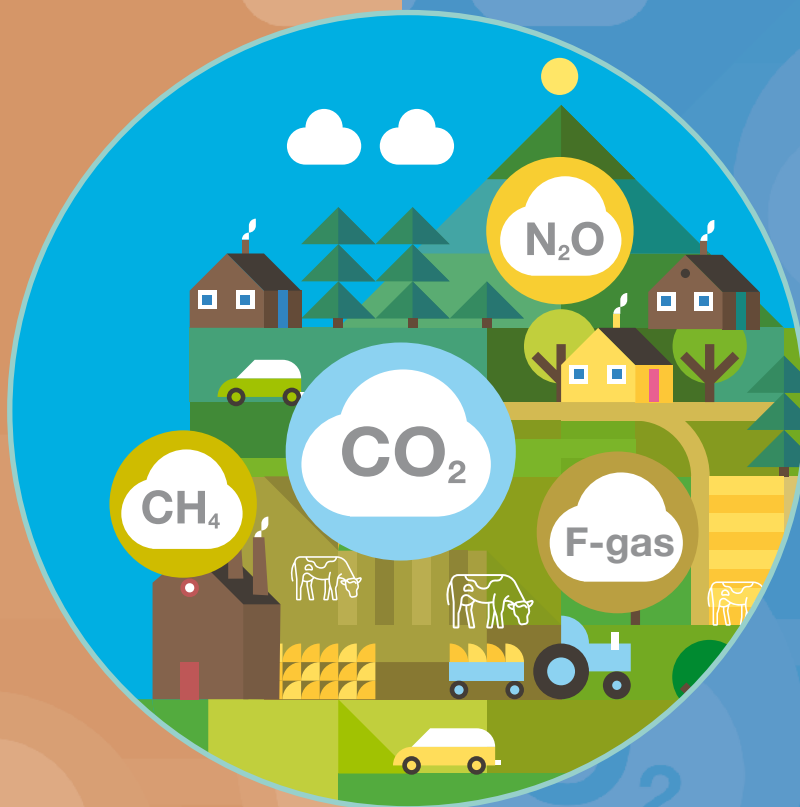


Quarterly Greenhouse Gas Emissions Indicator Report

2025 Quarter 3

January 2026



Environmental Protection Agency

The EPA is responsible for protecting and improving the environment as a valuable asset for the people of Ireland. We are committed to protecting people and the environment from the harmful effects of radiation and pollution.

The work of the EPA can be divided into three main areas:

- **Regulation:** Implementing regulation and environmental compliance systems to deliver good environmental outcomes and target those who don't comply.
- **Knowledge:** Providing high-quality, targeted and timely environmental data, information and assessment to inform decision making.
- **Advocacy:** Working with others to advocate for a clean, productive and well-protected environment and for sustainable environmental practices.

Our responsibilities include:

LICENSING

- Large-scale industrial waste and petrol storage activities;
- Urban wastewater discharges;
- The contained use and controlled release of genetically modified organisms;
- Sources of ionising radiation;
- Greenhouse gas emissions from industry and aviation through the EU Emissions Trading Scheme.

NATIONAL ENVIRONMENTAL ENFORCEMENT

- Audit and inspection of EPA-licensed facilities;
- Drive the implementation of best practice in regulated activities and facilities;
- Oversee local authority responsibilities for environmental protection;
- Regulate the quality of public drinking water and enforce urban wastewater discharge authorisations;
- Assess and report on public and private drinking water quality;
- Coordinate a network of public service organisations to support action against environmental crime;
- Prosecute those who flout environmental law and damage the environment.

WASTE MANAGEMENT AND CHEMICALS IN THE ENVIRONMENT

- Implement and enforce waste regulations including national enforcement issues;
- Prepare and publish national waste statistics and the National Hazardous Waste Management Plan;
- Develop and implement the National Waste Prevention Programme;
- Implement and report on legislation on the control of chemicals in the environment.

WATER MANAGEMENT

- Engage with national and regional governance and operational structures to implement the Water Framework Directive;
- Monitor, assess and report on the quality of rivers, lakes, transitional and coastal waters, bathing waters and groundwaters, and measurement of water levels and river flows.

CLIMATE SCIENCE AND CLIMATE CHANGE

- Publish Ireland's greenhouse gas emission inventories and projections;
- Provide the Secretariat to the Climate Change Advisory Council and support to the National Dialogue on Climate Action;
- Support National, EU and UN climate science and policy development activities.

ENVIRONMENTAL MONITORING & ASSESSMENT

- Design and implement national environmental monitoring systems: technology, data management, analysis and forecasting;
- Produce the State of Ireland's Environment and Indicator Reports;
- Monitor air quality and implement the EU Clean Air for Europe Directive, the Convention on Long Range Transboundary Air Pollution and the National Emissions Ceiling Directive;
- Oversee the implementation of the Environmental Noise Directive;
- Assess the impact of proposed plans and programmes on the Irish environment.

ENVIRONMENTAL RESEARCH AND DEVELOPMENT

- Coordinate and fund national environmental research activity to identify pressures, inform policy and provide solutions;
- Collaborate with national and EU environmental research activity.

RADIOLOGICAL PROTECTION

- Monitoring radiation levels and assess public exposure to ionising radiation and electromagnetic fields;
- Assist in developing national plans for emergencies arising from nuclear accidents;
- Monitor developments abroad relating to nuclear installations and radiological safety;
- Provide, or oversee the provision of, specialist radiation protection services.

GUIDANCE, AWARENESS RAISING, AND ACCESSIBLE INFORMATION

- Provide independent evidence-based reporting, advice and guidance to government, industry and the public on environmental and radiological protection topics;
- Promote the link between health and wellbeing, the economy and a clean environment;
- Promote environmental awareness including supporting behaviours for resource efficiency and climate transition;
- Promote radon testing in homes and workplaces and encourage remediation where necessary.

PARTNERSHIP AND NETWORKING

- Work with international and national agencies, regional and local authorities, non-governmental organisations, representative bodies and government departments to deliver environmental and radiological protection, research coordination and science-based decision making.

MANAGEMENT AND STRUCTURE OF THE EPA

The EPA is managed by a full-time Board, consisting of a Director General and five Directors. The work is carried out across five Offices:

- Office of Environmental Sustainability
- Office of Environmental Enforcement
- Office of Evidence and Assessment
- Office of Radiation Protection and Environmental Monitoring
- Office of Communications and Corporate Services

The EPA is assisted by advisory committees who meet regularly to discuss issues of concern and provide advice to the Board.



Quarterly Greenhouse Gas Emission Indicator Report 2025 Quarter 3

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Summary for Policy Makers

This summary provides a high-level overview of progress and short-term changes. Ireland’s greenhouse gas (GHG) emissions continue to trend downward overall, in line with trends reported in the Provisional National Inventory for 1990-2024, though sectoral patterns remain mixed, and the pace of reductions remains insufficient.

January-September 2025 vs January-September 2024

Over the first three quarters of 2025, GHG emissions are down -1.5% compared to the same period in 2024. This aligns with the annual Provisional Inventory trend for 2024, which showed a second consecutive annual decline in national emissions (-2.0%) and continued reductions in Electricity and Agriculture sectors. Emission reductions were observed in almost all sectors, except Commercial Buildings and the ‘Other’ sector comprised of a diversity of smaller sectors including petroleum refining and fluorinated gas use.

Main drivers	
Residential Buildings	-8.9% drop in emissions reflecting lower heating demand due to milder conditions (7.8% fewer heating degree days).
Agriculture	-0.6% emission reduction driven by reduced national cattle numbers (-3.8%).
Changes in other sectors	
Transport	-0.8% reduction in emissions due to less emissions from road transportation (-3.0%) masked by increased emissions from shipping between Irish ports.
Electricity	-1.0% decrease in emissions due to the ongoing decarbonisation of the sector in combination with increased importation.
Industry	-1.0% drop in emissions due to reductions in fossil fuel use in manufacturing.
Commercial Buildings	Slight increase of +0.6%; emissions in this sector are relatively static across quarters in comparison to residential buildings.
Other	+6.0% increase in emissions; a petroleum refinery was offline for essential maintenance for most of 2024 and this increase represents a return to average emissions in this sector.

1. Key Findings

Please note that all quoted figures in Key Findings are comparing emissions at the end of Quarter 3 2025 with emissions at the end of Quarter 3 2024 unless otherwise indicated. Emissions are broken down by Climate Action Plan-aligned sectors, excluding LULUCF (Land Use, Land Use Change and Forestry).

Quarterly figures are more susceptible to volatility and seasonality, particularly in the case of comparison to the previous quarter. In addition, these data have been seasonally adjusted to provide a clearer picture of underlying trends by eliminating the noise caused by seasonal fluctuations.

An increase or decrease in quarterly emissions does not indicate an overall yearly change in the same direction.

Looking at Year-to-Date 2025 compared to Year-to-Date 2024:

- Overall greenhouse gas emissions decreased by -1.5% (-554.3 kt CO₂ eq) compared to Year-to-Date 2024.
- The largest decrease in emissions occurred in the Buildings (-377.3 kt CO₂ eq) sector, followed by the Agriculture (-86.0 kt CO₂ eq) sector.
- The largest increase in emissions occurred in the Other (+59.4 kt CO₂ eq) sector.

Looking at Quarter 3 2025 compared to Quarter 3 2024:

- Overall greenhouse gas emissions decreased by -2.8% (-359.0 kt CO₂ eq) compared to Quarter 3 2024.
- The largest decrease in emissions occurred in the Agriculture (-184.2 kt CO₂ eq) sector, followed by the Electricity (-88.9 kt CO₂ eq) sector.
- The largest increase in emissions occurred in the Other (+17.1 kt CO₂ eq) sector.

Contents Page	Q3 2025 Summary	Agriculture	Electricity	Industry	Data
Key Findings	Sectoral Summaries	Transport	Buildings	Other	Methodological Notes

Table 1: Key Findings

Sector	Key Finding
Q3 2024 vs. Q3 2025	GHG emissions decreased by -2.8% (-359.0 kt CO ₂ eq) driven mainly by a -3.8% decrease in the Agriculture sector (-184.2 kt CO ₂ eq), due to decreased total fertiliser sales and reduced cattle numbers, and a -5.8% reduction in Electricity sector emissions (-88.9 kt CO ₂ eq), due to increased generation from renewables.
Agriculture	Emissions decreased by -3.8% (-184.2 kt CO ₂ eq), primarily due to a 23.0% fall in total fertiliser sales and a 3.4% reduction in cattle numbers (-1.4% dairy cows, -3.9% other cattle).
Transport	Transport emissions increased marginally by 0.1% (+1.6 kt CO ₂ eq). A -2.4% decline in Road Transport emissions (-64.5 kt CO ₂ eq) was offset by a +66.0 kt CO ₂ eq rise in Domestic Navigation, resulting in a small net increase in sectoral emissions.
Electricity	Emissions decreased by -5.8% (-88.9 kt CO ₂ eq) despite a 3.1% increase in overall electricity supply. This was achieved by a 9.8% increase in renewable sources of electricity generation and a 2.7% increase in imports.
Buildings – Commercial & Public	Emissions decreased slightly in the Commercial Services sector -1.0% (-3.9 kt CO ₂ eq) due to reduced fossil fuel use during the quarter.
Buildings – Residential	Emissions decreased by -4.3% (-64.0 kt CO ₂ eq) due to reduced heating demand: there were 27.5% fewer heating degree days (HDD, days with average temperature below 15.5 degrees Celsius where heating would be needed) compared to the same quarter in 2024.
Industry	Emissions fell by 2.7% (-36.8 kt CO ₂ eq), primarily due to reductions in both process and combustion emissions from cement production, as well as combustion-related decreases across other industries within the Manufacturing Combustion subsector.
GHG Emissions Q2 2025 to Q3 2025	GHG emissions increased by +1.5% (+179.5 kt CO ₂ eq) compared to Quarter 2 2025, on a seasonally adjusted basis, driven by increases in the Buildings sector (+331.1 kt CO ₂ eq) despite emission reductions in all other sectors.
GHG Emissions YTD 2024 to YTD 2025	Comparing the YTD of 2025 with 2024, emissions have decreased by -1.5% (-554.3 kt CO ₂ eq), largely driven by decreases in the Buildings sector (-377.3 kt CO ₂ eq), due to lower heating demand, and the Agriculture sector (-86.0 kt CO ₂ eq), due to a -3.8% reduction in total cattle numbers.

Table 2 shows the year-on-year changes for Quarter 3 2025 compared to Quarter 3 2024, quarter-on-quarter changes for Quarter 3 2025 compared to Quarter 2 2025, and year-to-date changes for 2025 compared to 2024.

Table 2: Key Findings

Sector	Emissions Q3 2025 (kt CO ₂ eq)	Comparison with Q3 2024 (%)	Comparison with Q2 2025 (%)	YTD 2025 vs. 2024 (%)
Overall	12,406.5	-2.8	1.5	-1.5
Agriculture	4,664.3	-3.8	-1.0	-0.6
Buildings	1,803.5	-3.6	22.5	-7.0
Electricity	1,442.5	-5.8	-2.5	-1.0
Industry	1,326.0	-2.7	-0.7	-1.0
Other	346.1	5.2	-0.2	6.0
Transport	2,824.2	0.1	-1.9	-0.8

2. Quarter 3 2025 Summary

This section presents the key high-level emissions estimates for Quarter 3 2025, followed by further sectoral analysis in Section 3.

Figure 1 shows that from a high in Q2 2018 overall emissions are on a downward trend with marked drop in emissions during the Covid-19 pandemic lockdown in Q2 2020.

Similarly, Figure 2 summarises emissions per Climate Action Plan-aligned sector, excluding LULUCF (Land Use, Land Use Change and Forestry). Since 2018, the broadly consistent trend in emissions reductions can be seen in the Buildings, Electricity and Industry sectors. The only major change was in Q2 2020 and Q2 2021 during the Covid-19 pandemic lock downs, with marked reductions in transport emissions. Agriculture remains the largest source of emissions throughout this period and the ‘Other’ sector (waste, petroleum refining and fluorinated gases) the smallest source.

Figure 1: Overall quarterly movement in greenhouse gas emissions for all sectors from Q1 2018 to Q3 2025

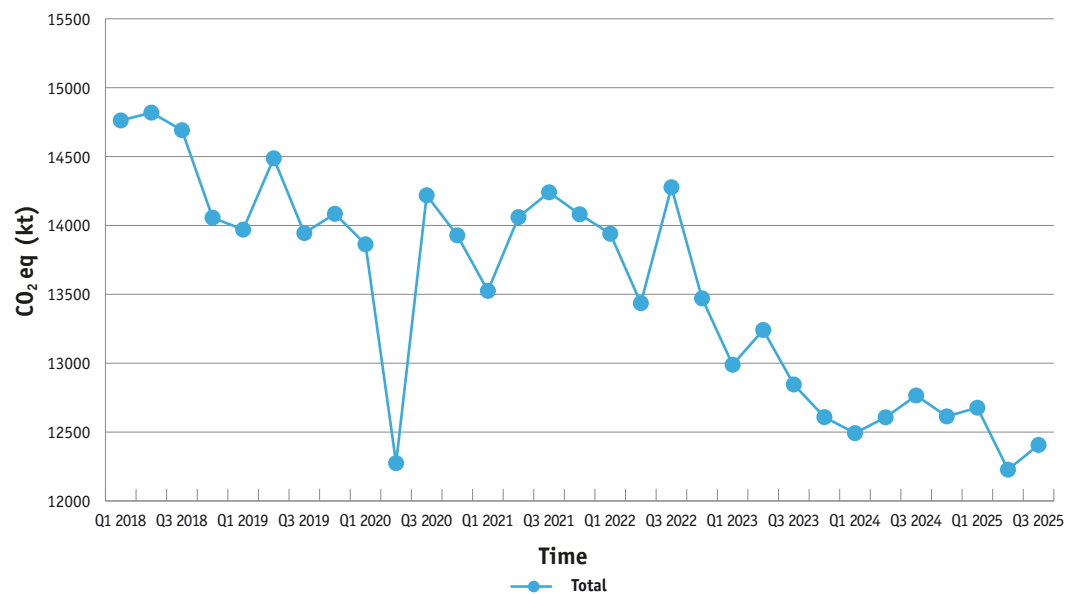
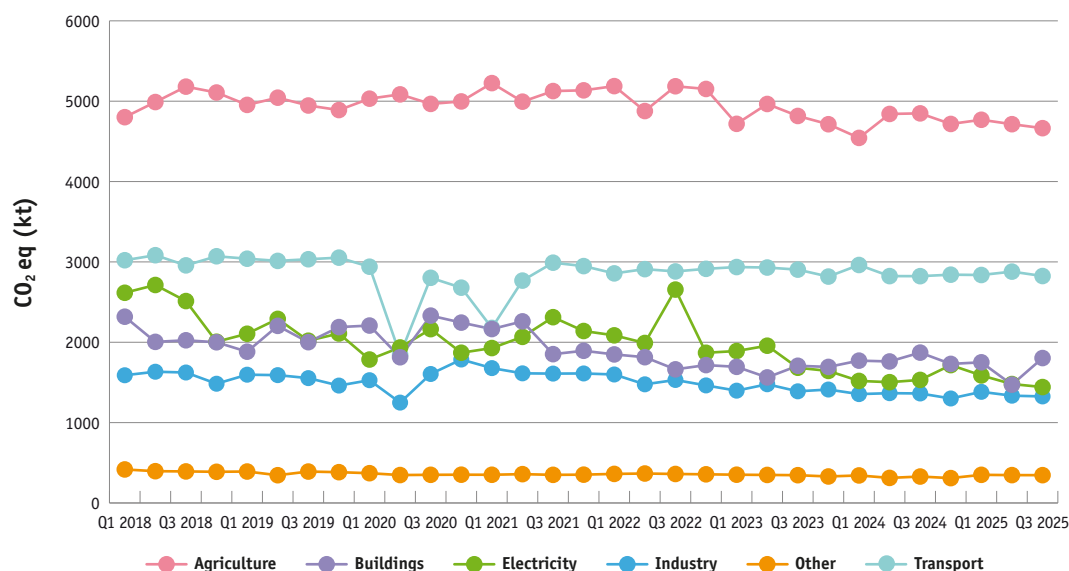


Figure 2: Overall quarterly movement in greenhouse gas emissions for all Sectors from Q1 2018 to Q3 2025



2.1 Year-on-Year Change

In this section we look at the emissions for Quarter 3 2025 and compare them to Quarter 3 2024. We will also provide cumulative emissions for the first three quarters of 2025 in comparison to the first three quarters of 2024.

Key finding:

- Overall GHG emissions decreased by -2.8% (-359.0 kt CO₂ eq) compared to Quarter 3 2024, driven mainly by decreases in the Agriculture sector (-184.2 kt CO₂ eq) due to decreased total fertiliser sales and reduced cattle numbers, the Electricity sector (-88.9 kt CO₂ eq) due to increased electricity generation from renewables, and the Buildings sector (-67.8 kt CO₂ eq) due to a -27.5% decrease in heating degree days.

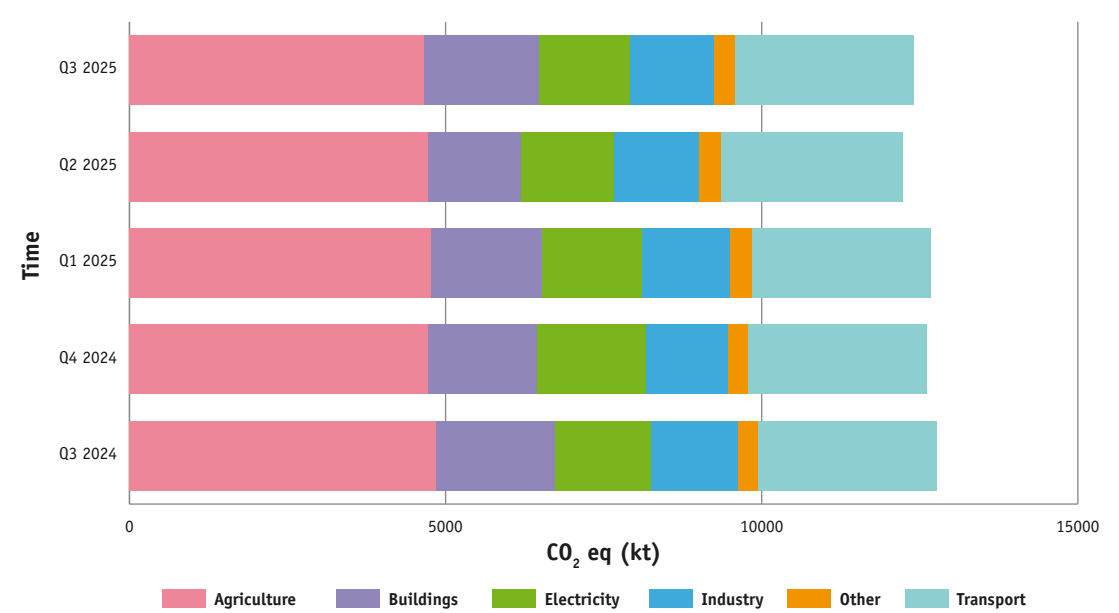
Looking at Quarter 3 2025 compared to Quarter 3 2024:

- Overall greenhouse gas emissions decreased by -2.8% (-359.0 kt CO₂ eq) compared to Quarter 3 2024.
- The largest decrease in emissions occurred in the Agriculture sector (-184.2 kt CO₂ eq), followed by the Electricity sector (-88.9 kt CO₂ eq).
- The largest increase in emissions occurred in the Other sector (+17.1 kt CO₂ eq).

Table 3: Summary Q3 2025 Compared to Q3 2024

Sector	Greenhouse Gas	Emissions Q3 2025 (kt CO ₂ eq)	Comparison to Q3 2024	
			(kt CO ₂ eq)	(%)
Overall		12,406.5	-359.0	-2.8
Agriculture	CH ₄ , CO ₂ , N ₂ O	4,664.3	-184.2	-3.8
Buildings	CH ₄ , CO ₂	1,803.5	-67.8	-3.6
Electricity	CO ₂	1,442.5	-88.9	-5.8
Industry	CO ₂	1,326.0	-36.8	-2.7
Other	CH ₄ , N ₂ O, HFC, PFC, SF ₆ , NF ₃	346.1	17.1	5.2
Transport	CO ₂	2,824.2	1.6	0.1

Figure 3: Overall quarterly movement in greenhouse gas emissions for all Sectors from Q3 2024 to Q3 2025



2.2 Year-to-Date Change

Key finding:

- Overall GHG emissions decreased by -1.5% (-554.3 kt CO₂ eq) compared to the same period in 2024, driven mainly by decreases in the Buildings sector (-377.3 kt CO₂ eq) due to -7.8% less days with average temperature below 15.5 degrees Celsius (Heating Degree Days) than the first three quarters of 2024 indicating decreased demand for heating, and the Agriculture sector (-86.0 kt CO₂ eq) driven by a -3.8% reduction in total cattle numbers.

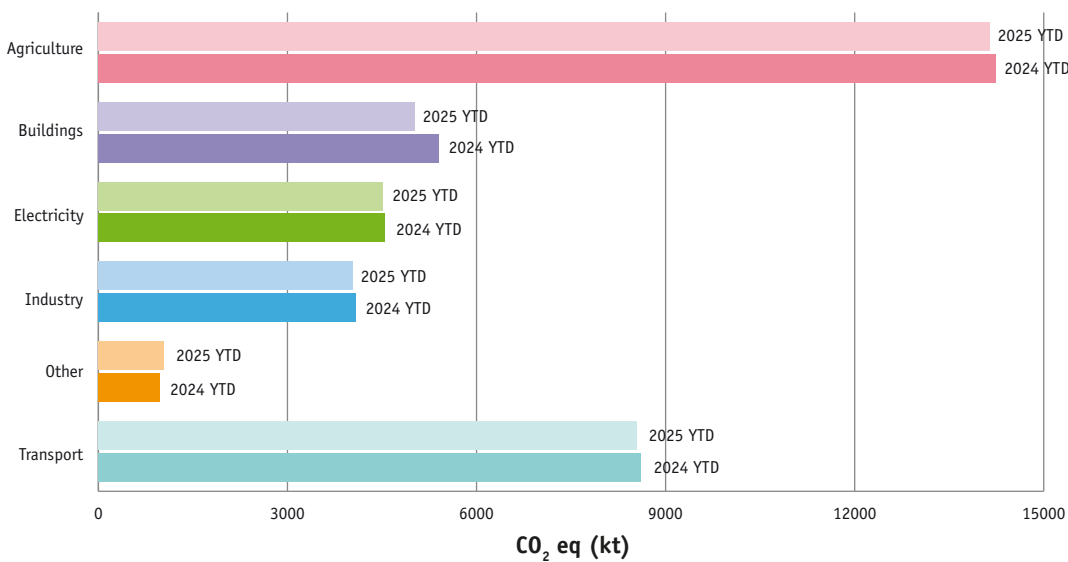
Looking at Year-to-Date 2025 compared to Year-to-Date 2024:

- Overall greenhouse gas emissions decreased by -1.5% (-554.3 kt CO₂ eq) compared to Year-to-Date 2024.
- The largest decrease in emissions occurred in the Buildings sector (-377.3 kt CO₂ eq), followed by the Agriculture sector (-86.0 kt CO₂ eq).
- The largest increase in emissions occurred in the Other sector (+59.4 kt CO₂ eq).

Table 4: Summary YTD 2025 Compared to YTD 2024

Sector	Greenhouse Gas	Emissions YTD 2025 (kt CO ₂ eq)	Comparison to YTD 2024	
			(kt CO ₂ eq)	(%)
Overall		37,310.7	-554.3	-1.5
Agriculture	CH ₄ , CO ₂ , N ₂ O	14,146.9	-86.0	-0.6
Buildings	CH ₄ , CO ₂	5,026.3	-377.3	-7.0
Electricity	CO ₂	4,509.8	-43.7	-1.0
Industry	CO ₂	4,044.3	-39.7	-1.0
Other	CH ₄ , N ₂ O, HFC, PFC, SF ₆ , NF ₃	1,043.0	59.4	6.0
Transport	CO ₂	8,540.4	-67.1	-0.8

Figure 4: Comparing Year-To-Date 2025 to Year-To-Date 2024 by sector



2.3 Quarter-on-Quarter Change

Key finding:

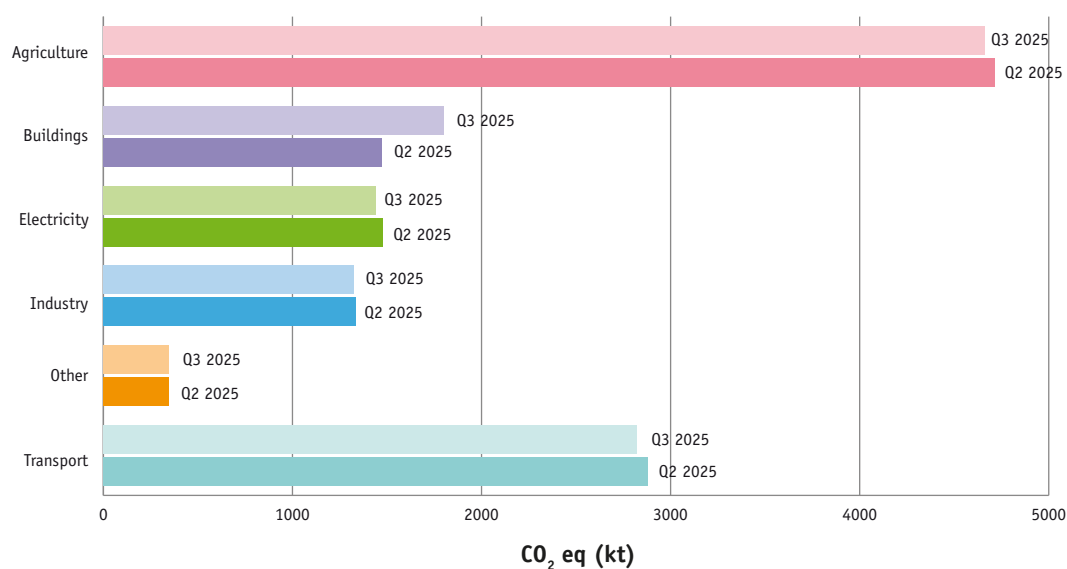
- Overall GHG emissions increased by +1.5% (+179.5 kt CO₂ eq) compared to Quarter 2 2025, on a seasonally adjusted basis, driven by higher emissions in the Buildings sector (+331.1 kt CO₂ eq) associated with increased heating demand and a rebound from the unusually low levels observed in Quarter 2 2025, despite decreases in all other sectors.

Looking at Quarter 3 2025 compared to Quarter 2 2025:

- Overall greenhouse gas emissions increased by +1.5% (+179.5 kt CO₂ eq) compared to Quarter 2 2025.
- The largest increase in emissions occurred in the Buildings sector (+331.1 kt CO₂ eq).
- The largest decrease in emissions occurred in the Transport sector (-54.9 kt CO₂ eq), followed by the Agriculture sector (-49.4 kt CO₂ eq).

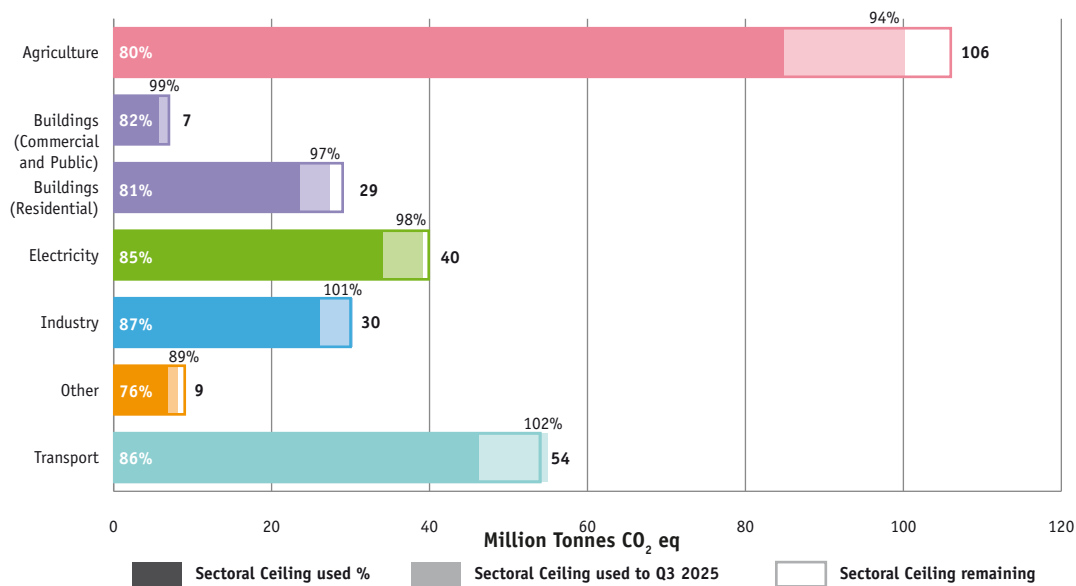
Table 5: Summary Q3 2025 Compared to Q2 2025

Sector	Greenhouse Gas	Emissions Q3 2025 (kt CO ₂ eq)	Comparison to Q2 2025	
			(kt CO ₂ eq)	(%)
Overall		12,406.5	179.5	1.5
Agriculture	CH ₄ , CO ₂ , N ₂ O	4,664.3	-49.4	-1.0
Buildings	CH ₄ , CO ₂	1,803.5	331.1	22.5
Electricity	CO ₂	1,442.5	-37.5	-2.5
Industry	CO ₂	1,326.0	-9.2	-0.7
Other	CH ₄ , N ₂ O, HFC, PFC, SF ₆ , NF ₃	346.1	-0.6	-0.2
Transport	CO ₂	2,824.2	-54.9	-1.9

Figure 5: Comparing Q3 2025 to Q2 2025 by sector

With regards to Sectoral Emissions Ceilings, looking specifically at the first Carbon Budget period of 2021-2025, Figure 6 shows the emissions used and the remaining CAP emissions until the ceiling is reached. The amount of sectoral budget used ranges from 89% in the Other Sector, to 101% and 102% in the Industry and Transport sectors respectively, indicating that these sectors have already used all available budget prior to Q4 2025.

Figure 6: Summary of Sectoral Ceiling Emissions Used across 2021 to 2024 as reported in the Provisional Greenhouse Gas Emissions 1990-2024 (dark), Emissions Used up to Q3 2025 (bright) and the Sectoral Ceiling Emissions Remaining (outline)



Based on [Ireland's Greenhouse Gas Emissions Projections 2024-2055](#), under the With Additional Measures scenario that assumes full implementation of measures in Government Plans (such as the Climate Action Plan), the projected emissions per sector at the end of 2025 are:

- Agriculture, 105.3 Mt CO₂ eq
- Buildings (Commercial and Public), 7.2 Mt CO₂ eq
- Buildings (Residential), 28.9 Mt CO₂ eq
- Electricity, 40.4 Mt CO₂ eq
- Industry, 32.3 Mt CO₂ eq
- Other, 9.1 Mt CO₂ eq
- Transport, 58.0 Mt CO₂ eq

Note: Due to the impact of updated science to the [agricultural inventory in 2023](#), the Sectoral Emissions Ceilings for Agriculture is no longer aligned with the reduction target for the sector.

3. Sectoral Summaries

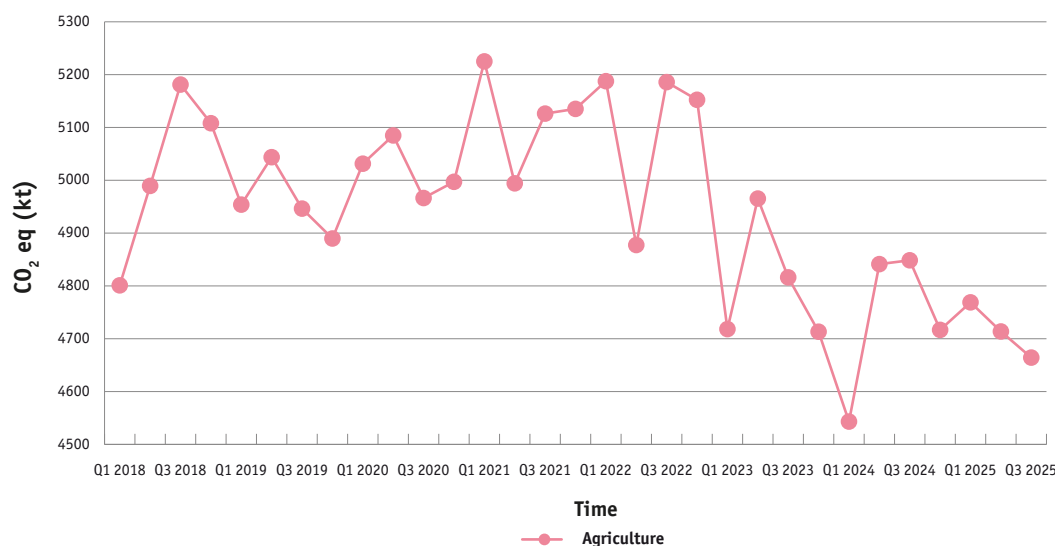
3.1 Agriculture

Subsectors: Agricultural Soils; Agriculture/Forestry Fuel Combustion; Enteric Fermentation; Fishing Fuel Combustion; Liming; Manure Management; Urea Application

Number of indicator categories: Eighteen

Estimated total coverage of quarterly indicator categories compared to original annual National Inventory Report: 97.0%

Figure 7: Changes in emissions in the Agriculture Sector from Q1 2018 to Q3 2025, based on seasonally adjusted data



3.1.1 Agriculture Year-on-Year Change

Key findings:

- There was a -3.8% (-184.2 kt CO₂ eq) decrease in emissions compared to the same quarter last year. This was driven by decreased total nitrogen fertiliser sales (-23.0%) and a -3.4% reduction in total cattle numbers (-1.4% dairy cows, -3.9% other cattle) compared to the same quarter in 2024. This follows a -2.9% reduction in the cattle herd reported in the Provisional Inventory for 2024.

Looking at Quarter 3 2025 compared to Quarter 3 2024:

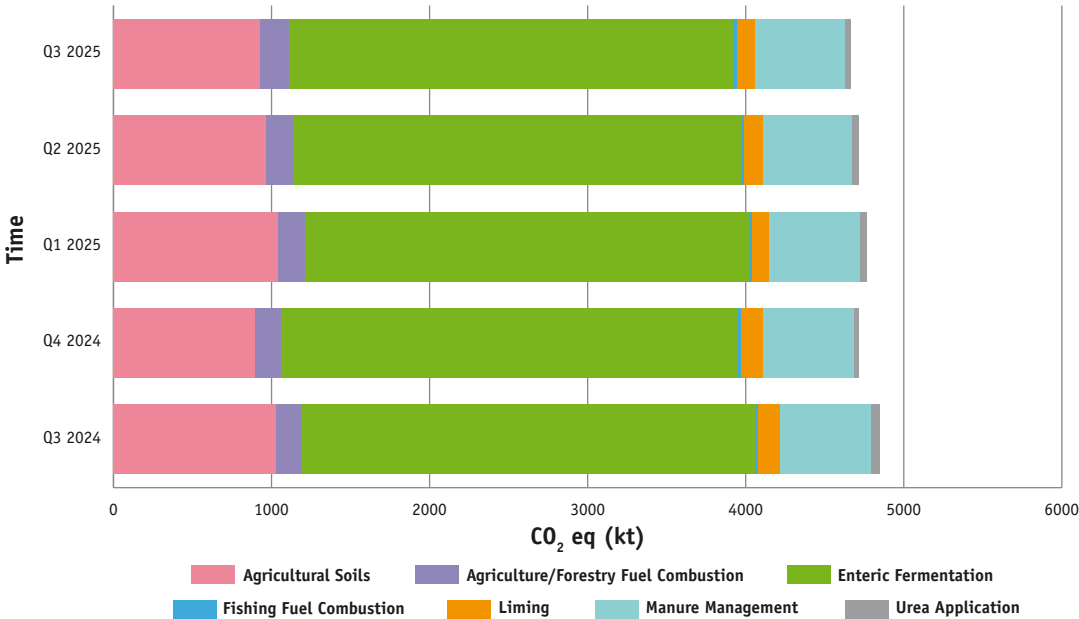
- Agriculture greenhouse gas emissions decreased by -3.8% (-184.2 kt CO₂ eq) compared to Quarter 3 2024.
- The largest decrease in emissions occurred in the Agricultural Soils (-100.3 kt CO₂ eq), followed by the Enteric Fermentation sector (-54.9 kt CO₂ eq).
- The largest increase in emissions occurred in the Agriculture/Forestry Fuel Combustion (+17.3 kt CO₂ eq).

Table 6: Summary Q3 2025 Compared to Q3 2024 – Agriculture

			Comparison to Q3 2024	
Sector	Greenhouse Gas	Emissions Q3 2025 (kt CO ₂ eq)	(kt CO ₂ eq)	(%)
Agriculture	CH ₄ , CO ₂ , N ₂ O	4,664.3	-184.2	-3.8
Agricultural Soils	N ₂ O	928.0	-100.3	-9.8
Agriculture/Forestry Fuel Combustion	CO ₂	177.8	17.3	10.8
Enteric Fermentation	CH ₄	2,819.6	-54.9	-1.9
Fishing Fuel Combustion	CO ₂	15.1	0.1	0.6
Liming*	CO ₂	117.3	-18.9	-13.9
Manure Management	CH ₄ , N ₂ O	567.1	-11.4	-2.0
Urea Application	CO ₂	39.3	-16.1	-29.1

* Liming subsector: Direct CO₂ emissions only. Indirect benefits from liming, such as from reduced fertiliser requirements due to increased soil fertility, captured under other subsectors (e.g. Agricultural Soils). Quarterly liming activity is estimated using a seasonal exponential smoothing model selected on the basis of out-of-sample forecast performance

Figure 8: Comparison of subsectoral breakdown in emissions for this quarter vs last four quarters, based on seasonally adjusted data



3.1.2 Agriculture Year-to-Date Change

Key findings:

- There was a -0.6% (-86.0 kt CO₂ eq) decrease in emissions year-to-date compared to the previous year. This was driven by a -3.8% reduction in total cattle numbers (-2.2% dairy cows, -4.2% other cattle) offset somewhat by increased total nitrogen fertiliser sales (+14.9%).

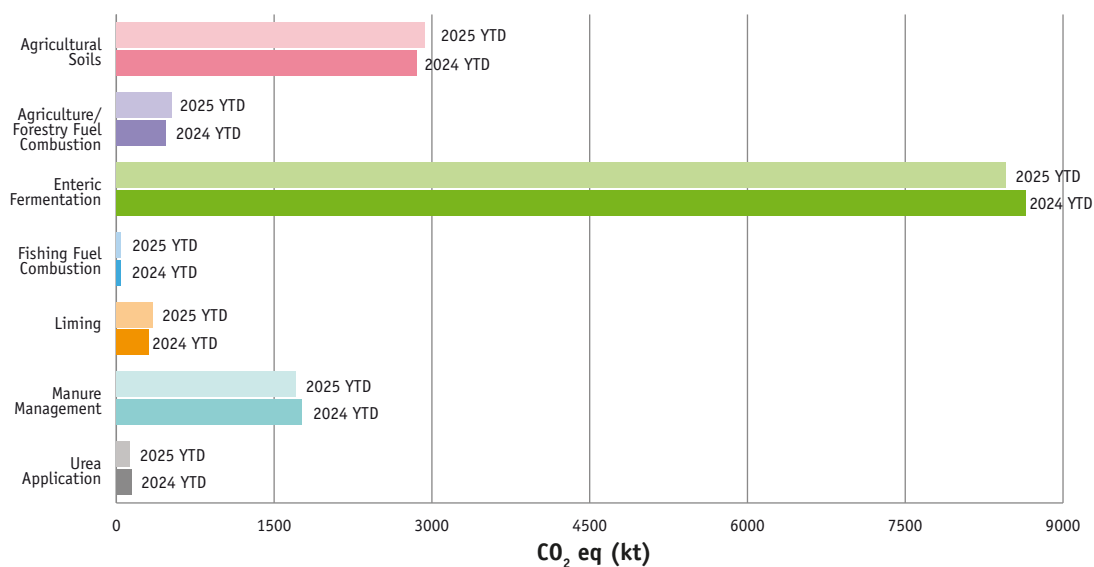
Looking at Year-to-Date 2025 compared to Year-to-Date 2024:

- Agriculture greenhouse gas emissions decreased by -0.6% (-86.0 kt CO₂ eq) compared to Year-to-Date 2024.
- The largest decrease in emissions occurred in the Enteric Fermentation (-180.9 kt CO₂ eq), followed by the Manure Management (-52.1 kt CO₂ eq).
- The largest increase in emissions occurred in the Agricultural Soils (+70.5 kt CO₂ eq), followed by the Agriculture/Forestry Fuel Combustion (+53.0 kt CO₂ eq).

Table 7: Summary YTD 2025 Compared to YTD 2024 – Agriculture

Sector	Greenhouse Gas	Emissions YTD 2025 (kt CO ₂ eq)	Comparison to 2024 YTD	
			(kt CO ₂ eq)	(%)
Agriculture	CH₄, CO₂, N₂O	14,146.9	-86.0	-0.6
Agricultural Soils	N ₂ O	2,930.8	70.5	2.5
Agriculture/Forestry Fuel Combustion	CO ₂	523.7	53.0	11.3
Enteric Fermentation	CH ₄	8,461.1	-180.9	-2.1
Fishing Fuel Combustion	CO ₂	45.2	-0.1	-0.3
Liming*	CO ₂	346.6	39.1	12.7
Manure Management	CH ₄ , N ₂ O	1,711.0	-52.1	-3.0
Urea Application	CO ₂	128.5	-15.5	-10.8

* Liming subsector: Direct CO₂ emissions only. Indirect benefits from liming, such as from reduced fertiliser requirements due to increased soil fertility, captured under other subsectors (e.g. Agricultural Soils). Quarterly liming activity is estimated using a seasonal exponential smoothing model selected on the basis of out-of-sample forecast performance

Figure 9 Comparing Year-To-Date 2025 to Year-To-Date 2024 by subsector

3.1.3 Agriculture Quarter-on-Quarter Change

Key findings:

- There was a -1.0% (-49.4 kt CO₂ eq) decrease in emissions compared to the previous quarter. This was driven by a reduction of -3.1% in total cattle numbers (-2.9% dairy cows, -3.1% other cattle) compared to the previous quarter.

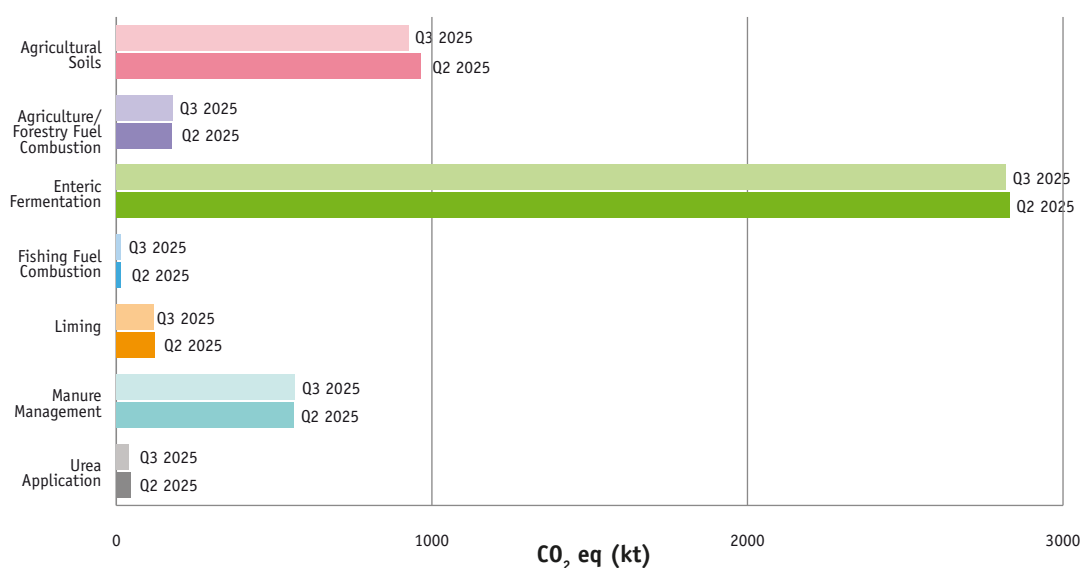
Looking at Quarter 3 2025 compared to Quarter 2 2025:

- Agriculture greenhouse gas emissions decreased by -1.0% (-49.4 kt CO₂ eq) compared to Quarter 2 2025.
- The largest decrease in emissions occurred in the Agricultural Soils (-35.4 kt CO₂ eq), followed by the Enteric Fermentation (-11.2 kt CO₂ eq).

Table 8: Summary Q3 2025 Compared to Q2 2025 – Agriculture

Sector	Greenhouse Gas	Emissions Q3 2025 (kt CO ₂ eq)	Comparison to Q2 2025	
			(kt CO ₂ eq)	(%)
Agriculture	CH₄, CO₂, N₂O	4,664.3	-49.4	-1.0
Agricultural Soils	N ₂ O	928.0	-35.4	-3.7
Agriculture/Forestry Fuel Combustion	CO ₂	177.8	2.8	1.6
Enteric Fermentation	CH ₄	2,819.6	-11.2	-0.4
Fishing Fuel Combustion	CO ₂	15.1	0.0	0.2
Liming*	CO ₂	117.3	-4.2	-3.4
Manure Management	CH ₄ , N ₂ O	567.1	4.0	0.7
Urea Application	CO ₂	39.3	-5.6	-12.4

* Liming subsector: Direct CO₂ emissions only. Indirect benefits from liming, such as from reduced fertiliser requirements due to increased soil fertility, captured under other subsectors (e.g. Agricultural Soils). Quarterly liming activity is estimated using a seasonal exponential smoothing model selected on the basis of out-of-sample forecast performance

Figure 10: Quarter-on-Quarter changes in emissions in the Agriculture subsectors, based on seasonally adjusted data

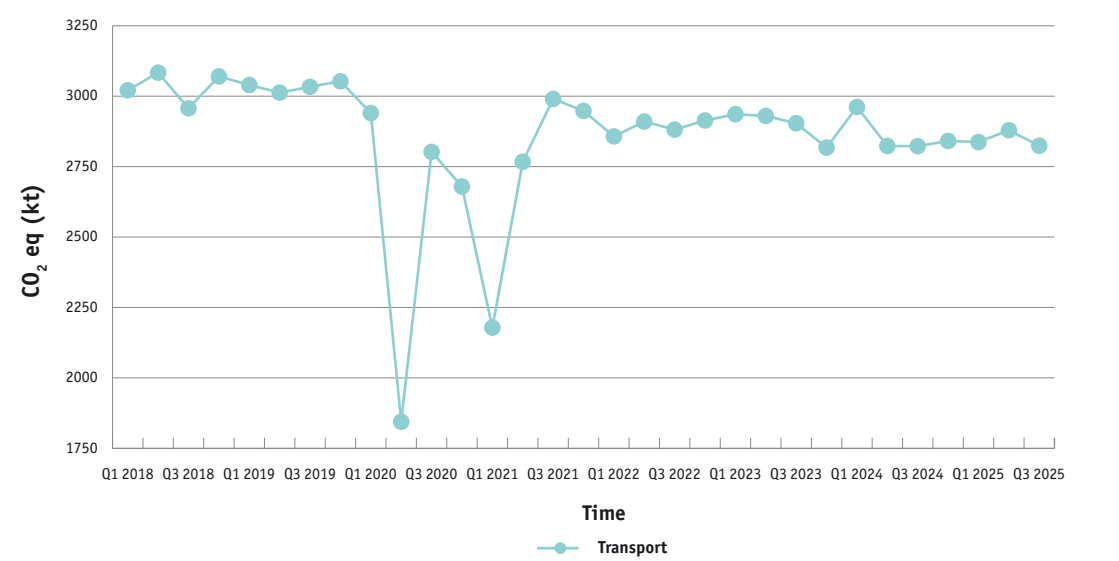
3.2 Transport

Subsectors: Domestic Navigation; Other Transportation; Railways; Road Transportation

Number of indicator categories: Ten

Estimated total coverage of quarterly indicator categories compared to original annual National Inventory Report: 98.5%

Figure 11: Changes in emissions in the Transport Sector from Q1 2018 to Q3 2025, based on seasonally adjusted data



3.2.1 Transport Year-on-Year Change

Key finding:

- Transport emissions were marginally up +0.1% (+1.6 kt CO₂ eq) compared to the same quarter last year, driven by increased emissions from Domestic Navigation (shipping between Irish ports). Emissions from Road Transportation were down -2.4% due to decreased sales of diesel (-4.5%) offset by increased sales of petrol (+5.4%) compared to the same quarter last year. Petrol and diesel biofuel blending rates remained stable year-over-year (9.7% by volume for petrol, and 6.3% for diesel).

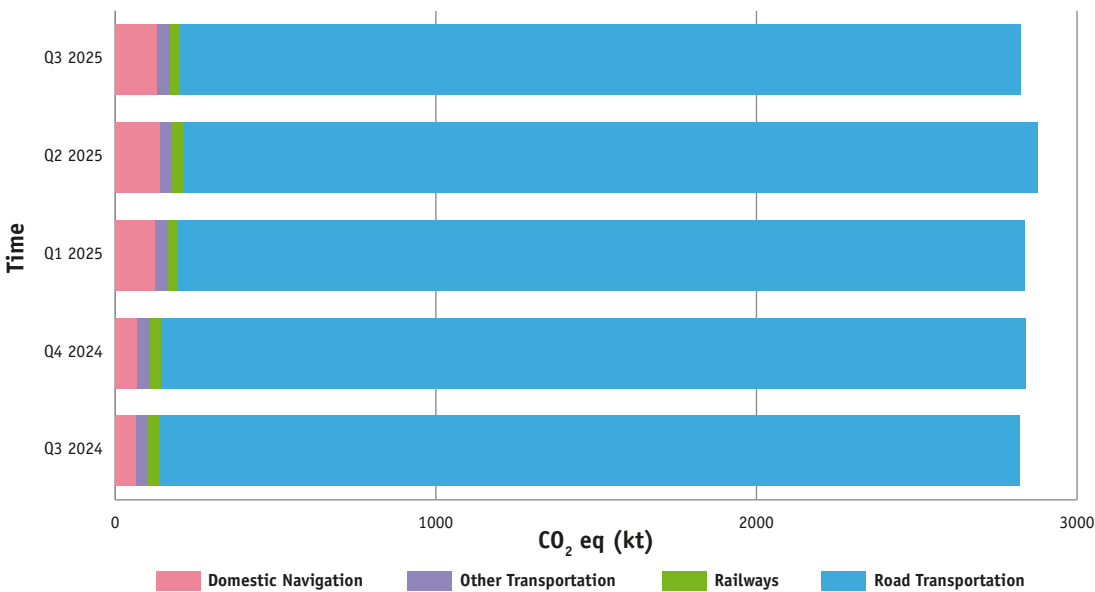
Looking at Quarter 3 2025 compared to Quarter 3 2024:

- Transport greenhouse gas emissions increased by +0.1% (+1.6 kt CO₂ eq) compared to Quarter 3 2024.
- The largest increase in emissions occurred in the Domestic Navigation Sector (+66.0 kt CO₂ eq).
- The largest decrease in emissions occurred in the Road Transportation Sector (-64.5 kt CO₂ eq).

Table 9: Summary Q3 2025 Compared to Q3 2024 – Transport

Sector	Greenhouse Gas	Emissions Q3 2025 (kt CO ₂ eq)	Comparison to Q3 2024	
			(kt CO ₂ eq)	(%)
Transport	CO₂	2,824.2	1.6	0.1
Domestic Navigation	CO ₂	129.6	66.0	103.7
Other Transportation	CO ₂	38.7	-0.1	-0.2
Railways	CO ₂	33.2	0.1	0.4
Road Transportation	CO ₂	2,622.7	-64.5	-2.4

Figure 12: Comparison of subsectoral breakdown in emissions for this quarter vs last four quarters, based on seasonally adjusted data



3.2.2 Transport Year-to-Date Change

Key finding:

- The primary driver of the -0.8% (-67.1 kt CO₂ eq) change in emissions in the first three quarters was decreased emissions from Road Transportation (-3.0%) offset by increased emissions from Domestic Navigation (shipping between Irish ports).
- Emissions from Road Transportation were down -3.0% due to decreased sales of diesel (-4.4%) offset by increased sales of petrol (+3.7%) compared to the first three quarters of last year. Average petrol biofuel blending rates increased from 8.7% to 9.7% by volume, while diesel blending rates decreased from 6.7% to 6.1% by volume.

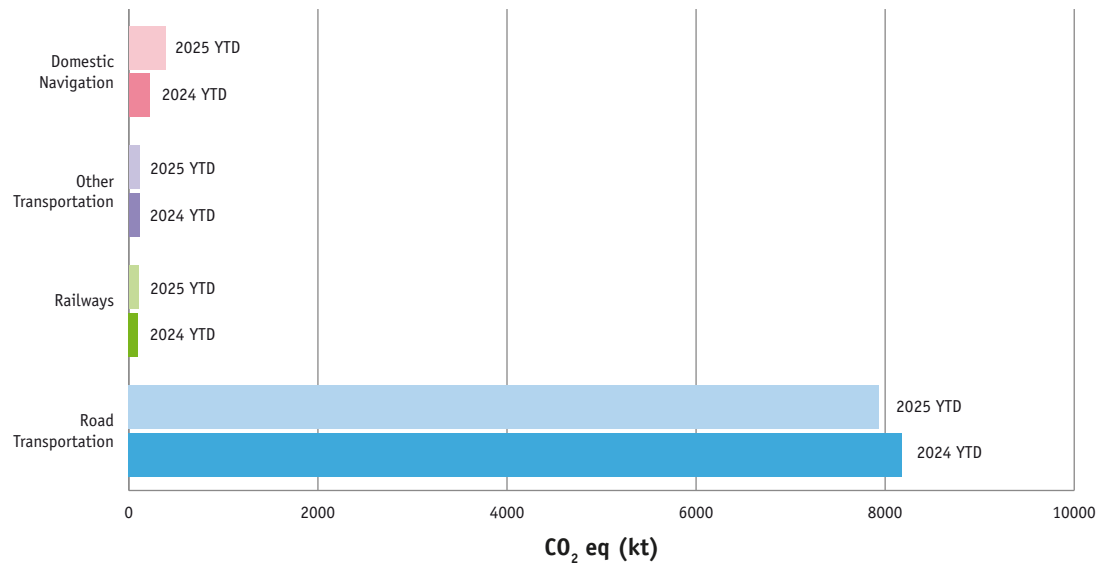
Looking at Year-to-Date 2025 compared to Year-to-Date 2024:

- Transport greenhouse gas emissions decreased by -0.8% (-67.1 kt CO₂ eq) compared to Year-to-Date 2024.
- The largest decrease in emissions occurred in the Road Transportation sector (-242.1 kt CO₂ eq).
- The largest increase in emissions occurred in the Domestic Navigation sector (+174.0 kt CO₂ eq).

Table 10: Summary YTD 2025 Compared to YTD 2024 – Transport

Sector	Greenhouse Gas	Emissions YTD 2025 (kt CO ₂ eq)	Comparison to YTD 2024	
			(kt CO ₂ eq)	(%)
Transport	CO ₂	8,540.4	-67.1	-0.8
Domestic Navigation	CO ₂	389.8	174.0	80.7
Other Transportation	CO ₂	115.5	0.0	0.0
Railways	CO ₂	99.1	1.0	1.1
Road Transportation	CO ₂	7,936.1	-242.1	-3.0

Figure 13: Comparing Year-To-Date 2025 to Year-To-Date 2024 by subsector.



3.2.3 Transport Quarter-on-Quarter Change

Key finding:

- The primary driver of the -1.9% (-54.9 kt CO₂ eq) change in emissions this quarter was decreased sales of diesel (-4.9%) offset somewhat by an increase in petrol sales (+1.3%) compared to the previous quarter.

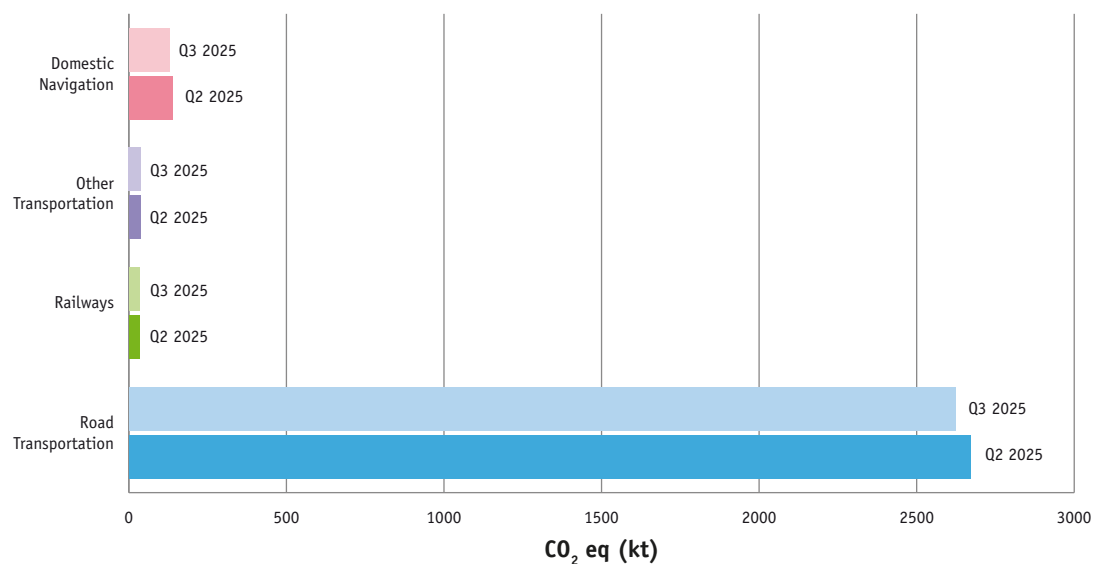
Looking at Quarter 3 2025 compared to Quarter 2 2025:

- Transport greenhouse gas emissions decreased by -1.9% (-54.9 kt CO₂ eq) compared to Quarter 2 2025.
- The largest decrease in emissions occurred in the Road Transportation sector (-47.2 kt CO₂ eq).

Table 11: Summary Q3 2025 Compared to Q2 2025 – Transport

Sector	Greenhouse Gas	Emissions Q3 2025 (kt CO ₂ eq)	Comparison to Q2 2025	
			(kt CO ₂ eq)	(%)
Transport	CO ₂	2,824.2	-54.9	-1.9
Domestic Navigation	CO ₂	129.6	-8.4	-6.1
Other Transportation	CO ₂	38.7	0.7	1.8
Railways	CO ₂	33.2	0.1	0.2
Road Transportation	CO ₂	2,622.7	-47.2	-1.8

Figure 14: Changes in emissions in the Transport subsectors from Q2 2025 to Q3 2025, based on seasonally adjusted data



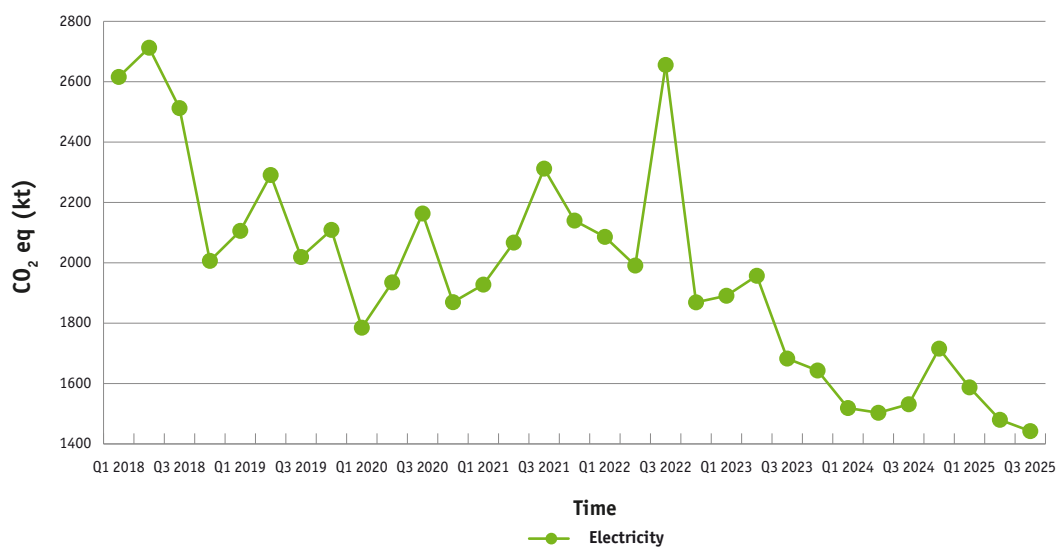
3.3 Electricity

Subsectors: Public Electricity and Heat Production; Solid Fuels and Other Energy Industries

Number of indicator categories: Five

Estimated total coverage of quarterly indicator categories compared to original annual National Inventory Report: 90.6%

Figure 15: Changes in emissions in the Electricity sector from Q1 2018 to Q3 2025, based on seasonally adjusted data



3.3.1 Electricity Year-on-Year Change

Key finding:

- Greenhouse gas emissions decreased by -5.8% (-88.9 kt CO₂ eq) despite a +3.1% increase in overall electricity supply due to a +9.8% increase in renewable sources of electricity generation and a +2.7% increase in imported electricity. Such movements were reflected in changes in the share of the energy supply in Q3 2025 compared to Q3 2024 from renewables (36.4% vs 34.2%), non-renewables (45.2% vs 47.3%) and imports (18.4% vs 18.5%).

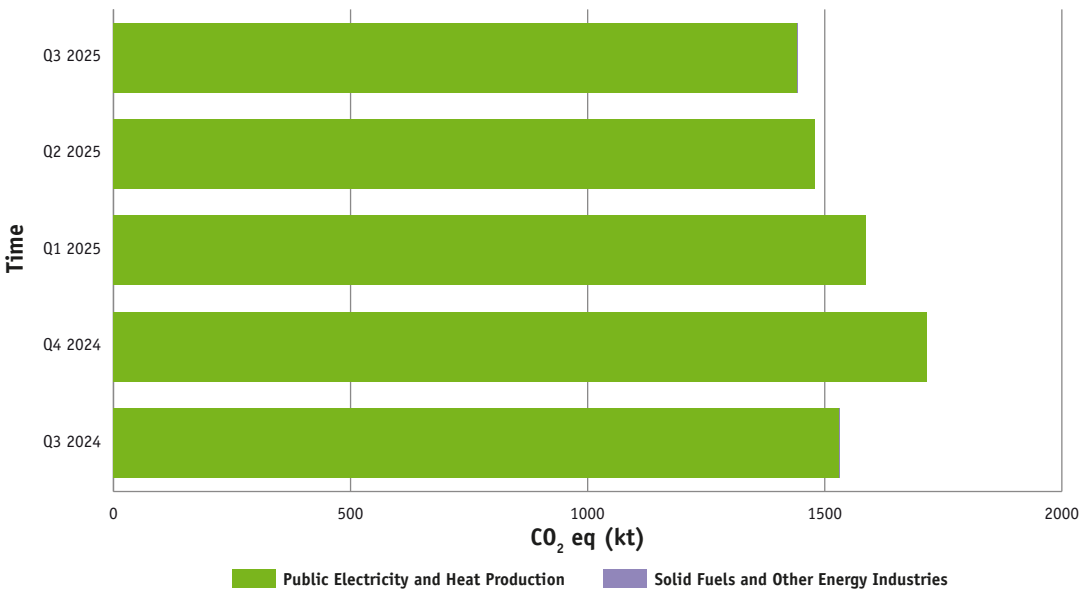
Looking at Quarter 3 2025 compared to Quarter 3 2024:

- Electricity greenhouse gas emissions decreased by -5.8% (-88.9 kt CO₂ eq) compared to Quarter 3 2024.
- The largest decrease in emissions occurred in the Public Electricity and Heat Production Sector (-88.9 kt CO₂ eq).

Table 12: Summary Q3 2025 compared to Q3 2024 – Electricity

Sector	Greenhouse Gas	Emissions Q3 2025 (kt CO ₂ eq)	Comparison to Q3 2024	
			(kt CO ₂ eq)	(%)
Electricity	CO ₂	1,442.5	-88.9	-5.8
Public Electricity and Heat Production	CO ₂	1,441.4	-88.9	-5.8
Solid Fuels and Other Energy Industries	CO ₂	1.1	0.0	-3.4

Figure 16: Comparison of subsectoral breakdown in emissions for this quarter vs last four quarters, based on seasonally adjusted data



3.3.2 Electricity Year-to-Date Change

Key finding:

- Greenhouse gas emissions decreased by -1.0% (-43.8 kt CO₂ eq) despite a +2.9% increase in electricity generation. There was a decrease in the share of non-renewables (43.6% vs 45.4%) and an increase in the share of net electricity imports (17.5% vs 15.7%). The share of renewables was unchanged at 38.9%.

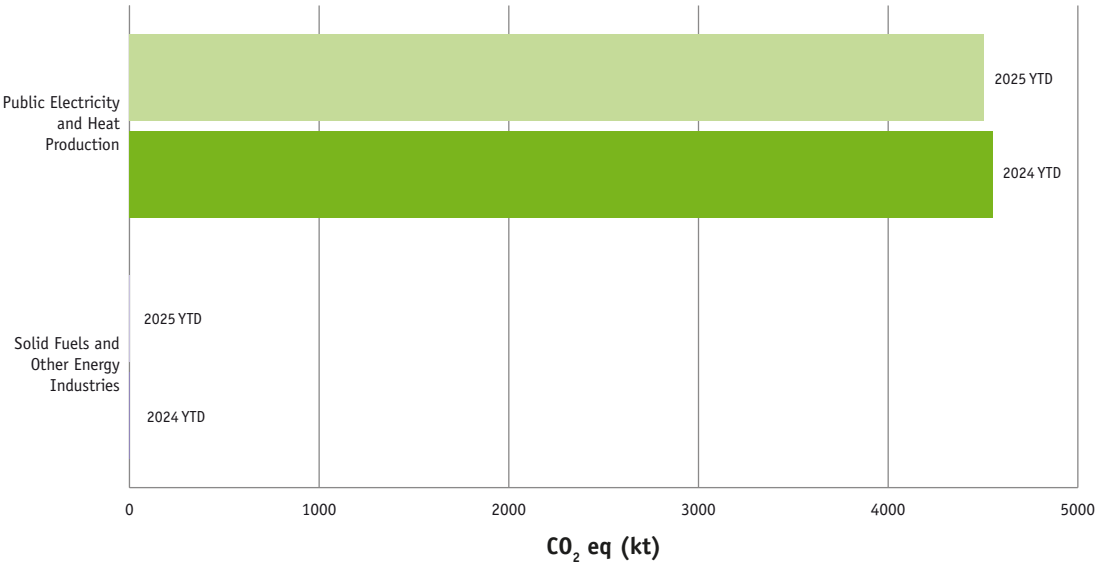
Looking at Year-to-Date 2025 compared to Year-to-Date 2024:

- Electricity greenhouse gas emissions decreased by -1.0% (-43.7 kt CO₂ eq) compared to Year-to-Date 2024.
- The largest decrease in emissions occurred in the Public Electricity and Heat Production Sector (-43.8 kt CO₂ eq).

Table 13: Summary YTD 2025 compared to YTD 2024 – Electricity

Sector	Greenhouse Gas	Emissions YTD 2025 (kt CO ₂ eq)	Comparison to YTD 2024	
			(kt CO ₂ eq)	(%)
Electricity	CO ₂	4,509.8	-43.7	-1.0
Public Electricity and Heat Production	CO ₂	4,506.5	-43.8	-1.0
Solid Fuels and Other Energy Industries	CO ₂	3.3	0.1	1.5

Figure 17: Comparing Year-To-Date 2025 to Year-To-Date 2024 by subsector



3.3.3 Electricity Quarter-on-Quarter Change

Key finding:

- Greenhouse gas emissions decreased by -2.5% (-37.5 kt CO₂ eq) mostly due to a +5.4% increase in renewable energy. Emissions decreased despite an increase of +3.7% in electricity generation from non-renewable sources due to changes in the sources used, such as the phase-out of coal that occurred in Q3 2025 and a decrease in oil which were replaced by the less carbon intensive natural gas.

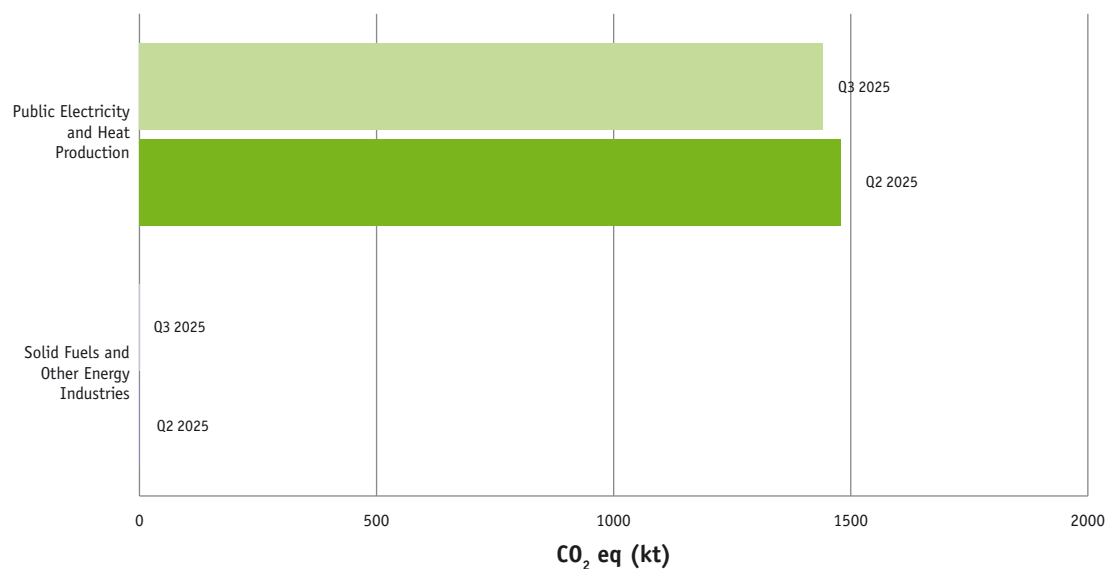
Looking at Quarter 3 2025 compared to Quarter 2 2025:

- Electricity greenhouse gas emissions decreased by -2.5% (-37.5 kt CO₂ eq) compared to Quarter 2 2025.
- The largest decrease in emissions occurred in the Public Electricity and Heat Production Sector (-37.5 kt CO₂ eq).

Table 14: Summary Q3 2025 Compared to Q2 2025 – Electricity

Sector	Greenhouse Gas	Emissions Q3 2025 (kt CO ₂ eq)	Comparison to Q2 2025	
			(kt CO ₂ eq)	(%)
Electricity	CO ₂	1,442.5	-37.5	-2.5
Public Electricity and Heat Production	CO ₂	1,441.4	-37.5	-2.5
Solid Fuels and Other Energy Industries	CO ₂	1.1	0.0	-0.9

Figure 18: Changes in emissions in the Electricity subsectors from Q3 2025 to Q2 2025, based on seasonally adjusted data.



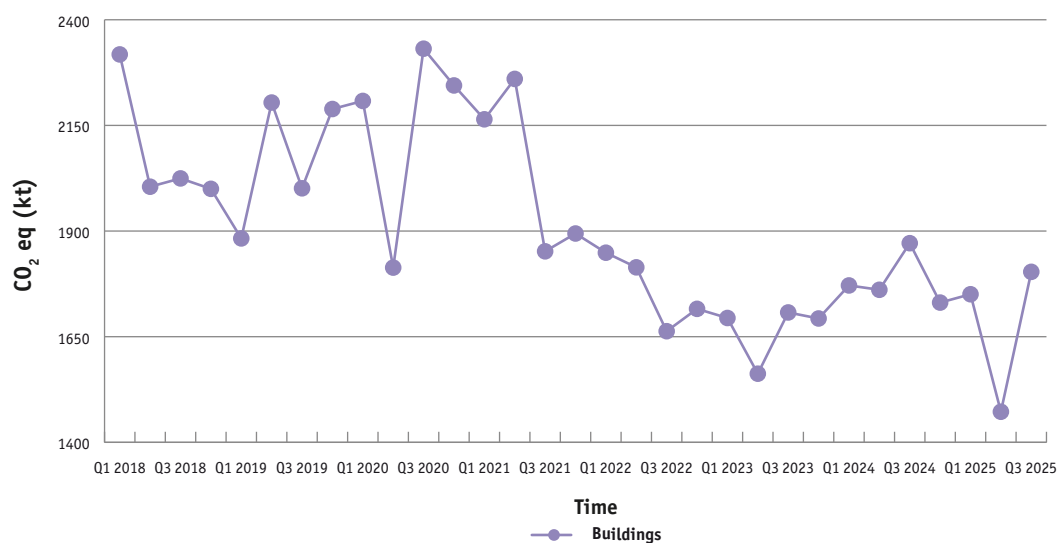
3.4 Buildings

Subsectors: Residential; Commercial & Public Services

Number of indicator categories: Eight

Estimated total coverage of quarterly indicator categories compared to original annual National Inventory Report: 93.4%

Figure 19: Changes in emissions in the Buildings (Residential) sector from Q1 2018 to Q3 2025, based on seasonally adjusted data



3.4.1 Buildings Year-on-Year Change

Key finding:

- Overall GHG emissions from Buildings were down -3.6% (-67.8 kt CO₂ eq) due to decreased energy demand in the Residential sector (-4.3%, -64.0 kt CO₂ eq). There was 27.5% less heating degree days (HDD, days with average temperature below 15.5 degrees Celsius where heating would be needed) in Quarter 3 2025 compared to Quarter 3 2024 which indicates reduced demand for residential heating.

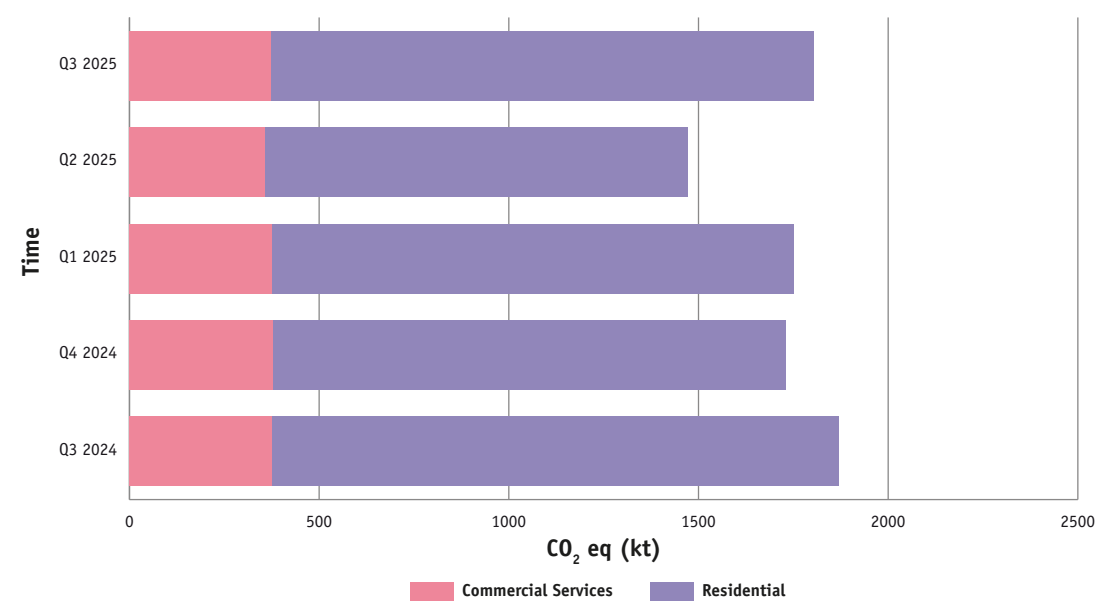
Looking at Quarter 3 2025 compared to Quarter 3 2024:

- Buildings greenhouse gas emissions decreased by -3.6% (-67.8 kt CO₂ eq) compared to Quarter 3 2024.
- The largest decrease in emissions occurred in the Residential sector (-64.0 kt CO₂ eq).

Table 15: Summary Q3 2025 Compared to Q3 2024 – Buildings

Sector	Greenhouse Gas	Emissions Q3 2025 (kt CO ₂ eq)	Comparison to Q3 2024	
			(kt CO ₂ eq)	(%)
Buildings	CH ₄ , CO ₂	1,803.5	-67.8	-3.6
Commercial Services	CO ₂	373.0	-3.9	-1.0
Residential	CH ₄ , CO ₂	1,430.4	-64.0	-4.3

Figure 20: Comparison of subsectoral breakdown in emissions for this quarter vs last four quarters, based on seasonally adjusted data



3.4.2 Buildings Year-to-Date Change

Key finding:

- GHG emissions from Buildings were down -7.0% (-377.3 kt CO₂ eq) due to decreased energy demand in the Residential Sector (-8.9%, -384.2 kt CO₂ eq). The first nine months of 2025 had 7.8% less days with average temperature below 15.5 degrees Celsius than 2024 (Heating Degree Days) indicating decreased demand for heating in the Residential Sector.

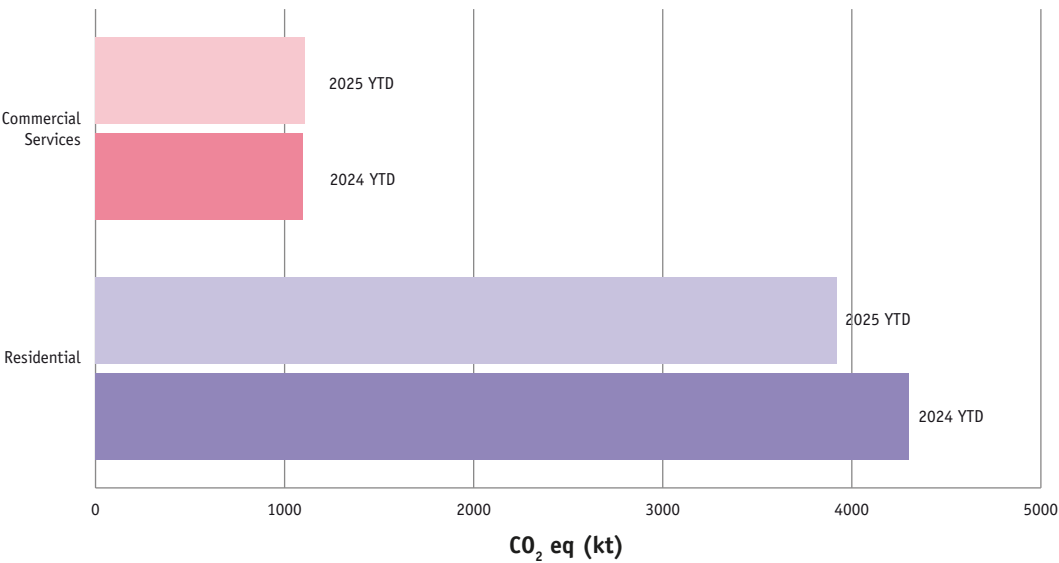
Looking at Year-to-Date 2025 compared to Year-to-Date 2024:

- Buildings greenhouse gas emissions decreased by -7.0% (-377.3 kt CO₂ eq) compared to Year-to-Date 2024.
- The largest decrease in emissions occurred in the Residential sector (-384.2 kt CO₂ eq).

Table 16: Summary YTD 2025 Compared to YTD 2024 – Buildings

Sector	Greenhouse Gas	Emissions YTD 2025 (kt CO ₂ eq)	Comparison to YTD 2024	
			(kt CO ₂ eq)	(%)
Buildings	CH ₄ , CO ₂	5,026.3	-377.3	-7.0
Commercial Services	CO ₂	1,106.1	6.9	0.6
Residential	CH ₄ , CO ₂	3,920.2	-384.2	-8.9

Figure 21: Comparing Year-To-Date 2025 to Year-To-Date 2024 by subsector



3.4.3 Buildings Quarter-on-Quarter Change

Key finding:

- GHG emissions from Buildings increased +22.5% (+331.1 kt CO₂ eq) on a seasonally adjusted basis with the largest subsectoral increase in emissions in the Residential sector (+316.2 kt CO₂ eq).

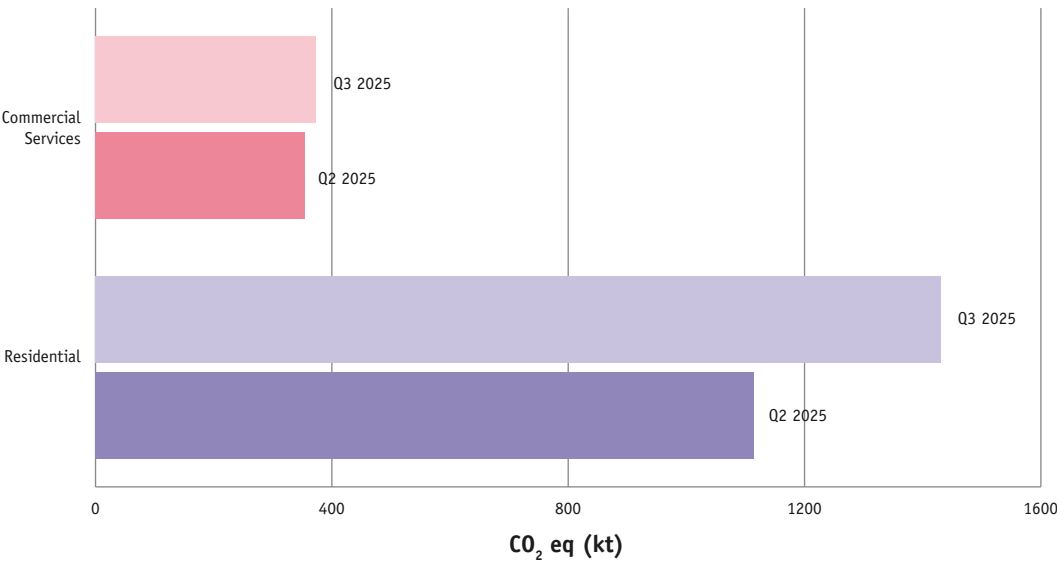
Looking at Quarter 3 2025 compared to Quarter 2 2025:

- Buildings greenhouse gas emissions increased by +22.5% (+331.1 kt CO₂ eq) compared to Quarter 2 2025.
- The largest increase in emissions occurred in the Residential sector (+316.2 kt CO₂ eq).

Table 17: Summary Q3 2025 Compared to Q2 2025 – Buildings

			Comparison to Q2 2025	
Sector	Greenhouse Gas	Emissions Q3 2025 (kt CO ₂ eq)	(kt CO ₂ eq)	(%)
Buildings	CH ₄ , CO ₂	1,803.5	331.1	22.5
Commercial Services	CO ₂	373.0	14.9	4.2
Residential	CH ₄ , CO ₂	1,430.4	316.2	28.4

Figure 22: Changes in emissions in the Building subsectors from Q3 2025 to Q2 2025, based on seasonally adjusted data



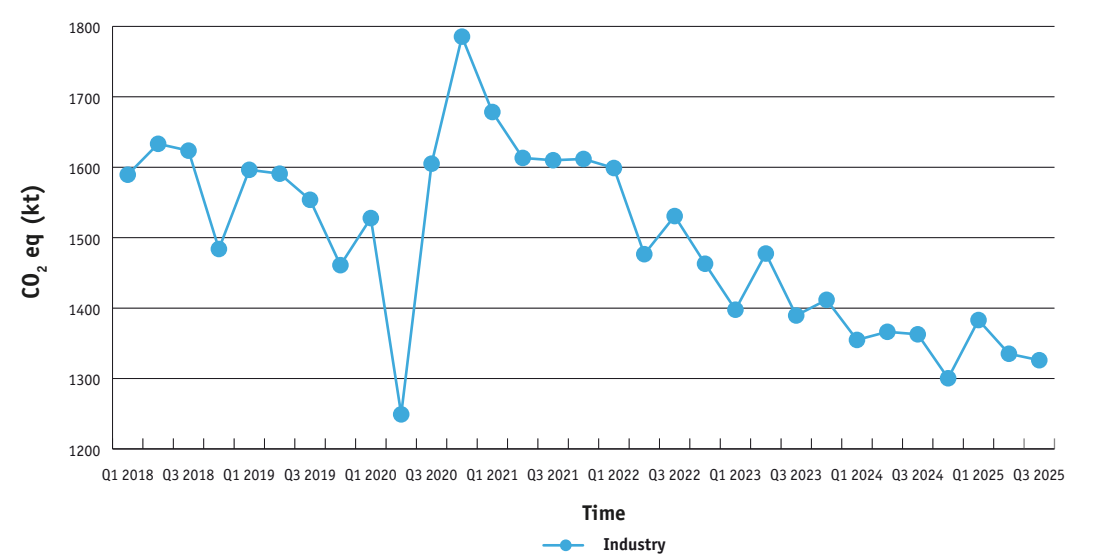
3.5 Industry

Subsectors: Manufacturing Combustion; Mineral Industry

Number of indicator categories: Ten

Estimated total coverage of quarterly indicator categories compared to original annual National Inventory Report: 93.9%

Figure 23: Changes in emissions in the Industry sector from Q1 2018 to Q3 2025, based on seasonally adjusted data



3.5.1 Industry Year-on-Year Change

Key finding:

- Industry emissions were down -2.7% (-36.8 kt CO₂ eq), driven by decreased emissions from both the Mineral Industry (largely represented by the Cement Production sector and includes lime, brick and ceramic sectors) and from Manufacturing Combustion due to declined coal and oil usage.

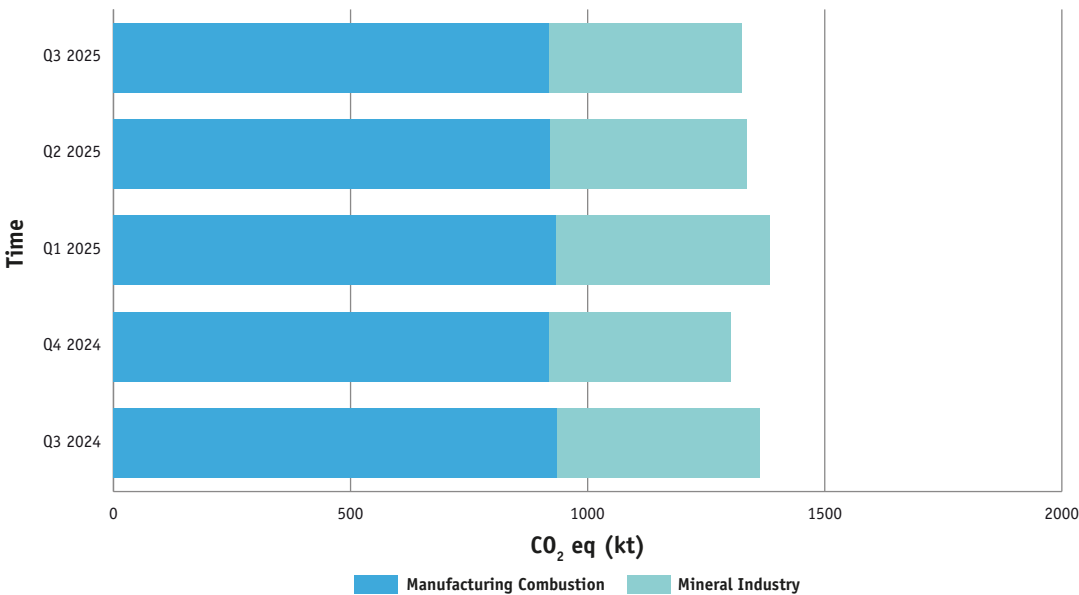
Looking at Quarter 3 2025 compared to Quarter 3 2024:

- Industry greenhouse gas emissions decreased by -2.7% (-36.8 kt CO₂ eq) compared to Quarter 3 2024.
- The largest decrease in emissions occurred in the Manufacturing Combustion (-18.9 kt CO₂ eq), followed by the Mineral Industry (-17.9 kt CO₂ eq).

Table 18: Summary Q3 2025 Compared to Q3 2024 – Industry

Sector	Greenhouse Gas	Emissions Q3 2025 (kt CO ₂ eq)	Comparison to Q3 2024	
			(kt CO ₂ eq)	(%)
Industry	CO ₂	1,326.0	-36.8	-2.7
Manufacturing Combustion	CO ₂	917.4	-18.9	-2.0
Mineral Industry	CO ₂	408.6	-17.9	-4.2

Figure 24: Comparison of subsectoral breakdown in emissions for this quarter vs last four quarters, based on seasonally adjusted data



3.5.2 Industry Year-to-Date Change

Key finding:

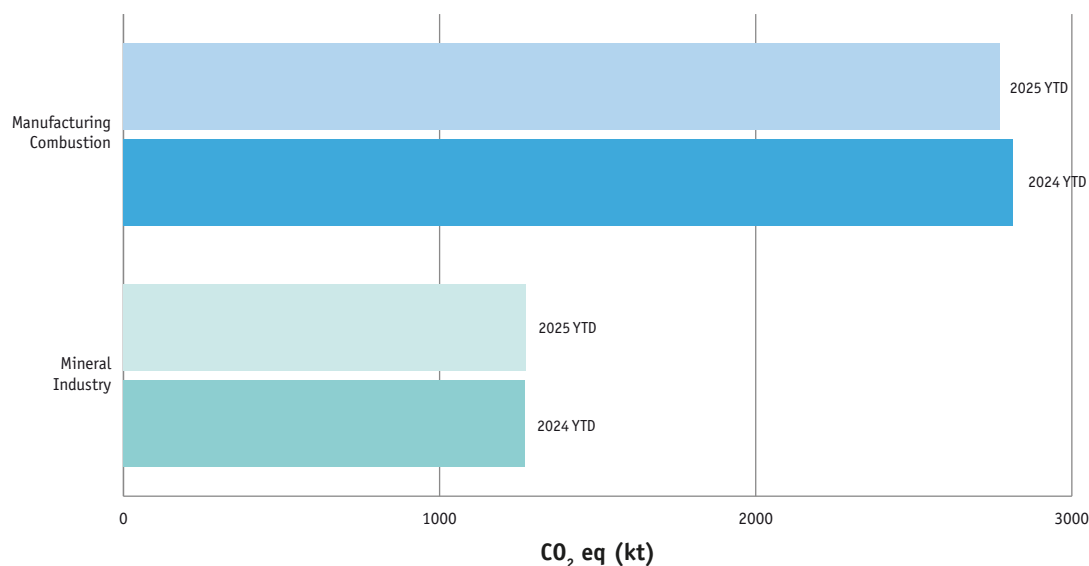
- Industry emissions were down -1.0% (-39.7 kt CO₂ eq), due to reductions in Manufacturing Combustion but a marginal increase in emissions in the Mineral Industry (largely represented by the Cement Production sector and includes lime, brick and ceramic sectors).

Looking at Year-to-Date 2025 compared to Year-to-Date 2024:

- Industry greenhouse gas emissions decreased by -1.0% (-39.7 kt CO₂ eq) compared to Year-to-Date 2024.
- The largest decrease in emissions occurred in the Manufacturing Combustion (-41.0 kt CO₂ eq).

Table 19: Summary YTD 2025 Compared to YTD 2024 – Industry

Sector	Greenhouse Gas	Emissions YTD 2025 (kt CO ₂ eq)	Comparison to YTD 2024	
			(kt CO ₂ eq)	(%)
Industry	CO₂	4,044.3	-39.7	-1.0
Manufacturing Combustion	CO ₂	2,771.3	-41.0	-1.5
Mineral Industry	CO ₂	1,272.9	1.3	0.1

Figure 25: Comparing Year-To-Date 2025 to Year-To-Date 2024 by subsector

3.5.3 Industry Quarter-on-Quarter Change

Key finding:

- Industry emissions were down -0.7% (-9.2 kt CO₂ eq), driven by decreases in both process and combustion emissions from the Mineral Industry and from Manufacturing Combustion on a seasonally adjusted basis.

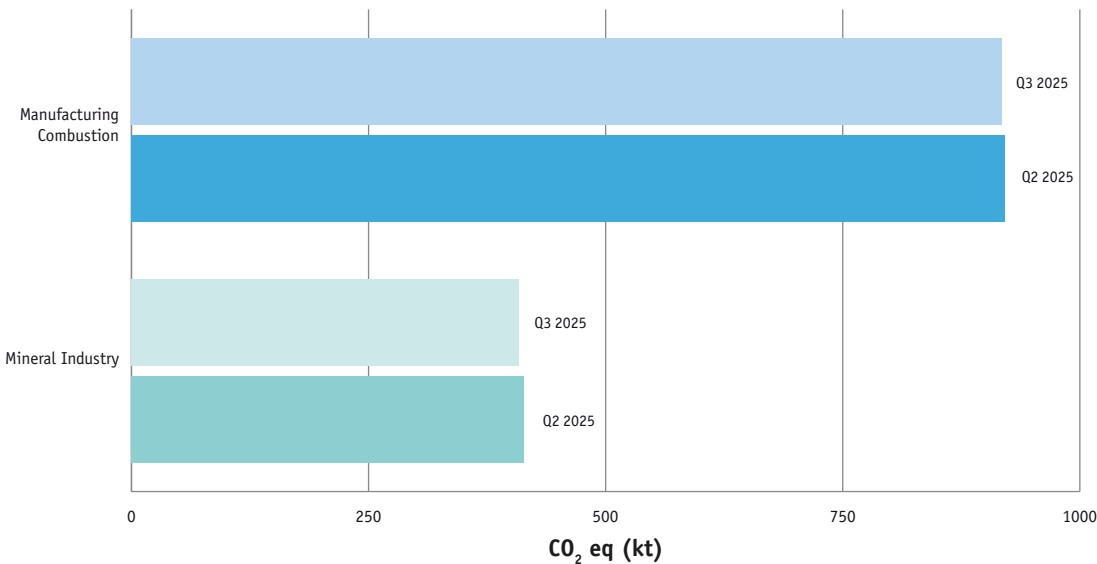
Looking at Quarter 3 2025 compared to Quarter 2 2025:

- Industry greenhouse gas emissions decreased by -0.7% (-9.2 kt CO₂ eq) compared to Quarter 2 2025.

Table 20: Summary Q3 2025 Compared to Q2 2025 – Industry

Sector	Greenhouse Gas	Emissions Q3 2025 (kt CO ₂ eq)	Comparison to Q2 2025	
			(kt CO ₂ eq)	(%)
Industry	CO₂	1,326.0	-9.2	-0.7
Manufacturing Combustion	CO ₂	917.4	-3.4	-0.4
Mineral Industry	CO ₂	408.6	-5.8	-1.4

Figure 26: Quarter-on-Quarter Changes in emissions in the Industry subsectors, based on seasonally adjusted data



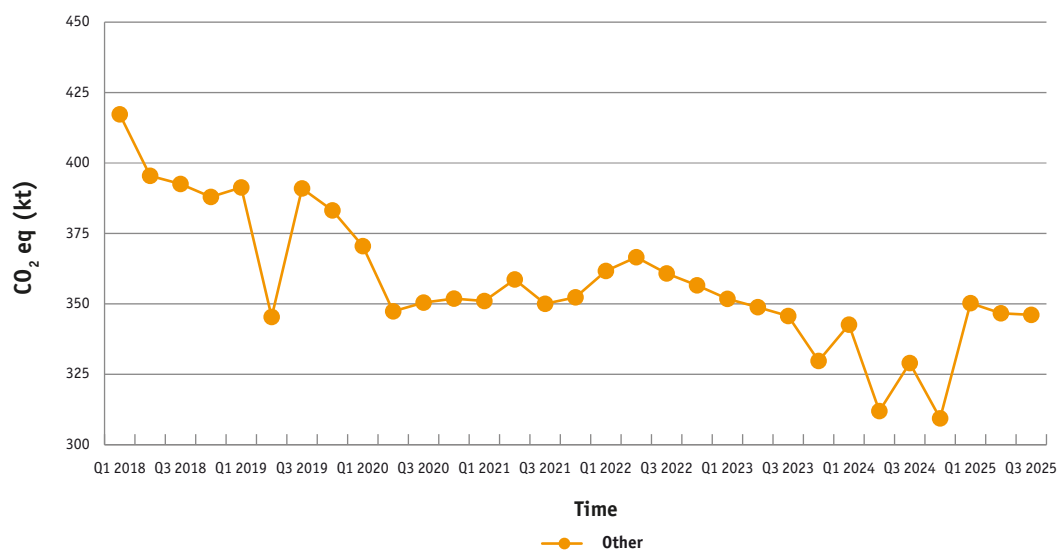
3.6 Other

Subsectors: F-Gases; Petroleum Refining; Waste: Landfills; Waste: Wastewater Treatment and Discharge

Number of indicator categories: Six

Estimated total coverage of quarterly indicator categories compared to original annual National Inventory Report: 90.3%

Figure 27: Changes in emissions in the Other sector from Q1 2018 to Q3 2025, based on seasonally adjusted data



3.6.1 Other Year-on-Year Change

Key finding:

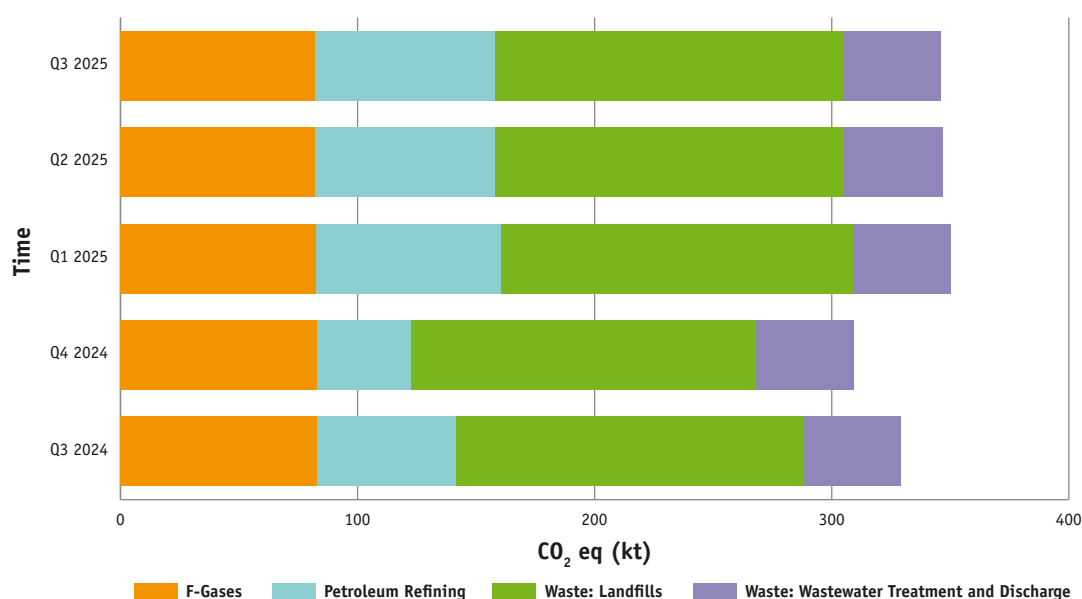
- The primary driver of the +5.2% (+17.1 kt CO₂ eq) change in emissions this quarter was an increase in emissions from Petroleum Refining (+29.8%) compared to the same quarter last year. A refinery was offline for essential maintenance for extended periods last year which affected emissions in that period.

Looking at Quarter 3 2025 compared to Quarter 3 2024:

- Other greenhouse gas emissions increased by +5.2% (+17.1 kt CO₂ eq) compared to Quarter 3 2024.
- The largest increase in emissions occurred in the Petroleum Refining sector (+17.4 kt CO₂ eq).

Table 21: Summary Q3 2025 Compared to Q3 2024 – Other

Sector	Greenhouse Gas	Emissions Q3 2025 (kt CO ₂ eq)	Comparison to Q3 2024	
			(kt CO ₂ eq)	(%)
Other	CH₄, CO₂, N₂O, HFC, PFC, SF₆, NF₃	346.1	17.1	5.2
F-Gases	HFC, PFC, SF ₆ , NF ₃	81.9	-1.0	-1.2
Petroleum Refining	CO ₂	76.0	17.4	29.8
Waste: Landfills	CH ₄	146.8	0.7	0.4
Waste: Wastewater Treatment and Discharge	CH ₄ , N ₂ O	41.4	0.0	0.1

Figure 28: Comparison of subsectoral breakdown in emissions for this quarter vs last four quarters, based on seasonally adjusted data

3.6.2 Other Year-to-Date Change

Key finding:

- The primary driver of the +6.0% (+59.4 kt CO₂ eq) change in year-to-date emissions was an increase in emissions from Petroleum Refining (+35.1%) compared to the same period last year. A refinery was offline for essential maintenance for extended periods in 2024, resulting in unusually low emissions for that period and a corresponding rebound in 2025.

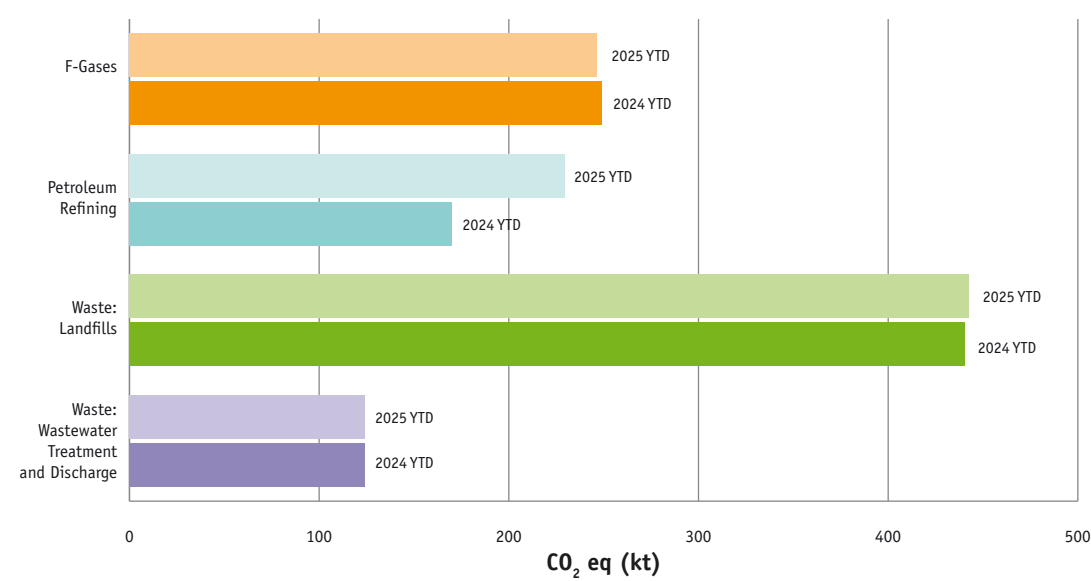
Looking at Year-to-Date 2025 compared to Year-to-Date 2024:

- Other greenhouse gas emissions increased by +6.0% (+59.4 kt CO₂ eq) compared to Year-to-Date 2024.
- The largest increase in emissions occurred in the Petroleum Refining sector (+59.7 kt CO₂ eq).

Table 22: Summary YTD 2025 Compared to YTD 2024 – Other

Sector	Greenhouse Gas	Emissions YTD 2025 (kt CO ₂ eq)	Comparison to YTD 2024	
			(kt CO ₂ eq)	(%)
Other	CH ₄ , CO ₂ , N ₂ O, HFC, PFC, SF ₆ , NF ₃	1,043.0	59.4	6.0
F-Gases	HFC, PFC, SF ₆ , NF ₃	246.4	-2.6	-1.1
Petroleum Refining	CO ₂	229.8	59.7	35.1
Waste: Landfills	CH ₄	442.6	2.1	0.5
Waste: Wastewater Treatment and Discharge	CH ₄ , N ₂ O	124.2	0.3	0.2

Figure 29: Comparing Year-To-Date 2025 to Year-To-Date 2024 by subsector



3.6.3 Other Quarter-on-Quarter Change

Key finding:

- Emissions from the Other Sector decreased marginally by -0.2% driven by quarter-over-quarter decreases in emissions from F-Gases (-0.2%, -0.2 kt CO₂ eq) and Waste: Landfills (-0.4%, -0.6 kt CO₂ eq).

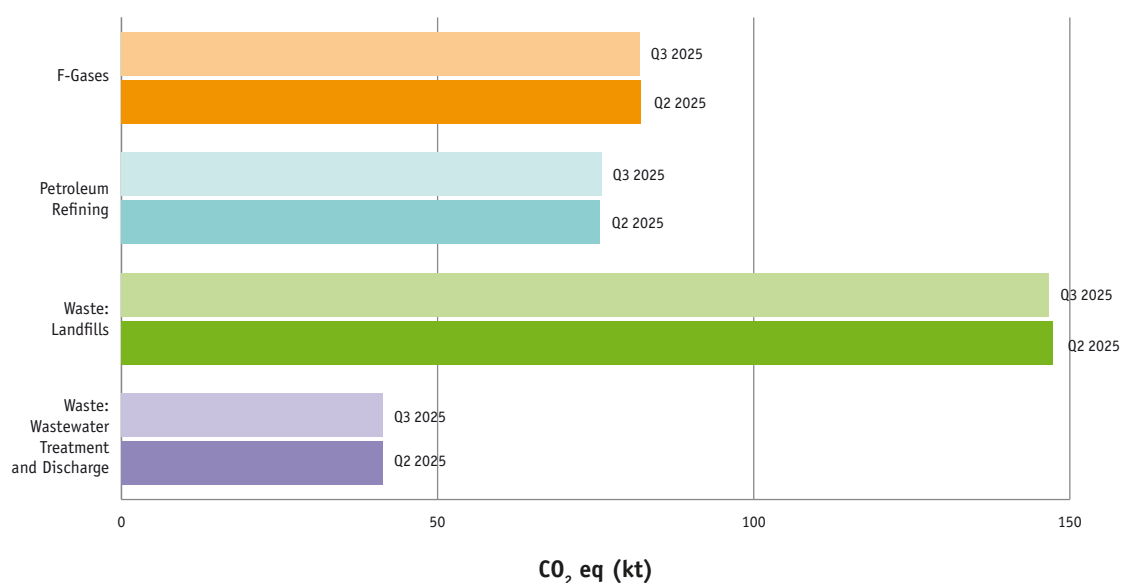
Looking at Quarter 3 2025 compared to Quarter 2 2025:

- Other greenhouse gas emissions decreased by -0.2% (-0.6 kt CO₂ eq) compared to Quarter 2 2025.

Table 23: Summary Q3 2025 Compared to Q2 2025 – Other

Sector	Greenhouse Gas	Emissions Q3 2025 (kt CO ₂ eq)	Comparison to Q2 2025	
			(kt CO ₂ eq)	(%)
Other	CH₄, CO₂, N₂O, HFC, PFC, SF₆, NF₃	346.1	-0.6	-0.2
F-Gases	HFC, PFC, SF ₆ , NF ₃	81.9	-0.2	-0.2
Petroleum Refining	CO ₂	76.0	0.2	0.3
Waste: Landfills	CH ₄	146.8	-0.6	-0.4
Waste: Wastewater Treatment and Discharge	CH ₄ , N ₂ O	41.4	0.0	0.0

Figure 30: Changes in emissions in the Other subsectors from Q3 2025 to Q2 2025, based on seasonally adjusted data



4. Data

All source data for this report is provided as a separate downloadable MS Excel file via the [EPA website](#). For access to non-open licensed data, please contact the data provider directly.

5. Methodological Notes

This section provides an overview of the two key methodologies used to produce quarterly greenhouse gas emissions estimates:

Temporal disaggregation and benchmarking of the existing EPA National Inventory Report emissions into quarterly values. The method allows for the estimation of quarterly emissions while adhere to the constraint that the sum of all four quarters will equal the reported total annual emissions tonnage. In addition, quarters can be extrapolated by this method beyond current annual data.

Once quarterly data are available, either primary data or data estimated from temporal disaggregation and benchmarking, the degree of seasonality in the data is assessed and, when present, a robust method of seasonal adjustment is applied.

5.1 Summary Methodology

5.1.1 Temporal Disaggregation with Benchmarking

Temporal disaggregation divides the annual inventory time series into four quarterly values. The benchmarking process ensures that the sum of the four quarters equals the annual reported value for the years. Importantly, the method also extrapolates estimates forward in time to predict quarterly values for which the annual totals are not yet available.

Temporal disaggregation and extrapolation can be employed naively or with information from high frequency time series known as proxy indicators. As a first step, domain experts from each sector produce a list of potential proxy indicators. The indicators should approximate the quarterly behaviour or movement of the greenhouse gases emissions in each IPCC category. Examples of proxy indicator variables include monthly energy statistics, monthly trade data, daily gas meter usage data, quarterly census of animal population.

The appropriate method of temporal disaggregation depends on the length of the high frequency proxy time series available. In the ideal case of ten plus years of high frequency data, the first step is to aggregate the high frequency data into annual data and test for correlation with the annual inventory time series using Kendall's tau. It is important to detrend both series by obtaining the first differences before testing for correlation.

There are two recommended statistical regression methods for the case of ten plus years of high frequency data. The Chow-Lin method is suited for stationary or cointegrated series, and for series with stable growth rates. The alternative Fernandez method is recommended for unstable growth rates or for non-co-integrated data. The appropriate method is selected by comparing the model goodness of fit between Chow-Lin and Fernandez.

The next steps involve checking the quality of the disaggregated quarterly series. The ratio of the quarterly benchmark (the annual values divided by four) to the quarterly indicator over time should be stable. Both the disaggregated quarterly time series and quarterly indicator values are detrended by getting the first difference, and the correlation between the two is calculated using Kendall's tau on the detrended values.

To evaluate the forecast accuracy of the model, out of sample predictive performance for the disaggregated quarterly estimates are calculated. For each full year of available annual inventory data, a comparable annual value is predicted using only the preceding years disaggregated quarterly estimates data. The RMSE, MAE and BIAS between the two estimates as well as the average across years gives a measure of the performance of the disaggregated quarterly series in predicting the annual totals.

Finally, to gauge the volatility in disaggregated quarterly estimates over time, different ratios are calculated between the quarterly estimates and annual totals. The calculated ratios also summarise which quarters, on average, have the most emissions.

It is necessary to apply a slightly altered methodology for high frequency time series covering a period of five to ten years. As before, both Chow-Lin and Fernandez are applied, and the best fitting model chosen. However here we also implement the Denton-Chelotte method, which unlike the regression approaches, retains the movement of the high frequency series regardless of correlation with the annual series. The final model is selected based upon the quality of the disaggregated quarterly series produced from each approach. The Denton-Chelotte method can only accommodate one proxy indicator, and if a more complex model involving multiple indicators is needed, a statistical regression method is used.

If only two to four years of high frequency are available, the implementation of a statistic regression method is not recommended. Here the Denton-Chelotte method is applied to produce disaggregated quarterly estimates. As before, the disaggregated quarterly time series is quality checked, and the predictive performance calculated.

5.1.2 Seasonal Adjustment

The first consideration is the length of the time series, and nine quarters of data is an absolute minimum for seasonal adjustment. If the disaggregated quarterly time series is less than nine quarters, then seasonal adjustment cannot be applied. Preferably, the time series will have at least twenty quarters. If the time series contains more than nine but less than twenty quarters, a domain expert should be consulted to confirm if seasonal adjustment is necessary.

An important first step is to check for the presence of seasonality in the data. Different plots (ACF, PACF, Quarterly sub-series, Lag correlation) are produced to visually inspect for seasonality. In combination with the visual inspection, three formal statistical tests are employed. The first known as the QS-test evaluates the null hypothesis that the first two seasonal lags for quarterly data (4 and 8) are zero. The second Kruskal-Wallis test is non-parametric and tests if the means of each quarter are drawn from different distributions. The final Friedman test is also non-parametric and tests if the medians differ across quarters.¹² If at least two out of the three tests find seasonality, seasonal adjustment is implemented. If both the visual inspection, Kruskal-Wallis and Friedman test fail to find any signal of seasonality (no seasonality or highly unstable seasonality), then the series is not adjusted.

All seasonal adjustment is implemented using the RJDemetra interface. According to the CSO methodology, the X-13ARIMA-SEATS pre-treatment, and the 'airline' model ARIMA (0, 1, 1, 0, 1, 1), are chosen as the initial starting point. The software will evaluate whether a log transformation is necessary and will automatically detect clear additive outliers, level shift outliers and temporary change outliers.

It is important to check the quality of the model automatically selected by the RJDemetra interface. The normality, independence and linearity of the model residuals are assessed, and the distribution of model residuals visually inspected. If the model is not a good fit, the fully automated model selection specification is used to find a suitable model. If this also fails to produce a viable model and both Kruskal-Wallis and Friedman tests also fail, then seasonal adjustment is not applied.

Given the conservative threshold of detection in automatic identification of outliers, the irregular component of the initial model is examined and points in the time series where the value is greater than 1.5 times the inter-quartile range are identified. The irregular component is visually inspected, and additional outliers are manually included into the model specification. After applying the new model, if the t-value of the additional outliers is greater than 2.0, then the outliers are included in the final model.

The quality of the seasonal adjustment is examined using different outputs from RJDemetra. The idempotency test checks for residual seasonality in the adjusted series. The model decomposition is checked

and visual inspections on the diagnostic plots completed. An important output from RJDemetra is the Statistics Canada's Seasonal Adjustment Dashboard. The dashboard report includes graphs of the series, as well as summaries of individual seasonal effects and patterns. Additionally, key seasonal adjustment diagnostics are presented in a traffic light display, and the net effect of seasonal adjustment is decomposed into its various components. Red warnings on the Statistics Canada's Seasonal Adjustment Dashboard indicate poor seasonal adjustment.

If the combination of the model and seasonal adjustment is of superior quality, then the model is implemented, and the resulting seasonally adjusted estimates used for reporting. However, if both the model and seasonal adjustment are of inadequate quality, seasonal adjustment is not implemented, and the unadjusted estimates are used for reporting. In cases where either the model or seasonal adjustment are poor, CSO methodology are consulted to identify improvement actions.

5.2 Revisions and Methodological Changes of Note

5.2.1 Other Sector Revision

An error was identified in the time series for the F-Gases subsector of the Other sector in the previous report. This resulted in an average over-estimation of 11.3 kt CO₂ eq across the affected time series. Relative to the total Other sector emissions over the corresponding period, this represents an over-estimation of approximately 3.2%. The data associated with this release have now been corrected.

5.2.2 Methodology for imputation of incomplete proxy data sets

Agriculture sector: Ground limestone sales activity data were available up to June 2025 at the time of compilation. Activity data for Q3 2025 were forecast to allow estimation of emissions in the Liming subsector. The monthly data were aggregated to a quarterly time series, and the seasonal pattern in the series was evaluated. A number of established time-series models were assessed, including exponential smoothing with multiplicative seasonality, seasonal ARIMA, and a seasonal naive benchmark. Rolling one-step-ahead cross-validation was used to compare model performance, with the exponential smoothing model providing the most accurate out-of-sample results.

Buildings sector: Central Statistics Office daily gas demand activity data were available up to August 2025. The month of September was imputed to complete the quarter and allow estimation of emissions in the Buildings sector. The daily data were aggregated to a monthly time series for analysis. For the Residential subsector, a simple linear regression was used with heating degree days (HDD) as the explanatory variable, given the strong relationship between the monthly values of the two variables (p -value < 0.001 and $R^2 = 0.96$) to forecast the missing month. For the Commercial subsector an ARIMA model was selected with HDD as a regressor. The September 2025 HDD data were then used to generate a one-step-ahead forecast.

An Gníomhaireacht um Chaomhnú Comhshaoil

Tá an GCC freagrach as an gcomhshaol a chosaint agus a fheabhsú, mar shócmhainn luachmhar do mhuintir na hÉireann. Táimid tiomanta do dhaoine agus don chomhshaol a chosaint ar thionchar díobhálach na radaíochta agus an truaillithe.

Is féidir obair na Gníomhaireachta a roinnt ina trí phríomhréimse:

- Rialáil:** Rialáil agus córais chomhlíonta comhshaoil éifeachtacha a chur i bhfeidhm, chun dea-thorthaí comhshaoil a bhaint amach agus díriú orthu siúd nach mbíonn ag cloí leo.
- Eolas:** Sonraí, eolas agus measúnú ardchaighdeán, spriocdhírthe agus tráthúil a chur ar fáil i leith an chomhshaoil chun bonn eolais a chur faoin gcinnteoireacht.
- Abhcóideacht:** Ag obair le daoine eile ar son timpeallachta glaine, táirgiúla agus dea-chosanta agus ar son cleachtas inbhuanaithe i dtaobh an chomhshaoil.

I measc ár gcuid freagrachtaí tá:

CEADÚNÚ

- Gníomhaíochtaí tionscail, dramhaíola agus stórála peitрил ar scála mór;
- Sceitheadh fuíolluisce uirbigh;
- Úsáid shrianta agus scaoileadh rialaithe Orgánach Géinmhodhnaithe;
- Foinsí radaíochta ianúcháin;
- Astaíochtaí gás ceaptha teasa ó thionscal agus ón eitlíocht trí Scéim an AE um Thrádáil Astaíochtaí.

FORFHEIDHMIÚ NÁISIÚNTA I LEITH CÚRSAÍ COMHSHAOIL

- Iníúchadh agus cigireacht ar shaoráidí a bhfuil ceadúnas acu ón GCC;
- Cur i bhfeidhm an dea-chleachtais a stiúradh i ngníomhaíochtaí agus i saoráidí rialáilte;
- Maoirseacht a dhéanamh ar fhreagrachtaí an údaráis áitiúil as cosaint an chomhshaoil;
- Caighdeán an uisce óil phoiblí a rialáil agus údaruithe um sceitheadh fuíolluisce uirbigh a fhorfheidhmiú
- Caighdeán an uisce óil phoiblí agus phríobháidigh a mheasúnú agus tuairisciú air;
- Comhordú a dhéanamh ar líonra d'eagraíochtaí seirbhíse poiblí chun tacú le gníomhú i gcoinne coireachta comhshaoil;
- An dlí a chur orthu siúd a bhriseann dlí an chomhshaoil agus a dhéanann dochar don chomhshaol.

BAINISTÍOCHT DRAMHAÍOLA AGUS CEIMICEÁIN SA CHOMHSHAOL

- Rialacháin dramhaíola a chur i bhfeidhm agus a fhorfheidhmiú lena n-áirítear saincheisteanna forfheidhmithe náisiúnta;
- Staitisticí dramhaíola náisiúnta a ullmhú agus a fhoilsiú chomh maith leis an bPlean Náisiúnta um Bainistíocht Dramhaíola Guaisí;
- An Clár Náisiúnta um Chosc Dramhaíola a fhorbairt agus a chur i bhfeidhm;
- Reachtaíocht ar rialú ceimiceán sa timpeallacht a chur i bhfeidhm agus tuairisciú ar an reachtaíocht sin.

BAINISTÍOCHT UISCE

- Plé le struchtúir náisiúnta agus réigiúnacha rialachais agus oibriúcháin chun an Chreat-treoir Uisce a chur i bhfeidhm;
- Monatóireacht, measúnú agus tuairisciú a dhéanamh ar chaighdeán aibhneacha, lochanna, uiscí idirchreasa agus cósta, uiscí snámha agus screamhuisce chomh maith le tomhas ar leibhéil uisce agus sreabhadh abhann.

EOLAÍOCHT AERÁIDE & ATHRÚ AERÁIDE

- Fardail agus réamh-mheastacháin a fhoilsiú um astaíochtaí gás ceaptha teasa na hÉireann;
- Rúnaíocht a chur ar fáil don Chomhairle Chomhairleach ar Athrú Aeráide agus tacaíocht a thabhairt don Idirphlé Náisiúnta ar Gníomhú ar son na hAeráide;

- Tacú le gníomhaíochtaí forbartha Náisiúnta, AE agus NA um Eolaíocht agus Beartas Aeráide.

MONATÓIREACHT AGUS MEASÚNÚ AR AN GCOMHSHAOL

- Córais náisiúnta um monatóireacht an chomhshaoil a cheapadh agus a chur i bhfeidhm: teicneolaíocht, bainistíocht sonraí, anailís agus réamhaisnéisiú;
- Tuairiscí ar Staid Thimpeallacht na hÉireann agus ar Tháscairí a chur ar fáil;
- Monatóireacht a dhéanamh ar chaighdeán an aeir agus Treoir an AE i leith Aeir Ghlain don Eoraip a chur i bhfeidhm chomh maith leis an gCoinbhinsiún ar Aerthruailliú Fadraoin Trasteorann, agus an Treoir i leith na Teorann Náisiúnta Astaíochtaí;
- Maoirseacht a dhéanamh ar chur i bhfeidhm na Treorach i leith Torainn Timpeallachta;
- Measúnú a dhéanamh ar thionchar pleananna agus clár beartaithe ar chomhshaol na hÉireann.

TAIGHDE AGUS FORBAIRT COMHSHAOIL

- Comhordú a dhéanamh ar ghníomhaíochtaí taighde comhshaoil agus iad a mhaoiniú chun brú a aithint, bonn eolais a chur faoin mbeartas agus réitigh a chur ar fáil;
- Comhoibriú le gníomhaíocht náisiúnta agus AE um thaighde comhshaoil.

COSAINT RAIDEOLAÍOCH

- Monatóireacht a dhéanamh ar leibhéil radaíochta agus nochtadh an phobail do radaíocht ianúcháin agus do réimsí leictreamaighnéadacha a mheas;
- Cabhrú le pleananna náisiúnta a fhorbairt le haghaidh éigeandálaí ag eascairt as taismí núicléacha;
- Monatóireacht a dhéanamh ar fhorbairtí thar lear a bhaineann le saoráidí núicléacha agus leis an tsábháilteacht raideolaíochta;
- Sainseirbhísí um chosaint ar an radaíocht a sholáthar, nó maoirsiú a dhéanamh ar sholáthar na seirbhísí sin.

TREOIR, ARDÚ FEASACHTA AGUS FAISNÉIS INROCHTANA

- Tuairisciú, comhairle agus treoir neamhspleách, fianaise-bhunaithe a chur ar fáil don Rialtas, don tionscal agus don phobal ar ábhair maidir le cosaint comhshaoil agus raideolaíoch;
- An nasc idir sláinte agus folláine, an geilleagar agus timpeallacht ghlan a chur chun cinn;
- Feasacht comhshaoil a chur chun cinn lena n-áirítear tacú le hiompraíocht um éifeachtúlacht acmhainní agus aistriú aeráide;
- Tástáil radóin a chur chun cinn i dtithe agus in ionaid oibre agus feabhsúchán a mholadh áit is gá.

COMHPHÁIRTÍOCHT AGUS LÍONRÚ

Oibriú le gníomhaireachtaí idirnáisiúnta agus náisiúnta, údaráis réigiúnacha agus áitiúla, eagraíochtaí neamhrialtais, comhlachtaí ionadaíocha agus ranna rialtais chun cosaint chomhshaoil agus raideolaíoch a chur ar fáil, chomh maith le taighde, comhordú agus cinnteoireacht bunaithe ar an eolaíocht.

BAINISTÍOCHT AGUS STRUCHTÚR NA GNÍOMHAIREACHTA UM CHAOMHNÚ COMHSHAOIL

Tá an GCC á bainistiú ag Bord lánaimseartha, ar a bhfuil Ard-Stiúrthóir agus cúigear Stiúrthóir. Déantar an obair ar fud cúig cinn d'Oifigí:

- An Oifig um Inbhuanaitheacht i leith Cúrsaí Comhshaoil
- An Oifig Forfheidhmithe i leith Cúrsaí Comhshaoil
- An Oifig um Fhianaise agus Measúnú
- An Oifig um Chosaint ar Radaíocht agus Monatóireacht Comhshaoil
- An Oifig Cumarsáide agus Seirbhísí Corparáideacha

Tugann coistí comhairleacha cabhair don Gníomhaireacht agus tagann siad le chéile go rialta le plé a dhéanamh ar ábhair imní agus le comhairle a chur ar an mBord.

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