SCOTTISH WATER

Water Industry Commission for Scotland (WICS) ANNUAL RETURN 2024/25

Section C – Carbon Emissions and Net Zero

Contents

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1 Table C0 – Summary

1.1 Overview

Scottish Water has been reporting its annual operational Carbon Footprint (CFP) within its annual reports and sustainability reports since 2006-07, and directly to the Scottish Government since 2014 in line with obligations on public bodies under Scotland's Climate Change Act. The data have been included in the Annual Return since AR22.

The operational CFP reports the greenhouse gas emissions associated with the day-to-day delivery of water and wastewater services. This includes regulated services delivered on Scottish Water's behalf through the PFI concessions.

Carbon is expressed as "tonnes Carbon Dioxide equivalents" (tCO2e), which includes non- CO2 emissions (e.g. methane and nitrous oxide from wastewater treatment). The information in the tables provides a detailed breakdown of our operational carbon emission data and renewable energy generation.

With respect to emissions on Scottish Water's landholdings, AR22 reported the breakdown of the types of landholdings owned by Scottish Water and noted that work was ongoing to finalise the baseline carbon inventory. In AR23 we reported the carbon associated with the landholdings, due to the completion of initial baseline work during this period. In line with our continued improvement in this area, in AR25 we report the updated land carbon inventory that has been prepared by the James Hutton Institute using our survey data to inform the carbon inventory.

Key changes to note are the improved understanding of woodland and peatland areas, condition and extent, and an adjustment to some of the emission factors to reflect updates to standards such as the Peatland Code. In some cases field data from our survey work has been used where the James Hutton Institute agrees it can replace top down national data sets and general assumptions used previously. This has seen a significant reduction in peatland losses of carbon, but also a smaller amount of carbon capture in woodland as some areas have been reduced in size based on new data.

Due to continued developments in carbon reporting, in AR25 we see a change to the lines in the C0 table. In AR25 we no longer report 'Emissions embodied in the asset base' (previously **Lines C0.10-C0.13**). This is replaced by 'Carbon emissions from the capital investment programme' (Line **C0.10**). This reflects that we no longer report a high and low estimate of intensity of investment, instead reporting carbon intensity as a single figure informed by actual reported carbon of capital projects. This change is reflected in Table C2, where it is explained in further detail.

There is also a new line titled 'Net Zero Emissions' (**Line C0.11**). This is our overall net emissions, a sum of net operational emissions and capital carbon emissions.

Tables C2, C3 and C4 have been audited by Binnies. Table C1 was audited by Achilles in line with ISO14064, as described in the commentary for Table C1.

1.2 Performance Trends

1.2.1 Lines C0.1-C0.4 – Operational Emissions

These lines refer to information detailed in C1 tables.

C0.1 Net operational emissions in previous year (opening)
Reported as 224,978 tCO2e, taken from AR25 tables **Line C1.29.**

C0.2 Change in Scope 1 to 3 emissions in the report year
Reported as -4,495 tCO2e. All elements associated with operational emissions are detailed in **Lines C1.1-C1.29**. Changes for each scope are detailed in the memo **Lines C1.37-C1.39**.

C0.3 Change in renewable electricity generated and exported in the year
Reported as -49 tCO2e, as calculated from **Lines C1.41-C1.43.** Whilst this change is less significant than in AR24 (-250 tCO2e)**,** we report our highest volume of generated electricity from our renewable schemes to date in AR25, the majority of which is consumed on site rather than exported, detailed in **Line C1.42**.

C0.4 Net operational emissions in reporting year (closing)

Reported as 220,434 tCO2e, as presented in **Line C1.29**. This is a 2% decrease from AR24. The main source of this fall is the reduction in consumption of grid electricity leading to a notable decrease in our Scope 2 emissions, with small increases to Scope 1 and 3 emissions. Further trends are detailed in C1 commentary.

Net operational emissions refer to emissions arising from the day-to-day operation of Scottish Water and includes emissions from the regulated water and wastewater operations, including Private Finance Initiatives (PFI), but not from the wider Scottish Water Group. Emissions sources include direct emissions from burning of fossil fuels on sites and in vehicles (scope 1), direct emissions in the form of nitrous oxide and methane from wastewater and sludge treatment (scope 1), indirect emissions from consumption of grid electricity (scope 2), indirect emissions from outsourced activities and business travel (scope 3). The term “net emissions” refers to the netting off of emissions from exports of renewable electricity to the grid. Emissions are calculated and reported using the Carbon Accounting Workbook (CAW) Version 19, a standard tool for the UK Water Industry. Lines C1.5 to C1.8 split out the tCO2e into each of the main greenhouse gases (GHG): carbon dioxide (CO2), methane (CH4), and nitrous oxide (N2O). The table is split according to “emissions scopes” in line with Global GHG reporting protocols (see descriptions in Section 2.2, Performance Trends, below). The Global Warming Potential (GWP) accounts for the different potential each GHG has for global warming. Carbon dioxide is given a GWP of 1 and all other gases are compared against this. This metric allows for the comparison of the impacts of different gases on global warming and is essential for calculating the carbon dioxide equivalent (tCO2e) of emissions. The Global Warming Potential (GWP) of gases has not changed since the last Carbon Accounting Workbook (CAWv19), allowing for direct comparison between AR25 and AR24 data. In AR25, there are two main changes compared to AR24. Firstly, the net operational Carbon Footprint (CFP) reported by Scottish Water for water and wastewater services in AR25 is 220,434 tCO2e reported in **Line C1.29**, which represents a decrease of 2% from the AR24 figure.Within the Annual Performance and Prospects report the CFP is rounded to 220,000 tCO2e. This reduction is primarily driven by a decrease in Scope 2 emissions, particularly from purchased electricity, which saw a reduction of 5.92%. The greenhouse gas intensity of grid electricity is slightly higher than in AR24 meaning that the decrease in Scope 2 emissions can be attributed to a decrease in consumption of electricity. Secondly, there has been a small increase in direct emissions from burning fossil fuels (scope 1), rising from 4,305 tCO2e in AR24 to 4,937 tCO2e in AR25. This increase is attributed to the need for diesel generators during Storm Eowyn, which impacted grid electricity supplies. The process and fugitive emissions show a broadly stable position, with a slight decrease from 23,974 tCO2e in AR24 to 23,813.17 tCO2e in AR25.

1.2.2 Lines C0.5-C0.7 Emissions from landholdings

As described in previous Annual Returns, the initial baseline carbon inventory was carried out by the James Hutton Institute (JHI) using national data sets and methods as outlined in Section 1.3 below, alongside survey data to better inform the dataset where possible. The land inventory is updated 3 yearly, and in between we report updated numbers adjusted by the findings of peatland condition surveys (outlined in the commentary for **Line C4.6**) or other forms of survey. These changes are then subsumed into the formal 3-yearly update at the appropriate time. The first 3-yearly update to the baseline inventory was completed to inform AR25.

This remains an uncertain and developing area. It is important to note that the numbers reported in the Annual Return are the mid-point of a range of land-based carbon capture/ emissions. The range reflects the level of uncertainty around land-based emissions and will improve as we gather greater understanding of our land.

In AR25 we report that Scottish Water's landholdings are sequestering -350 tCO2e per annum. In AR24 we reported -5,844 tCO2e per annum. The changes to Table C4 figures in AR25 reflect the the JHI update to the land inventory as anticipated in AR24. There has been a significant reduction in emissions from peatland as survey information and restoration work has been considered by JHI. However we have also had to remove an area of woodland from the assessment as the carbon benefits are currently accounted for by a third party. One of the key principles we apply is that we seek to avoid double counting benefits hence we have excluded this from our reporting at this time. This is explained in further detail in Table C4.

We suggest adding a further line to the Annual Return in future to report "total land carbon" which would include areas we are at present not able to use within our net zero emissions goal, but which remain part of our landbank.

1.2.3 Lines C0.8-C0.9 Net operational emissions net of insetting and offsetting (opening & closing)

These are the net positions, calculated from the net operational emissions and the landholding emissions for the opening and closing position lines in the C0 Table.

The outturn position in AR25 is that the net operational emissions (net of insetting and offsetting from the landbank) is 220,084 tCO2e.

1.2.4 Line C0.10 Carbon emissions from the capital investment programme

As described in Section 1.1, this is a new line for AR25. This is reported for the first time as a single figure representing our current actual reported capital carbon value. For this reason, we do not have a value available to compare with AR24. The AR25 value is pulled forward from **Line C2.3,** where the calculation is explained in greater detail. The data reported comes from our automated Capital Carbon dashboard, which pulls together the data from nearly 12,000 projects, which has allowed us to improve accuracy and reduce time in the production of reports.

Scottish Water has continued developing tools that enable understanding and accounting for carbon within the current investment programme. The key focus in AR25 has been on the development of the carbon module for our cost estimating system, which we aim implement during 2025/26. These tools draw from UK water industry guidance and adopt known carbon factors for materials from standard sources such as the Bath University/Institution of Civil Engineers embodied carbon database.

The tools have enabled Scottish Water to understand the current carbon intensity of investment, and to identify major sources of emissions within the capital programme. These tools have been adopted by our supply chain and enabled the identification of opportunities to reduce carbon intensity.

This remains a developing area and we continue to improve the tools we use and their coverage within the programme, but we have already seen positive moves towards adopting lower carbon solutions such as low carbon concrete and steel, offsite fabrication, the adoption of sustainable fuels and nature-based solutions.

1.2.5 C0.11 Net Zero Emissions

As described in Section 1.1, this is a new line for AR25. For this reason, we do not have a value available to compare with AR24. This is our overall net emissions, a sum of net operational emissions and capital carbon emissions, and for AR25 is reported as 325,480 tCO2e.

1.3 Investment

Emissions management is supported by a range of activities carried out across the business. Much is not directly connected to management approaches or specific investment needs for carbon but is delivered through changes in operational or investment delivery practices. For example - investment in data and systems such as the development of reporting for electric vehicles or creating embodied emissions functionality within costing systems. Similarly, promoting greener measures within capital investment projects (adoption of low emission fuels or use of low emission materials) would be integrated within projects.

1.4 Data

Greenhouse gas emission and energy data are reported for operational activities, capital investment and land-based emissions. Of these, electricity use and generation have the greatest level of confidence at A2, reflecting corporate energy data and billing systems. Operational emissions are C4 reflecting the wider range of data sources and methods of calculation, along with uncertainty in areas such as modelled process emissions.

Capital Investment emissions has a confidence grade of B4 an improvement on AR24 reflecting our move to an automated corporate tool, and the size of the data set.

Land based emissions are assigned C5, which reflects that the landholdings data are based on corporate GIS and national data sets to which assumptions and models are applied to assess greenhouse gas emissions/capture.

A full overview of the data sources, methodology, assumptions, and confidence grades is covered in the Commentary for Tables C1 to C4.

See the corresponding table commentary for details of data improvement programmes.

2 Table C1 – Operational emissions

2.1 Overview

All figures within this table refer to the measurement of the annual operational Greenhouse Gas (GHG) emissions of the regulated business (Scottish Water operated sites, and PFI sites). Unless otherwise stated, it does not include emissions from the wider (non-regulated) Scottish Water Group. Emissions are reported in line with Global, UK, and Scottish reporting protocols and guidance, and calculated using UK Water Industry Research's Carbon Accounting Workbook (CAWv19) used by all UK water companies. This is updated annually to reflect the latest UK Government Department for Energy, Security and Net Zero (DESNZ) carbon conversion factors, boundaries, guidance, and methods. Prior to publication, Scottish Water's operational carbon footprint is audited externally by Achilles, carbon specialists, in accordance with ISO 14064-1.

Emissions are recorded as tonnes of carbon dioxide equivalent (tCO2e) to account for the different potential each GHG has for global warming. Lines C1.5 to C1.8 split out the tCO2e into each of the main GHGs: carbon dioxide (CO2), methane (CH4), and nitrous oxide (N2O). The table is split according to "emissions scopes" in line with Global GHG reporting protocols (see descriptions in Section 2.2, Performance Trends, below).

The Global Warming Potential (GWP) accounts for the different potential each GHG has for global warming. Carbon dioxide is given a GWP of 1 and all other gases are compared against this. This metric allows for the comparison of the impacts of different gases on global warming and is essential for calculating the carbon dioxide equivalent (tCO2e) of emissions.

The Global Warming Potential (GWP) of gases has not changed since the last Carbon Accounting Workbook (CAWv19), allowing for direct comparison between AR25 and AR24 data.

In AR25, there are two main changes compared to AR24. Firstly, the net operational Carbon Footprint (CFP) reported by Scottish Water for water and wastewater services in AR25 is 220,434 tCO2e reported in **Line C1.29**, which represents a decrease of 2% from the AR24 figure.Within the Annual Performance and Prospects report the CFP is rounded to 220,000 tCO2e. This reduction is primarily driven by a decrease in Scope 2 emissions, particularly from purchased electricity, which saw a reduction of 5.92%.

The greenhouse gas intensity of grid electricity is slightly higher than in AR24 meaning that the decrease in Scope 2 emissions can be attributed to a decrease in consumption of electricity.

Secondly, there has been a small increase in direct emissions from burning fossil fuels (scope 1), rising from 4,305 tCO2e in AR24 to 4,937 tCO2e in AR25. This increase is attributed to the need for diesel generators during Storm Eowyn, which impacted grid electricity supplies.

The process and fugitive emissions show a broadly stable position, with a slight decrease from 23,974 tCO2e in AR24 to 23,813.17 tCO2e in AR25.

2.2 Performance Trends

2.2.1 Lines C1.1-C1.8 Scope 1 Emissions

Scope 1 refers to emissions arising directly from the burning of fossil fuels or other direct release of GHGs such as CH4 or N2O.

Line C1.1 Direct emissions from burning fossil fuels (including CHP generated on site
This covers all activities that release emissions from fossil fuels in the course of delivering water and wastewater services, including natural gas used in heating, diesel and other fuels used in generators on site. This is reported as tCO2e and has increased from 4,305 tCO2e in AR24 to 4,937 in AR25.

These emissions can vary depending on operational practices and in-year demands (e.g. standby generator use). While natural gas use has fallen, diesel and kerosene use has increased. January 2025 saw the need for 112 wastewater treatment works (WwTW) to be powered by diesel generators. This was for resilience purposes during Storm Eowyn that impacted grid electricity supplies. This has driven the increase in overall direct emissions from burning fossil fuels.

As part of an initiative to transition standby generators from diesel to Hydrotreated Vegetable Oil (HVO) (with an emission factor 90% lower than fossil fuels), HVO usage has increased. This shift helped avoid diesel emissions equivalent to 212 tCO2e. The emissions factor used in these calculations is supplied by DESNZ for the AR table value.

Line C1.2 Process and fugitive emissions

The reported emissions for AR25 are 23,813 tCO2e, showing a decrease from 23,974 tCO2e in AR24. This represents a broadly stable position. These emissions consists of direct release of GHGs such as CH4 and N2O from the natural processes of wastewater and sludge management.

They are estimated based on the quantity of sludge processed and the PE of WwTWs using the agreed methodology set in the UK Water Sector's Carbon Accounting Workbook.

C1.3 Transport: company owned and leased vehicles

Reported as 11,261 tCO2e for AR25, with small decrease from the 11,541 tCO2e reported for AR24.

This includes emissions from Scottish Water-owned fleet and long-term leased vehicles. It does not include emissions from business travel in private vehicles, which is included under scope 3. Whilst the emissions in this category are proportional to fleet mileage and customer activity, the continued transition of the van fleet to electric vehicles will also lead to reductions in this line.

C1.4 Total scope 1 emissions

Reported as 40,011 tCO2e for AR25, increasing slightly from 39,820 tCO2e for AR24. This presents the total Scope 1 emissions (a sum of **Lines C1.1, C1.2 and C1.3**), which comprises all emissions released directly from Scottish Water assets (including vehicles). The increase in fuel use (**C1.1**) is balanced by the decrease in process emissions (**C1.2**) and transport emissions from company vehicles (**C1.3**). Please refer to items **C1.1 – C1.3** for detailed explanations.

2.2.1 Lines C1.1-C1.8 Scope 1 Emissions

Scope 1 refers to emissions arising directly from the burning of fossil fuels or other direct release of GHGs such as CH4 or N2O.

Line C1.1 Direct emissions from burning fossil fuels (including CHP generated on site

This covers all activities that release emissions from fossil fuels in the course of delivering water and wastewater services, including natural gas used in heating, diesel and other fuels used in generators on site. This is reported as tCO2e and has increased from 4,305 tCO2e in AR24 to 4,937 in AR25.

These emissions can vary depending on operational practices and in-year demands (e.g. standby generator use). While natural gas use has fallen, diesel and kerosene use has increased. January 2025 saw the need for 112 wastewater treatment works (WwTW) to be powered by diesel generators. This was for resilience purposes during Storm Eowyn that impacted grid electricity supplies. This has driven the increase in overall direct emissions from burning fossil fuels.

As part of an initiative to transition standby generators from diesel to Hydrotreated Vegetable Oil (HVO) (with an emission factor 90% lower than fossil fuels), HVO usage has increased. This shift helped avoid diesel emissions equivalent to 212 tCO2e. The emissions factor used in these calculations is supplied by DESNZ for the AR table value.

2.2.2 Lines C1.5-C1.8 break down Scope 1 emissions into their constituent GHGs – carbon dioxide (CO2), methane (CH4), nitrous oxide (N2O) and other GHGs

Nitrous oxide (N2O) from wastewater treatment is the largest contributor to Scope 1 emissions.

There is a discrepancy that cannot be reconciled between **Line C1.4** where total scope 1 emissions is 40,011 tCO2e and the sum of the constituent GHGs in **C1.5-C1.8** which totals as 40,005 tCO2e (as detailed in Table 1). This difference is mainly due to the UK Government DESNZ 2024 conversion factors (which are used in the CAWv19) not having a breakdown of emissions by GHG for Hydrogenated Vegetable Oils (HVOs), and so these emissions are only available in tCO2e, detailed in Table 2.

There is also a small discrepancy attributed to other DESNZ conversion factors - specifically the factors for different GHGs broken down by type (methane, nitrous oxide, carbon dioxide etc.) and how they add up to the CO2 equivalent. This is a factor in the methodology of the UK Water industry's Carbon Accounting Workbook that cannot be fully reconciled and impacts all UK Water companies that use the CAW to report their figures.

Table 1: Total Scope 1 Emissions – Discrepancy attributed to DESNZ conversion factors

	tCO2e
C1.4 Total scope 1 emissions	40, 011
Scope 1 emissions - CO2	15,992
Scope 1 emissions - CH4	5,962
Scope 1 emissions - N2O	18,048
Scope 1 emissions - other GHGs	3
Sum of C1.5-C1.8	40,005
Difference	6

Table 2: Items not included in constituent GHG breakdown

Items not included in constituent GHG (C1.5-C1.8)	**tCO2e**	**Comments**
HVO fuel consumption	3.05	The 2024 UK government DESNZ 2024 Emission factor does not provide a breakdown for constituent GHGs.
Refrigerant R410A	2.89	The 2024 UK government DESNZ 2024 Emission factor does not provide a breakdown for constituent GHGs.
TOTAL	5.94	

C 1.5 Scope 1 emissions – CO2

Reported as 15,992 tCO2e for AR25, increasing from 15,652 tCO2e for AR24. This is due to the increase in diesel and kerosene on operational sites, as explained in C1.1.

C1.6 Scope 1 emissions – CH4

Reported as 5,962 tCO2e for AR25, increasing from 4,676 tCO2e for AR24.

This largely comprises methane emissions from wastewater and sludge treatment processes. These emissions are calculated based on the volume of sludge treated and the PE of Scottish Water WwTWs. The increase of CH4 is mainly associated to an the increase in sludge treatment through the Cambi process (thermal hydrolysis) for recycling.

C1.7 Scope 1 emissions – N2O

Reported as 18,048 tCO2e for AR25, decreasing from 19,492 tCO2e for AR24. This is nitrous oxide emissions from the wastewater treatment process, which is a calculated number based on the PE of Scottish Water WwTWs. A reduction in the reported PE served by at least secondary sewage treatment has contributed to this fall.

C1.8 Scope 1 emissions - other GHGs

Reported as 3 tCO2e for AR25, increasing from 0 tCO2e reported for AR24. This represents refrigerant gas loss reported in servicing air conditioning units.

2.2.3 Lines C1.9-C1.16 Scope 2 emissions

Scope 2 refers to emissions associated with the purchase of electricity and specifically the generation of electricity within the national grid and other purchases. It is important to note that this does not include the carbon associated with the transmission and distribution of electricity across the grid, which is accounted for as a Scope 3 emission.

Note that in line with guidance from the Scottish Government, Scottish Water uses the location-based method for accounting, where emissions are reported based on where the electricity is generated and consumed. This means we use the standard UK grid emission factor for calculating emissions. Some water companies in the rest of the UK may report their emissions using the market-based method, which allows grid electricity purchase to be reported as zero emissions when green tariffs are in place.

C1.9 Purchased Electricity

Reported as 91,839 tCO2e for AR25, decreasing from 97,614 tCO2e for AR24.

These emissions are associated with purchased electricity from the national grid and other sources. They are calculated from the annual electricity purchased and the DESNZ grid emissions factor. Grid electricity use comprises the major element of Scottish Water's carbon footprint.

Line C1.9 only covers Scottish Water electricity use (excluding electric vehicles), which represents 41.7% of the carbon footprint. This line excludes both Scope 3 transmission and distribution losses and PFI electricity, which are reported within Scope 3, **Line C1.20** and in part of **Line C1.18a**, respectively. With these two elements included, aggregate electricity emissions represent 55.7% of the carbon footprint. In the Annual Report all electricity is reported together regardless of Scottish Water or PFI use.

Scope 2 electricity consumption emissions have reduced by 5.92% since AR24. The grid emission factor has very slightly increased compared to AR24 meaning that this fall is attributed to a fall in the consumption of electricity, further explained in **Table C.3**

C1.10 Electric vehicles

Reported as 60.56 tCO2e for AR25, increasing from 52 tCO2e for AR24.

This reflects the increase in electric vehicles (EVs) used in our leased fleet and private vehicles. It covers emissions from all electricity used to charge EVs outwith our sites.

C1.11 Removal of electricity to charge electric vehicles at site

This line refers to the amount of electricity used to charge EVs at Scottish Water sites. The electricity used to charge EVs on site, reflected in Line C1.11, has been removed from the total Grid purchases (C1.9) to prevent double counting.

This is a new reported number for AR25 following a digital project to improve reporting.

Whilst further improvements will be made, the project has enabled us to report 143 tCO2e associated with charging EVs at Scottish Water sites in Line C1.11 in AR25.

C1.12 Total Scope 2 emissions

Reported as 92,042 tCO2e for AR25, decreasing from 97,666 tCO2e for AR24.

There has been a decrease in the total scope 2 emissions principally attributed to a reduction in electricity demand for water and wastewater pumping (**see Table C3**).

2.2.4 Lines C1.13-C1.16 Breakdown of Scope 2 emissions into their constituent GHGs

C1.13 Scope 2 emissions – CO2
Reported as 89,464 tCO2e for AR25, decreasing from 95,477 tCO2e for AR24. CO2 from purchased grid electricity is the main constituent of scope 2 emissions, and has reduced in the current period.

C1.14 Scope 2 emissions – CH4
Reported as 2,046 tCO2e for AR25, an increase from 1,622 tCO2e for AR24. The rise in CH4 emissions in Scope 2 is attributed to the increased use of natural gas along with biogas from sludge treatment in the CHP engine for electricity generation in Stirling and Dalmarnock.

C1.15 Scope 2 emissions – N2O
Reported as 533 tCO2e for AR25, a slight decrease from 568 tCO2e for AR24.

C1.16 Scope 2 emissions - other GHGs
Reported as 0 tCO2e for AR25, as it was in AR24. There are no other constituent GHGs that make up scope 2 emissions.

2.2.5 Lines C1.17-C1.26 Scope 3 emissions

Scope 3 emissions refer to our indirect emissions from activities that are emitted by others on our behalf (e.g. public transport, outsourced activities).

C1.17 Business travel by public transport and private vehicles used for company business
Reported as 769 tCO2e for AR25, an increase from 672 tCO2e for AR24. This has continued to increase post-pandemic as the business has moved to a hybrid working pattern, with a further return to office working and face-to-face meetings.

C1.18a Outsourced activities – PFI outside the Scottish Water group
Reported as 79,612 tCO2e for AR25, increasing from 78,790 tCO2e for AR24.

This is a relatively stable position across our PFI concessions.

C1.19 Outsourced activities – other
Reported as 3,259 tCO2e for AR25, and increase from 2,977 tCO2e for AR24. This consists of sludge tankering carried out by third parties on our behalf.

C1.19 shows a slight increase in emissions associated with third-party sludge tankering due to increased mileage in AR25. However, this remains within the normal year-on-year variation due to typical changes in operational patterns.

C1.20 Purchased electricity - transmission and distribution

Reported as 7,971 tCO2e for AR25, decreasing slightly from 8,341 tCO2e for AR24. These are emissions associated with electricity lost in the electrical transmission and distribution system.

Despite a small increase in the electricity transmission and distribution grid emission factor, we see an overall decrease due to reduced consumption of grid electricity.

C1.21 Disposal of water and wastewater treatment waste to landfill

Reported as 1,192 tCO2e for AR25, increasing from 1,084 tCO2e for AR24. This is within the variation expected from previous years (as shown in Table 3) and reflects quantity of waste to landfill on several islands where no recycling outlets are available.

Table 3: Disposal of water and wastewater treatment waste to landfill.

	AR25	AR24	AR23	AR22	AR21	AR20
Disposal of water and wastewater	1,192	1,084	864	1,123	1,214	923

Note that this is not a required part of OFWAT reporting by water companies in England & Wales but has been included in Scottish Water's operational carbon footprint for more than a decade.

C1.22 Total scope 3 emissions.

Reported as 92,803 tCO2e for AR25, increasing from 91,864 tCO2e for AR24.

The majority of this is made up of emissions from PFI operators acting on Scottish Water's behalf, as reported in **Line C1.18a**.

2.2.6 Lines C1.23-C1.26 break down Scope 3 emissions into their constituent GHGs

C1.23 Scope 3 emissions – CO2

Reported as 62,673 tCO2e for AR25, increasing slightly from 61,995 tCO2e for AR24.

C1.24 Scope 3 emissions – CH4

Reported as 12,051 tCO2e for AR25, increasing slightly from 11,820 tCO2e for AR24.This includes process emissions from PFI sites.

C1.25 Scope 3 emissions – N2O

Reported as 18,069 tCO2e for AR25, compared with18,050 tCO2e for AR24.

C1.26 Scope 3 emissions - other GHGs

Reported as 0 tCO2e. As in previous years all GHG emissions are in the form of CO2, CH4 or N2O, as reported in **Lines C1.23-1.25**.

C1.27 Gross operational emissions (scope 1, 2 and 3)

Reported as 224,855 tCO2e for AR25, decreasing from 229,350 tCO2e for AR24.

This is a sum of scope 1, 2 and 3 emissions. The scope 2 emission reduction from reduced electricity consumption is the main contributor to this fall, with small increases in scopes 1 & 3.

C1.28 Renewable Electricity Generated and Exported

Reported as -4,421 tCO2e for AR25, increasing slightly from -4,372 tCO2e for AR24.

Electricity generated but not used on site is exported to the grid where suitable connections are available. Where the generation meets the Renewable Energy Guarantee of Origin (REGO) criteria, this is converted to carbon credit and netted off against the overall operational carbon footprint.

C1.29 Total net operational emissions

Reported as 220,434 tCO2e for AR25, decreasing from 224,978 tCO2e for AR24. Net operational emissions are the total of Scopes 1, 2 and 3 (C1.27 gross operational emissions) minus the carbon credit associated with exported renewable electricity (**C1.28**).

For AR25 we also provide a water and wastewater split for the first time. For this reason, we do not have a comparison with AR24 available for this.

Net operational emissions are reported to the nearest kiloton (220,000) tCO2e in the Performance and Prospects report. The rounding formula is not included in the revised Water Industry for Scotland (WICS) template and therefore the figures held within the table may not exactly match the figures quoted in other publications containing these data.

2.2.7 Lines C1.30-C1.31 Ratio values

The carbon intensity of water and wastewater services are figures we have calculated and published since 2006-07 to provide information to customers on the carbon intensity of their service, and to enable interested organisations to calculate emissions embodied in the water they use. Intensity is expressed in tCO2e per megalitre of water or wastewater service provided.

C1.30 Carbon Intensity, water (operational emissions)
Reported as 0.08 tCO2e/Ml of treated drinking water for AR25, consistent with 0.08 tCO2e/Ml in AR24.

C1.31 Carbon Intensity, wastewater (operational emissions)

Reported as 0.18 tCO2e/Ml of wastewater for AR25, a small increase on 0.17 tCO2e/Ml in AR24.

There has been a fall in flow to full treatment volume at Scottish Water and PFI sites that exceeds the more modest reduction in Scottish Water's wastewater operational emissions hence the intensity of emissions per Ml of wastewater has increased for AR25.

2.2.8 Lines C1.32-C1.35 Comparison to 2006-07 baseline

In AR25 our net operational footprint has fallen 2% from AR24 and is a 52.3% reduction from our 2006-7 baseline of 462,000 tonnes.

2.2.9 Lines C1.36-C1.43 Memo lines

These are for comparison with the AR24 and commentary on key differences is contained in relevant lines above. These lines can be considered duplication now that a "Previous Year" column has been added to the AR template. Between line C1.27 and line C1.40 there is a difference of two units even though they both refer to same figure. This is because Line C1.40 is calculated based on the differences from the figures in the year prior, that are rounded to the nearest unit and lack the granularity to match the calculations perfectly. This discrepancy occurred in the AR24 submission as well.

The figure in C1.27 is the more accurate one as the numbers conforming it are transferred directly from the UKWIR CAW (Carbon Accounting Workbook) with the accuracy necessary.

2.2.10 Lines C1.44-C1.45 Scottish Water Group

These lines refer to emissions from Scottish Water Group subsidiaries that are not included in the regulated operational footprint above.

C1.44 Scottish Water Horizons net operational emissions in report year

Reported as -805.82 tCO2e for AR25, decreasing from 982 tCO2e for AR24.Fuel consumption dropped from 2,243 tCO2e in AR24 to 610 tCO2e this is driven by the sale of both Stirling and Dalmarnock CHP during the year. This, combined with an increase in electricity exports to the grid from 1320tCO2e to 1512 tCO2e, contributed to net negative emissions reported for Scottish Water Horizons.

C1.45 Scottish Water Business Stream net operational emissions in report year
Reported as 83.04 tCO2e for AR25, decreasing from 473 tCO2e for AR24.

AR24 emissions reflected a spike caused by a fire suppressant system in the server room. A cable started to smolder causing the refrigerant gas to be released. Business Stream has moved offices and do not use air conditioning units that may cause refrigerant loss in their new location. In addition Business Stream has moved to fully electric vehicles. Collectively these changes led to significant emission reduction in AR25.

2.3 Investment

During AR25, 6.28 GWh annual equivalent energy efficiency was delivered in wastewater and water through adoption of lower energy equipment and by the Exemplar Wastewater Treatment (further detail is contained in section 4.3, investment related to table C3 – Energy).

2.4 Data

2.4.1 Data sources and confidence grades

There are two main types of data involved in calculating the operational carbon footprint – consumption data from Scottish Water and emission conversion factors from the CAW. There are inherent uncertainties in both, that must be considered in assigning confidence grades. Consumption data is gathered from teams across the business from a variety of sources including meter readings, invoices, internal and regulatory reporting. Much of this is held in corporate systems and input follows an auditable process that is set out within Scottish Water's management system so can be assigned a high confidence grade. For example, electricity consumption (which is the largest single contributor to our footprint – 56%) is taken from verified meter readings, and fleet fuel usage is based on purchase information from vehicle fuel cards.

Some consumption data is not available in the correct units to allow a direct conversion into associated emissions and so some estimation is involved. For example, on site fuel consumption and travel on public transport are gathered in £ sterling. However, in order to be entered into the CAW, these need to be converted into litres of fuel and kilometres travelled respectively based on Scottish Water reference sites (on site fuel use), Department for Transport information etc., such entries will therefore be assigned a lower confidence grade.

Emission factors in the CAW are updated annually in line with latest UK Government BEIS carbon conversion factors, boundaries, guidance and methods. The main uncertainty recognised by the water industry is with regards to process emissions from wastewater and sludge treatment. Emissions are based on fixed factors applied to the population equivalent (PE) served and tonnes sludge treated. This does not take into account the varying nitrogen load of sewage entering the works, or the method of treatment or operation of the works. The water industry in the UK is collectively reviewing its methods around this and we expect the methodology to change in the next few years. This is reflected in the assigned confidence grade – i.e. we are confident in the figure we are reporting but expect this will change when the methodology changes.

Going forward, due to the greening of the grid, we expect electricity to make up a smaller proportion of our carbon footprint. As components become more or less significant, the confidence grade of our overall footprint may change.

2.4.2 Data improvement programmes

Annually, the operational carbon footprint of the regulated business is verified externally in line with ISO 14064-1 and informs continual improvement actions.
We are working with the wider water sector and through on-site monitoring programmes to better understand our process emissions and how they may be accounted for in the future.

The water industry in the UK works collaboratively each year to review and improve the CAW, including footprint boundaries, emissions factors and methods of calculation.

2.4.3 Assumptions used for forecast data

The C1 Table does not include forecasts.

3 Table C2 – Investment emissions

3.1 Overview

The following section explains Scottish Water's approach to investment carbon, detailing the progress we have made to date, and sets out the data improvement we have put in place during the year.

The key change from the perspective of the annual return is the move to reporting actual carbon intensity figures, these are sourced from our capital carbon dashboard, a suite of corporate and management reports. Section 3.3.1 of this report will detail the methodology of the calculation.

Other areas of progress have been:

- Scottish Water achieving PAS2080 accreditation (section 3.1.2)
- Setting an agreed internal capital carbon intensity target (section 3.1.6)
- Setting up of carbon teams in capital investment directorate (section 3.1.3)
- Agreement for the inclusion of the capital carbon measure in PaaG (section 3.3.1)
- System and data improvements - including the purchase of data from Circular Ecology (section 3.5.1)

3.1.1 Carbon Tools and Data Improvements

Scottish Water is using the same tools as described in previous annual returns, any changes made have been of continuous improvement type, rather than incremental changes. Areas of improvement are listed below:

Capital Carbon Assessment Tool (CCAT) – Unchanged during the year. A successful trial was undertaken during the year to test whether it was possible to transfer data from BES to CCAT. When the BES carbon module is live we will feed data from BES to CCAT to improve data consistency.

Benchmark Estimating System (BES) – There have been no direct changes to the BES system.

We are currently working with the developer of BES, on the production of a carbon module, which will elevate the ability of Scottish Water to fully control our capital carbon. Progress on this tool has been slower than hoped and we missed our original delivery date of spring 2025, however we expect that the tool should start a phased rollout in October 2025.

Non-complex Service Delivery Application (NCSD) – The Non-Complex Service Delivery (NCSD) application is used within the Capital Programme to initiate low- value, non-complex needs. The investment promoted through the App during 2024/25 was approximately £130 million (around 14,000 projects) out of a total programme of £1,168 million (approximately18,500 projects). Although the quantity of projects is high, the corresponding investment represents only around 12% of the overall financial value of the Capital Programme.

A significant proportion of NCSD projects have historically defaulted to a carbon intensity factor set by Scottish Water. To improve the accuracy of carbon reporting within the App, two enhancement initiatives have been developed to understand the root cause, and where possible increase the number of projects using the Scottish Water cost/carbon matrix calculation method.

The first enhancement initiative, focused on Electrical & Mechanical projects, is scheduled to go live in Q1 of 2025–26. The second initiative remains under root cause analysis, with a ‘system solution’ expected later in the year.

High Level Pricing Tool (HLPT) – There has been no change to this tool, it is expected that use of this tool will be phased out once the BES carbon module becomes operational.

Reporting – The Carbon Dashboard - a Power BI report - has been fully operational during the year and provides detailed investment carbon reporting for Scottish Water and our delivery partners. The data is linked to the P3M system which holds the relevant carbon data at each delivery milestone (Gate) and the latest carbon estimate.

The report has been used as the source of the data for table C2 of the annual return, in a change of methodology from AR24. The key difference is that the reported intensity figure is a point number with a confidence range, rather than a range as was reported in previous years. The methodology and calculations are covered in section 3.3.1 Line C2.1

The change was made to the reporting process to improve the efficiency of reporting to take data directly from the 'Data Lake' and produces the report automatically. This has reduced the time spend producing the report by approximately 50% each month and improved data quality through 'one version of the truth'. This means that all users see data that has been processed using a known and transparent approach, free from local interaction/adjustment.

3.1.2 PAS2080

Following a series of audits Scottish Water achieved PAS2080 accreditation during the year. PAS 2080 is a globally applicable standard for managing carbon in buildings and infrastructure. It looks at the whole value chain and aims to reduce carbon and cost through intelligent design, construction and use. It also acknowledges that we have a framework and process that manages our carbon data.

Scottish Water is looking for our key delivery vehicles to also apply for PAS2080 accreditation, during the SR27 investment period.

3.1.3 Internal Management

During the year there was an increase in the carbon management capacity to support carbon reductions across investment. Responsibility for carbon has been broadened across capital investment and this approach is consistent with Scottish Water's wider approach to carbon reduction, where we aim to embed carbon within the functions that are responsible for and best placed to support carbon reduction.

We have created two new teams:

Commercial carbon team

This is a new team with within the costing team, concentrating on ensuring that project carbon values are accurately accounted with a future focus on reduction opportunities, with responsibility for:

- Production of capital carbon values for projects (primarily focused on projects priced using the BES costing system).
- Identifying areas of carbon reduction
- Embedding carbon reduction into decision making
- Upkeep and continual improvement of capital carbon data for BES
- Leading development of commercial strategy for carbon reduction in SR27

Procurement

This is a new team within Procurement & Supply Chain (PSC) tasked with collaborating with the supply chain to decarbonise key areas of focus. The team's remit includes:

- Inclusion of low carbon solutions in procurement processes
- Collection and analysis of carbon data from supply chain
- Management of the Supply Chain Innovation Process
- Development of Standard Products
- Development of partnerships with the supply chain on carbon focus areas e.g. Low Carbon Concrete

In addition to the new teams described above, there has been a strengthening of carbon actions within existing teams.

Capital Investment Net Zero

This team is focused on avoiding, switching or improving the embodied carbon created in the design and construction stage of the project lifecycle with responsibility for:

- Capital Investment Net Zero Strategy.
- Growing net zero knowledge and understanding of our people and partners.
- Working with project delivery teams to identify carbon opportunities.
- Liaison with delivery vehicles
- Liaison with wider industry
- Growing net zero skills within project teams
- Reporting progress to Capital Investment Leadership Team (CILT)

Within the early stages of a project the Sustainable Investment Decision Making (SIDM) process, ensures that carbon is included in the optioneering stages of the project lifecycle, to identify the lowest whole life carbon options.

The key areas of improvement have been to further embed carbon into the future planning process, this has included the inclusion of carbon assessment into the Copperleaf system.

In addition Technical Support and Assurance (TSA) have increased their focus on carbon through the inclusion of carbon within the process selection matrix. which is a tool used by engineers to identify preferred treatment process solutions for treatment works projects.

3.1.4 Carbon reduction progress

Scottish Water and its delivery partners have made progress in adopting measures to reduce capital investment carbon in a number of areas during 2024-25. Examples include:

- Establishing a low carbon procurement framework to bring lower carbon replacement products into the business. A good example is low carbon kiosks where suppliers submitted low carbon products alongside traditional kiosks. Through this we installed our first timber kiosk, manufactured from timber grown on Scottish Water land.
- Where appropriate our Delivery Partners have started using green steel - scrap steel recycled in an electric arc furnace.
- Deploying drone technology to inspect sewers and aqueducts, avoiding temporary works.
- Low carbon site set ups becoming business as usual with direct connection to electricity grid for larger projects and the use of hydro treated vegetable oil (HVO) and battery power on smaller projects.
- Low carbon concrete becoming more widely adopted becoming widespread with improved supply chain reporting of the types of concrete used.
- Collaborating with Transport Scotland, Network Rail, SSE and Scottish Power, in Scotland's Low Carbon Concrete Collective.
- Hosting 'Cementing Sustainable Change 2024', an all-day event with existing and prospective partners as part of Scotland's Low Carbon Concrete Collective, with 60 representatives from over 20 organisations to assess challenges greening the concrete industry.
- receiving our first 3D concrete printed assets on site following work with OFWAT and United Utilities.

In addition a series of enablers established during the year will support further action:

- Signing the Construction Leadership Council's Five Client Carbon Commitments.
- Engaging with the UK-wide Infrastructure Client Group focussing on low carbon delivery.
- Net Zero is included in new procurement frameworks and carbon frameworks for steel and recycled aggregates were established.
- Improved product carbon data from the wider supply chain - concrete, chemicals, pumps, generators
- Net Zero Challenge Workshops delivered across our nine largest capital programmes to identify further opportunities.
- Quarterly knowledge sharing events with Delivery Vehicles and wider supply chain has supported further adoption of methods
- Guidance on adopting biodiversity measures in Capital Projects launched with delivery partners.
- Developed a Circular Economy Strategy for Procurement & Supply Chain, setting out the objectives and activities that the function will work towards.

In doing the above we received industry recognition in the form of;

- Built Environment Smarter Transformation "Best Gamechanger Award" with Ross Shire Engineering for the development of the timber kiosk.

- Utility Week Award for refurbishment approach to mechanical and electrical projects with WGMB.
- Institution of Civil Engineers Scotland, Sustainability Champion Award for our Capital Investment Net Zero Strategy.

3.2 Auditing

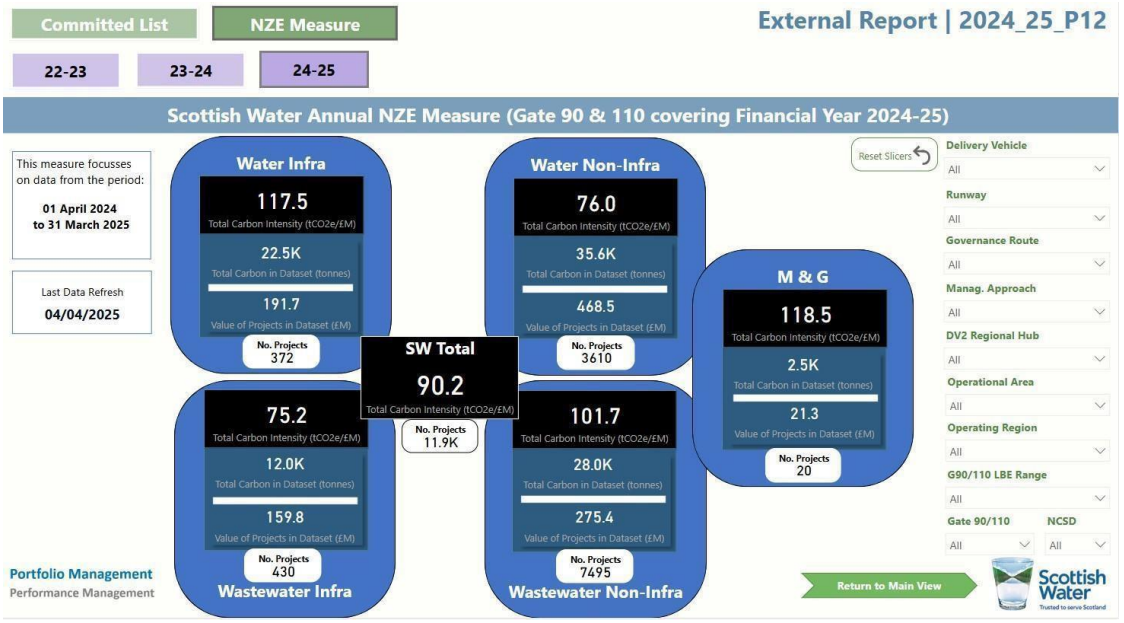
The C2 tables were audited externally by Binnies in AR25.

3.3 Performance Trends

The data in previous annual returns is not comparable with the current data. Trends will be available in AR26.

3.3.1 Lines C2.1 Carbon intensity of investment

As described above Scottish Water has moved to reporting a single figures for carbon intensity rather than a range. The source of this data is the Capital Carbon Dashboard. The dashboard is a mix of management reports and corporate reporting and used data directly from the P3M system, which is the reporting system for all capital data. An image of the year end dashboard is shown below.



The AR25 figure is not comparable with AR24 data, and we are not in a position to report a level of change during the financial year, as the data for 2023/24 was incomplete as the reporting system was being implemented.

The intensity measure encompasses the sum of the carbon and there sum of the latest best estimates of cost (LBE) for all projects that have reach either gate 90 or 110 during the year:

$$\text{Capital carbon intensity (t CO2e/£m)} = \frac{\text{Total carbon (t CO2e)}}{\text{LBE (£m)}}$$

$$\text{Capital carbon intensity 90.2 tCO2e/£m} = \frac{\text{100,680.7t CO2e}}{\text{£1,116.652m}}$$

The water and waste figures in the annual return use the same approach as above but the data is split into 3 categories water, waste and "maintenance and general" (M&G). We are not able to fully disaggregate this for water and wastewater, so the M&G is split evenly between water and waste categories.

This is based on a sample set of 11,927 projects. A large number of the projects are small value and pass through the NCSD app, as described in the NCSD section 3.1.1

This measure will be reported monthly as a shadow measure within Scottish Water's performance at a glace (PaaG) report.

Line C2.2 Capital expenditure (figure brought forwards from capital tables)

The total figure provided is taken from **Line G1.83**. The calculation is detailed below in Table 5:

Table 5: Capital expenditure breakdown

		Water (£m)	Waste (£m)	Total (£m)
G1.66	Water	564.462		564.462
G1.67	Wastewater (combined)		452.306	452.306
	Percentage	56	46	
G1.70	General	58.218	46.650	104.868
G1.81	Water Reasonable Cost Contributions	15.012		15.012
G1.82	Wastewater Reasonable Cost Contributions		31.812	31.812
G1.83	**Total Investment including Reasonable Cost Contributions**	637.692	530.768	1,168.460

3.3.2 Lines C2.3 Carbon emissions from the capital investment programme

This is the estimated for the total carbon footprint resulting from Investment activities and is calculated from intensity multiplied by the cost of the capital programme.

It should be noted that due to rounding error the total does not equal the sum of the water and waste figures. The total column is the figure that Scottish Water would recognise as the carbon emission resulting from investment activities, for 2024/25 the figures is 105,395t CO2e.

As explained in C2.1, we are using a single point figure for the first time so do not have a direct comparison with AR24 available.

3.3.3 Lines C2.4-C2.7 Quadrant intensity figures

The quadrant figures are taken directly from the carbon dashboard and use the same method of calculation as described above.

3.4 Data

3.4.1 Data sources and confidence grades

Lines C2.1 Carbon intensity of investment

We see a wide range of data-points within the sample set of over 11,000 projects, we have have applied a confidence range of C4 as we feel that our current value plus/minus 25% appears to cover the uncertainty we have in the data.

We now understand that the carbon intensity figure is likely to increase once the new BES carbon management module is implemented. This is due to more detailed reporting and improved carbon data, which show higher carbon figures than the historical data.

Early offline analysis of the new data from Circular Ecology, using the new BES methodology, indicates that the carbon associated with projects will increase compared to the existing CESMM4 data. There are two main reasons for this change:

1. Increased Data Granularity: The new BES methodology operates at a more detailed level. While the existing system describes an action such as laying a pipe, the new BES module records every action, including the hours each machine operates, the fuel used, and the materials like pipes and bedding. As we increase the granularity, more elements of work are identified.

2. Improved Carbon Estimates: The new data from Circular Ecology shows that the previous carbon estimates in CESMM4 were too low. This is due to a better understanding of the carbon content in materials, provided by leading experts such as Circular Ecology. For example, the carbon associated with an individual pipe is now found to be higher than the carbon value from CESMM4 for the pipe and the pipelaying activities.

We expect to see an upward pressure that is expected to see an increase in overall intensity as we switch to the new BES tool and start using the new more granular data from Circular Ecology, but that it may take time for this to be fully realised as we switch and the new projects appear within the rolling 12 month measure.

Line C2.2 Capital Expenditure

Data supplied by capital investment team; data grade applied (A1) is the same as **Line G1.83**.

Lines C2.3 Carbon emissions from the capital investment programme

This is a calculation based on the data above, the confidence grade (C4) reflects the confidence in **Line C2.1**

Lines C2.4-C2.7 Emissions by water/waste/infra/non-infra

3.5.1 Lines C2.1-C2.2 Carbon intensity of investment

In AR23 and AR24 we described how we wanted to move to using our data dashboard, which has now been successfully implemented and is providing data for AR25, as described above.

Our current data improvement focus is on the delivery of the new BES carbon module. Part of this work involved the purchase of new, updated embodied carbon data from Circular Ecology to further supplement data purchased in 2024.

Circular Ecology are environmental sustainability consultants, founded in 2013 by Dr Craig Jones a specialist in embodied carbon assessment who founded the Bath University/Institution of Civil Engineers Carbon Database, used as the standard for almost 20 years. Circular Ecology have supplied Scottish Water detailed data to use within the BES carbon module at a resource level, which will provide Scottish Water will unparalleled data granularity and insights currently not available to us.

We are currently integrating the Circular Ecology data into the existing BES tool, to allow Scottish Water to improve existing data and better understand the data changes as we transition from the older datasets such as CESMM4[1].

NCSD – In AR24 we described that we were aware of an issue with the NCSD app using too much in fill data, work is still ongoing in rectifying this issue, as there appear to be multiple issues within the system. This approach is described in more detail in the reporting section 3.1.1

3.5.2 Assumptions used for forecast data

The C2 Table does not include forecasts.

[1] CESMM4 is the Civil Engineering Standard Method of Measurement, edition 4 a costing and carbon tool that was developed in 2012 and used Bath University/Institution of Civil Engineers carbon factors.

4 Table C3 - Energy

4.1 Overview

Table C3 provides information on electricity consumption, generation and export; and its associated financial information as well as other fossil fuels consumption. Scottish Water's operational electricity consumption comes from different sources. The predominant source is the grid, but we also use electricity generated by our own schemes and a small proportion comes from a Combined Heat and Power (CHP) plant located at a farm adjacent to one of our treatment works and connected to it via a private wire.

2024-25 saw the lowest historic electricity consumption from the grid which is linked to more favourable weather conditions with fewer high intensity, short duration storms. Additionally, our renewable schemes generated the largest volume ever recorded thanks to better performance of existing assets and the commissioning of new ones.

4.2 Performance Trends

4.2.1 Lines C3.1a-C3.1c and C3.2b Electricity Consumption

Scottish Water Regulated - Total consumption for regulated operations was 481.405GWh (from the grid and self-supplied) for AR25 showing a reduction of 21.665GWh compared to AR24. During AR25, the consumption of electricity was the lowest coinciding with fewer high intensity, short term rainfall episodes.

Note that **Lines 3.1a, 3.1b, 3.1c and 3.2b** refer only to operational consumption of electricity, from each of the sources stated.

The predominant source of electricity consumed is the grid (436.267GWh) which was 28.086GWh lower than for AR24. This was largely explained by less demand from our pumping assets (water and waste) and wastewater treatment which correlates with better weather conditions (fewer high intensity, short term rainfall episodes) experienced in the year. There was also volume displaced from the grid to self supplied (6.421GWh) given the increase in our own generation.

The electricity we self-supply is mainly renewable with the exception of Stirling and Dalmarnock CHPs (included in **Line C3.1c**). The higher volume supplied via **Line C3.1c** (+1.249GWh) reflects an improvement in the performance of the 3 CHPs that make up this line: Girvan, Stirling and Dalmarnock in particular. Whereas the positive variance shown on **Line C3.2b** (+5.142GWh) was the result of increased output from our renewable assets taking it to the highest volume ever generated.

PFIs (Excluding those in Scottish Water Group)- Total electricity consumption for PFIs (**C3.1a**) saw a small increase from 122.160GWh in AR24 to 125.176GWh in AR25, which falls within normal year-on-year variability. Grid electricity consumption (**C3.1b**) has kept at steady levels with 103.242GWh in AR24 and 100.850GWh in AR25. Private wire consumption has not seen any remarkable changes.

Scottish Water Grampian - Showing as zero following the conclusion of the PFI contract in October 2022 when the assets came back into the Scottish Water Regulated business and are reported under the Scottish Water Regulated section.

Scottish Water Horizons - The total electricity consumption has lowered to 1.290GWh in AR25 from 1.528GWh in AR24. However, grid electricity consumption (**C3.1b**) for Scottish Water Horizons increased to 0.263GWh, higher than the consumption in FY2023-24 but lower than FY2022-23. The main reason behind this is an increased consumption at the Deerdykes facility. As Deerdykes has now been sold it is expected that the electricity consumption associated to Scottish Water Horizons will drop greatly in the next FY.

4.2.2 Lines C3.2a-C3.2c On-site renewable electricity generated, used and exported

C3.2a – On site renewable electricity generated

This is presented disaggregated by the owners of the schemes: Scottish Water Regulated, PFIs and Scottish Water Horizons. The PFI schemes benefit only their own assets whereas the Horizons schemes are mostly embedded in Scottish Water regulated assets, contributing to displacing grid consumption. Hence **Line C3.2b** - On-site renewable electricity used reflects the usage of renewable power by the Scottish Water Regulated assets regardless of ownership of the renewable scheme.

Scottish Water Regulated - The volume of renewable electricity self-supplied (**Line C3.2b**) for the use of regulated assets showed a variance of +5.142GWh thanks to an increase in the volume generated by the Group's renewable schemes.

As pointed out in previous years, the volume self-supplied does not match the difference between total generation (**Line C3.2a**) minus exports (**Line C3.2c**) for two reasons:

- The regulated sites also benefit from the volume supplied by renewable schemes owned by Scottish Water Horizons when these are located on regulated operational sites
- The hydro turbine at Daer WTW where, due to export connection constraints, 0.521GWh of the generation had to be diverted into heat dumps.

PFIs (excluding those in Scottish Water Group) - Overall renewable generation from biogas CHPs at PFIs has increased from 20.047GWh in AR24 to 25.580GWh in AR25.

Scottish Water Grampian - Showing as zero following the conclusion of the PFI contract in October 2022 when the assets came back into the Scottish Water Regulated business and are reported under the Scottish Water Regulated section.

Scottish Water Horizons - The total volume generated grew by 3.087GWh as a result of new schemes (+1.648GWh) and better performance of existing assets (+1.439GWh).

C3.3 Renewable Electricity Capacity at end of year

Line C3.3 represents how much the existing renewable schemes could generate in a year as per the design output. It is not intended to express the capacity of the assets (usually expressed in MW) or the actual output in a given year, but rather how much the scheme is expected to generate in GWh based on its design and assumptions on operational conditions.

The source of this information varies. For older schemes it is based on historical output. For newer schemes it is based on the Acceptance Certificate (an internal document that shows the

expected benefits of the project when delivered). For schemes owned by PFIs or third party-hosted on Scottish Water land, we rely on the information provided by these companies.

There is a net increase of 6.425 GWh of capacity coming from sixteen new renewable schemes: 15 PVs and one hydro turbine. These projects were delivered by Scottish Water Horizons and will benefit Scottish Water regulated assets.

C3.4 Percentage of 2030 Renewable Target Reached

Line C3.4 is a calculated figure that tracks progress against our 1320GWh target which has been based on our 2018-19 grid consumption. It compares **Line C3.3** in GWh to the 1320GWh objective. The current percentage achieved is 72.14%, a slight increase from 71.65% in AR24.

In AR25, the renewable capacity was 1.9 times the volume taken from the grid for operational purposes.

4.2.3 Lines C3.5-C3.9 Renewable technologies

This section shows the volume of renewable electricity generated, split by technology and ownership.

Scottish Water Regulated - The largest contribution (63%) to on-site renewable generation in **Lines C3.5-C3.9** comes from hydro turbines (**Line C3.5**) and the total generation across **Lines C3.5-C3.9** showed a positive variance of 2.937GWh in AR25. This was down to an increase in solar PV generation (mainly from new schemes) and improved performance from bioresources (**Line C3.8**).

PFIs (excluding those in Scottish Water Group) - Overall renewable generation from biogas CHPs at PFIs has increased from 20.047GWh in AR24 to 25.580GWh in AR25

Scottish Water Grampian - Showing as zero following the conclusion of the PFI contract in October 2022 when the assets came back into the Scottish Water Regulated business and are reported under the Scottish Water Regulated section.

Scottish Water Horizons – The two main technologies contributing to the total generation are solar PV and Bioresources. All but one of the solar PV schemes are embedded in Scottish Water regulated assets benefiting them (only one PV is at a PFI site). The Deerdykes CHP (bioresources) is located at the Scottish Water Horizons Deerdykes facility. The net increase in the total volume generated (+3.087GWh) was driven by solar PV (+4.656GWh) which was partially offset by lower generation at Deerdykes due to maintenance activities in preparation for the asset sale.

4.2.4 Lines C3.10a - C3.11b Other Fuels

C3.10a Diesel consumption (transport by fleet owned and fleet leased by the organisation i.e. scope 1)

This line represents the liquid fossil fuel usage (diesel and petrol) from owned and leased fleet according to the boundaries outlined in the table. ‘Scottish Water fleet’ is only relevant for the Scottish Water regulated number.

Scottish Water Regulated - Reported as 4,474,448 litres of fuel for AR25, including both diesel (4,454,784.83) and petrol (19,663.17). In AR24 we reported 4,561,571 litres diesel. These figures are not directly comparable as the figure for AR24 did not include petrol usage; however, there has not been a significant change in diesel usage by Fleet.

We have added a further 70 Electric Vehicles (EVs) to our fleet in the FY 2024-25, which will help reduce diesel consumption.

PFIs (Excluding those in Scottish Water Group) - Reported as 205,147 litres of fuel (294 litres of petrol the remainder diesel) in AR25 compared to 250,647 litres diesel in AR24.

This drop likely reflects reflects a drive from our PFI partners to reduce their carbon footprint by moving to alternative fuels.

Scottish Water Grampian - SW Grampian PFI concessions concluded in October 2022. Full year consumption and generation for AR25 is therefore included within Scottish Water regulated category.

Scottish Water Horizons - Reported as 4,219 litres diesel for AR25, a decrease compared to 5,975 litres diesel for AR24.

C3.10b Non-fossil fuel consumption by fleet (transport by fleet owned and fleet leased by the organisation i.e. scope 1)

This line is new to AR25 and represents the usage of non-fossil fuels in owned and leased fleet.

During AR25, Scottish Water Regulated and our PFIs at Veolia started using HVO for fuel transport . Scottish Water used 14,384 litres and the PFIs used 56,706 litres. We cannot compare to previous years as the usage only started in the current period but we expect the quantity to increase in coming years.

C3.11a Other fuels (non-transport)

This includes fuels not used for transport, including natural gas for heating and on-site fuel use in generators. This is the equivalent of Line C1.1 but expressed in GWh rather than tCO2e.

Scottish Water Regulated - Scottish Water Regulated - Reported as 49.871GWh for AR25, increasing from 44.328GWh for AR24. The increase in this figure is driven by the increased diesel usage during Storm Éowyn to power standby generation following electricity grid impacts.

PFIs (Excluding those in Scottish Water Group) Reported as 228.314GWh for AR25, increasing from 193.073GWh for AR24. This is due to an increase in on-site fuel consumption of natural gas and especially biogas. This returns to levels similar to previous years

Scottish Water Grampian - SW Grampian PFI concessions concluded in October 2022. Full year consumption and generation for AR25 is therefore included within Scottish Water regulated category.

Scottish Water Horizons - Reported as 17.424GWh in AR25, a large decrease from 31.244 GWh for AR24. This difference is explained by the sale of Stirling and Dalmarnock CHPs during the financial year.

C3.11b Other non-fossil fuels (non-transport)

In AR25 the energy values for non-fossil fuels used in Scottish Water is 0.816GWh. This comprises the use of HVO for stand-by generators and it is the first year that it gets reported on the AR, so there is no previous data to compare. It is expected that this number will rise in following years as the use of HVO gets embedded through the business.

Neither our PFI partners or Scottish Water Horizons have reported using any non-fossil fuels in this section in the present period.

4.2.5 Lines C3.12-14 Income received from energy exports and decarbonisation payments

All values presented have been extracted from our general ledger which captures costs at an account level. With the exception of Scottish Water Horizons, Line C3.12 is derived from amounts recorded as exported to grid. Line C3.13 is derived from amounts recorded as Renewable Obligation Certificates (ROC) and Feed in Tariffs (FIT) income.

Scottish Water Horizons, Line C3.12 has been populated using income recorded as sale of electricity and does not include the sale of electricity to the core business as this is included in line 3.17 detailed below.

Income from renewable electricity exported (line C3.12) in Scottish Water regulated decreased £1.593m or 47% to £1.767m (2024: £3.360m). This has been mostly driven by a 50% decrease in export prices slightly offset by an increase in electricity generated and exported (as reported in lines C3.21 – C3.23).

Income from ROC and FITs (Line 3.13) in Scottish Water regulated increased by £0.598m or 11% to £5.811m (2024: £5.213m). The main driver for increases has been the price increase of 10% when compared to prior year (2023/24 £59.01 per MWh) and FIT increases in line with inflation at 5.2%.

Income from renewable electricity exported (line 3.12) in Scottish Water Horizons decreased £1.307m or 46% to £1.525m (2024: £2.832m). The decrease in the year relates to a combination of lower export prices and the decommissioning of the Deerdykes facility for disposal from October 2024.

Income from ROC and FITs within Scottish Water Grampian decreased to nil in the year (2024: £0.016m) reflecting the transfer of generation and income to Scottish Water.

Electricity costs, recharges and hosting and export income have been extracted from our general ledger which captures costs at an account level. This data for PFIs is not available to us due to its commercially sensitive nature.

C3.15 Income from Hosting Renewable Electricity

The gross income received from our hosted renewables was reduced by £2.273m from £5.876m to £3.603m. The reduction was explained by less revenue at Clyde wind farm through a combination of lower market prices and less volume generated.

4.2.6 Lines C3.16-20 Electricity expenditure

All values presented have been extracted from our general ledger which captures costs at an account level. Line 3.16 is derived from charges from Optima and also includes Power Purchase Agreements charges and other non-optima charges. The value reported for gross expenditure is net of offset benefits.

Recharges of electricity expenditure represents the sale of renewable electricity from Scottish Water Horizons to the core business. This is also reported within the N Tables.

Total electricity expenditure (line C3.16) for Scottish Water regulated has decreased £5.809m or 7% to £80.688m (2024: £86.497m). The decrease in the year has been mainly driven by consumption reductions (lines C3.1b).

Recharges of electricity expenditure in Scottish Water regulated have decreased £0.656m or 22% to £2.282m (2024: £2.938m). The decrease reflects the disposal of Scottish Water Horizons Heat from Sewage assets at Dalmarnock and Stirling to a third party and the corresponding payment to Scottish Water to ensure that Scottish Water costs for electricity reflect market prices. At a group level the offset is shown on line C3.17 in the Scottish Water Horizons column.

During the year there has been no movement of income between companies in the Scottish Water group (line C3.19).

Electricity costs, recharges and hosting and export income have been extracted from our general ledger which captures costs at an account level. This data for PFIs is not available to us due to its commercially sensitive nature.

4.2.6 Memo Lines C3.21-23

These are for comparison with the AR24 and commentary on key differences is contained in relevant lines above. These lines can be considered duplication now that a"Previous Year" column has been added to the data tables.

4.3 Investment

To reduce emissions from electricity, Scottish Water is investing to improve energy efficiency and to increase renewable generation on its assets aligned with the Energy Efficiency Management Approach MA027. This prioritises projects based on positive NPV payback and will see Scottish Water replacing electrical equipment with more modern, energy efficient systems including pump variable speed drives, blowers, aerators, lighting and real time control technology.

Under MA101 – Renewable Energy Enhancement, Scottish Water has adopted a strategic approach with a hierarchy of options that start with the largest cost and carbon benefit (displacing grid electricity) to the least (no on site use, all generated power exported to grid) over the strategic review period 2021-2027.

In addition to investment of Tier 2 funds on renewables, Scottish Water Horizons are making investments on renewables. The renewables investment hierarchy provides guidance on what investment should be Tier 2 or Horizons funded.

4.4 Data

The data for electricity consumption, generation and export comes from meter recordings and invoices from our electricity supplier.

The vast majority of our electricity import supplies, and renewable assets are fitted with smart meters that record and transmit data automatically. We have access to this data via a portal run by Scottish Power Dataserve (our meter operator).

The consumption and export data are also sent directly by Dataserve to our electricity supplier nPower for billing purposes and is subject to industry standard validation processes.

A small proportion of our import supplies are billed on estimated data when actuals are not available due to communication issues or lack of a manual meter reading and the estimation is done by our supplier following industry rules.

The meter data and the supplier's invoices feed our energy management system Optima from where we can obtain reports. Hence the degree of confidence in this data, as per WICS definitions, would be A2 (to allow for estimates).

The data relating to the "installed capacity at the end of year" comes from a mix of sources: historical records, internal documents and spreadsheets and information received from third parties; therefore, it has been graded B3.

The PFI consumption and generation data is gathered directly from each PFI company.

Electricity costs, recharges and hosting and export income have been extracted from our general ledger which captures costs at an account level. This data for PFIs is not available to us due to its commercially sensitive nature.

The data presented in Table C3 was audited by Binnies, with the exception of **Lines C.3.10 and C3.11** which were audited by Achilles. Achilles also audited the source data behind **Lines C3.1a to C3.9**.

4.4.1 Data improvement programmes

We continue to identify electricity supplies with analogue meters so that these can be replaced with smart meters capable of transmitting data automatically avoiding reliance on manual readings or estimates.

4.4.2 Assumptions used for forecast data

The C3 Table does not include forecasts

5 Table C4 – Land and carbon inventory

5.1 Overview

Scottish Water's landholdings play a key role in our routemap to supporting Net Zero. To do this we need to understand, manage and enhance our landholdings as an asset for carbon sequestration and greenhouse gas emission reduction. The complexity means we need to work with others to develop and report credible data on the carbon balance of our landholdings.

Scottish Water owns over 23,000 hectares of land predominantly in water catchments, with a diverse mix of upland moorland, grassland, woodland and peatland in varying conditions. Around 13,000 hectares is under some form of lease or tenancy for agriculture (mainly grazing) with 9,500 under long term tenancy to Forestry and Land Scotland at Loch Katrine.

Whilst there is significant woodland that is capturing carbon on Scottish Water's land, it is essential to consider all areas comprehensively. There are significant areas of peatland, much in a degraded condition, where carbon is being emitted. It is therefore important we understand and report the 'net' position of land carbon - where we are losing, where we are gaining, and where we can improve.

Land Carbon Assessment

Owing to the specialist nature of land and carbon assessments, Scottish Water engaged the James Hutton Institute to develop an approach using established methods such as national and international standards, woodland and peatland carbon codes, and academic evidence for losses or gains across different land types.

The approach uses spatially explicit national land cover data; robust and referenced modelling approaches; and published emission factors. It considers land cover, soil type, peatland condition, climate, topography, and land management practices. It aligns with global and national principles for greenhouse gas accounting and was strengthened by engagement with external stakeholders including the Scottish Government, Scottish Forestry and NatureScot.

The inventory adopts a “top-down” approach using national data sets, augmented by field data where available. The carbon position is reported as a range reflecting the uncertainty around actual site condition when compared with the possible range in the national data sets. For the purposes of the Annual Return, a mid-range figure is reported in the data tables.

Sources of uncertainty include the actual extent and condition of peatland, the age and species composition of woodland, and the management practices on moorland and grassland.

Owing to the scale of work for a full land assessment, and the time it takes for land changes to be confirmed (it takes 5 years for new woodland to become established), this is undertaken once every 3 years. During interim years Scottish Water may report expected benefits arising from activities from peatland restoration, woodland creation and new field intelligence, but the inventory will be formally updated through review and recalculation of the position by the JHI (or other relevant expert organisation) every 3 years.

Each 3-yearly inventory update will review the emission factors or approaches to reflect latest guidance, include improvements to input data, mapping, site condition surveys etc, and confirm the extent to which work by Scottish Water on peatland and woodland in the preceding years can be fully integrated within the 3-yearly baseline.

Typical changes may cover:

- improved intelligence (better land classification from survey and other data)
- changes in land cover (e.g. grassland to woodland)
- improvements (e.g. peatland restoration)
- improved intelligence from woodland surveys (updated age class and species mix used in analysis)
- Losses - e.g. areas of woodland that have been sold, harvested or lost to wildfire

It is important to reflect potential losses because, unlike market-based schemes such as the Woodland Carbon Code where the risk of loss is built into the cost of the credit, within the inventory approach the loss of carbon assets must be accounted. If we lose carbon storing assets through events such as storm or fire damage it will impact our inventory and our net zero position.

Our first land carbon inventory was published alongside a wider assessment of the biodiversity and natural capital status of Scottish Water landholdings within Scottish Water's 2023 statutory Biodiversity Report. We will be formally reporting an update to this in the 2026 report using the information presented in AR25.

As well as the baseline study undertaken by JHI, a wider land assessment exercise was undertaken to establish a baseline of biodiversity and natural capital across our landholdings. The resultant data were used to report our first set of Natural Capital Accounts in our Biodiversity Report 2023. This is published on our website, and we expect to publish the next update in our 2026 statutory Biodiversity Report.

It should be noted that the inventory assessment focuses mainly on our major landholdings, mostly those under agricultural tenancies or grazing lets. It excludes small areas of land associated with operational sites and assets, which were not part of our initial carbon assessment. The full baseline re-assessment will be repeated by external experts on a three-

yearly basis and new data on our landholdings (including inclusion of additional land) will be applied as appropriate.

Land Carbon Inventory

In 2022 Scottish Water worked with JHI to create the first carbon inventory, which was reported in AR23 across key land classes and in our 2023 Biodiversity Report. This suggested that significant carbon capture in woodland was exceeded by losses from peatland (using the mid-point of ranges). This formed the basis for AR24 where we also reported anticipated improvements in peatland emissions based on survey, analysis and restoration activities.

Since AR23 Scottish Water has focussed on site level data improvement of peatland and woodland, to decrease uncertainty and help target activities for land improvement. Improvements to peatland data focus on confirming the extent of peatland and the actual condition (which directs the appropriate emission factors to use).

In 2024-25 this field data was used by JHI to supplement national data sets and update the inventory, which we report in AR25 and will also publish in the 2026 Biodiversity report. There are 2 areas of significant change between the baseline reported in AR23 and the AR25 update:

Firstly, there has been a significant improvement in the emissions associated with peatland as a consequence of improved field surveys and peatland restoration activities.

Secondly, there has been a reduction in the area of woodland we can use within the carbon inventory. Within the Loch Katrine catchment there is an area of forestry created through investment by a third party - the Scottish Forestry Alliance (SFA). Presently the SFA hold the right to report carbon benefits (using the Woodland Carbon Code methodology) and we have therefore removed this from our carbon inventory to avoid double counting benefit in line with our agreed methodology.

In future years it may be appropriate have an additional line in the AR to capture this as it remains part of our overall land inventory and we will need to further consider how losses and gains of carbon from this area may be reported.

Overall emissions have increased in AR25 compared to AR24. However, this apparent rise is primarily due to the exclusion of the Scottish Forestry Alliance (SFA) area from the AR25 reporting. In AR24, emissions and removals associated with the SFA area were included, contributing positively to the overall emissions balance. If the SFA area had been included in AR25 as it was in AR24, there would have been a modest improvement in emissions. This change is due to the Woodland Emissions associated with the SFA now being accounted for elsewhere, as detailed in section C4.7.

It is important to note that Scottish Water's reported emissions position in AR25 shows a net carbon capture of-350 tonnes CO_2e per annum (midpoint of the estimated range), compared with a larger net carbon capture of -5,844 tonnes CO_2e per annum in AR24. This reflects a

reduction in the reported scale of net carbon capture, rather than an actual increase in emissions from woodland. The carbon sequestration from the 1,275 hectares of woodland in the SFA area has not been lost, but is no longer counted within Scottish Water's inventory.

5.2 Performance Trends

AR25 represents the fourth year in which we have reported land information, the third where we report a carbon inventory, but the first time we report a formal update to the original baseline. As noted in the Overview, AR23 reported that gains in carbon in woodland were exceeded by losses from peatland. The updated AR25 inventory reverses this and confirms Scottish Water to be a weak carbon sink.

There has been a significant improvement in peatland emissions with an improvement to reported condition based on survey, restoration work and adopting of improved carbon factors following the revision to the Peatland Code.

Peatland restoration delivery has significantly increased, with 555 hectares restored in 2024-25. Whilst this delivers significant carbon gain it is not represented in the carbon inventory at this stage as the data cutoff for the inventory is much earlier in the year (restoration is seasonal and restricted to winter) owing to the time required for analysis. Whilst we forecast potential benefits, these benefits will be formally reflected in the AR28 inventory update

There is a significant drop in the reported carbon benefit from woodland. This is primarily because we have had to discount an area of woodland in Loch Katrine as the carbon benefits are presently accounted for by a third party. We further note that the carbon benefits from woodland creation during SR21 have not yet been reflected in the inventory. This is because we require 5 years from planting to confirm establishment and that formal land cover change (e.g. from grassland to woodland) has been achieved. We expect to see a significant improvement in woodland carbon in the next inventory update in AR28.

Line C4.1 Total area of peatland

The reported value of 4,960 hectares is based on our major landholdings, mostly those under agricultural tenancies or grazing lets, and excludes small areas of land associated with operational sites and assets, which were not part of our initial carbon assessment.

This is a small increase in area arising from improved survey and land data. Surveys have been completed across a number of catchments focussed on areas requiring restoration, and these data were used by the JHI to inform its assessment.

Following surveys in the south of the catchment in AR24, detailed peatland survey work was completed within the remainder of Loch Katrine. Significant differences were identified in the field compared with the national dataset/inventory and field sampling generally identified that whilst restoration is required the peatland is generally in better condition and is less extensive than expected.

During the JHI work we identified further survey work required to confirm the extent of some areas of peatland. The overlying vegetation suggests peatland may be less extensive, but further soil analysis is required and we will, build this into future survey work. However, our focus has remained on identifying peatland in poor condition to facilitate the development of restoration projects.

Surveys in other catchments to establish peat condition are ongoing.

Line C4.2 Total area of woodland

The reported value of 3,860 hectares is based on our major landholdings, mostly those under agricultural tenancies or grazing lets, and excludes small areas of land associated with operational sites and assets, which were not part of our initial carbon assessment.

Whilst this appears to be a small increase compared with 3,808 Ha in AR24, there has been a significant change in the underlying information. As noted in the Overview, carbon associated with 1,275 hectares of relatively mature Loch Katrine woodland is accounted for by a third party (SFA) and has therefore been excluded from Scottish Water's inventory.

In terms of land area, this loss has been compensated by confirmation through survey of additional woodland across Scottish Water's estate, predominantly through natural regeneration where trees have reached sufficient height and density for reclassification of the land. This will be at an earlier stage of carbon capture maturity (benefits will grow in future years).

With respect to woodland creation in SR21 a key principle of the land carbon inventory method is that we will not re-assign land to woodland until five years post-creation. This aligns with the Woodland Carbon Code and allows sufficient time to enable the planting to become established and for us to confidently report the new land cover type.

As such we expect the benefits of SR21 programmes to begin to be reflected in AR28.

Line C4.3 Total area of grassland

The reported value of 5,459 hectares is based on our major landholdings, mostly those under agricultural tenancies or grazing lets, and excludes those small areas of land associated with, for example, operational sites and assets, which were not part of our initial carbon assessment.

Some areas of grassland have been planted as woodland in AR24 and AR25. However Scottish Water will wait five years before representing this as an established land use change. Therefore new woodland creation (through planting) has not impacted grassland area in AR25.

Natural Regeneration of new woodland has been claimed in areas previously identified as grassland and further areas reclassified as moorland (Line **C4.4** "other land cover types") through the latest JHI assessment.

Line C4.4 Total area of other land cover types

The reported value of 7,701 ha, has reduced from 8,899 Ha in AR 24 includes Montane and Moorland areas, as well as Scottish Water's only arable farm. Aside from updating a policy position to prevent Muirburn (the burning of the heath and stubble on a moor) on tenanted moorland (which will come into force at the conclusion of an existing tenancy), Scottish Water has not yet sought to proactively intervene and change land types in this category.

Reductions in the area of 'other land' reported in AR25 are due to the omission of open space within the Loch Katrine woodland area that is claimed by a third party, and areas of moorland being reclassified as Regenerating Woodland. Arable and Montane remain unchanged from AR24.

Line C4.5 Total area of landholdings

The reported value of 21,980 Ha of total landholdings represents the area of land that is contributing to our carbon stocks (excluding SFA woodland areas at Loch Katrine) and flows for the carbon inventory. Our total area of landholdings remains at 23,219 Ha and is the same as AR24.

It may be appropriate to create a further line in the AR to capture the position of this SFA area of land at Loch Katrine.

Line C4.6 CO2e emissions from peatland in year

The baseline inventory reported in AR23 was 40,000 tCO2e emissions from peatland within the range 28,000 - 52,0000 tCO2e. AR23 and AR24 reported estimated benefits based on survey and restoration work, with AR24 reporting 24,956 tCO2e, noting this needed to be confirmed through the formal inventory update.

In AR25 we report a significant reduction to 16,900tCO2e emitted from peatland within a narrower range of 6,500 - 25,000 tCO2e emissions.

The main changes are attributed to improvements in peatland surveys, changes in Peatland Carbon Code factors and some restoration work in SR21. The data has helped narrow the range, but more analysis will be required to support the next 3-yearly update ahead of AR28. As current restoration data is not yet included in the current 2025 JHI Land Carbon Inventory figures, the decrease is attributed to refined assumptions and improved data, rather than changes in land condition or restoration outcomes.

JHI completed the initial baseline using national datasets, whereas site surveys have been used to update the JHI assessment where appropriate. The assessment also used the updated version 2.0 of the Peatland Code which sees changes to the emissions factors associated with Peatland Conditions, and applies further UK Greenhouse Gas guidance on % vegetative cover.

Further data improvement will continue year on year through peatland surveys for drinking water quality and carbon purposes, with a focus on further restoration and informing the next inventory update in AR28.

Line C4.7 CO2e emissions from woodland in year

AR24 reported carbon capture of -39,000 tCO2e per annum, the mid-point of a large range (-24,000 to -54,000 tCO2e) developed as part of the original baseline inventory.

AR25 reports significant changes following the JHI analysis with carbon capture dropping to -24,000 tCO2e. The fall is mainly attributed to the exclusion of 1275 hectares of woodland from Loch Katrine, where carbon is presently accounted for by a third party. Under our inventory approach we need to avoid double counting benefit. With the improvements in data used by the JHI in the 2025 update we understand this represents some 6,150 tonnes carbon capture benefit removed from the annual carbon capture inventory we are able to report for Net Zero.

In addition, woodland identified within peatland has been removed from the report as it has been deemed to be net neutral and not sequestering due to the impact on peat carbon storage.

The benefits from woodland creation in SR21 are not yet reflected in these figures - woodland needs to be established for 5 years before it can be integrated, and the benefits of SR21 woodland creation will begin to be represented in the inventory update ahead of AR28.

Line C4.8 CO2e emissions from grassland in year

The AR25 reported number of -6,450 tCO2e is the mid-point from the range -8.0k to -4.9k, a small increase from AR24 (-6,250 tCO2e) as assessed by the JHI in the inventory update. Some areas of grassland have been planted as woodland in AR25 as in AR 23 & 24 however as noted above, we will wait five years before representing this as an established land use change with associated change in emissions.

As with peatland and woodland, the confidence grade for grassland is low due to the nature of the source data. It includes both improved grassland (where there is carbon capture) and upland unimproved grazing land where carbon is being lost. It excludes the operational emissions of any land operator which are beyond the control of Scottish Water. We will work with agricultural experts to better understand and manage these emissions in future years.

Line C4.9 CO2e emissions from other land cover types in year

The reported number of 13,200 tCO2e per annum emissions is the sum of other land types in the inventory prepared by JHI and is likewise the mid-point of the range given (12,800 to 13,600 tCO2e).

Line C4.10 Total CO2e emissions from landholdings in year

The reported value of -350 tCO2e is the sum of Lines C4.6-C4.9. This has fallen from the original baseline inventory figure reported in AR23 of 2,517 tCO2e such that Scottish Water's

land is now a weak carbon sink. The most significant change between the AR23 and AR25 figure in the inventory update completed by the James Hutton Institute is the removal of a proportion of the Loch Katrine woodland from Scottish Water's formal carbon inventory. This is because it is an area of woodland created under a scheme, where the carbon benefits accrue to a third party, the Scottish Forestry Alliance (SFA). Whilst the SFA area remains part of Scottish Water's landholdings, under the current arrangements we are unable to include this within the net zero calculation owing to the need to avoid double counting benefit.

On a like for like basis our carbon capture would have been -6,150tCO_2e per annum in 2024-25, but with the removal of the SFA area this falls to -350tCO_2e. There remain wide ranges around these figures and, as noted above, the benefits from woodland creation in SR21 and the most recent peatland restoration in 2024-25 have not yet been integrated.

We will continue to undertake survey work to improve field data and reduce uncertainty, and to deliver further woodland creation and peatland restoration. AR28 will report the next formal update to our land carbon inventory when we expect to see further significant improvements in the carbon position.

5.2.1 Lines C4.11-C4.19 Carbon sequestration – progress

Line C4.11 Peatland restored in year

This reports restoration on Scottish Water and 3rd Party land, and Line C4.11 reports 555 ha across 5 sites in AR25 compared with 193 ha in AR24. This represents a record year for delivery, the bulk of which is on Scottish Water sites – Afton, Loch Katrine and Lintrathen and Backwater. Restoration at Afton is now complete and work at Loch Katrine and Lintrathen and Backwater will continue over future years. One third party land site was completed at Loch Fasgro (107 ha) as part of a water quality project.

The area of restored peatland is reviewed and agreed with NatureScot as part of the reporting to the Scottish Government and associated Peatland Action grant funding.

For the purposes of Scottish Water's land carbon inventory, only emissions from Scottish Water peatland is included.

Line C4.12 Woodland created in year

Line C4.12 reports 303 ha of woodland creation in AR25 across 21 sites. This is comprised of 208 ha of planted woodland, the most we have achieved to date, and a further 95 hectares of natural regeneration, with 92 hectares at Loch Katrine and 3 hectares at Airdrie reaching the required height and density.

As outlined in Line C4.2, new woodland will be added to the inventory after five years, once establishment is confirmed. AR28 is expected to be the first year that newly planted woodland in the early part of SR21 is included, and woodland created for AR25 will be captured in AR31

depending on success of the planting (only established woodland will be added to the inventory). Each year standard maintenance is applied to created woodland with annual inspections, maintenance and replacement of failed trees (this is known as 'beating up').

Line C4.13 Grassland restored and created in year

No grassland projects took place within the reporting year.

Line C4.14 Other land cover changes in year

No other land cover change projects took place within the reporting year.

Line C4.15 Total land area changed in year

During AR25, 858 ha of land cover change took place compared to 766 ha in AR24. (sum of **Lines C4.11- C4.14**).

Line C4.16 Peatland restored in year (forecast benefit in future years)

The reported figure of -4,392 tCO2e is an annual figure calculated based on the difference in emissions factor between actively eroding peat (the assumed original condition at the site) and drained peat, multiplied by the number of hectares restored. This is based on the positional benefits from the restoration carried out in year, which is not yet part of the formal land carbon inventory.

Monitoring in future years will provide more data on actual condition, and a formal update to the inventory to reflect the changes in AR25 will occur in AR28.

C4.17 Woodland created in year (forecast benefit in future years)

The reported figure of -1,803 tCO2e is an annual figure, which is calculated by multiplying the number of hectares planted by the sequestration rate for the type of woodland created (based on species, yield class and planting density). This is captured in the appraisal ~~document~~ for each new area of woodland. Sequestration from new woodland is not counted in the land carbon inventory for the first five years. As described in **Lines C4.2 and C4.12**, this aligns with the Woodland Carbon Code and allows sufficient time to enable the planting to become established and for us to confidently report the sequestration associated with the new land cover type. As for peatland, monitoring in future years will confirm the actual position of the woodland and we would expect woodland created in AR25 to be reported in the inventory update in AR31.

As for peatland, monitoring in future years will confirm the actual position of the woodland and we would expect woodland created in AR25 to be reported in the inventory update in AR31.

C4.18 Grassland restored and created in year (forecast benefit in future years)

There has been no activity focussed on grassland during AR25.

C4.19 Other land cover (forecast benefit in future years)

There has been no activity focussed on other land use during AR25.

5.2.2 Lines C4.20-C4.24 Expenditure

Line C4.20 Expenditure on peatland restoration in year

The expenditure figure of £4,363k consists of contractor costs for physical restoration, all overheads, surveys etc.

As with past years' figures, this should not be used to calculate £/ha or £/tCO2e avoided. Costs in year are not all directly related to restoration work in-year. In particular, the figure includes condition surveys at sites that might need full, partial or no restoration, but which is likely to take place in future years. Additionally, purchase of materials for restoration in one year may not be used until the following year.

C4.21 Expenditure on forestry creation in year

Expenditure of £1,600k consists of all costs associated with screening, surveys, site preparation (e.g. road construction, fencing, ground preparation), planting and all overheads.

As with past years' figures, this should not be used to calculate £/ha or £/tCO2e abated. Costs in-year are not all directly related to work in-year. For example, they include screening and legal work for all potential woodland sites, whether or not they prove suitable for planting (the majority of them do not); surveys and third-party time for sites that were planned for delivery (whether or not they progress in year); and early surveys for sites intended for delivery in future years (larger schemes can take 2-3 years of planning and survey).

Line C4.22 Expenditure on grassland restoration and creation in year

No grassland projects took place within the reporting year.

Line C4.23 Other land cover

No other land cover change projects took place within the reporting year.

Line C4.24 Expenditure on land managed for sequestration in year

The reported figure of £5,963k is the sum of **Lines C4.20-4.23**.

5.2.3 Lines C4.25-C4.27 Memo Lines

Line C4.25 Total area of landholdings in previous year

The total area of landholdings of 23,219 ha is the same as that given in AR24. Despite the exclusion of part of Loch Katrine from the land carbon inventory, we continue to own the land and further studies will be undertaken to further establish the responsibility for carbon in trees and peat within that area. We will continue to review our landholding sand improve our data and any changes will be reported on a three - yearly basis when the baseline work is repeated.

Line C4.26 Total CO2e emissions from landholdings in previous year

AR24 reported a sequestration level of -5,844 tCO2e, but this is superseded by the revised baseline update in AR25.

Line C4.27 Expenditure on land managed for sequestration in previous year

£1,459k was invested in projects during AR24.

Line C4.28 Resource Recovery

To be reported in AR27

Lines C4.29-C4.30 Biodiversity and nature-based solutions (interim measure)

Following analysis of public landholdings and associated designations, NatureScot has now confirmed (as of June 2025) that 9,700 hectares of Scottish Water's landholdings would be considered as "Protected Areas Managed for Nature". This covers landholdings with designations such as "Special Area of Conservation" under habitat regulations, or registered as Sites of Special Scientific Interest.

This aligns with our most recent assessment of our land holdings completed in 2024/25 and as reported in the 2025 James Hutton Institute (JHI) Land Carbon Inventory. This will also be reported in our 2026 Biodiversity Report (in line with statutory 3 yearly reporting requirements).

5.3 Investment

Related to Management Approach MA077, Scottish Water continues to improve its understanding of annual carbon capture and carbon stocks in landholdings, identifying opportunities for improvement, establishing credible and transparent mechanisms for carbon accounting and working towards delivering increases in annual carbon capture of our landholdings. We are developing partnerships with key stakeholders, such as Forestry and Land Scotland, and developing an engagement approach to work with tenant farmers, neighbours and others to facilitate the delivery of carbon capture.

5.4 Data

5.4.1 Data sources and confidence grades

Data for **Lines C4.1-C4.5** are taken from the Scottish Water land greenhouse gas baseline inventory described above. This consists of the extent of landholdings covered by Scottish Water's GIS system used to assess carbon status. This excludes those small areas of land associated with, for example, operational sites and assets, which were not part of this initial carbon assessment. The division of landholdings between the land types is based on national data sets and will be updated over time with Scottish Water site data.

Land Cover - Work commissioned, through the James Hutton Institute (JHI) in 2024-25, has delivered Scottish Water's first update to the 3-yearly land carbon inventory. This will be formally reported in the 2026 statutory Biodiversity Report. There has been substantial update to the methodology to adopt the latest Woodland and Peatland Code guidance and to include field survey data to supplement national data sets.

Using V1.1 of the Peatland Code and aligning our understanding of eroded peatland cover to the findings of the UK GHG, we assume 15% of Eroded peatland to have the emissions factor of 19.3tCO2e/yr and the remaining 85% to be equivalent to Drained 3.32tCO2e/yr. This is derived from the Peatland Carbon code v1.1, used in the first Land Carbon Inventory Report undertaken by the James Hutton Institute (JHI) in 2022. The value is the difference between the emission factor for Eroded Peatland and the Modified (post-restoration) condition. The value of 19.3 was retained between the two land carbon updates in 2021/22 and 2024/25 as it enabled a forecast potential benefit on the same basis as the Previous 2022 JHI Land Carbon Inventory.

In areas where no field data is available JHI compiled nationally available data sets (soils, land cover, habitats, national peatland assessments) on a 50x50 m grid to create an inventory for each of Scottish Water's land holdings as per the original baseline work reported in AR23 and in Scottish Water's 2023 Biodiversity Report.

The base land cover map was the freely available Land Cover of Scotland 1988 (LCS88), which represents upland landcover well. Forestry planting is the biggest land cover change since this data was derived. LCS88 was corrected for forestry planting using both Scottish

Water forestry data and the Forest Research 2019 National Forest Inventory.

As noted in commentary **Lines C4.6 and C4.7**, these national data sets will be superseded by ground-truthed field surveys where they are available. In the case of peatland, we can update this annually as the survey results become available, and for woodland as part of the three-year inventory refresh. Surveys of other land cover types are likely to take place on a site-by-

site basis, for example at Loch Katrine as part of the ten-year Land Management Plan developed with Forestry and Land Scotland.

Carbon inventory - It is important to note that carbon performance of landholdings is a relatively new and developing area, particularly for top-down national assessments. The carbon inventory is assessed using national and international principles and methods for carbon assessment, coupled with expertise from the JHI that adopts the latest academic methodologies for assessing carbon stocks and flows in land cover, soil and vegetation types, as well as national peatland inventory data for indicative condition.

As this is a developing area, a key element of the three-yearly inventory update is a commitment to review methodologies against the latest guidance, academic literature and carbon factors to ensure that they are robust. Where field surveys are completed, the inventory will be updated with the relevant ground-truthed data. Any changes in input data or method in light of new developments and field work will be explained.

Confidence grades for area **Lines C4.1-C4.5** and **Lines C4.11-C4.15** have been assigned based on the use of GIS polygons provided by our land agents, and national data sets of land cover provided and analysed by JHI.

Confidence grades for emissions/sequestration **Lines C4.6-C4.10** and **Lines C4.16-C4.19**) have been assigned based on the above land use, plus peatland condition, assumptions on tree age and use of proxy tree species for sequestration rates. All data were provided and analysed by JHI except the ground-truthed peatland conditions assessments, which were conducted by peatland experts and the subsequent emissions calculation applied after discussions with JHI.

5.4.2 Data improvement programmes

Land use and condition is expected to change over time and the strategic and field data sets used to inform it will continually be reviewed and update. Data improvement work is currently prioritising:

Land cover - Observations made over 2024/25 note that field surveys at peatland sites continue to suggest the actual extent of peatland may be considerably lower than previously estimated using national datasets. While additional data is still required to accurately assign alternative land cover and habitat types, these findings have led to a re-scoping of the survey approach. These developments will be incorporated into future survey work, which will feed into the scheduled three-yearly updates. The next updates are planned for Annual Returns AR27/28, AR28, and the Biodiversity Report in 2029.

Peatland condition - For several sites Scottish Water now has accurate peatland survey data providing condition and depth profiles, in areas where this has not been provided the National Datasets for Peatland and Soil are still used. These surveys have identified differences in peatland extent, and that there are differences between the assumed condition (which forms a broad range of carbon performance) and the confirmed field condition. Survey information has informed some of the updated inventory presented in AR25 enabling us to report a narrower

range of emissions from this type of land. In discussion with the JHI we have identified further survey needs that will allow us to progressively include more baseline data in the next inventory update, which we will report in AR28.

Woodland age and species - For woodlands outside of Loch Katrine our land agent, Bell Ingram, have provided woodland survey data giving improvements from previous years in corroborating the age and species composition of woodlands on our landholdings. A program of desk-based record searches and field surveys has been undertaken to ground-truth our woodlands and this will be used to improve our land inventory and have been included in the reported data in AR25. This has led to reduced range of estimated emissions. Data from Loch Katrine - including all 'Natural Regeneration' has been provided by Forestry and Land Scotland and from Scottish Water assessments to survey existing woodland, naturally regenerating woodland and provide data on age, species, Yield class etc to give a complete complement of field data across Scottish Water landholdings which have been included in the AR25 inventory.

Assumptions used for forecast data - the annual figure for projected emissions savings from restored peatland is currently calculated based on the difference in Peatland Code v1.2 emissions factors between actively eroding peat (the assumed original condition at the site) and drained peat, multiplied by the number of hectares restored. We do not use the lower emissions factor for the category of near natural peat, as it is thought that drained peatland is unlikely to return to near natural condition. However, findings at south Loch Katrine, where sheep were removed from the catchment, suggest this might be possible. Monitoring in future years will provide more data, and further guidance on survey approaches from JHI will inform continued improvement in baseline data for use in the inventory update to be reported in AR28.

The annual figure for projected carbon sequestration from newly created woodland is calculated by multiplying the number of hectares planted by the sequestration rate for the type of woodland created (based on species, yield class and planting density). Sequestration from new woodland is not counted for the first five years. As described in **Line C4.2**, above, this aligns with the Woodland Carbon Code and allows sufficient time to enable the planting to become established and for us to confidently report the sequestration associated with the new land cover type.