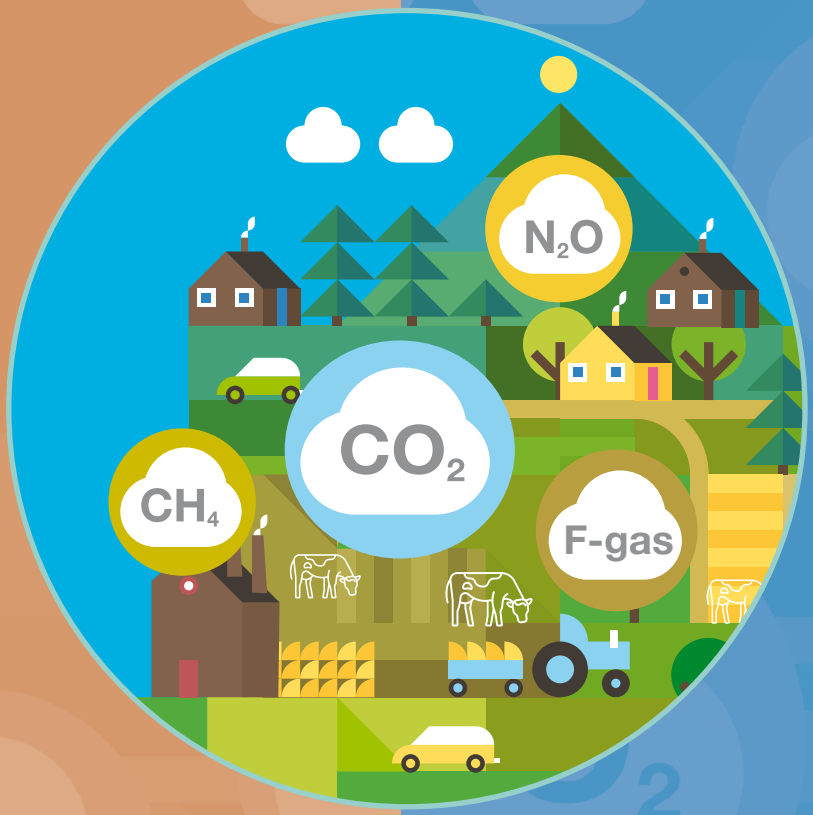
Quarterly Greenhouse Gas Emissions Indicator Report

2025 Quarter 2

October 2025



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 Emissions Indicator Report 2025 Quarter 2

ENVIRONMENTAL PROTECTION AGENCY

An Ghníomhaireacht um Chaomhnú Comhshaoil

PO Box 3000, Johnstown Castle, Co. Wexford, Ireland

Telephone: +353 53 9160600 Fax: +353 53 9160699

Email: info@epa.ie Website: www.epa.ie

Lo Call: 0818 33 55 99

Published 2025

Disclaimer

ISBN 978-1-80009-245-7

Table of Contents

1. Key Findings

Please note that all quoted figures in Key Findings are comparing emissions at the end of Quarter 2 2025 with emissions at the end of Quarter 2 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 Quarter 2 2025 compared to Quarter 2 2024:

- Overall greenhouse gas emissions decreased by -3.2% (-403.2 kt CO_2 eq) compared to Quarter 2 2024.
- The largest decrease in emissions occurred in the Buildings (-295.6 kt CO_2 eq) sector, followed by the Agriculture (-117.3 kt CO_2 eq) sector.
- The largest increase in emissions occurred in the Other (+38.1 kt CO_2 eq) sector, followed by the Transport (+24.6 kt CO_2 eq) sector.

There was a 13.6% decrease in the number of heating degree days (HDD, days with average temperature below 15.5 degrees Celsius where heating would be needed) in Q2 2025 compared to Q2 2024, resulting in lower demand for heating in the Building sector.

In Q2 2025 compared to Q2 2024, electricity demand increased by 2.2%, and the share of electricity supplied included an increase in renewables (34.9% vs 34.2%), a decrease in non-renewables (44.0% vs 47.7%) and an increase in imports (21.1% vs 18.1%).

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

- Overall greenhouse gas emissions decreased by -0.9% (-215.5 kt CO_2 eq) compared to Year-to-Date 2024.
- The largest decrease in emissions occurred in the Buildings (-317.7 kt CO_2 eq) sector, followed by the Transport (-99.3 kt CO_2 eq) sector.
- The largest increase in emissions occurred in the Agriculture (+109.6 kt CO_2 eq) sector, followed by the Other (+47.3 kt CO_2 eq) sector.

Table 1: Key Findings

Sector	Key Finding
Q2 2024 vs. Q2 2025	Greenhouse Gas emissions decreased by -3.2% (-403.2 kt CO_2 eq) driven mainly by decreases in the Buildings sector (-295.6 kt CO_2 eq) due to decreased energy demand for home heating, and the Agriculture sector (-117.3 kt CO_2 eq) due to a decrease in fertiliser sales and reductions in non-dairy cattle numbers.
Agriculture	There was a -2.4% (-117.3 kt CO_2 eq) decrease in emissions compared to the same quarter last year. This was due to a decrease in inorganic nitrogen fertiliser sales on the same quarter last year, in combination with a decrease in non-dairy cattle numbers leading to reductions in emissions from enteric fermentation and manure management.
Transport	The primary drivers of the +0.9% (+24.6 kt CO_2 eq) change in emissions were increased sales of petrol and a decrease in biofuel blending rates for diesel in comparison to the same quarter last year.
Electricity	Emissions decreased by -1.5% (-22.4 kt CO_2 eq) despite a 2.2% increase in overall electricity supply. This was achieved by a 19.0% increase in imported electricity and a 4.2% increase in renewable sources of electricity generation.
Buildings – Commercial and Public	Emissions increased in the Commercial Services + 1.5% (+5.3 kt CO_2 eq) sector due to increased network gas demand in this sector.
Buildings – Residential	Emissions decreased by -20.7% (-300.9 kt CO_2 eq) due to reduced heating demand: there were 13.6% 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 were down -2.2% (-30.7 kt CO_2 eq), driven by reductions in emissions across both the Mineral Industry and Manufacturing combustion subsectors.
GHG Emissions H1 2024 to H1 2025	Comparing the first half of 2025 with 2024, emissions have decreased by -0.9% (-215.5 kt CO_2 eq), largely driven by decreases in the Buildings sector (-317.7 kt CO_2 eq) due to lower heating demand, and the Transport sector (-99.3 kt CO_2 eq) due to a decline in sales of diesel and increased biofuel blending rates in petrol.
GHG Emissions Q1 2025 to Q2 2025	Greenhouse gas emissions decreased by -3.5% (-438.5 kt CO_2 eq) compared to Quarter 1 2025 driven mainly by emission decreases in the Buildings sector (-227.3 kt CO_2 eq) due to reduced heating demand and in the Electricity sector (-107.5 kt CO_2 eq) driven by lower electricity demand.

Table 2 shows the year-on-year changes for 2025 Quarter 2 compared to 2024 Quarter 2, quarter-on-quarter changes for 2025 Quarter 2 compared to 2025 Quarter 1, and year-to-date changes for 2025 compared to 2024.

Table 2: Key Findings

Sector	Emissions Q2 2025 (kt CO_2 eq)	Comparison with Q2 2024 (%)	Comparison with Q1 2025 (%)	Half Year 2025 vs. 2024 (%)
Overall	**12,248.9**	**-3.2**	**-3.5**	**-0.9**
Agriculture	4,712.9	-2.4	-1.3	1.2
Buildings	1,507.3	-16.4	-13.1	-8.9
Electricity	1,480.3	-1.5	-6.8	1.5
Industry	1,337.5	-2.2	-3.4	-0.1
Other	357.7	11.9	-0.7	7
Transport	2,853.4	0.9	0.2	-1.7

2. 2025 Quarter 2 Summary

This section presents the key high-level emissions estimates for Quarter 2 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 Q2 2025

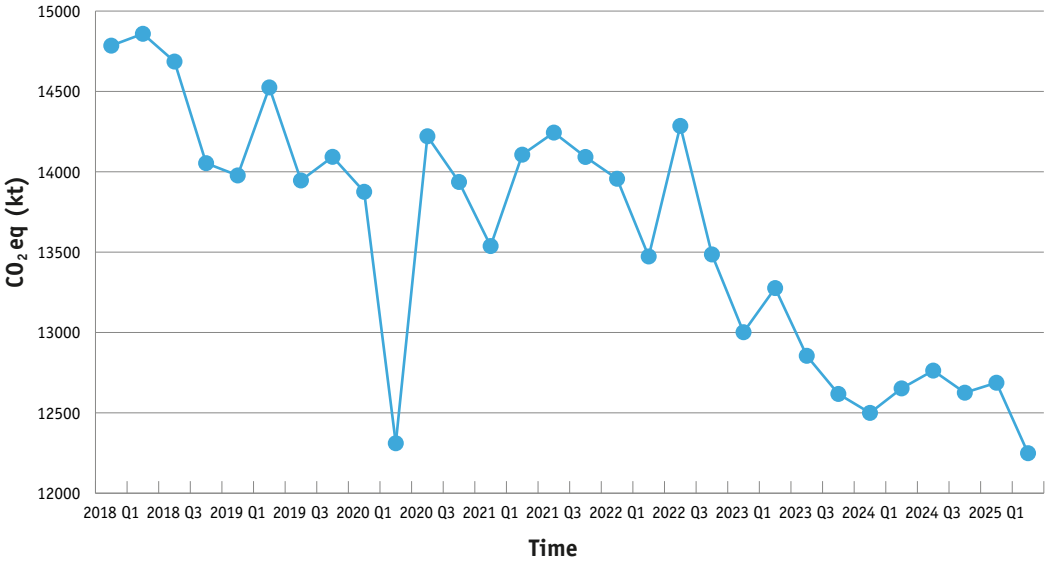
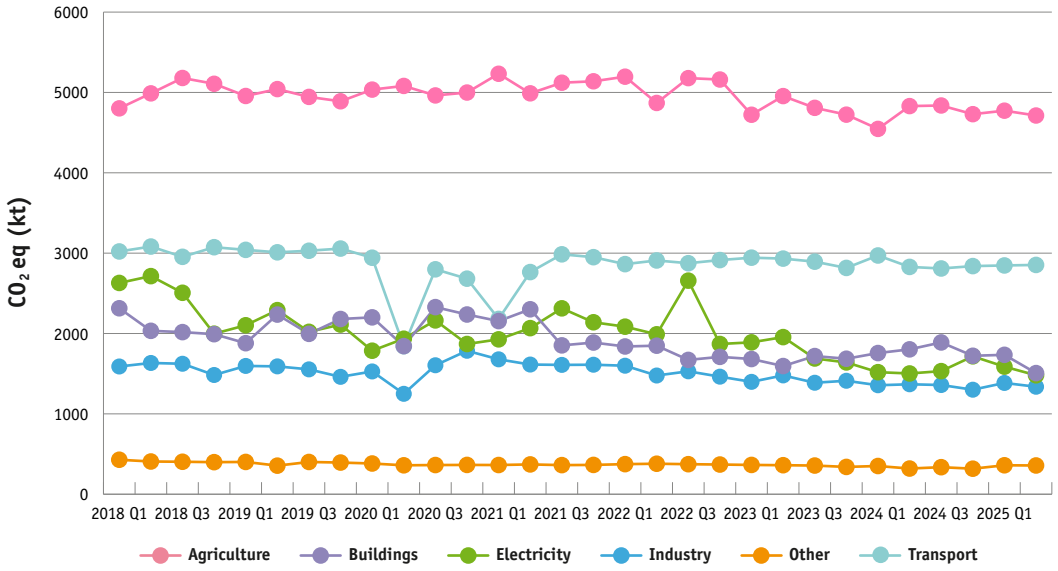


Figure 2: Overall quarterly movement in greenhouse gas emissions for all Sectors from Q1 2018 to Q2 2025



2.1 Year-on-Year Change

In this section we look at the emissions for Quarter 2 2025 and compare them to Quarter 2 2024. We will also provide cumulative emissions for the first half of 2025 (Quarters 1 and 2) in comparison to the first half of 2024.

Key finding:

- Overall GHG emissions decreased by -3.2% (-403.2 kt CO_2 eq) compared to Quarter 2 2024, driven mainly by decreases in the Buildings sector (-295.6 kt CO_2 eq) due to a -13.6% decrease in heating degree days, and the Agriculture sector (-117.3 kt CO_2 eq) due to a decrease in inorganic nitrogen fertiliser sales on the same quarter last year, in combination with a decrease in non-dairy cattle numbers leading to reductions in emissions from enteric fermentation and manure management.

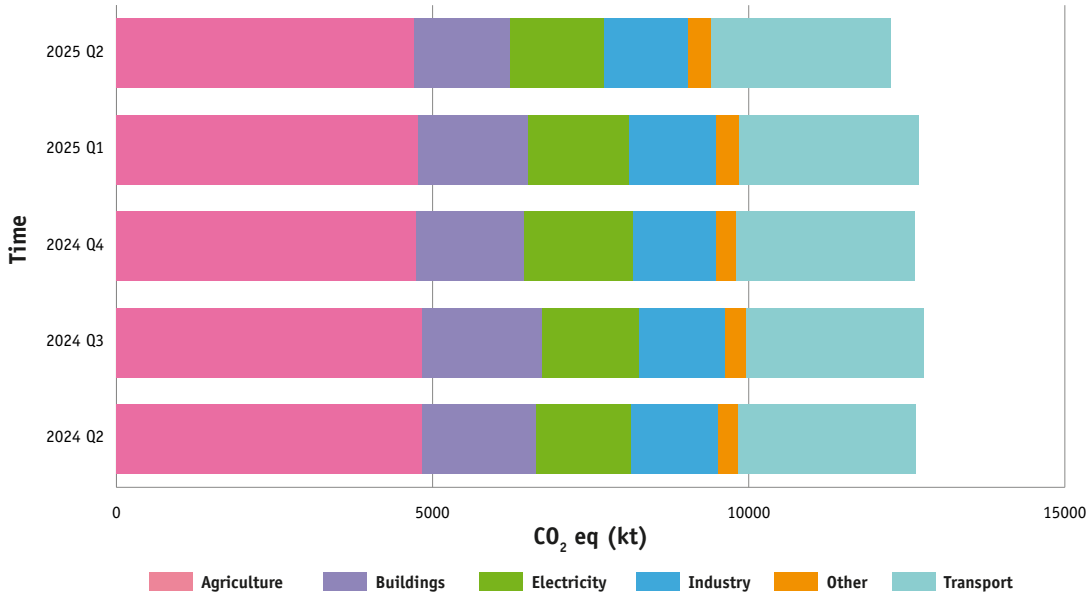
Looking at Quarter 2 2025 compared to Quarter 2 2024:

- Overall greenhouse gas emissions decreased by -3.2% (-403.2 kt CO_2 eq) compared to Quarter 2 2024.
- The largest decrease in emissions occurred in the Buildings (-295.6 kt CO_2 eq) sector, followed by the Agriculture (-117.3 kt CO_2 eq) sector.
- The largest increase in emissions occurred in the Other (+38.1 kt CO_2 eq) sector, followed by the Transport (+24.6 kt CO_2 eq) sector.

Table 3: Summary Q2 2025 compared to Q2 2024

			Comparison to Q2 2024	
Sector	**Greenhouse Gas**	**Emissions 2025 Q2 (kt CO_2 eq)**	**(kt CO_2 eq)**	**(%)**
Overall		**12,248.9**	**-403.2**	**-3.2**
Agriculture	CH_4, CO_2, N_2O	4,712.9	-117.3	-2.4
Buildings	CH_4, CO_2	1,507.3	-295.6	-16.4
Electricity	CO_2	1,480.3	-22.4	-1.5
Industry	CO_2	1,337.5	-30.7	-2.2
Other	CH_4, CO_2, N_2O, HFC, PFC, SF_6, NF_3	357.7	38.1	11.9
Transport	CO_2	2,853.4	24.6	0.9

Figure 3: Overall quarterly movement in greenhouse gas emissions for all Sectors from Q2 2024 to Q2 2025



2.2 Year-to-Date Change

Key finding:

- Overall GHG emissions decreased by -0.9% (-215.5 kt CO_2 eq) compared to the same period in 2024, driven mainly by decreases in the Buildings sector (-317.7 kt CO_2 eq) due to 4.4% less days with average temperatures below 15.5 degrees Celsius (Heating Degree Days) than the first half of 2024, indicating decreased demand for heating, and the Transport sector (-99.3 kt CO_2 eq) driven by a decline in sales of diesel and increased biofuel blending rates for petrol.

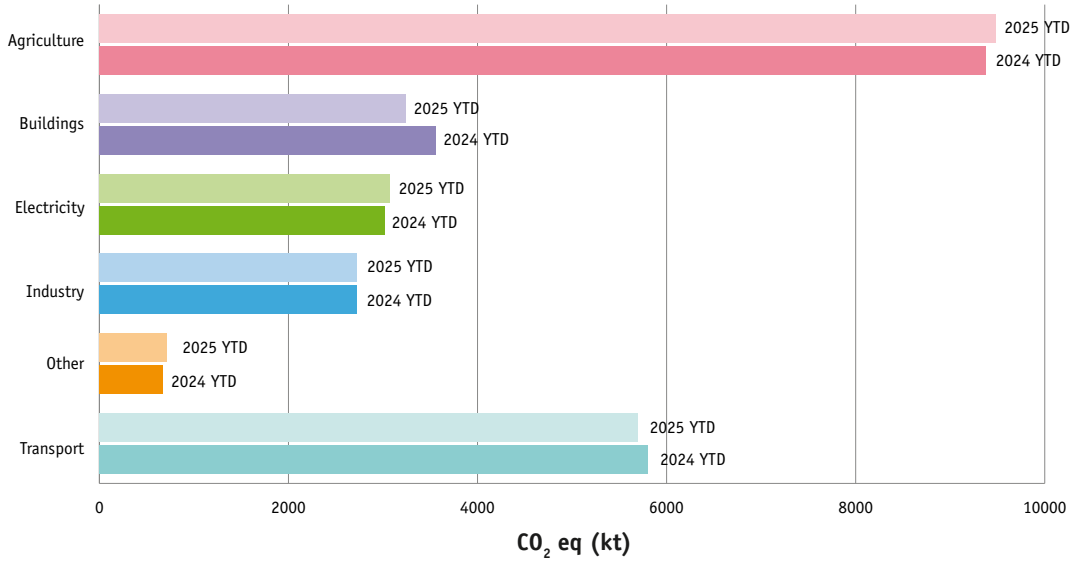
Looking at Year-to-Date 2025 compared to Year-to-Date 2024:

- Overall greenhouse gas emissions decreased by -0.9% (-215.5 kt CO_2 eq) compared to Year-to-Date 2024.
- The largest decrease in emissions occurred in the Buildings (-317.7 kt CO_2 eq) sector, followed by the Transport (-99.3 kt CO_2 eq) sector.
- The largest increase in emissions occurred in the Agriculture (+109.6 kt CO_2 eq) sector, followed by the Other (+47.3 kt CO_2 eq) sector.

Table 4: Summary YTD 2025 compared to YTD 2024

			Comparison to YTD 2024	
Sector	**Greenhouse Gas**	**Emissions YTD 2025 (kt CO_2 eq)**	**(kt CO_2 eq)**	**(%)**
Overall		**24,936.4**	**-215.5**	**-0.9**
Agriculture	CH_4, CO_2, N_2O	9,486.0	109.6	1.2
Buildings	CH_4, CO_2	3,241.9	-317.7	-8.9
Electricity	CO_2	3,068.0	46.6	1.5
Industry	CO_2	2,722.3	-2.0	-0.1
Other	CH_4, CO_2, N_2O, HFC, PFC, SF_6, NF_3	717.8	47.3	7
Transport	CO_2	5,700.4	-99.3	-1.7

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 decreased by -3.5% (-438.5 kt CO_2 eq) compared to Quarter 1 2025, on a seasonally adjusted basis, driven by decreases in the Buildings sector (-227.3 kt CO_2 eq) due to lower heating demand, and in the Electricity sector (-107.5 kt CO_2 eq) driven by a decrease in energy demand of -12.5%.

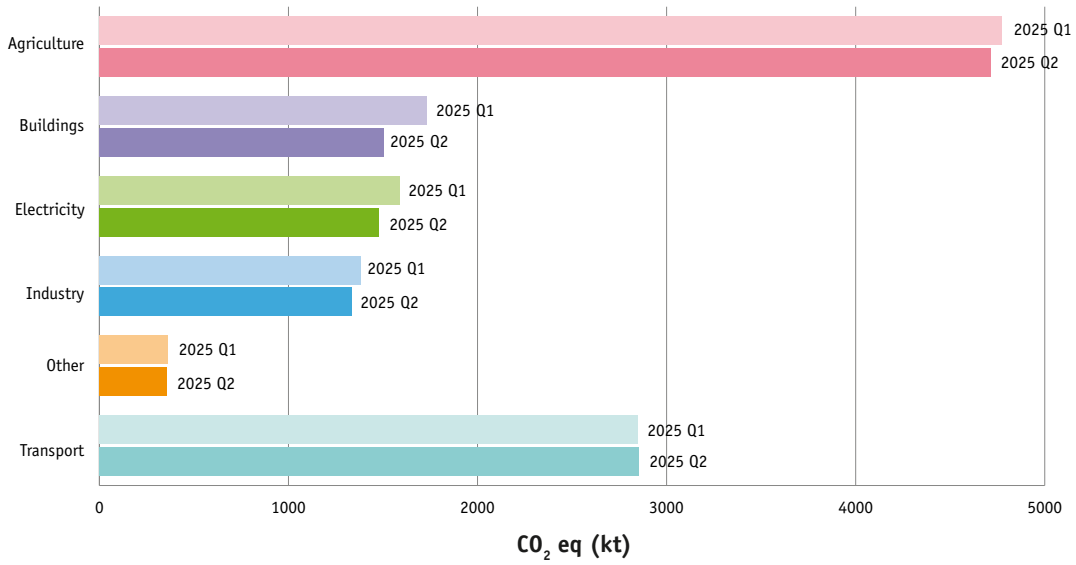
Looking at Quarter 2 2025 compared to Quarter 1 2025:

- Overall greenhouse gas emissions decreased by -3.5% (-438.5 kt CO_2 eq) compared to Quarter 1 2025.
- The largest decrease in emissions occurred in the Buildings (-227.3 kt CO_2 eq) sector, followed by the Electricity (-107.5 kt CO_2 eq) sector.
- The largest increase in emissions occurred in the Transport (+6.4 kt CO_2 eq) sector.

Table 5: Summary Q2 2025 compared to Q1 2025

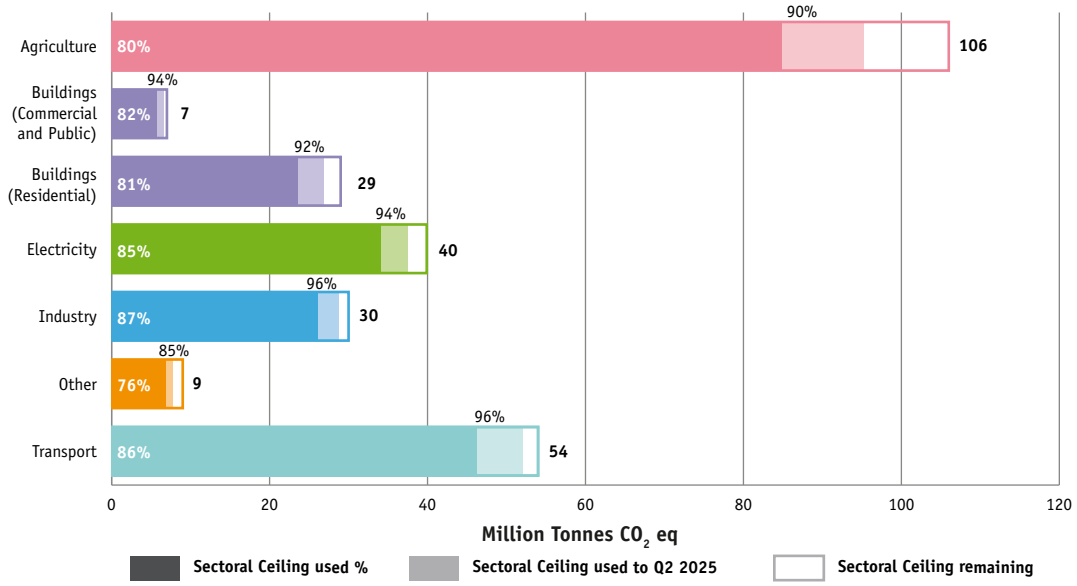
			Comparison to Q1 2025	
Sector	**Greenhouse Gas**	**Emissions Q2 2025 (kt CO_2 eq)**	**(kt CO_2 eq)**	**(%)**
Overall		**12,248.9**	**-438.5**	**-3.5**
Agriculture	CH_4, CO_2, N_2O	4,712.9	-60.3	-1.3
Buildings	CH_4, CO_2	1,507.3	-227.3	-13.1
Electricity	CO_2	1,480.3	-107.5	-6.8
Industry	CO_2	1,337.5	-47.3	-3.4
Other	CH_4, CO_2, N_2O, HFC, PFC, SF_6, NF_3	357.7	-2.5	-0.7
Transport	CO_2	2,853.4	6.4	0.2

Figure 5: Comparing Q2 2025 to Q1 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 85% in the Other Sector to 96% in the Industry and Transport sectors. Buildings recorded the largest rises in Carbon Budget usage year-to-date (increasing by +12 and +11 percentage points for Commercial and Residential Buildings respectively).

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 Q2 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 CO_2 eq
- Buildings (Commercial and Public), 7.2 Mt CO_2 eq
- Buildings (Residential), 28.9 Mt CO_2 eq
- Electricity, 40.4 Mt CO_2 eq
- Industry, 32.3 Mt CO_2 eq
- Other, 9.1 Mt CO_2 eq
- Transport, 58.0 Mt CO_2 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

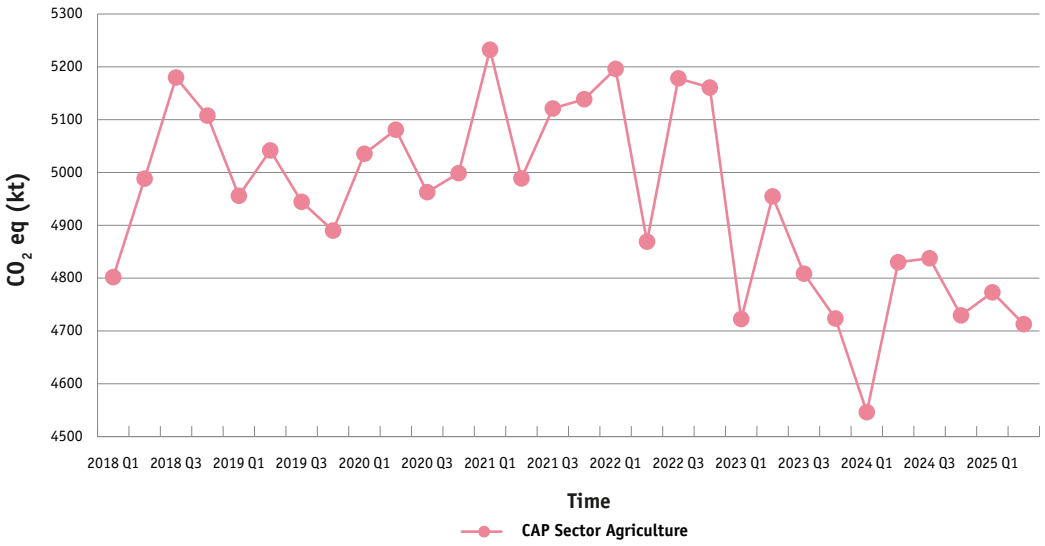
3.1 Agriculture

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 Q2 2025, based on seasonally adjusted data



3.1.1 Agriculture Year-on-Year Change

Key findings:

- There was a -2.4% (-117.3 kt CO_2 eq) decrease in emissions compared to the same quarter last year. This was driven by the 13.7% decrease in inorganic nitrogen fertiliser sales on the same quarter last year, in combination with a 4.5% decrease in non-dairy cattle numbers leading to reductions in emissions from enteric fermentation and manure management.

Looking at Quarter 2 2025 compared to Quarter 2 2024:

- Agriculture greenhouse gas emissions decreased by -2.4 (-117.3 kt CO_2 eq) compared to Quarter 2 2024.
- The largest decrease in emissions occurred in the Agricultural soils (-85.2 kt CO_2 eq) sector, followed by the Enteric fermentation (-40.7 kt CO_2 eq) sector.
- The largest increase in emissions occurred in the Liming (+33.0 kt CO_2 eq) sector, followed by the Agriculture/Forestry fuel combustion (+18.4 kt CO_2 eq) sector.

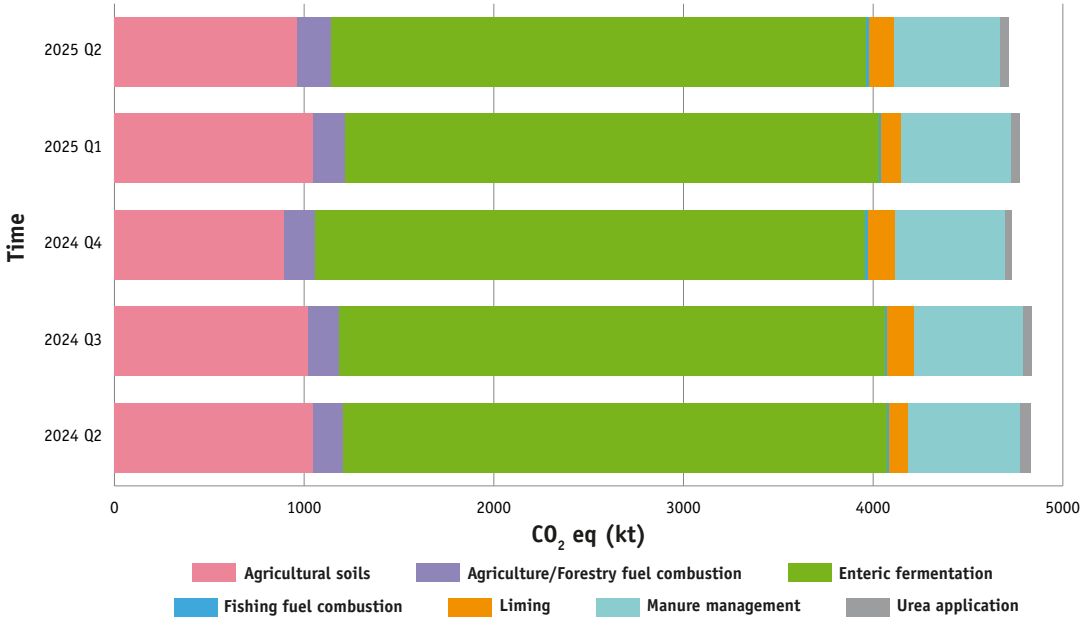
Table 6: Summary Q2 2025 compared to Q2 2024 – Agriculture

			Comparison to Q2 2024	
Sector	**Greenhouse Gas**	**Emissions Q2 2025 (kt CO_2 eq)**	**(kt CO_2 eq)**	**(%)**
Agriculture	**CH_4, CO_2, N_2O**	**4,712.9**	**-117.3**	**-2.4**
Agricultural soils	N_2O	962.9	-85.2	-8.1
Agriculture/Forestry fuel combustion	CO_2	175.0	18.4	11.8
Enteric fermentation	CH_4	2,824.5	-40.7	-1.4
Fishing fuel combustion	CO_2	15.1	0.0	-0.1
Liming*	CO_2	129.2	33.0	34.4
Manure management	CH_4, N_2O	561.5	-32.0	-5.4
Urea application	CO_2	44.6	-10.8	-19.5

Note:

* Liming subsector: Direct CO_2 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)

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 +1.2% (+109.6 kt CO_2 eq) increase in emissions compared to the previous year. This was driven by increased inorganic nitrogen fertiliser sales (29.8%) compared to the below average sales seen over the same time period in 2024. The increase in emissions in the first six months of 2025 was offset by decreased emissions from enteric fermentation and manure management, due to the reduction in the number of non-dairy cattle by 4.4%.

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

- Agriculture greenhouse gas emissions increased by +1.2% (+109.6 kt CO_2 eq) compared to the same time period in 2024.
- The largest increase in emissions occurred in the Agricultural soils (+175.1 kt CO_2 eq) sector.
- The largest decrease in emissions occurred in Enteric fermentation (-127.0 kt CO_2 eq), followed by Manure management (-41.0 kt CO_2 eq)

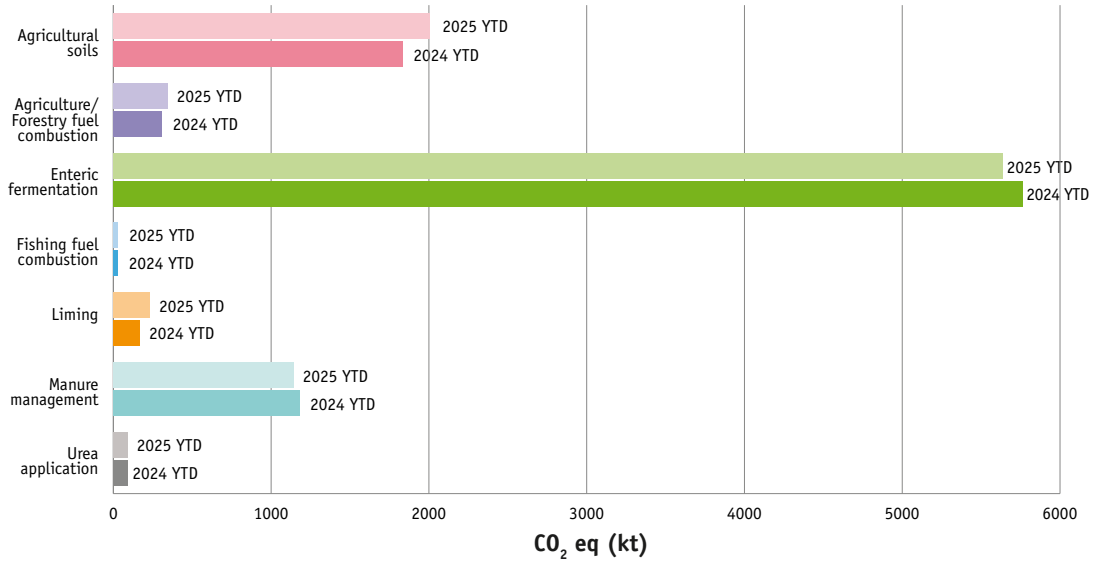
Table 7: Summary YTD 2025 compared to YTD 2024 – Agriculture

			Comparison to YTD 2024	
Sector	**Greenhouse Gas**	**Emissions YTD 2025 (kt CO_2 eq)**	**(kt CO_2 eq)**	**(%)**
Agriculture	**CH_4, CO_2, N_2O**	**9,486.0**	**109.6**	**1.2**
Agricultural soils	N_2O	2,007.9	175.1	9.6
Agriculture/Forestry fuel combustion	CO_2	345.9	35.7	11.5
Enteric fermentation	CH_4	5,635.1	-127.0	-2.2
Fishing fuel combustion	CO_2	30.1	-0.2	-0.7
Liming	CO_2	233.8	64.8	38.4
Manure management	CH_4, N_2O	1,142.2	-41.0	-3.5
Urea application	CO_2	91.0	2.2	2.5

Note:

* Liming subsector: Direct CO_2 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)

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 -1.3% (-60.3 kt CO_2 eq) decrease in emissions compared to the previous quarter. This was driven by decreased emissions from inorganic nitrogen fertiliser being partially offset by increased direct emissions from liming. However, this does not take into account indirect benefits from liming, such as from reduced fertiliser requirements due to increased soil fertility. The increase in emissions from enteric fermentation was driven by 4% higher milk production than the rolling 5-year average for this quarter.

Looking at Quarter 2 2025 compared to Quarter 1 2025:

- Agriculture greenhouse gas emissions decreased by -1.3% (-60.3 kt CO_2 eq) compared to Quarter 1 2025.
- The largest increase in emissions occurred in the Liming (+24.6 kt CO_2 eq) sector, followed by the Enteric fermentation (+13.9 kt CO_2 eq) sector.
- The largest decrease in emissions occurred in the Agricultural soils (-82.0 kt CO_2 eq) sector.

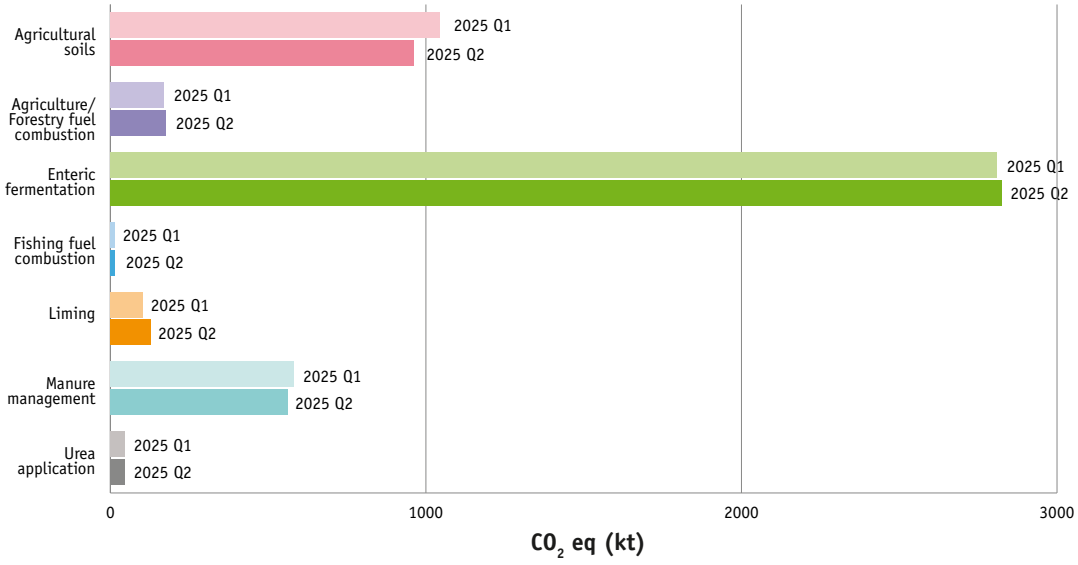
Table 8: Summary Q2 2025 compared to Q1 2025 – Agriculture

			Comparison to Q1 2025	
Sector	**Greenhouse Gas**	**Emissions Q2 2025 (kt CO_2 eq)**	**(kt CO_2 eq)**	**(%)**
Agriculture	**CH_4, CO_2, N_2O**	**4,712.9**	**-60.3**	**-1.3**
Agricultural soils	N_2O	962.9	-82.0	-7.8
Agriculture/Forestry fuel combustion	CO_2	175.0	4.2	2.5
Enteric fermentation	CH_4	2,824.5	13.9	0.5
Fishing fuel combustion	CO_2	15.1	0.0	0.2
Liming	CO_2	129.2	24.6	23.5
Manure management	CH_4, N_2O	561.5	-19.2	-3.3
Urea application	CO_2	44.6	-1.8	-3.9

Note:

* Liming subsector: Direct CO_2 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)

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



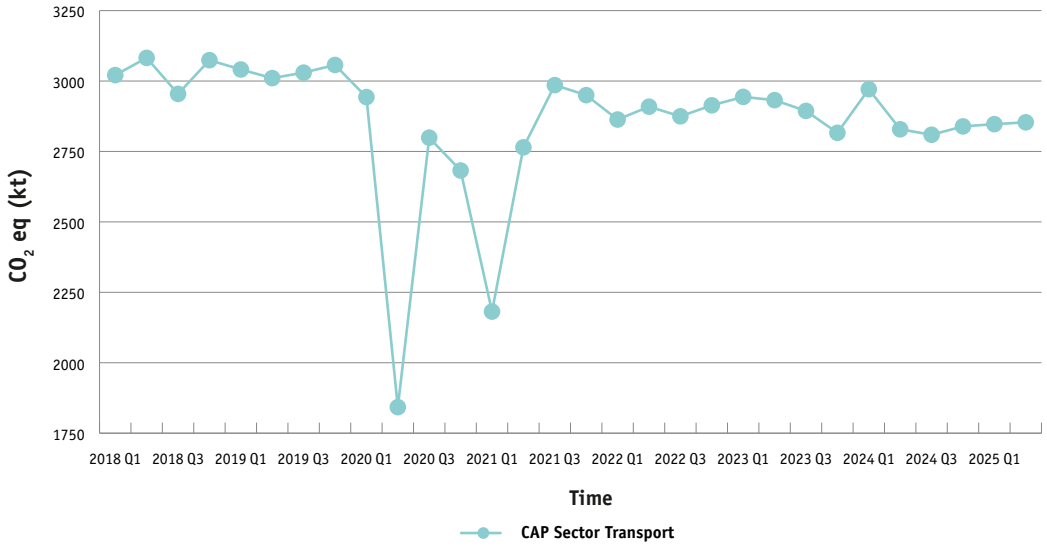
3.2 Transport

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 Q2 2025, based on seasonally adjusted data



3.2.1 Transport Year-on-Year Change

Key finding:

- The primary drivers of the +0.9% (+24.6 kt CO_2 eq) change in emissions this quarter were increased sales of petrol (+7.7%) compared to the same quarter last year. Although sales of diesel decreased (-1.2%), these were offset by a decrease in biofuel blending rates for diesel (6.2% versus 6.9% by volume).

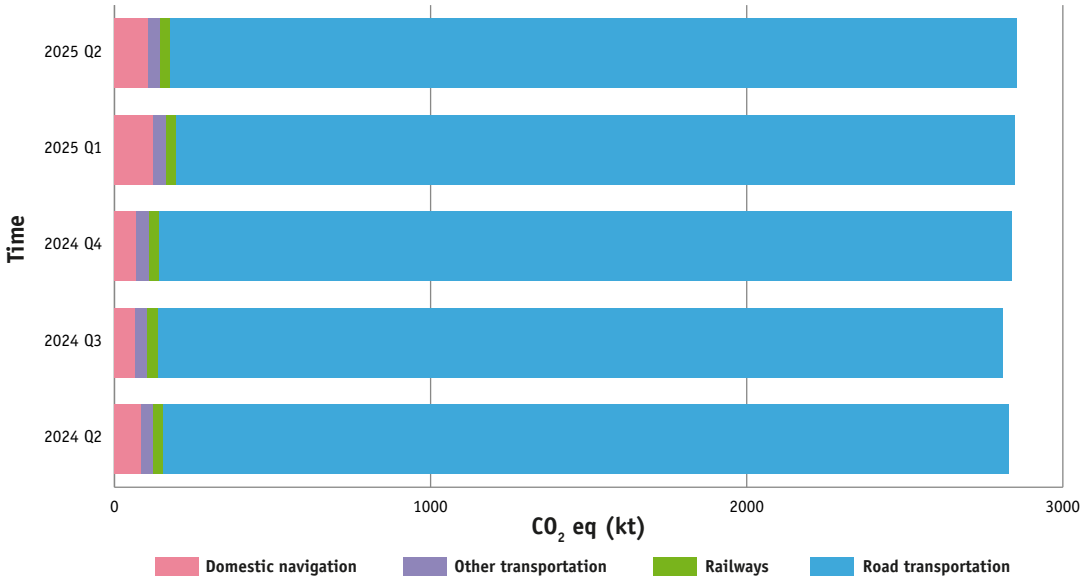
Looking at Quarter 2 2025 compared to Quarter 2 2024:

- Transport greenhouse gas emissions increased by +0.9% (+24.6 kt CO_2 eq) compared to Quarter 2 2024.
- The largest increase in emissions occurred in the Domestic navigation (+22.2 kt CO_2 eq) sector.

Table 9: Summary Q2 2025 compared to Q2 2024 – Transport

			Comparison to Q2 2024	
Sector	**Greenhouse Gas**	**Emissions Q2 2025 (kt CO_2 eq)**	**(kt CO_2 eq)**	**(%)**
Transport	**CO_2**	**2,853.4**	**24.6**	**0.9**
Domestic navigation	CO_2	104.7	22.2	26.9
Other transportation	CO_2	37.9	-0.6	-1.6
Railways	CO_2	33.1	0.4	1.2
Road transportation	CO_2	2,677.7	2.7	0.1

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 -1.7% (-99.3 kt CO_2 eq) change in emissions in the first six months of 2025 were decline in sales of diesel (-4.2%). In addition, biofuel blending rates increased for petrol (9.8% versus 8.2% by volume) compared to diesel (6.1% versus 6.8% by volume) which offset emissions from the increased sales of petrol (+4.6%).

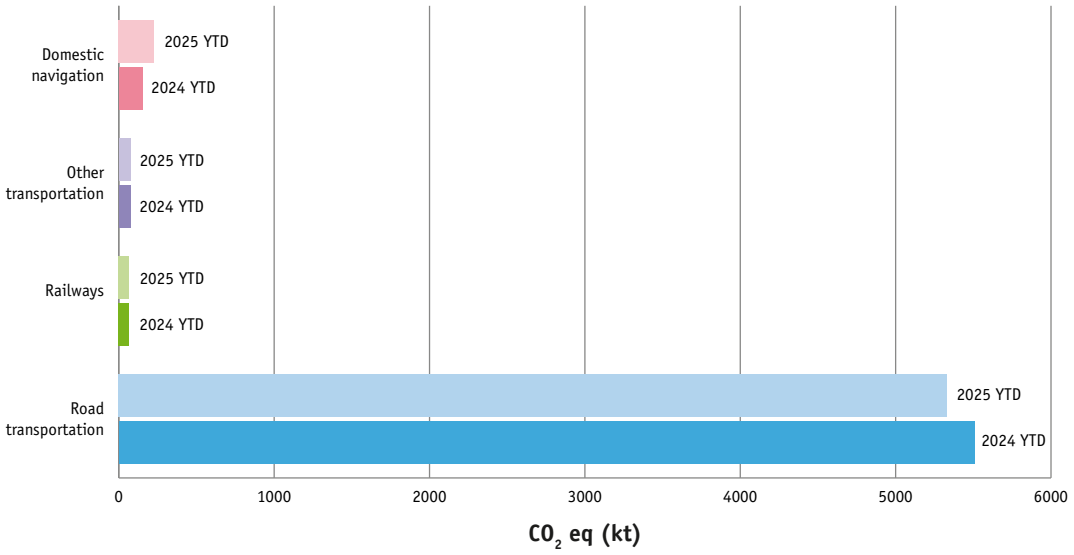
Looking at Year-to-Date 2025 compared to Year-to-Date 2024:

- Transport greenhouse gas emissions decreased by -1.7% (-99.3 kt CO_2 eq) compared to Year-to-Date 2024.
- The largest decrease in emissions occurred in the Road transportation (-174.9 kt CO_2 eq) sector.
- The largest increase in emissions occurred in the Domestic navigation (+74.7 kt CO_2 eq) sector.

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

			Comparison to YTD 2024	
Sector	**Greenhouse Gas**	**Emissions YTD 2025 (kt CO_2 eq)**	**(kt CO_2 eq)**	**(%)**
Transport	**CO_2**	**5,700.4**	**-99.3**	**-1.7**
Domestic navigation	CO_2	226.8	74.7	49.1
Other transportation	CO_2	76.7	0.0	0.1
Railways	CO_2	66.0	0.9	1.4
Road transportation	CO_2	5,331.0	-174.9	-3.2

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 drivers of the +0.2% (+6.4 kt CO_2 eq) change in emissions this quarter was increased sales of diesel (+6.7%) coupled with an increase in petrol sales (+12.7%) compared to the previous quarter.

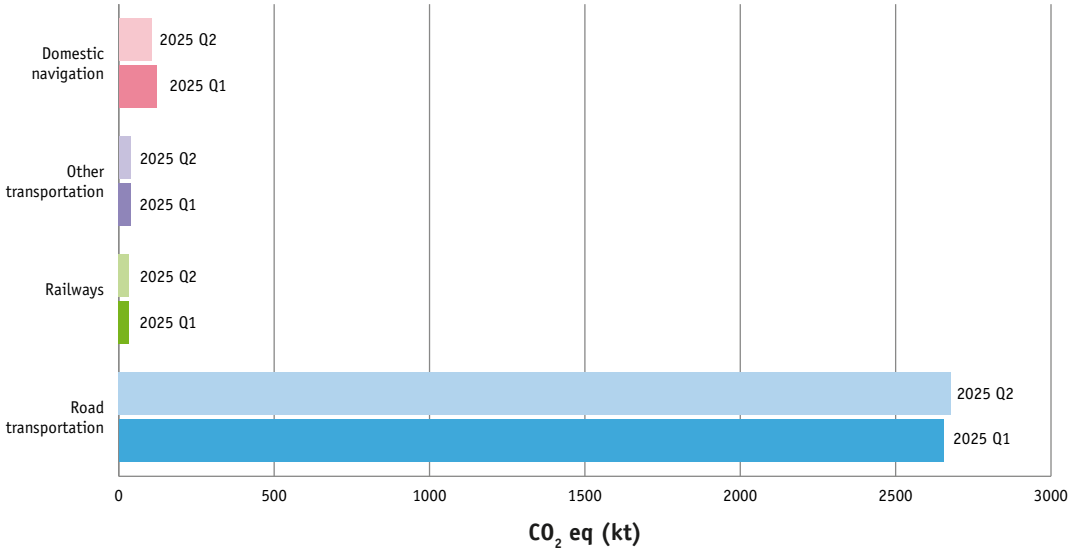
Looking at Quarter 2 2025 compared to Quarter 1 2025:

- Transport greenhouse gas emissions increased by +0.2% (+6.4 kt CO_2 eq) compared to Quarter 1 2025.
- The largest increase in emissions occurred in the Road transportation (+24.4 kt CO_2 eq) sector.
- The largest decrease in emissions occurred in the Domestic navigation (-17.3 kt CO_2 eq) sector.

Table 11: Summary Q2 2025 compared to Q1 2025 – Transport

			Comparison to Q1 2025	
Sector	**Greenhouse Gas**	**Emissions Q2 2025 (kt CO_2 eq)**	**(kt CO_2 eq)**	**(%)**
Transport	**CO_2**	**2,853.4**	**6.4**	**0.2**
Domestic navigation	CO_2	104.7	-17.3	-14.2
Other transportation	CO_2	37.9	-0.9	-2.3
Railways	CO_2	33.1	0.2	0.7
Road transportation	CO_2	2,677.7	24.4	0.9

Figure 14: Changes in emissions in the Transport Subsectors from Q1 2025 to Q2 2025, based on seasonally adjusted data



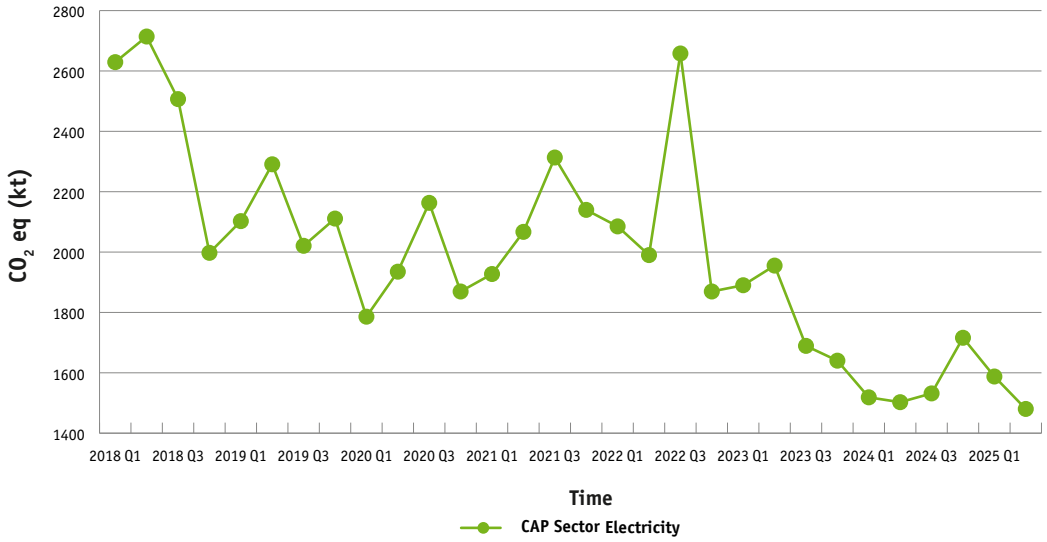
3.3 Electricity

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 Q2 2025, based on seasonally adjusted data



3.3.1 Electricity Year-on-Year Change

Key finding:

- Greenhouse gas emissions decreased by -1.5% (-22.4 kt CO_2 eq) despite a 2.2% increase in overall electricity demand due to a 19.0% increase in imported electricity and a 4.2% increase in renewable sources of electricity generation. This is reflected in the share of the electricity supply in Q2 2025 compared to Q2 2024 from renewables (34.9% vs 34.2%), non-renewables (44.0% vs 47.7%) and imports (21.1% vs 18.1%).

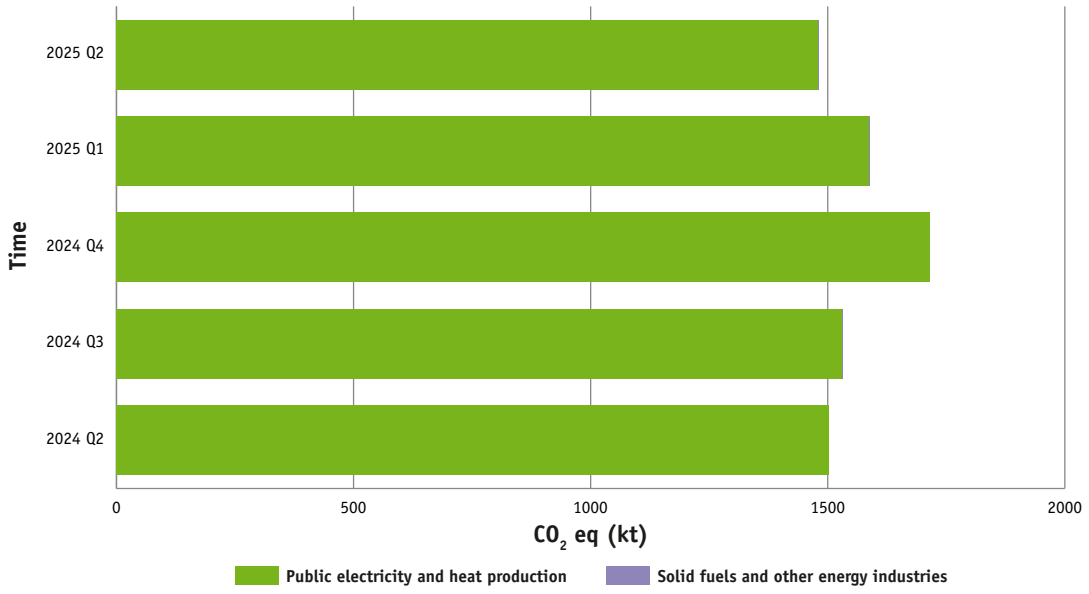
Looking at Quarter 2 2025 compared to Quarter 2 2024:

- Electricity greenhouse gas emissions decreased by -1.5% (-22.4 kt CO_2 eq) compared to Quarter 2 2024.
- The largest decrease in emissions occurred in the Public electricity and heat production (-22.4 kt CO_2 eq) sector.

Table 12: Summary Q2 2025 compared to Q2 2024 – Electricity

			Comparison to Q2 2024	
Sector	**Greenhouse Gas**	**Emissions Q2 2025 (kt CO_2 eq)**	**(kt CO_2 eq)**	**(%)**
Electricity	**CO_2**	**1,480.3**	**-22.4**	**-1.5**
Public electricity and heat production	CO_2	1,479.2	-22.4	-1.5
Solid fuels and other energy industries	CO_2	1.1	0.0	0.6

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 increased by +1.5% (+46.6 kt CO_2 eq) due to a 2.8% increase in electricity demand. In parallel, compared to H1 2024, there was a marked increase (+21.9%, +541.1 GWh) in net electricity imports via interconnectors. Overall, there was a small decrease in the share of renewables (40.0% vs 41.1%) and non-renewables (42.9% vs 44.5%) and increase in the share of net electricity imports (17.1% vs 14.4%).

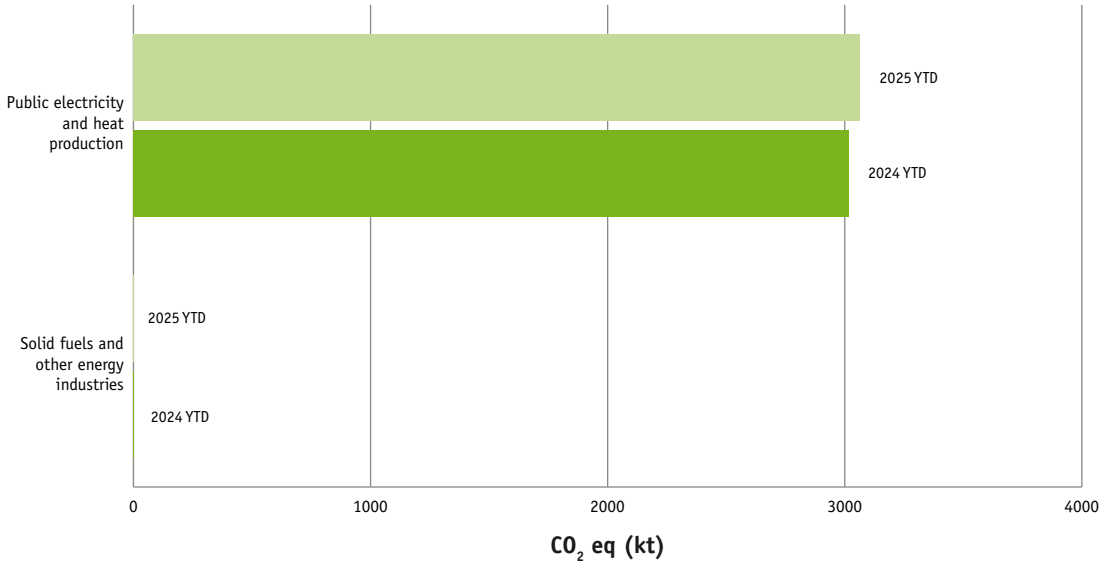
Looking at Year-to-Date 2025 compared to Year-to-Date 2024:

- Electricity greenhouse gas emissions increased by +1.5% (+46.6 kt CO_2 eq) compared to Year-to-Date 2024.
- The largest increase in emissions occurred in the Public electricity and heat production (+46.5 kt CO_2 eq) sector.

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

			Comparison to YTD 2024	
Sector	**Greenhouse Gas**	**Emissions YTD 2025 (kt CO_2 eq)**	**(kt CO_2 eq)**	**(%)**
Electricity	**CO_2**	**3,068.0**	**46.6**	**1.5**
Public electricity and heat production	CO_2	3,065.8	46.5	1.5
Solid fuels and other energy industries	CO_2	2.2	0.1	4.2

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 -6.8% (-107.5 kt CO_2 eq) due to a -12.5% decrease in electricity demand, a -8.1% (-316.8 GWh) decrease in non-renewable electricity generation, and an increase of +35.0% (+448.1 GWh) in interconnector imports (21.1% share of electricity supply in Q2 vs 13.7% share in Q1).

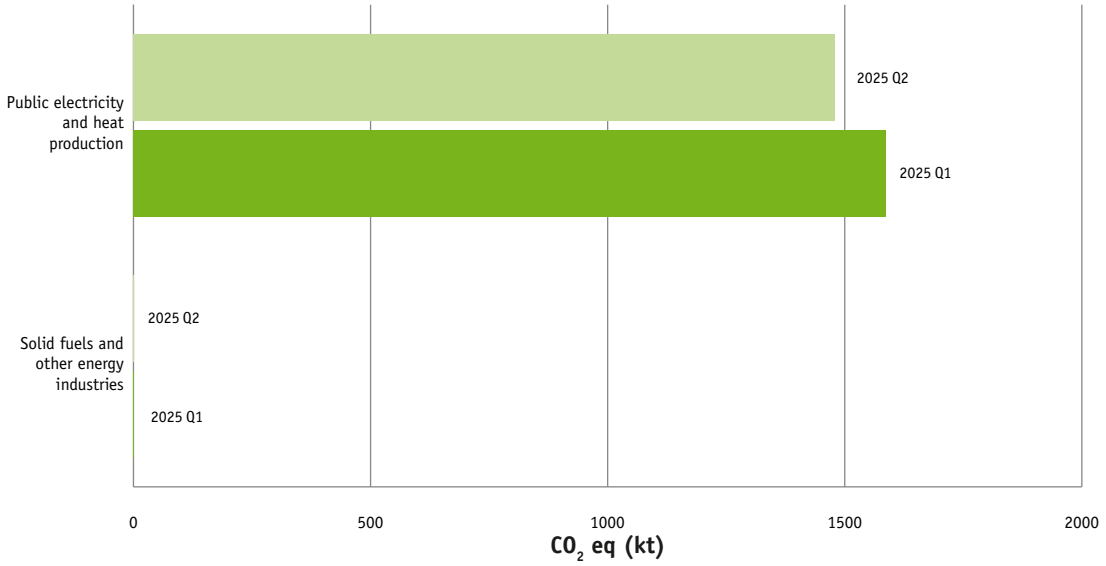
Looking at Quarter 2 2025 compared to Quarter 1 2025:

- Electricity greenhouse gas emissions decreased by -6.8% (-107.5 kt CO_2 eq) compared to Quarter 1 2025.
- The largest decrease in emissions occurred in the Public electricity and heat production (-107.4 kt CO_2 eq) sector.

Table 14: Summary Q2 2025 compared to Q1 2025 – Electricity

			Comparison to Q1 2025	
Sector	**Greenhouse Gas**	**Emissions Q2 2025 (kt CO_2 eq)**	**(kt CO_2 eq)**	**(%)**
Electricity	**CO_2**	**1,480.3**	**-107.5**	**-6.8**
Public electricity and heat production	CO_2	1,479.2	-107.4	-6.8
Solid fuels and other energy industries	CO_2	1.1	0.0	-1.4

Figure 18: Changes in emissions in the Electricity subsectors from Q2 2025 to Q1 2025, based on seasonally adjusted data



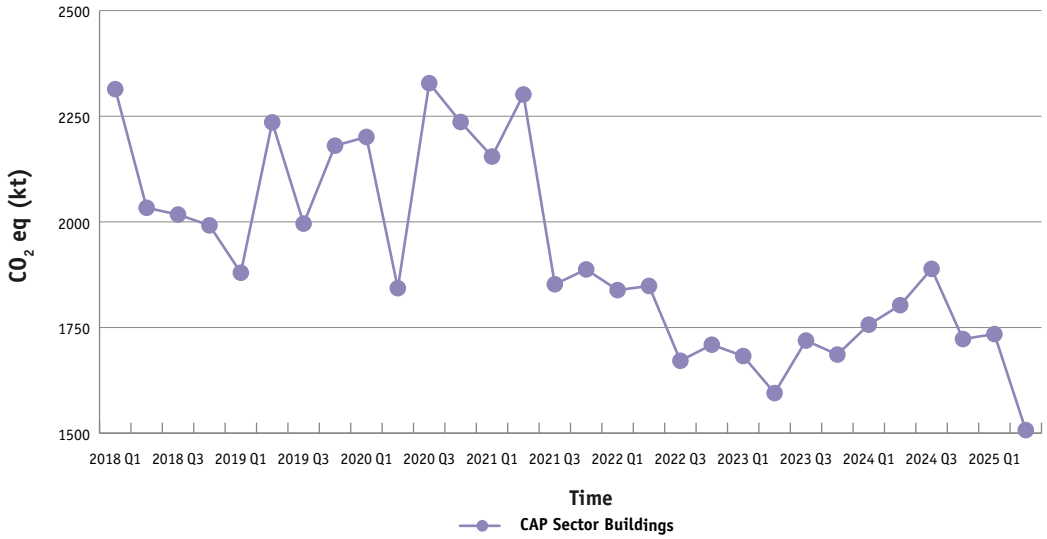
3.4 Buildings

Subsectors: Residential; Commercial and 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 Sector from Q1 2018 to Q2 2025, based on seasonally adjusted data



3.4.1 Buildings Year-on-Year Change

Key finding:

- Overall GHG emissions from Buildings were down -16.4% (-295.6 kt CO_2 eq) due to decreased energy demand in the Residential sector (-20.7%, -300.9 kt CO_2 eq). There was 13.6% less heating degree days (HDD, days with average temperature below 15.5 degrees Celsius where heating would be needed) in Quarter 2 2025 compared to Quarter 2 2024 which indicates reduced demand for residential heating.

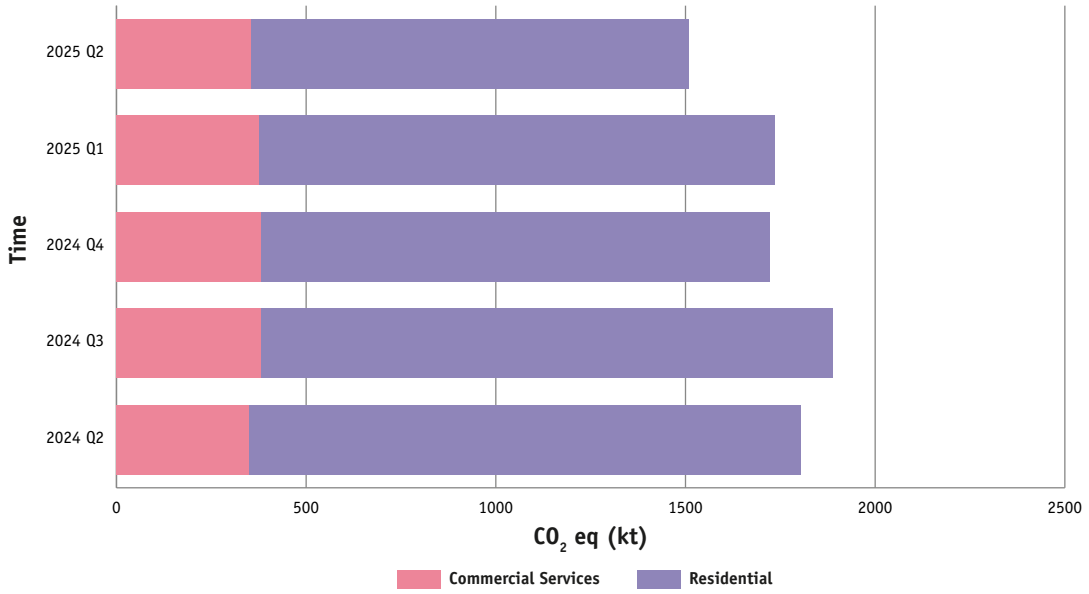
Looking at Quarter 2 2025 compared to Quarter 2 2024:

- Buildings greenhouse gas emissions decreased by -16.4% (-295.6 kt CO_2 eq) compared to Quarter 2 2024.
- The largest decrease in emissions occurred in the Residential (-300.9 kt CO_2 eq) sector.

Table 15: Summary Q2 2025 compared to Q2 2024 – Buildings

			Comparison to Q2 2024	
Sector	**Greenhouse Gas**	**Emissions Q2 2025 (kt CO_2 eq)**	**(kt CO_2 eq)**	**(%)**
Buildings	**CH_4, CO_2**	**1,507.3**	**-295.6**	**-16.4**
Commercial Services	CO_2	354.5	5.3	1.5
Residential	CH_4, CO_2	1,152.8	-300.9	-20.7

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 -8.9% (-317.7 kt CO2 eq) due to decreased energy demand in the Residential sector (-11.5%, -328.0 kt CO2 eq). The first half of 2024 had 4.4% less days with average temperature below 15.5 degrees Celsius than 2024 (Heating Degree Days) indicating decreased demand for heating in the Buildings sector.

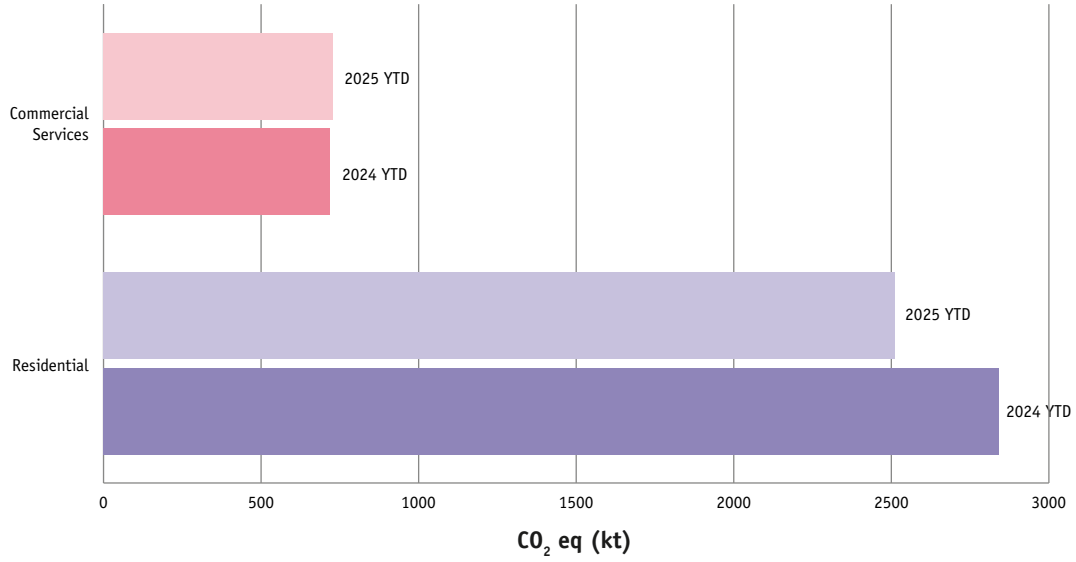
Year-to-Date 2025 compared to Year-to-Date 2024:

- Buildings greenhouse gas emissions decreased by -8.9% (-317.7 kt CO2 eq) compared to Year-to-Date 2024.
- The largest decrease in emissions occurred in the Residential (-328.0 kt CO2 eq) sector.
- The largest increase in emissions occurred in the Commercial Services (+10.2 kt CO2 eq) sector.

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

			Comparison to YTD 2024	
Sector	**Greenhouse Gas**	**Emissions YTD 2025 (kt CO_2 eq)**	**(kt CO_2 eq)**	**(%)**
Buildings	**CH_4, CO_2**	**3,241.9**	**-317.7**	**-8.9**
Commercial Services	CO_2	729.3	10.2	1.4
Residential	CH_4, CO_2	2,512.6	-328.0	-11.5

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 decreased -13.1% (-227.3 kt CO_2 eq) on a seasonally adjusted basis with the largest subsectoral decrease in emissions in the Residential sector (-207.0 kt CO_2 eq).

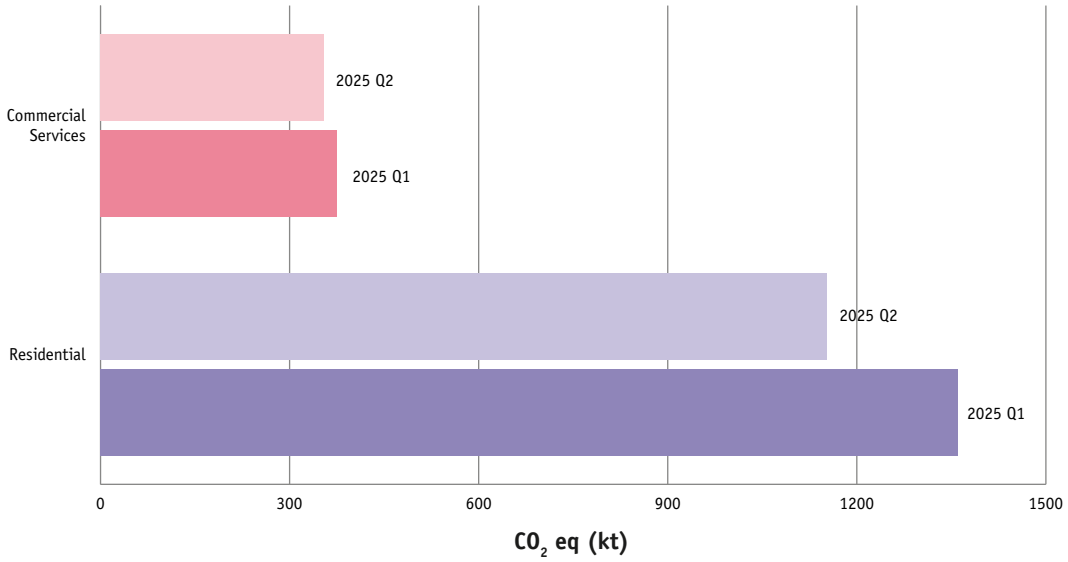
Looking at Quarter 2 2025 compared to Quarter 1 2025:

- Buildings greenhouse gas emissions decreased by -13.1% (-227.3 kt CO_2 eq) compared to Quarter 1 2025.
- The largest decrease in emissions occurred in the Residential (-207.0 kt CO_2 eq) sector.

Table 17: Summary Q2 2025 compared to Q1 2025 – Buildings

			Comparison to Q1 2025	
Sector	**Greenhouse Gas**	**Emissions Q2 2025 (kt CO_2 eq)**	**(kt CO_2 eq)**	**(%)**
Buildings	**CH_4, CO_2**	**1,507.3**	**-227.3**	**-13.1**
Commercial Services	CO_2	354.5	-20.4	-5.4
Residential	CH_4, CO_2	1,152.8	-207.0	-15.2

Figure 22: Changes in emissions in the Building Subsectors from Q1 2025 to Q2 2025, based on seasonally adjusted data



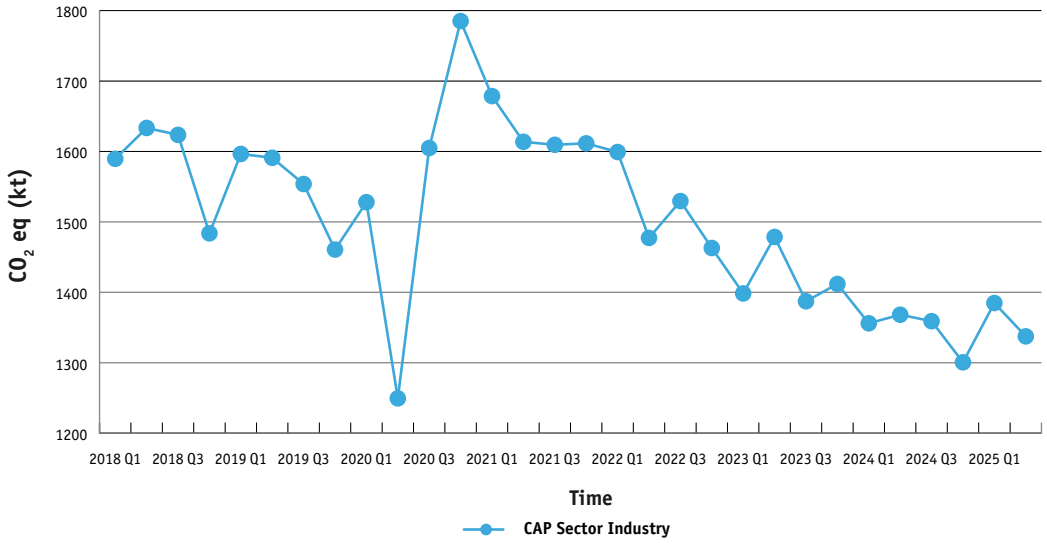
3.5 Industry

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 Q2 2025, based on seasonally adjusted data



3.5.1 Industry Year-on-Year Change

Key finding:

- Industry emissions were down -2.2% (-30.7 kt CO_2 eq), driven by decreased emissions from the Mineral Industry (largely represented by the cement production sector and includes lime, brick and ceramic sectors) and from Manufacturing Combustion by the same industry. This was driven by a decrease in production of cement clinker (a key component of cement) compared to the same quarter last year.

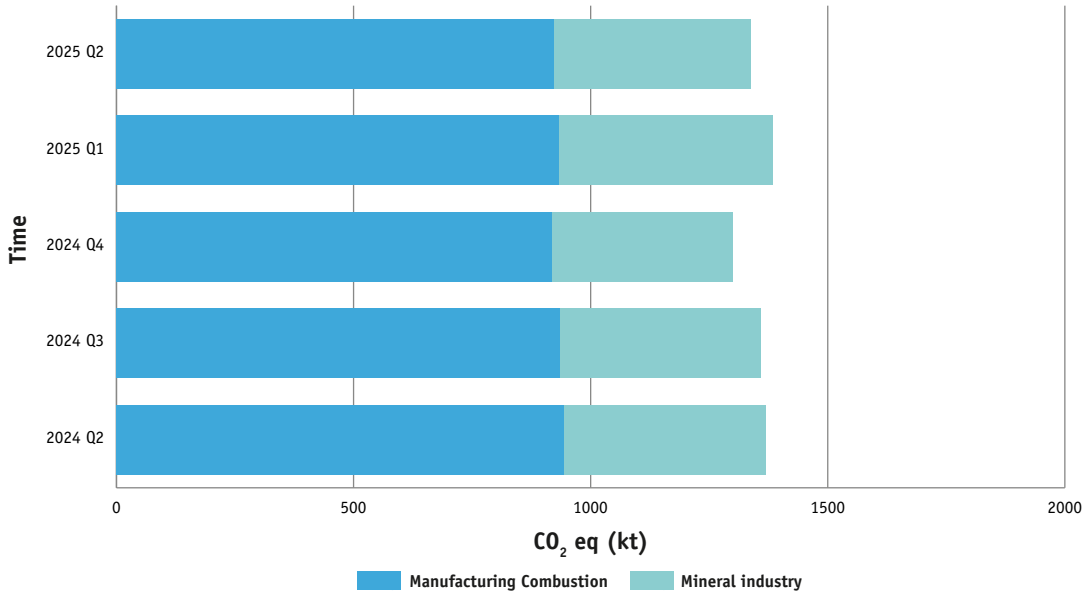
Looking at Quarter 2 2025 compared to Quarter 2 2024:

- Industry greenhouse gas emissions decreased by -2.2% (-30.7 kt CO_2 eq) compared to Quarter 2 2024.
- The largest decrease in emissions occurred in the Manufacturing Combustion (-22.2 kt CO_2 eq) sector.

Table 18: Summary Q2 2025 compared to Q2 2024 – Industry

			Comparison to Q2 2024	
Sector	Greenhouse Gas	Emissions Q2 2025 (kt CO_2 eq)	(kt CO_2 eq)	(%)
Industry	**CO_2**	**1,337.5**	**-30.7**	**-2.2**
Manufacturing Combustion	CO_2	921.7	-22.2	-2.4
Mineral industry	CO_2	415.8	-8.5	-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 almost unchanged, down only -0.1% (-2.0 kt CO_2 eq), due to reductions in Manufacturing Combustion but increases in the Mineral Industry (largely represented by the cement production sector and includes lime, brick and ceramic sectors). In the first six months of 2025 compared to the same time period in 2024, production of cement clinker has increased but combustion-based emissions have decreased, indicating potential energy efficiency gains.

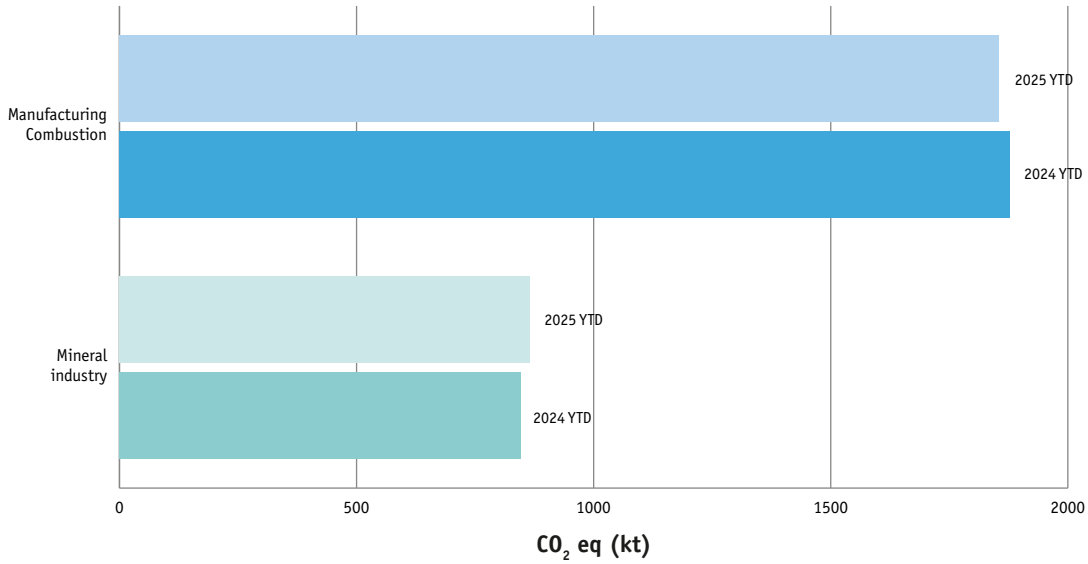
Looking at Year-to-Date 2025 compared to Year-to-Date 2024:

- Industry greenhouse gas emissions decreased by -0.1% (-2.0 kt CO_2 eq) compared to Year-to-Date 2024.
- The largest decrease in emissions occurred in the Manufacturing Combustion (-21.7 kt CO_2 eq) sector.
- The largest increase in emissions occurred in the Mineral industry (+19.8 kt CO_2 eq) sector.

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

			Comparison to YTD 2024	
Sector	**Greenhouse Gas**	**Emissions YTD 2025 (kt CO_2 eq)**	**(kt CO_2 eq)**	**(%)**
Industry	**CO_2**	**2,722.3**	**-2.0**	**-0.1**
Manufacturing Combustion	CO_2	1,855.6	-21.7	-1.2
Mineral industry	CO_2	866.7	19.8	2.3

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 -3.4% (-47.3 kt CO_2 eq), driven by decreases in both process and combustion emissions from multiple sectors in the Mineral Industry and Manufacturing Combustion subsectors on a seasonally adjusted basis.

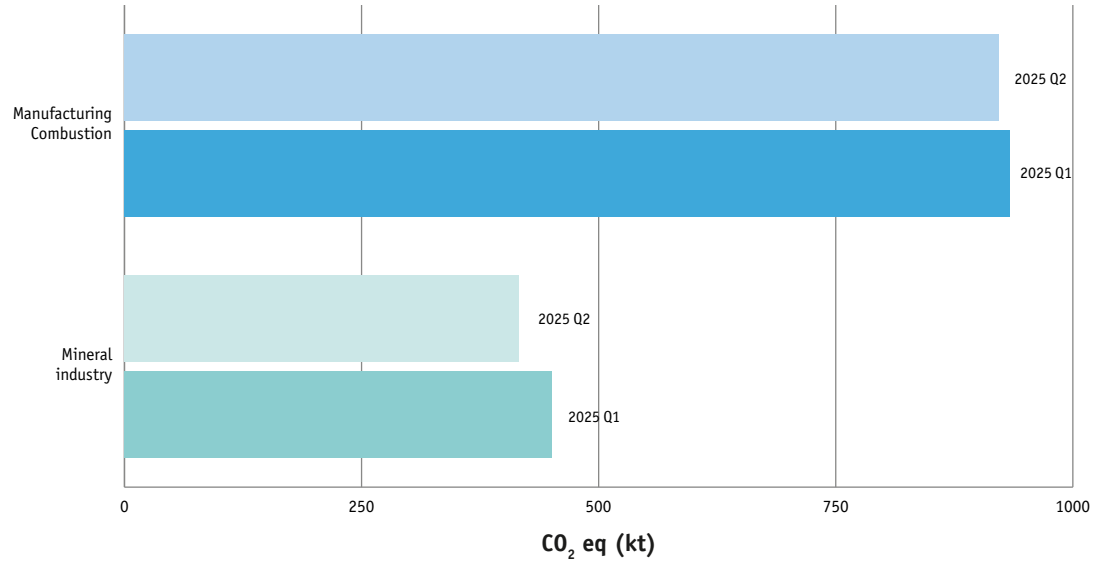
Looking at Quarter 2 2025 compared to Quarter 1 2025:

- Industry greenhouse gas emissions decreased by -3.4% (-47.3 kt CO_2 eq) compared to Quarter 1 2025.
- The largest decrease in emissions occurred in the Mineral industry (-35.1 kt CO_2 eq) sector, followed by the Manufacturing Combustion (-12.2 kt CO_2 eq) sector.

Table 20: Summary Q2 2025 compared to Q1 2025 – Industry

			Comparison to Q1 2025	
Sector	**Greenhouse Gas**	**Emissions Q2 2025 (kt CO_2 eq)**	**(kt CO_2 eq)**	**(%)**
Industry	**CO_2**	**1,337.5**	**-47.3**	**-3.4**
Manufacturing Combustion	CO_2	921.7	-12.2	-1.3
Mineral industry	CO_2	415.8	-35.1	-7.8

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



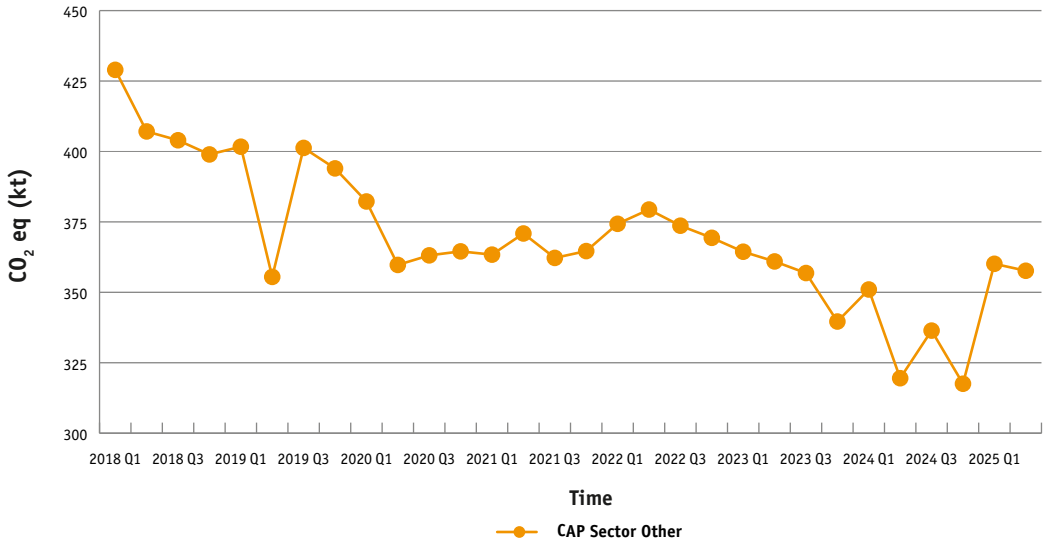
3.6 Other

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 Q2 2025, based on seasonally adjusted data



3.6.1 Other Year-on-Year Change

Key finding:

- The key driver of the +11.9% (+38.1 kt CO_2 eq) change in emissions this quarter was an increase in emissions from Petroleum Refining (+90.4%) compared to the same quarter last year. This is primarily due to a refinery being offline for essential maintenance for extended periods last year.

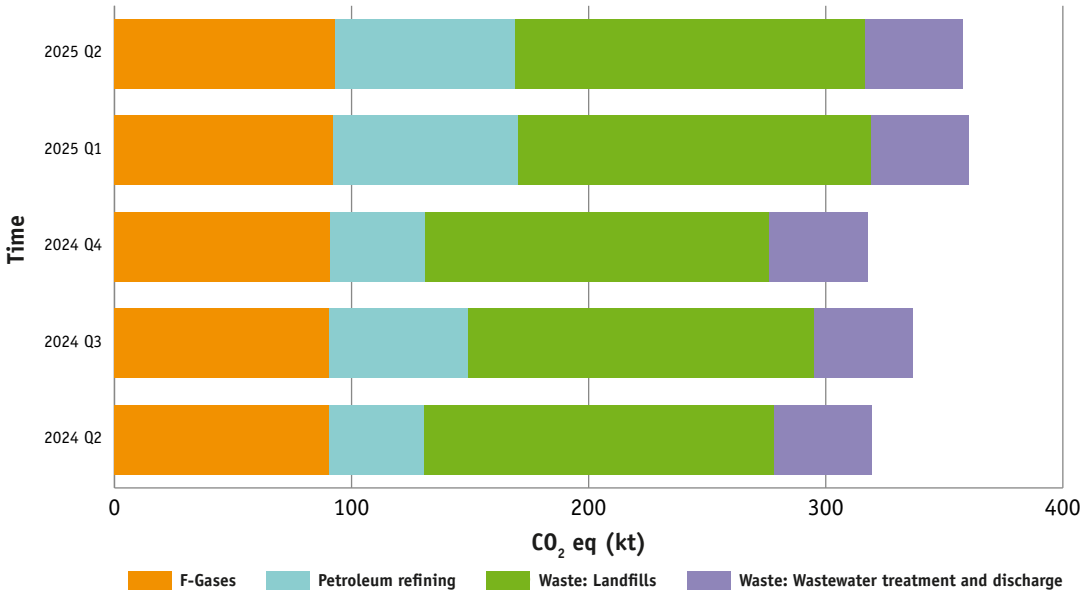
Looking at Quarter 2 2025 compared to Quarter 2 2024:

- Other greenhouse gas emissions increased by +11.9% (+38.1 kt CO_2 eq) compared to Quarter 2 2024.
- The largest increase in emissions occurred in the Petroleum refining (+36.0 kt CO_2 eq) sector.

Table 21: Summary Q2 2025 compared to Q2 2024 – Other

			Comparison to Q2 2024	
Sector	**Greenhouse Gas**	**Emissions Q2 2025 (kt CO_2 eq)**	**(kt CO_2 eq)**	**(%)**
Other	**CH_4, CO_2, N_2O, HFC, PFC, SF_6, NF_3**	**357.7**	**38.1**	**11.9**
F-Gases	HFC, PFC, SF_6, NF_3	93.1	2.5	2.8
Petroleum refining	CO_2	75.7	36.0	90.4
Waste: Landfills	CH_4	147.4	-0.4	-0.3
Waste: Wastewater treatment and discharge	CH_4, N_2O	41.4	0.1	0.2

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 +7.0% (+47.3 kt CO_2 eq) change in emissions this quarter was a decrease in emissions from Petroleum Refining (+37.9%) compared to the same quarter last year due to a refinery being offline for essential maintenance for extended periods.

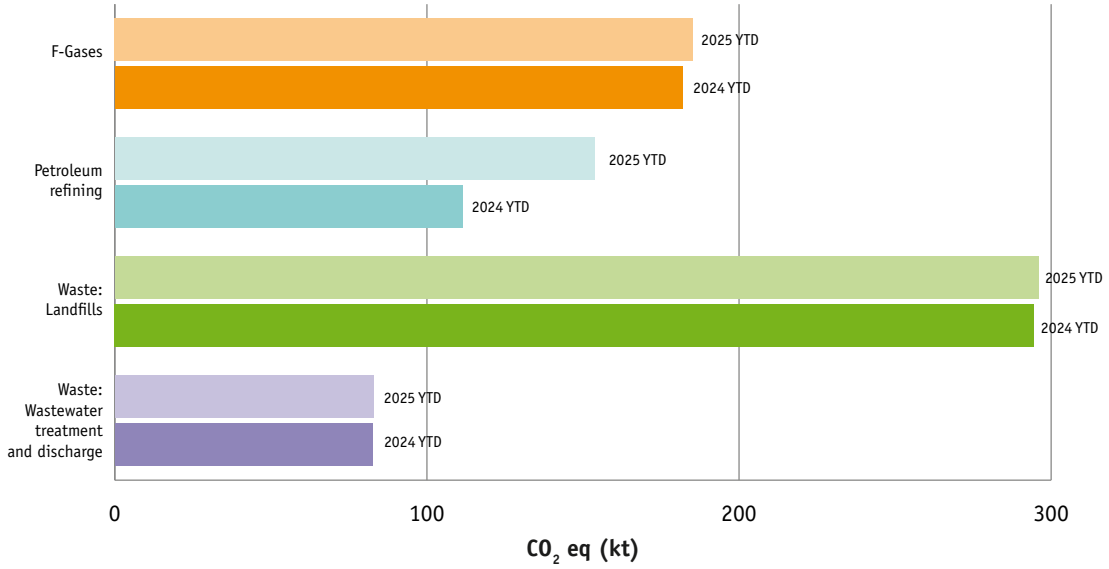
Looking at Year-to-Date 2025 compared to Year-to-Date 2024:

- Other greenhouse gas emissions increased by +7.0% (+47.3 kt CO_2 eq) compared to Year-to-Date 2024.
- The largest increase in emissions occurred in the Petroleum refining (+42.3 kt CO_2 eq) sector.

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

			Comparison to YTD 2024	
Sector	**Greenhouse Gas**	**Emissions YTD 2025 (kt CO_2 eq)**	**(kt CO_2 eq)**	**(%)**
Other	**CH_4, CO_2, N_2O, HFC, PFC, SF_6, NF_3**	**717.8**	**47.3**	**7**
F-Gases	HFC, PFC, SF_6, NF_3	185.2	3.3	1.8
Petroleum refining	CO_2	153.8	42.3	37.9
Waste: Landfills	CH_4	296.0	1.4	0.5
Waste: Wastewater treatment and discharge	CH_4, N_2O	82.8	0.3	0.3

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 Other sectors decreased -0.7% driven by a quarter-over-quarter decrease in gas and liquid fuel combustion in Petroleum Refining (-2.9%).

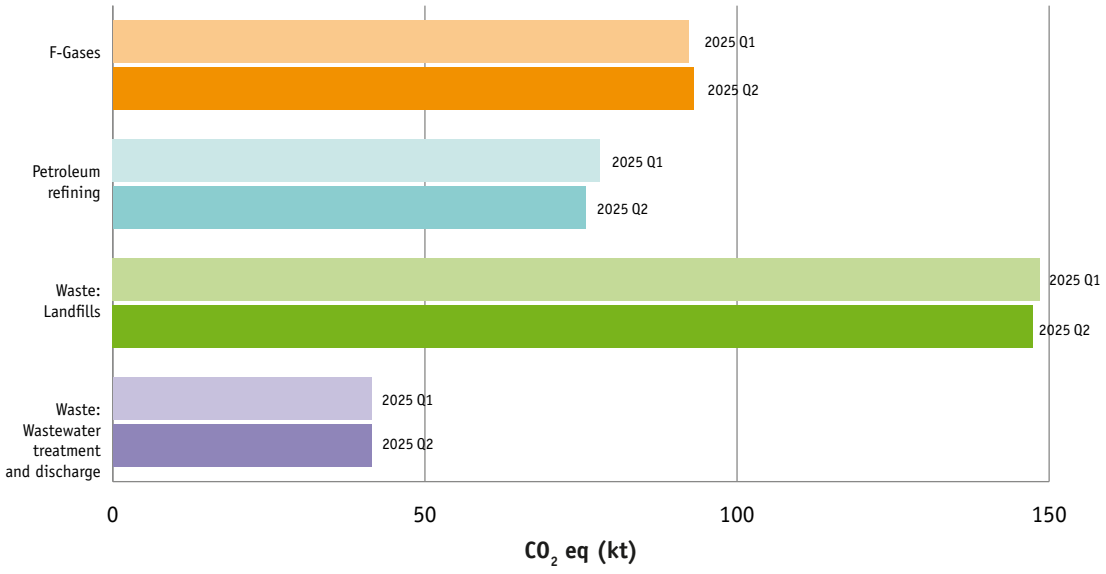
Looking at Quarter 2 2025 compared to Quarter 1 2025:

- Other greenhouse gas emissions decreased by -0.7% (-2.5 kt CO_2 eq) compared to Quarter 1 2025.

Table 23: Summary Q2 2025 compared to Q1 2025 – Other

			Comparison to Q1 2025	
Sector	**Greenhouse Gas**	**Emissions Q2 2025 (kt CO_2 eq)**	**(kt CO_2 eq)**	**(%)**
Other	**CH_4, CO_2, N_2O, HFC, PFC, SF_6, NF_3**	**357.7**	**-2.5**	**-0.7**
F-Gases	HFC, PFC, SF_6, NF_3	93.1	0.9	1
Petroleum refining	CO_2	75.7	-2.3	-2.9
Waste: Landfills	CH_4	147.4	-1.1	-0.7
Waste: Wastewater treatment and discharge	CH_4, N_2O	41.4	0.0	0

Figure 30: Changes in emissions in the Other Subsectors from Q2 2025 to Q1 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

In the 2025 Q1 Report an error was detected in Electricity sector emissions prior to 2021. From 2018 Q1 to 2025 Q1 the error was equal to 2.5% (1,469.3 kt CO_2 eq) of the total sector emissions of 58,197.4 kt CO_2 eq. The data available to download with the 2025 Q1 Report have now been revised.

An Ghníomhaireacht 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 ardchaighdeáin, spriocdhírithe 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 peitril 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

- Iniúchadh 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 Ghníomhú 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 Inbhunaitheacht 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 Ghníomhaireacht agus tagann siad le chéile go rialta le plé a dhéanamh ar ábhair imní agus le comhairle a chur ar an mBord.

Headquarters

PO Box 3000,
Johnstown Castle Estate,
County Wexford, Ireland

T: +353 53 916 0600
F: +353 53 916 0699
E: info@epa.ie
W: www.epa.ie
LoCall: 0818 33 55 99

Regional Inspectorate

McCumiskey House,
Richview, Clonskeagh Road,
Dublin 14, Ireland

T: +353 1 268 0100
F: +353 1 268 0199

Regional Inspectorate

Inniscarra, Co. Cork,
Ireland

T: +353 21 487 5540
F: +353 21 487 5545

Regional Inspectorate

Seville Lodge, Callan Road,
Kilkenny, Ireland

T: +353 56 779 6700
F: +353 56 779 6798

Regional Inspectorate

John Moore Road, Castlebar,
Co. Mayo, Ireland

T: +353 94 904 8400
F: +353 94 902 1934

Regional Inspectorate

The Glen, Monaghan,
Ireland

T: +353 47 77600
F: +353 47 84987

Regional Offices

The Civic Centre,
Church St, Athlone,
Co. Westmeath, Ireland

T: +353 906 475722

Room 3, Raheen Conference Centre,
Pearse House, Pearse Road,
Raheen Business Park, Limerick,
Ireland

T +353 61 224764

ISBN 978-1-80009-245-7