Cabinet Secretary for Net Zero and Energy Gillian Martin MSP



T: 0300 244 4000 E: scottish.ministers@gov.scot

Edward Mountain MSP Convener Net Zero, Energy and Transport Committee The Scottish Parliament Edinburah EH99 1ŠP

By email: netzero.committee@parliament.scot

20 May 2025

Dear Edward,

#### PUBLICATION OF THE SCOTTISH NITROGEN BALANCE SHEET

I am writing to advise that the Scottish Government today published the 2022 Scottish Nitrogen Balance Sheet (SNBS).

A copy of the complementary Nitrogen Progress Report, as specified under regulation 5(1)(c) of the Climate Change (Nitrogen Balance Sheet) (Scotland) Regulations 2022, has been laid in Parliament and is enclosed within this letter for your information.

The SNBS allows for tracking of nitrogen flows across different parts of Scotland's economy and environment and provides summary estimates of how efficiently nitrogen is being used which support emissions reduction planning in Scotland.

The estimates reported in the SNBS are based on multiple datasets and evidence sources and include a number of improvements and developments since last year.

If you would like further information on SNBS or the Nitrogen Progress Report, this can be provided by contacting my official

Yours sincerely,

#### **GILLIAN MARTIN**

Scottish Ministers, special advisers and the Permanent Secretary are covered by the terms of the Lobbying (Scotland) Act 2016. See www.lobbying.scot







## Nitrogen Use Efficiency in Scotland: Annual Report 2025

Laid before the Scottish Parliament by the Scottish Ministers under Section 5(1)(c) of the Climate Change (Nitrogen Balance Sheet) (Scotland) Regulations 2022

SG/2025/45



May 2025

#### Introduction

This is the third annual report under section 5(1)(c) of the Climate Change (Nitrogen Balance Sheet) (Scotland) Regulations 2022 ("the Regulations"), and complements the latest published version (the fourth publication) of the <u>Scottish Nitrogen Balance</u> <u>Sheet</u> (SNBS) for the year 2022. Section 5(1)(c) of the Regulations requires that a copy of this report is laid before the Scottish Parliament.

Section 5(2) of the Regulations requires that this report contains -

a figure for nitrogen use efficiency, and the period of time to which that figure relates,

any revised figure for nitrogen use efficiency in relation to a period of time preceding the period of time to which the report relates and the reason for the revision, and

an assessment of-

progress towards implementing proposals and policies relevant to improving nitrogen use efficiency in Scotland,

any future opportunities for improving nitrogen use efficiency in Scotland, and

how nitrogen use efficiency is expected to contribute to the achievement of future emissions reduction targets ("emissions reduction target") has the meaning given by section 98 of the Climate Change (Scotland) Act 2009)

#### Overview

As outlined in the December 2021 report on <u>Establishing a Scottish Nitrogen</u> <u>Balance Sheet</u>, the largest overall "engine" of nitrogen use in Scotland is associated with food production, and the nitrogen cycle for food production is also closely linked with waste management, through the consumption of food for human nutrition and subsequent excretion.

There are also several sets of nitrogen flows that are largely independent of the food production system, including those associated with the combustion of fossil fuels (via transport, industry and wider energy use), although these are generally much smaller in magnitude and much simpler in structure (i.e. direct emissions to the air).

The latest publication of the Scottish Nitrogen Balance Sheet, for the year 2022, includes further information for these and other sectors and incorporates methodological improvements to the balance sheet along with a summary of these improvements.

#### Nitrogen Use Efficiency

In 2022, the whole economy Nitrogen Use Efficiency (NUE) figure was 27%. Although the whole economy figure is dominated by food production, this figure is lower than the NUE for food production due to the inclusion of sources such as transport which produce no useful nitrogen outputs. The NUE for all food production is 33%, with the figure for agriculture (33%) being very similar, given that agriculture dominates food production. The 33% figure for all of agriculture comprises the value for arable agriculture of 70% and that for livestock based agriculture of 10%.

Many Nitrogen Use Efficiencies were higher this year than in previous years. This is due to higher agricultural yields and lower fertiliser use as a result of unusually good weather in 2022 for farming. Future years with more typical weather would likely show NUE values closer to previous years.

There have been broadly no major changes to NUE values calculated for previous years, however the SNBS calculations have received some methodological updates, which are outlined within the Revisions section of the SNBS.

The inherent uncertainties in the underlying data means that the SNBS may need to be revised in the future for purely technical reasons. Such revisions have the potential to affect all historic time periods referenced. Additionally, there will always be a variable level of uncertainty present due to the wide variety of data sources used, spread across a variety of administrative data, survey data and modelled data. The disparate methods will all have different levels of inherent uncertainty within them which means caution must always be taken when comparing between flows.

# Progress towards implementing proposals and policies relevant to improving nitrogen use efficiency in Scotland

The Scottish Government has a range of strategies and policy initiatives in place, across sectors of the economy, to improve the use of nitrogen and thereby reduce the harms caused by losses into the environment. These measures include:

- policies to reduce nitrogen emissions from the agriculture sector through improved efficiencies and changes in practice, in particular in the storage and use of slurry and fertiliser. The <u>Agriculture and Rural Communities (Scotland) Act</u> <u>2024</u> provides the powers required to deliver a support framework that enables high-quality food production, climate mitigation and adaptation, and nature restoration. We continue to provide guidance, advice and knowledge transfer as well as financial support for farmers and crofters to better understand and take action to improve their nitrogen use efficiency.
- policies to reduce dependence on fossil fuel combustion across the transport sector, for example by shifting to electric vehicles, which will help reduce nitrous oxide emissions, and increasing the uptake of active and sustainable travel through investment in high-quality active travel infrastructure and behaviour change initiatives.
- continuing to implement existing strategies, such as for our Cleaner Air For Scotland 2 (CAFS2) Strategy, as air pollutants (including ammonia and nitrogen dioxide (NO<sub>2</sub>)) have impacts on human health and the natural environment within Scotland.
- policies to reduce the climate and environmental impacts of waste management processes and support a transition towards a more circular economy, with the <u>Circular Economy (Scotland) Act 2024</u> setting out legislation how we will progress this policy, and <u>Scotland's Circular Economy and Waste Route Map to 2030</u>, published December 2024, setting out priorities for delivery.

#### Further information on policies

Since the publication of Scotland's <u>Climate Change Plan Update (CCPu)</u>, actions with relevance to improving Scotland's nitrogen use have been implemented.

#### Food Production: Agriculture

The Scottish Government continues to take forward actions to deliver the ambitions set in the Scottish Government's <u>Vision for Agriculture</u>. It includes a phased transitional approach to the new <u>Future Support Framework</u>, which was outlined in the updated <u>Agricultural Reform Route Map</u> during summer 2024.

<u>The Agriculture and Rural Communities (Scotland) Act 2024</u> provides the powers required to deliver the Agricultural Reform Programme and includes the facilitation of climate mitigation as an overarching objective of Scottish agricultural policy. It also introduced new requirements, including the publication of a Rural Support Plan every five years, with the first plan to be published in 2025 along with a "Code of Practice on Sustainable and Regenerative Agriculture".

To help businesses understand their current performance and identify opportunities for improvement, the <u>Whole Farm Plan</u> (WFP) will be part of the conditionality requirements for the Basic Payment Scheme in 2025. Businesses must undertake two from five baseline audits and plans: Animal Health and Welfare Plan, Biodiversity Audit, Carbon Audit, Integrated Pest Management Plan or Soil Analysis. By 2028 at the latest, all businesses will need to have all relevant plans and audits in place, including Nutrient Management Plans which are being added to the WFP by 2028.

These plans and audits help farmers understand their current performance and identify opportunities for improvement such as nutrient planning and management which can help improve nitrogen use efficiency on farms. We continue to offer funding for carbon audits and soil sampling under Preparing for Sustainable Farming.

Slurry is an important resource to supply nutrients on farm as well as a significant source of methane and nitrogen emissions. Changes to application and management practices can support improved nitrogen use efficiency. The Agricultural Transformation (Programme) Fund (ATF) supports the agricultural sector to reduce greenhouse gas emissions, improve efficiency, and enhance Scotland's natural environment through the period of transition. The capital budget for ATF in 2024 was £3 million, plus a further £1.47 million from the Agri-Environment Climate

Scheme. It extended support for slurry storage with applications exceeding the original budget of £4.47 million, including 132 applications for slurry stores with a value of £5.96 million. Additional funding was made available to meet the excess demand.

New funding was announced in February 2025 via the Future Farming Investment Scheme to offer flexible support for capital items that can be used to improve efficiency or support nature and climate-friendly farming.

In 2021, <u>The Water Environment (Controlled Activities) (Scotland) Regulations 2011</u> were amended to require the use of precision equipment to apply slurry and liquid digestate by 2023. There are transitional arrangements which provide that precision equipment to apply slurry does not require to be used until 1 January 2027, these transitional provisions do not apply to some large farms and contractors as specified in the regulations.

We continue to provide extensive guidance and advice for Scottish farmers and crofters to improve their nitrogen use efficiency:

- The <u>Farm Advisory Service</u> (FAS) provides guidance and advice on precision farming and nitrogen use efficiency as well as advice on mandatory measures as part of the <u>Action Programme for Nitrate Vulnerable Zones</u> (NVZs).
- Farming and Water Scotland provides guidance and advice to farmers and crofters on diffuse pollution and the water environment, including 'Know the <u>Rules</u>' guidance on slurry spreading requirements in the Water Environment (Controlled Activities) Scotland Regulations 2011.
- The Scottish Government provides <u>guidance for farmers</u> with holdings within NVZs to help them comply with the Action Programme for Nitrate Vulnerable Zones (Scotland) Regulations 2008.
- The <u>Prevention of Environmental Pollution from Agricultural Activity</u> (PEPFAA) code of good practice has been reviewed and updated providing practical advice to reduce nitrogen emissions to the environment while benefitting the farm business.

We continue to support research into opportunities to reduce nitrogen emissions and support improved nitrogen use efficiency (NUE) in agriculture:

- The Scottish Government commissioned ClimateXChange (CXC) to produce a report on "Target setting for nitrogen use efficiency in Scotland" which was published in November 2024. The report considered whether the Scottish National Balance Sheet (SNBS) could be utilised as a data source for developing an NUE target for Scotland. It identifies key barriers and opportunities for improving NUE and concludes that a nitrogen use efficiency target for Scottish agriculture is not currently the most appropriate option for Scotland. This is due in part to a lack of alignment between agriculture in practice and as defined through the methodology of the SNBS as well as the complexity of NUE as a concept to communicate compared to, for example, nitrogen waste.
- The <u>Environment, natural resources and agriculture Strategic Research</u> <u>Programme 2022 to 2027</u> continues to conduct research into how we can reduce emissions from agriculture, including nitrogen emissions. Projects include:
  - The Impact of Novel Crops and Farming Technologies on the Scottish Agricultural Landscape.
  - Crop Improvement for Sustainable production in a Changing Environment.
  - Exploring Barley Diversity for resilience and sustainability.

#### Food Production: Aquaculture

The Scottish Government's <u>Vision for Sustainable Aquaculture</u> to 2045, published in July 2023, sets out how the sector can contribute to our Blue Economy and Net Zero ambitions, while remaining globally recognised as innovative, productive, and sustainable. The Vision is supporting the sector to continue to thrive whilst placing a renewed emphasis on environmental protection and community benefit. It sets the future direction for the sector where it can reach net zero and adapt to the challenges arising from climate change. The Scottish Government will deliver this Vision with stakeholders including local authorities, industry, and regulators.

<u>Scotland's aquaculture website</u> includes data on annual levels of nitrogen emitted from fish farms, provided by the Scottish Environment Protection Agency (SEPA) as part of monitoring and reporting requirements it sets under the Water Environment (Controlled Activities) Regulations 2011<sup>1</sup>.

Under SEPA's regulatory framework, fish farm operators have to ensure that concentrations of nitrogen in the waterbody or local sea area in which the farm is situated will not exceed the relevant environmental standard for Dissolved Inorganic Nitrogen (DIN) in Scottish coastal waters as defined in the <u>River Basin District</u> <u>Standards Directions 2014</u>. Operators must also ensure concentrations of un-ionized ammonia do not exceed the Environmental Quality Standard of 0.021 mg/l expressed as an annual average<sup>2</sup>.

SEPA screens proposals to assess the likelihood of risks to the marine environment from compounds of nitrogen using the Equilibrium Concentration Enhancement (ECE) method described in Gillibrand et al. (2002)<sup>3</sup> for sites in sea lochs as defined in <u>guidelines</u> prepared by the Marine Directorate. SEPA applies the open water ECE method described in Gillibrand et al. (2006)<sup>4</sup> to screen sites in open waters outwith sea lochs. Where screening indicates there may be little or no capacity for further inputs of nitrogen into a sea area or where sensitive features are present that may be at risk, fish farm businesses wishing to develop or expand farms have to demonstrate, including by means of suitable marine modelling, that their proposals will not lead to adverse impacts. In cases of greatest risk, operators may need to demonstrate that their proposals will not lead to adverse impacts by means of detailed eutrophication modelling.

#### Transport

In terms of air quality pollutants (including ammonia and nitrogen dioxide NO<sub>2</sub>)), the Scottish Government in July 2021 published the <u>Cleaner Air for Scotland 2 (CAFS2)</u> <u>Strategy</u>, which sets out the policy framework for further air quality improvements

<sup>&</sup>lt;sup>1</sup> The Water Environment (Controlled Activities) (Scotland) Regulations 2011 (Regulation 8)

<sup>&</sup>lt;sup>2</sup> The River Basin District Standards Directions 2014, table C4.5 (page38).

 <sup>&</sup>lt;sup>3</sup> Gillibrand, P. A., Gubbins, M. J., Greathead, C., Davies, I. M., 2002. Scottish Executive locational guidelines for fish farming: predicted levels of nutrient enhancement and benthic impact. Scottish Fisheries Research Report Number 63 / 2002 Fisheries Research Services, Marine Laboratory, Aberdeen.
<sup>4</sup> Gillibrand P.A. (2006) Improving Assimilative Capacity Modelling for Scottish Coastal Waters: II. A Model of Physical Exchange for Open Water Sites. SAMS Marine Physics Report No. 168.

over the period 2021-2026 to protect human health and the environment. It is recognised that NO<sub>2</sub> emissions from transport and combustion more generally can have a significant impact on human health, with high concentrations present close to busy roads. CAFS2 contains a wide range of actions across a number of policy areas which will contribute to reductions in NO<sub>2</sub> emissions. This includes our strategic approach to transport through Scotland's National Transport Strategy (NTS), published in February 2020, which underpins our efforts to deliver additional air quality improvements in CAFS2.

Development of a replacement for CAFS2 will commence during 2025 and continue into 2026. The current intention is to introduce a long term policy framework to tie in with the Scottish Government's net zero target date of 2045. Co-ordinated policy implementation can deliver co-benefits for both greenhouse gas and air pollutant reductions. Areas to be considered will include continued action on transport related nitrogen oxide emissions and the role that good agricultural practice can play in reducing the impact of ammonia on sensitive habitats and ecosystems, and as a significant component of fine particulate matter, one of the air pollutants of most concern for human health.

At its core, the NTS embeds the Sustainable Travel Hierarchy in decision making by promoting walking, wheeling, cycling, public transport and shared transport in preference to private car. It further embeds the Sustainable Investment Hierarchy in investment decisions that recognise the need to reduce unsustainable travel and focus on maintaining and safely operating existing assets over investment in targeted infrastructure improvements.

Annual NTS Delivery Plans set out the actions being taken across the Scottish Government to deliver our shared vision for transport. These actions will deliver a transformational shift away from the most polluting vehicles towards zero emission vehicles and more sustainable travel options, thereby reducing air quality pollutants.

The fourth Delivery Plan, published in December 2024, sets out the range of actions the Scottish Government will take until the end of 2025 and makes reference to the need for a mix of public and private finance to deliver more zero-emission buses and coaches, to establish a network of charging facilities open to a range of heavy-duty vehicle fleet operators, to continue to develop our public electric vehicle (EV) charging network and to transition to zero emission Heavy Duty Vehicles.

Low Emission Zones (LEZs) are now fully operational in Scotland's 4 largest cities: Aberdeen, Dundee, Edinburgh and Glasgow. The Glasgow LEZ-wide reduction in vehicular NOx emissions, compared with pre-LEZ levels, has been around 70% (comparing the year 2018 with 2024). Glasgow's LEZ began in 2018 with a phased approach to improving emissions from the city bus fleet and was expanded to cover enforcement of all vehicle types in 2023, with limited local grace periods and exemptions. It is expected that vehicular NOx emissions for Aberdeen, Dundee and Edinburgh will also be reduced.

The <u>Heavy Goods Vehicle (HGV) Decarbonisation Pathway for Scotland</u>, published in March 2024 and produced by the Zero Emission Truck Taskforce including the haulage, manufacturing, energy, government, union and finance sectors, identifies the barriers to the adoption of zero emission trucks and ways in which they might be overcome. The pathway commits the members of the taskforce, including government, to work towards the decarbonisation of trucks, assess progress annually and identify where action may be required to accelerate progress.

In support of the pathway, Transport Scotland published analysis in September 2024 of the likely requirements for charging and fuelling infrastructure for zero emission trucks, based on journey data from a sample of fleets. This analysis will be updated with more data as it becomes available to inform investment decisions by the energy sector, haulage sector, chargepoint providers and others.

The <u>Vehicle Emissions Trading Schemes (VETS) Order 2023</u> is currently the single most effective policy measure for reducing transport emissions in Scotland. As a result of VETS, we anticipate a reduction in cumulative emissions of 40 MtCO2e by 2040, equivalent to the total emissions produced by the entire Scottish economy in 2022. Successful implementation of VETS does, it must be noted, assume complementary policy support such as the provision of EV charging and support for EV adoption.

In June 2023 the Scottish Government published <u>its vision for a public EV charging</u> <u>network</u> that is comprehensive and convenient, meets the needs of all users, is grown with private investment, powered by clean, green energy and complements the wider sustainable transport system. In October 2024 <u>Scotland met the national</u> <u>target for 6,000 public EV charge points</u> two years ahead of schedule, as a result of public funding and increasing private sector investment. In December 2024 the Scottish Government published a <u>draft Implementation Plan</u> outlining the key actions that will deliver Scotland's Vision for public EV charging, including a route map for delivering approximately 24,000 additional public EV charge points by 2030, largely funded and delivered by the private sector.

Since 2011 the Scottish Government has invested over £65 million in expanding public EV charging across Scotland and the Scottish Government is continuing to invest through the £30 million EV Infrastructure Fund, which supports local authorities across Scotland to work in partnership with the private sector to continue to expand public EV charging, with public funding specifically targeting those areas of the country less likely to benefit from standalone private sector investment in public EV charging, including rural and island communities. The private sector is also making significant investments in public EV charging in Scotland and is estimated to have invested between £25 million and £35 million in 2023 and £40 million £55 million in 2024.

#### Humans and settlements (including waste management)

Moving to a circular economy in Scotland is key to ensuring optimal, sustainable use of nitrogen inputs to the economy, for example reducing waste, reusing and recycling nitrogen, and minimising losses of nitrogen into the environment. Our CCPu set out our circular economy vision that by 2045 Scotland's cultural, social and business norms will be driven by a focus on:

- Responsible Production, where a circular economy is embraced by the businesses and organisations that supply products, ensuring the maximum life and value from the natural resources used to make them.
- Responsible Consumption, where people and businesses demand products and services in ways which respect the limits of our natural resources. Unnecessary waste, in particular food waste, will be unacceptable in Scotland.

• Maximising Value from Waste and Energy, where the environmental and economic value of wasted resources and energy is harnessed efficiently.

To achieve this, and reduce nitrogen loss, we need fundamental changes in the way that resources are produced, consumed and managed. This means accelerating action across society to reduce the demand for raw material in products; encourage reuse and repair through responsible production and consumption; and recycle resources and energy to maximise the value of any waste that is generated, while minimising environmental and climate impacts.

To lay the foundations for this transformation, the Scottish Government published <u>Scotland's Circular Economy and Waste Route Map to 2030</u> in December 2024, the Route Map takes into account the feedback from two consultations that were held in 2022 and in early 2024. It outlines 11 strategic priorities for delivery through to 2030 to accelerate more sustainable use of our resources across the waste hierarchy, and how we will deliver and coordinate these actions to achieve maximum positive impact for communities and businesses in Scotland.

The <u>Circular Economy (Scotland) Act 2024</u> was unanimously passed in its final parliamentary vote in June 2024 and received Royal Assent on 8 August 2024. The Act establishes the legislative framework to support Scotland's transition to a zero waste and circular economy, significantly increase reuse and recycling rates, and modernise and improve waste and recycling services.

The Route Map and Circular Economy (Scotland) Act 2024 complement the existing, wide-ranging measures we have delivered or are delivering to meet our sustainable resource objectives, improve how efficiently nitrogen is used and support our drive to tackle climate change (including those policies and proposals outlined in the CCPu). Addressing nitrogen losses associated with food production and consumption is a significant challenge. Food waste reduction measures are one aspect of this. In 2024, further engagement has taken place working with WRAP UK and we continue to help fund their UK Food and Drink Pact programme to listen, learn and work with representatives across the food and drink industry on opportunities to reduce food waste. Engagement across the UK four nations has also continued to grow throughout 2024/2025 and this has explored opportunities for alignment to reduce

food waste. However, the 2024 publication of 'The 2021 Food Waste Estimate' revealed food waste in Scotland has increased since 2013.<sup>5</sup> We are developing work that will have an impact in the future and this is summarised in the 'Future opportunities for improving nitrogen use efficiency in Scotland' section.

Current measures to divert waste from landfill include a ban on biodegradable municipal waste going to landfill from 31 December 2025, and ongoing support for local authorities to secure contracts that comply with the ban. Our £70 million Recycling Improvement Fund was launched in March 2021, and more than £66 million has been awarded to 27 local authority projects to improve recycling infrastructure, projected to save over 57,000 tonnes of CO2e per year. This includes funding improvements to food waste recycling across Scotland. By reducing food waste sent to landfill we are preventing valuable nutrients from being lost. Reducing the amount of food, and other wastes with a high nitrogen content, sent to landfill can reduce the nitrogen content of landfill leachate, and therefore, reduce the amount released to the environment.

#### Forests, woodlands and terrestrial semi-natural ecosystems

Woodland creation and management in Scotland are underpinned by the internationally recognised principles of Sustainable Forest Management, as defined in the <u>UK Forestry Standard (UKFS)</u>. Version 5 of the UKFS, which came into effect from October 2024, is the technical standard for forestry in Scotland and sets out the legal and good practice requirements to be followed. The Scottish Government supports tree planting through the <u>Forestry Grant Scheme</u> for which, compliance with the UKFS is required to obtain funding. Through detailed guidelines, the UKFS gives considerable safeguards to protect the soil and water environment from nitrate saturation, leaching and runoff.

Scottish Forestry supports the <u>Forestry and Water Scotland Website</u> which is a collaborative project to ensure best practice across the sector with a focus on protecting and improving Scotland's water environment by reducing rural diffuse pollution. A recent publication posted on the site is guidance <u>Managing Forest</u>

<sup>&</sup>lt;sup>5</sup> 2021 Food Waste Estimate: <u>mf-cdtg7vnr-1696942041d</u>

<u>Operations to Protect the Water Environment</u> that reflects the enhanced minimum buffer protection as outlined in newest version of the UKFS.

SEPA and NatureScot in partnership with United Kingdom Centre for Ecology and Hydrology (UKCEH) have developed a web application that provides access to the latest modelled estimates of nitrogen deposition and ammonia concentrations at a site level for protected areas. The data presented in the app allow the Scottish agencies to work more collectively towards reducing the impacts of nitrogen on the environment. The app also assists with identifying areas that require specific attention, with promoting mitigation measures and monitoring impacts on our habitats. The app also supports more direct action working with landowners to develop and implement local emission reduction measures to improve protection to sensitive habitats.

A specific example where use of the app can support nitrogen management is around the rearing of pigs and poultry. Rearing pigs and poultry above thresholds listed in Schedule 1, Section 6.9 Part A of The Pollution Prevention and Control (Scotland) Regulations 2012 (PPC Regs) requires a permit to operate. When determining applications for a permit under the PPC Regs, SEPA must be mindful of the wider duties imposed by the Habitats Regulations (Conservation (Natural Habitats, &c.) Regulations 1994) and the Nature Conservation (Scotland) Act 2004 for the protection of designated sites due to atmospheric nitrogen.

The app allows permitting staff to understand the impact of other sources of atmospheric nitrogen around a designated feature and provides information to inform a decision on whether a new proposal can be permitted. SEPA use the app to identify areas where additional sources of atmospheric nitrogen are likely to cause damage to protected sites. This allows SEPA to advise applicants at an early stage that mitigation will be required to bring down the process contribution.

#### Future opportunities for improving nitrogen use efficiency in Scotland

In parallel to a programme of ongoing technical development and monitoring of the SNBS, the Scottish Government will also continue to explore opportunities to integrate new evidence provided by the SNBS into wider policy frameworks and structures, including the draft Climate Change Plan which is due to be published later this year.

#### Food Production: Agriculture

The next Climate Change Plan will set out policies and proposals up to 2040 on how the agriculture sector will continue to play its part in meeting our ambitious net zero national target by 2045, including by reducing nitrogen emissions and improving nitrogen use efficiency.

#### Food Production: Aquaculture

Our <u>Vision for Sustainable Aquaculture</u> (July 2023) includes outcomes related to climate change with an ambition to see the aquaculture sector play its part in Scotland achieving Net-Zero emissions by 2045, transitioning to a zero waste and circular economy and improving nitrogen use efficiency by reducing waste discharge, capturing more waste and exploring more opportunities for best use.

#### Transport

Among the most significant transport-related action which will continue to play an important role in reducing nitrogen use is the Vehicle Emissions Trading Scheme (VETS). Following a public consultation on proposed amendment to VETS between 24 December 2024 and 18 February 2025 led by the UK Government, a four-nation consultation response was published in April 2025, with amendments to update VETS to follow. The proposed long term policy framework to replace the Cleaner Air for Scotland 2 strategy will also make a significant contribution to further action on nitrogen.

Scottish Forestry funds projects that remove HGV timber lorries from the roads and move timber movements onto ships. In addition, Scottish Forestry is currently supporting a trial of two fully electric HGVs for timber haulage which reduce carbon and nitrogen emissions. The aim of this trial is to explore the practical benefits and challenges of moving from diesel to electric motors.

#### Humans and settlements (including waste management)

By reducing demand for new products and virgin materials and driving down the amount of material disposed of via landfill and energy from waste, a range of negative pollution impacts, including nitrogen, on biodiversity, air, bodies of water, and soils can be avoided. The 2030 Circular Economy and Waste Route Map's <u>Strategic Environmental Assessment (SEA) Report</u> found that there was clear potential to reduce nitrogen pollution in Scotland via delivery of Route Map measures, for example as a result of a reduction in traffic congestion, reducing food waste and landfill leachate.

The Route Map has outlined the new direction of travel for food waste reduction work to 2030. It includes two priority actions: to develop with stakeholders effective options to implement mandatory public reporting for food waste and surplus by businesses, and develop an intervention plan to guide long-term work on household food waste reduction behaviour change. We will inform future action as we learn more through our work with stakeholders on mandatory reporting, testing interventions for households and from research recommendations. Future commitments will complement the Good Food Nation (Scotland) Act 2022, where all policy decisions regarding food will help make Scotland a Good Food Nation.

As well as key steps to drive more sustainable resource use and to cut waste, the Route Map also set out further steps to 2030 to minimise environmental and climate impacts from materials that cannot be avoided, reused, or recycled.

Priority actions underway or planned from the Route Map include the development of a Residual Waste Plan to ensure the best environmental outcome for unavoidable and unrecyclable waste and set strategic direction for management of residual waste to 2045, and facilitation of the development of a Sector-Led Plan to minimise the carbon impacts of the Energy from Waste Sector. Through these Plans it will be important to consider nitrogen-based emissions (for example nitrogen oxides (NOx) and ammonia (NH3) emissions).<sup>6</sup>

<sup>&</sup>lt;sup>6</sup> Existing regulations for waste incineration require abatement for NOX and require continuous monitoring with an emission limit value of 150mg/Nm3 (daily average). There is also continuous monitoring for NH3 (ELV of 10mg/ Nm3) for sites which employ SCR or SNCR abatement techniques.

The Scottish Government has also commenced a process to co-design a new household recycling Code of Practice with local authorities and other waste sector stakeholders. The new Code will aim to increase recycling and reuse rates, divert materials from residual waste, and deliver better, more consistent services across Scotland. A priority will be to ensure that improved recycling services reduce the emissions associated with the waste sector and service design will include assessments of the impact on emissions.

Other actions in recycling and waste management include <u>consultation</u> (published in March 2025) on the current approach to the rural exemption for food waste recycling and whether that should continue in its current form, be amended or be discontinued; the approach to textile recycling, including whether to make kerbside collection of textiles by local authorities a mandatory service or increase textile reuse and recycling through other means.

Building on the forthcoming December 2025 ban on biodegradable municipal waste going to landfill, consideration is also being giving to extending the ban to include non-municipal biodegradable (and other) wastes. <u>A call for evidence</u> was launched in March 2025.

#### Forests, woodlands and terrestrial semi-natural ecosystems

Scottish Forestry is keeping under review the scope for potential policies within this subject area.

#### How nitrogen use efficiency is expected to contribute to the

#### achievement of future emissions reduction targets

Nitrous oxide (N<sub>2</sub>O), which is a greenhouse gas, amounts to around 7 kt N / yr of these total emissions. The majority of nitrous oxide emissions come from agriculture (5.1 kt N / yr) with other contributions from land use and land use change (1 kt N / yr) and more minor ones from industry, transport and waste processing. Nitrous oxide is a potent greenhouse gas, with a global warming potential (i.e. conversion factor to carbon dioxide equivalent) of 265 times stronger than CO<sub>2</sub>. Scottish greenhouse gas

emissions statistics for  $2022^7$  show that the 7 kt of N in the nitrous oxide emissions amounted to 2.9 Mt of CO<sub>2</sub> equivalent emissions, which represented 7.2% of Scotland's net greenhouse gas emissions for that year<sup>8</sup>. This makes it the third most significant greenhouse gas, after CO<sub>2</sub> (which represents 66.2% of the net emissions) and methane (which represents 25.0% of the net emissions).

We are considering new opportunities to increase nitrogen use efficiency in the development of policies for the next Climate Change Plan to assist in meeting our target of net zero by 2045. Further opportunities will be considered through the development of future strategies and plans for relevant sectors and will be outlined in future SNBS reports.

<sup>&</sup>lt;sup>7</sup> Scottish Greenhouse Gas Statistics 2022 - gov.scot (www.gov.scot)

<sup>&</sup>lt;sup>8</sup> By convention, shares of emissions are assessed against net emissions for a given year, i.e. the net  $CO_2$  equivalent gasses added to the atmosphere in that year. However, it would also be valid to compare against gross emissions, excluding removals of  $CO_2$  from the atmosphere from land use, land use change and forestry (LULUCF). On that basis the share of nitrous oxide to gross emissions in 2020 was 5.7 per cent.



© Crown copyright 2025

### OGL

This publication is licensed under the terms of the Open Government Licence v3.0 except where otherwise stated. To view this licence, visit **nationalarchives.gov.uk/doc/open-government-licence/version/3** or write to the Information Policy Team, The National Archives, Kew, London TW9 4DU, or email: **psi@nationalarchives.gsi.gov.uk**.

Where we have identified any third party copyright information you will need to obtain permission from the copyright holders concerned.

This publication is available at www.gov.scot

Any enquiries regarding this publication should be sent to us at

The Scottish Government St Andrew's House Edinburgh EH1 3DG

ISBN: 978-1-83691-602-4 (web only)

Published by The Scottish Government, May 2025

Produced for The Scottish Government by APS Group Scotland, 21 Tennant Street, Edinburgh EH6 5NA PPDAS1579714 (05/25)

www.gov.scot