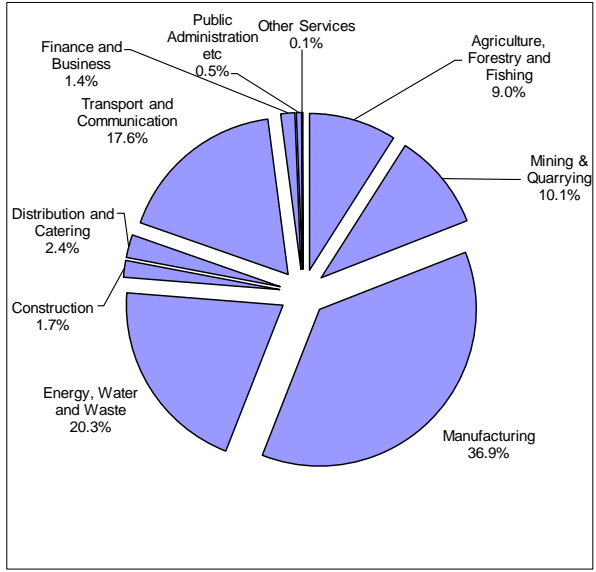


Figure 2c: Domestic and imported emissions, thousands of tonnes of CO<sub>2</sub> equivalent and percent

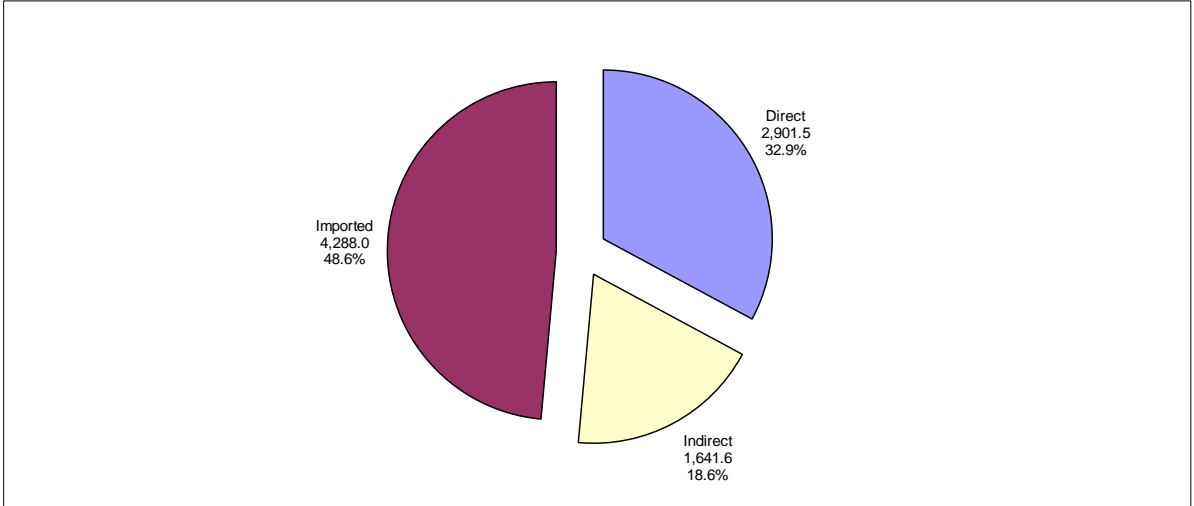
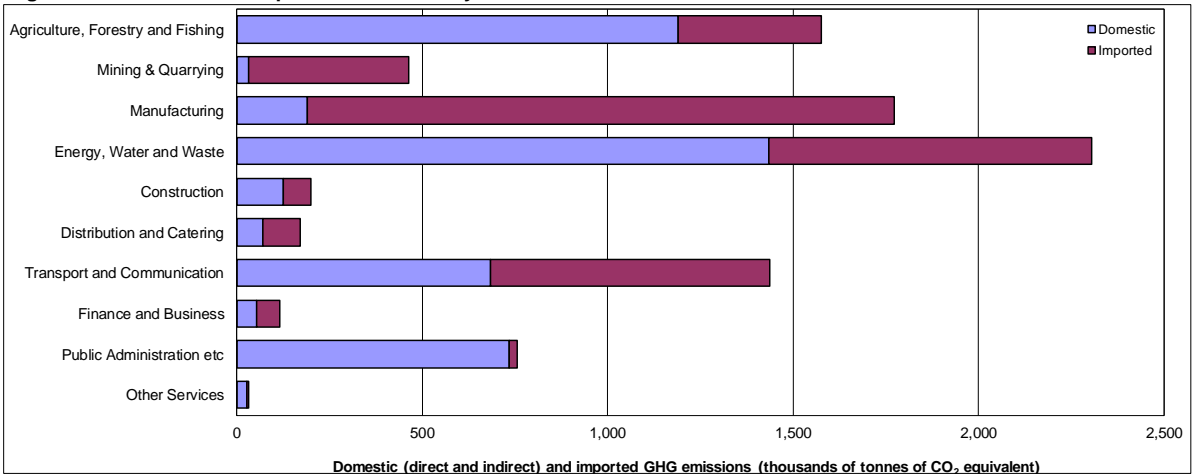


Figure 2d: Domestic and imported emissions by industrial sector



## Annex A – Methodology

1. The figures presented in this report are estimated using the Scottish Government Environmental Input-Output Model (EIO) 2018.
2. The EIO is constructed using the Scottish Government Input-Output Tables 2018 (taken from the 1998-2019 Tables published in October 2022), ONS United Kingdom Analytical Input-Output Tables, 2018 (Blue Book 2021), ONS Environmental Accounts, Atmospheric emissions: greenhouse gases by industry and gas, 2018 (Published November 2022) and HM Treasury GDP Deflators as at 17 November 2022.
3. A fuller description of the model and its associated Greenhouse Gas effects estimates that this assessment is based upon can be found at: <https://www.gov.scot/publications/about-supply-use-input-output-tables/pages/environmental-input-output/>

### Revisions to the Environmental Input-Output Model

1. With the release of new Input-Output Analytical Tables covering the year 2018 for Scotland and the UK, this year the base year of the EIO model has been updated from 2017 to 2018. This has involved several changes to the model:
  - The updating of the underlying Scottish Input-Output model and UK closed economy Input-Output model from the 2017 version to the latest published version for 2018.
  - The updating of the year used to calculate emissions factors from 2017 to 2018.alongside the regular annual updates of:
  - Updating the emissions data from ONS environmental accounts to the latest published version.
  - Updating the forecast GDP deflator used to project estimates to the budget year to the latest version published by HM Treasury.
2. During preparation of the 2023-24 HLCA, an error was identified in the processing of Gross Fixed Capital Formation (GFCF) data affecting the 2022-23 HLCA estimates. The error caused some capital spending to be attributed to incorrect industries, leading to an overestimation of emissions. Correcting this error in the 2022-23 model reduced the total emissions estimate from the published 9.9 MtCO<sub>2</sub>e to 9.4 MtCO<sub>2</sub>e, a reduction of 5.6%.
3. Once corrected, updating to the latest version of the model with the regular changes listed in the bullets above leads to a downward revision to estimated greenhouse gas emissions arising from the 2022-23 budget of around 8% compared to results from the corrected old model.
4. Around half of the downward revision versus the corrected old model arises from the updating of the underlying input-output tables, with the remainder of the revision split between the updates to the HMT deflators and the GHG industry emissions ratios.

5. Care should be taken when interpreting the revision to imported GHGs. Given the lack of a world economy model and emissions factors, the EIO model uses the UK economy as a proxy for the world economy. Changes in emissions intensities in the UK economy may not be representative of changes in the world economy, for example due to different technologies being used, or if more carbon intensive activities move overseas and are replaced by imports.



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