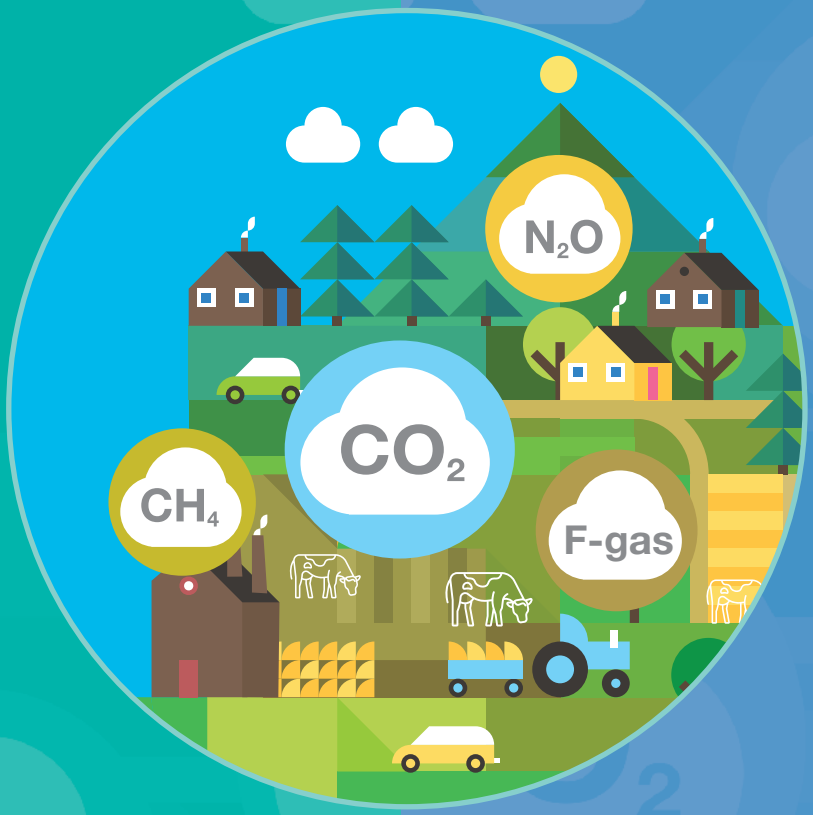
Environmental Protection Agency
An Ghníomhaireacht um Chaomhnú Comhshaoil

Ireland's Greenhouse Gas Emissions Projections

2024-2055

May 2025

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Key Findings

Ireland's Climate Act Ambition	Ireland is not on track to meet the 51 per cent emissions reduction target (by 2030 compared to 2018) which include many 2024 Climate Action Plan measures. Greenhouse gas emissions are projected to be 9 to 23 per cent lower by 2030 (compared to 2018) which places Ireland further from the 2030 national climate target compared to previous assessments.
Carbon Budgets	Budget period 1 (2021-2025) of 295 Mt CO_2eq is projected to be exceeded by between 8 to 12 Mt CO_2eq. Budget period 2 (2026-2030) of 200 Mt CO_2eq is also expected to be exceeded by a significant margin of 77 to 114 Mt CO_2eq (with carryover from Budget period 1).
Sectoral Emissions Ceilings	Sectoral emissions ceilings for 2030 are projected to be exceeded by the Buildings, Electricity, Industry and Transport sectors; and met by the sector 'Other'. A direct comparison of emissions in the Agriculture sector against its Sectoral Emission Ceilings is no longer viable due to significant refinement of the Agriculture inventory.
2030 EU Targets	Ireland is not projected to meet its EU target, set under the Effort Sharing Regulation, of a 42 per cent emissions reduction by 2030 (compared to 2005) even with flexibilities applied. This assessment shows that greenhouse gas emissions will be reduced by 10 to 22 per cent by 2030 (compared to 2005) without the use of flexibilities and by 13 to 26 per cent with the use of flexibilities.
Implementation Gap	Additional measures and accelerated implementation of existing measures is necessary to meet both National and EU targets. Projected gaps to National and EU 2030 targets reported this year are larger than last year due to more conservative delivery of measures and associated estimates of emission reductions by 2030.
Agriculture	From 21.4 Mt CO_2eq in 2018, total emissions from the Agriculture sector are projected to be between 18.0 and 21.6 Mt CO_2eq in 2030 (a 16 per cent reduction in WAM and 1 per cent increase in WEM). Without full implementation of all planned policies and measures, there will be a net increase in emissions in this sector by 2030.
Transport	Transport emissions are projected to decrease from 12.3 Mt CO_2eq in 2018 to between 9.7 Mt CO_2eq and 11.2 Mt CO_2eq in 2030 (a 9 to 21 per cent reduction). Measures that are projected to contribute to greater emissions reductions include 640,000 electric vehicles by 2030 and avoid/shift measures such as a 50 per cent increase in daily active travel journeys.
Electricity Generation	From 10.6 Mt CO_2eq in 2018, emissions from the Energy Industries sector are projected to decrease to between 3.4 and 4.4 Mt CO_2eq in 2030 (a 59 to 68 per cent reduction). Renewable energy generation at the end of the decade is projected to range from 60 to 68 per cent of electricity generation.

Residential Buildings	Emissions from the Residential Sector arise from fuel combustion for domestic space and hot water heating. These are projected to decrease from 7.0 Mt CO_2eq in 2018 to between 5.7 and 5.4 Mt CO_2eq in 2030 (a 19 to 22 per cent reduction). 571,000 domestic heat pumps are projected to be installed by 2030.
Land use, Land use Change and Forestry (LULUCF)	Total emissions from the LULUCF sector are projected to increase over the period 2018 to 2030 by between 1.5 and 3.8 Mt CO_2eq (an increase of 39 to 95 per cent). It is unlikely with current planned measures that the target set under the EU LULUCF Regulation, and included in Climate Action Plan 2024, will be met.
Policies and Measures (PaMs)	The ten PaMs (WEM and WAM) estimated to achieve the largest potential GHG emission reductions in 2030 account for over three quarters of the total potential GHG emission reduction in 2030.

1. Introduction

The Environmental Protection Agency (EPA) is the Competent Authority with responsibility for developing, preparing and publishing projections of greenhouse gas emissions for Ireland. The EPA produces national greenhouse gas emissions projections on an annual basis. These projections are compiled in line with European Union (EU) guidelines to meet EU reporting obligations[1]. At a national level, this assessment informs policy while also monitoring and reporting on Ireland's climate action performance under the Climate Action and Low Carbon Development (Amendment) Act 2021[2] and to the public as outlined in the national Climate Action Plans[3]. It also provides an assessment of Ireland's progress towards achieving its EU emission reduction targets for 2030 as set out under the Effort Sharing Regulation[4].

This report provides an assessment of Ireland's greenhouse gas (GHG) emissions projections from 2024 to 2055, using the latest inventory data for 2023 as the starting point[5]. The main focus of the assessment is out to 2030 given current national and EU 2030 climate targets. Projections data out to 2055 is provided in the Appendix and as a separate download accompanying this report.

Preparing the EPA projections involves compiling and processing key data such as macro-economic projections (fuel prices, carbon tax prices and economic growth), energy projections (projected fuel use in households, industry, services, transport and agriculture), developments in the agriculture and land use sectors and projected emissions from industrial processes.

1.1 National and EU targets

Ireland's Climate Action and Low Carbon Development (Amendment) Act 2021 (Climate Act) set a target for a 51% reduction in greenhouse gas emissions by 2030 compared to 2018. The national climate objective differs from the EU objective as it includes all sectors of the economy including the Land Use, Land Use Change and Forestry (LULUCF) sector. The LULUCF sector includes both greenhouse gas emissions and removals associated with activities on land. Ireland's national Climate Action Plans[3] set out a programme of policies and measures that aim to achieve significant progress towards the Climate Act objectives.

The Climate Act established carbon budgets[6] to support achievement of Ireland's 2050 climate neutral ambition. A carbon budget represents the total amount of greenhouse gas emissions that may be released during an agreed five-year period and, to date, two five-year budgets have been published (2021-25, 2026-30) and one provisional carbon budget has been proposed (2031-35). In July 2022 sectoral emissions ceilings[7] were approved by Government for each sector of the economy to ensure each sector stays within the limits of the agreed carbon budgets. The sectors include Agriculture, Buildings, Electricity, Industry and Transport and different ceilings apply to each sector. There is currently no sectoral ceiling for LULUCF.

1 Regulation (EU) 2018/1999 on the Governance of the Energy Union and Climate Action.

2 Climate Action and Low Carbon Development (Amendment) Act 2021 (irishstatutebook.ie).

3 The latest Climate Action Plan published at the time the projections underlying this report were prepared was Climate Action Plan 2024.

4 Regulation (EU) 2018/842 on binding annual greenhouse gas emission reductions by Member States from 2021 to 2030 contributing to climate action to meet commitments under the Paris Agreement.

5 https://www.epa.ie/publications/monitoring--assessment/climate-change/air-emissions/irelands-final-greenhouse-gas-emissions-1990-2023.php

6 https://www.gov.ie/en/publication/9af1b-carbon-budgets/

7 https://www.gov.ie/en/publication/76864-sectoral-emissions-ceilings/

Ireland's 2030 target under the EU's Effort Sharing Regulation (ESR) is to limit its greenhouse gas emissions by at least 42% by 2030 compared to 2005[8], which means ESR emissions of 27.7 Mt CO_2eq in 2030. The ESR includes those sectors outside the scope of the EU Emissions Trading System (EU-ETS), including Agriculture, Transport, Residential, Commercial/Public Services, Waste and F-gases, and is also referred to as "non-ETS". This EU 2030 target was set in April 2023 upon amendment of the ESR[9]. The 42% reduction defines the trajectory with binding annual emission limits over the period to 2030. At present, binding annual emission limits for the 42% reduction have been set for 2021 to 2025[10] and limits for 2026-2030 are due to be set later in 2025.

Under the ESR two flexibilities may be utilised to allow for a fair and cost-efficient achievement of the target. These flexibilities are the use of EU Emissions Trading System[11] allowances and credit from action undertaken in the LULUCF sector.

Ireland's 2024-2030 emission projections are set out in the following sections of this report. Each section of the report outlines our analysis and assessment with reference to the prescribed base year, targets and timeframes specified in the associated National or EU legislative context, outlined above.

1.2 Policies and Measures

In addition to projections, the EPA is also the Competent Authority with responsibility for submission of Policies and Measures or 'PaMs' under the Governance of the Energy Union and Climate Action Regulation[12]. PaMs are instruments which contribute to the achievement of climate change mitigation and energy targets, such as reducing GHG emissions, producing renewable energy or reducing energy consumption. PaMs are compiled by the EPA to meet EU[12] and United Nations Framework Convention on Climate Change (UNFCCC) reporting obligations.

In 2023, EU Member States reported on 3,039 individual policies and measures to reduce greenhouse gas emissions and achieve climate targets[13]. In this report we include for the first time more detailed information on the projected effects of specific policies and measures on reducing greenhouse gas emissions (see Section 5).

8 https://climate.ec.europa.eu/eu-action/effort-sharing-member-states-emission-targets/effort-sharing-2021-2030-targets-and-flexibilities_en

9 Regulation (EU) 2023/857 amending Regulation (EU) 2018/842 on binding annual greenhouse gas emission reductions by Member States from 2021 to 2030 contributing to climate action to meet commitments under the Paris Agreement, and Regulation (EU) 2018/1999.

10 Commission Implementing Decision (EU) 2023/1319 of 28 June 2023 amending Implementing Decision (EU) 2020/2126 to revise Member States' annual emission allocations for the period from 2023 to 2030 (europa.eu).

11 https://ec.europa.eu/clima/eu-action/eu-emissions-trading-system-eu-ets_en

12 Regulation (EU) 2018/1999 on the Governance of the Energy Union and Climate Action.

13 ETC CM report 2023/06: Overview of reported integrated national climate and energy policies and measures in Europe in 2023 – Eionet Portal

2. Approach

2.1 Projected Scenarios

The EPA greenhouse gas projections estimate what emissions are likely to be if a specific set of policies and measures are implemented over a defined period of time (e.g. from 2024 to 2030). Two scenarios are considered by the EPA in line with reporting guidelines, the *With Existing Measures* (WEM) scenario and the *With Additional Measures* (WAM) scenario. These scenarios are explained below.

Explainer: EPA projections scenarios, what do they mean?

***With Existing Measures* (WEM)**

The WEM scenario is a projection of future emissions based on the measures currently implemented and actions committed to by Government. To become part of the WEM scenario a policy or measure must be in place by the end of 2023 (the latest inventory year) and, in parallel, the resources and/or legislation must be in place or committed to by Government Departments or Agencies. For example, the WEM scenario now includes a biofuel blend rate of B20[14] by 2030. This policy is considered as implemented because it is underpinned by the Renewable Transport Fuel Obligation[15] and a 2023 Renewable Transport Fuel Policy statement[16] from the Department of Transport.

***With Additional Measures* (WAM)**

The WAM scenario is a projection of future emissions based on implemented measures included in the WEM scenario plus additional planned measures that are under discussion (as per plans, programmes or other policy documents) and have a realistic chance of implementation in the future (e.g. by 2030). The WAM scenario is based on the measures in the latest Government plans (such as the Climate Action Plan 2024) which have a realistic pathway in place for implementation. For example, in Transport the WAM scenario includes an Avoid/Shift policy encompassing a range of planned behavioural change and sustainable transport measures.

14 B20 means a diesel fuel blend containing at least 20% biodiesel or HVO (Hydrotreated Vegetable Oil) by volume.

15 S.I. No. 350/2022 – European Union (Renewable Energy) Regulations (2) 2022

16 gov.ie – Renewable Transport Fuel Policy 2023-2025

These emissions projections consider projected activity data provided by key data providers including:

- The Economic and Social Research Institute (ESRI): Outputs from an integrated energy, economy and environment model called i3E[17] provided by the ESRI, with input from the Department of Finance on economic growth projections.
- The Sustainable Energy Authority of Ireland (SEAI): Energy demand projections are provided by the SEAI.
- Government Departments: Anticipated progress in the implementation and planning of energy related policies and measures was determined by relevant Government Departments (Environment Climate and Communications, Enterprise Trade and Employment, Housing Local Government and Heritage, Transport) and the EPA.
- Teagasc: Agricultural activity projections are provided by Teagasc which are aligned with University of Missouri Food and Agricultural Policy Research Institute (FAPRI) Projections (February 2025) for medium-term developments in EU and world agricultural commodity markets[18]. Determination of anticipated progress in the implementation of Agriculture related policies and measures was determined by the EPA in discussion with the Department of Agriculture, Food and the Marine (DAFM).

Both scenarios use fuel prices from the latest European Commission recommended harmonised trajectories (see Appendix for details). In mandatory reporting years recommended price trajectories for coal, oil and gas are provided by the European Commission to support Member States in the production of emission projections. The most recent dataset from the European Commission was furnished in June 2024 for the 2025 mandatory reporting year.

EU reporting requires projected emissions for the following gases: carbon dioxide (CO_2), methane (CH_4), nitrous oxide (N_2O) and F-gases[19] and reported as carbon dioxide equivalent[20] (CO_2eq). Emissions are classified into the following sectors: Energy (Energy Industries, Manufacturing Combustion, Transport, Residential Buildings, Commercial/Public Services), Industrial Processes, Waste, F-gases, Agriculture, and LULUCF.

Carbon budgets and sectoral ceilings under the Climate Act classify these sectors differently but in a comparable manner: Electricity, Industry, Buildings (Residential), Buildings (Commercial/Public), Transport, Agriculture, LULUCF and 'Other' (emissions from petroleum refining, F-gases and Waste).

17 https://www.esri.ie/current-research/the-i3e-model

18 https://www.teagasc.ie/rural-economy/rural-economy/agricultural-economics/

19 F-gases or fluorinated gases are hydrofluorocarbons (HFCs), perflurocarbons (PFCs), sulphur hexafluoride (SF_6) and nitrogen trifluoride (NF_3).

20 Carbon dioxide equivalent (CO_2eq) is a metric used to compare the emissions from various greenhouse gases on the basis of their global-warming potential (GWP), by converting amounts of other gases to the equivalent amount of carbon dioxide with the same GWP. Global-warming potentials in this report are as laid out in the Intergovernmental Panel on Climate Change's (IPPC's) fifth assessment report (AR5).

2.2 Excluded Policies and Measures

In so far as possible, the policies and measures contained in the Climate Action Plan 2024 are included in these projections. However, as detailed below, there are several exceptions:

Policies and measures were not included as the evidence of an implementation pathway that supported inclusion was not available at the time of preparing the projections, or

The intended ambition of the planned policy or measure was reduced based on updated information provided by the relevant Government Departments and public bodies based on the current extent of implementation (WEM) or planning (WAM).

For these projections, the individual policies and measures that are not included or only partially included are described below. These measures combined, if delivered as anticipated, are estimated to provide a conservative additional abatement of 13 Mt CO_2eq in 2030.

Electricity

Policies and measures up to 2030

- The target of 80% share from renewable electricity (RES-E) by 2030 is not projected. Instead, WEM and WAM scenarios for variable renewable energy technology capacities for onshore wind, offshore wind and solar photovoltaic (PV) technologies were updated with latest information and used in the modelling. The RES-E share is projected to be 68.3% for WAM by 2030.

  The renewable energy technology capacities for onshore wind, offshore wind and solar PV in the WAM scenario is projected to be 7.1 GW, 2.7 GW and 6.3 GW respectively by 2030. This compares with 9 GW onshore wind, "at least" 5 GW offshore wind and 8 GW of solar PV by 2030 in CAP 2024.

- Eirgrid data[21] were used to produce an adjusted trajectory yielding new gas fired generation of 1.4 GW by 2030 in the WEM and WAM scenarios, as an implementation pathway to the CAP 2024 target of "at least" 2 GW for new flexible gas fired generation is not available.

Policies and measures post-2030

- 2 GW offshore wind for green hydrogen uses in industry post-2030 (as outlined in Chapter 12 of the Climate Action Plan 2024) is not currently included.
- Zero-emission gas-fired generation from biomethane and green hydrogen (via 2 GW offshore wind) commencing by 2030 is not currently included.

Transport

Policies and measures up to 2030

- Climate Action Plan 2023 introduced an Avoid/Shift policy to achieve an abatement of 2.09 Mt CO_2eq by 2030 including a range of behavioural change and sustainable transport measures. One of these measures relates to price increases in petrol and diesel out to 2030 and has no supporting policy so is not included in the EPA projections.
- The full CAP 2024 ambition of 945,000 electric vehicles on the road by 2030 is not modelled. Instead, a total of 640,750 electric vehicles is modelled in the WAM scenario, based on updated information from the Department of Transport.

21 EirGrid SONI Generation Capacity Statement 2023-2032

Enterprise, Built Environment and Public Sector

Policies and measures up to 2030

- Measures aimed at achieving emissions savings from a decrease in embodied carbon in construction materials (1.0 Mt CO_2 abatement by 2030) are not currently modelled as there is no evidence of an implementation pathway.
- The Climate Action Plan 2024 target of a 70-75% share in renewable heat in industry has no pathway to implementation outlined in the Plan and is not specifically modelled. Instead, current Support Scheme for Renewable Heat (SSRH) grant rates are modelled to 2055.
- The full CAP 2024 target for Biomethane of 5.7 TWh is not modelled. Instead, the delivery of 4.3 TWh biomethane is modelled in the WAM scenario, which is aligned with Gas Networks Ireland's best estimate biomethane production scenario from the 2023 Network Development Plan[22].
- The full CAP 2024 target for District Heating of 2.7 TWh is not modelled. Instead, 0.214 TWh district heating in place by 2030 is modelled in the WAM scenario based on latest project pipeline information.
- The CAP 2024 target for residential heat pumps (new homes and retrofits) is 680,000 by 2030. For these projections a total of 571,000 heat pumps installed by 2030 is modelled in the WAM scenario. This is based on the latest information on private and local authority retrofits and the number of new builds by 2030.

Policies and measures post-2030

- Post-2030 emissions reductions associated with Carbon Capture and Storage are not included as there is no pathway to implementation available.

Agriculture

Policies and measures up to 2030

- Diversification measures in Agriculture with savings by 2030 of 1.5 Mt CO_2eq are not included as further information is needed to model an implementation pathway for these measures.

Overall

- Climate Action Plan 2024 identified unallocated emissions savings of up to 26 Mt CO_2eq (5.25 Mt CO_2eq annually in the second carbon budget period 2026-2030). These savings are not modelled in these projections. It is noted that CAP 2024 addressed the issue of unallocated emissions savings under five themes (including energy efficiency, sustainable food and agriculture and deployment of carbon capture and storage) and these are further addressed in Climate Action Plan 2025.
- Further Measures post-2030 detailed in the Electricity, Industry, Built Environment, Transport and Agriculture sectors where no specific measures or emissions savings have been identified are not modelled.

These savings combined are estimated to provide a conservative additional abatement of 13 Mt CO_2eq in 2030.

22 Network-Development-Plan-2023.pdf

Climate Action Plan 2025 is not specifically referenced in this report as it had yet to be published during the preparation phase of the 2024-2055 projections. A review was undertaken and there are no significant additional measures in CAP 2025 therefore no major omissions in these projections.

2.3 Reference/Base Years in the Report

Ireland's EU and national legislative commitments have different levels of emissions reduction requirements, base years and timeframes for achievement.

The EU Effort Sharing Regulation (ESR) requires a 42% reduction of emissions compared to 2005 levels by 2030.

The Climate Act 2021, as amended, has specified 2018 as the base year from which a 51% emission reduction is to be achieved by 2030.

Each section of the report outlines the EPA's assessment with reference to the targets and base year specified in the associated legislation or reporting frameworks being discussed. Section 4 includes a sectoral assessment of projections out to 2030.

3. Projected Performance against EU and National Commitments

Ireland has several greenhouse gas emission reduction commitments at national, EU and international level. These various commitments have different scopes and interim targets associated with them, but all ultimately require Ireland to play its part in achieving the global goal of limiting temperature rise to 1.5 degrees as set out in The Paris Agreement.

3.1 European Targets

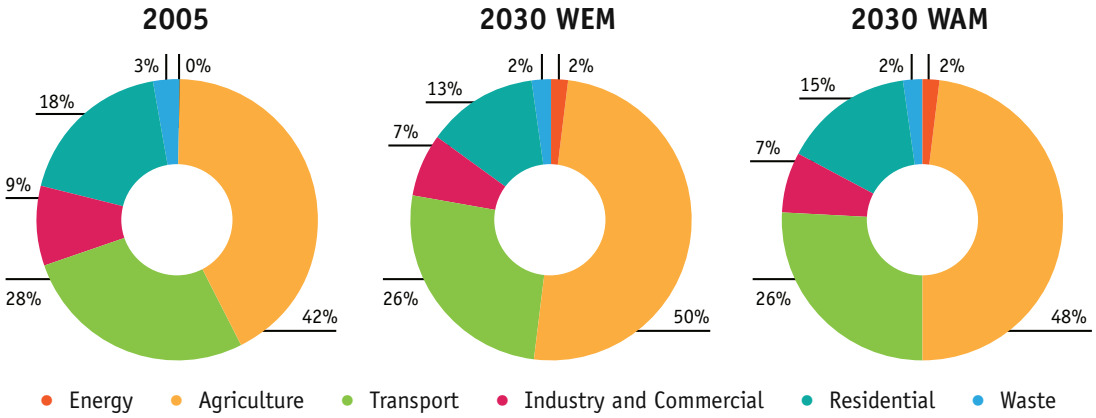
Ireland's 2030 target under the EU's Effort Sharing Regulation (ESR) is to deliver a 42% reduction of emissions compared to 2005 levels by 2030. This target was set in April 2023 upon amendment of the ESR. The ESR includes those sectors outside the scope of the EU Emissions Trading System (EU-ETS), including Agriculture, Transport, Residential, Commercial/Public Services, Waste and F-gases, and is also referred to as "non-ETS".

The latest EPA projections show that currently implemented policies and measures (WEM) will achieve a reduction of 9.5% on 2005 levels by 2030, significantly short of the 42% reduction target.

If policies and measures in the higher ambition (WAM) scenario are implemented, EPA projections show that Ireland can achieve a reduction of 21.7% on 2005 levels by 2030, still short of the 42% reduction target.

The ESR sectors are shown in Figure 1 below. The Projections show that Agriculture and Transport emissions form the majority of ESR/non-ETS emissions. Combined they represented 70% of ESR/Non-ETS emissions in 2005 and are projected to be 74% in 2030 in the WAM scenario.

Figure 1: Sectoral share of Effort Sharing Regulation greenhouse gas emissions in 2005 and projected sectoral share in 2030 under the WEM and WAM scenarios



Targets for 2030 under the ESR include binding annual limits per Member State known as "Annual Emission Allocations" (AEAs) for the period 2021-2030. The AEAs were updated to reflect the 42% reduction target set in 2023. To date, new AEAs have been implemented for 2021 to 2025[23] only. Limits for 2026-2030 have been estimated as per the methodology in the 2023 amendment of the Effort Sharing Regulation[24]. The Annual Emission Allocations (AEAs) under the Effort Sharing Regulation for the period 2021-2030 are shown in Table 1.

The most recent European Environment Agency Trends and Projections in Europe 2024 report[25] outlined that in 2022, without the use of flexibilities, Ireland was one of eight EU Member States where ESR emissions were above the annual emission allocations (AEAs). It was noted that Ireland had the largest share (52%) of Agriculture emissions as a proportion of non-ETS emissions.

Table 1: Annual emission allocations for Ireland for each year from 2021 to 2030

	Annual emission allocation in Mt CO_2eq					Estimated annual emission allocation in Mt CO_2eq[25]					
Year	**2021**	**2022**	**2023**	**2024**	**2025**	**2026**	**2027**	**2028**	**2029**	**2030**	**Total**
AEAs	43.5	42.4	40.5	38.7	36.8	38.1	35.5	32.9	30.3	27.7	**366.3**
	GHG emissions in Mt CO_2eq			**Projected GHG emissions in Mt CO_2eq**							
WEM	44.9	44.3	42.7	42.9	43.2	43.2	43.4	43.3	43.3	43.2	**434.4**
WAM	44.9	44.3	42.7	42.6	42.2	41.3	40.6	39.6	38.5	37.3	**413.9**

Under the WEM scenario, the projections indicate that Ireland will cumulatively exceed its total ESR 2021-2030 emissions allocation of 366.3 Mt CO_2eq by 68.1 Mt CO_2eq. Under the WAM scenario, the projections indicate that Ireland will cumulatively exceed the ESR 2021-2030 emissions allocation by 47.6 Mt CO_2eq.

Compliance and Flexibilities

To achieve the ESR target without the use of flexibilities, Ireland's ESR emissions must reach 27.7 Mt CO_2eq by 2030. The latest projections show that under the WAM scenario, Ireland's ESR emissions will be 37.3 Mt CO_2eq in 2030 (a reduction of 21.7%); under the WEM scenario Ireland's ESR emissions will be 43.2 Mt CO_2eq in 2030 (a reduction of 9.5%).

The ESR provides two flexibilities (EU-ETS and LULUCF)[26] to allow for a fair and cost-efficient achievement of the targets. The ETS flexibility available to Ireland for 2021 to 2030 is a maximum of 19.1 Mt CO_2eq.

23 Commission Implementing Decision (EU) 2023/1319 of 28 June 2023

24 Regulation (EU) 2023/857 amending Regulation (EU) 2018/842 on binding annual greenhouse gas emission reductions by Member States from 2021 to 2030 contributing to climate action to meet commitments under the Paris Agreement, and Regulation (EU) 2018/1999

25 Trends and projections in Europe 2024 | European Environment Agency's home page

26 Use of EU-ETS allowances and credit from action undertaken in the Land use, Land use Change and Forestry (LULUCF) sector

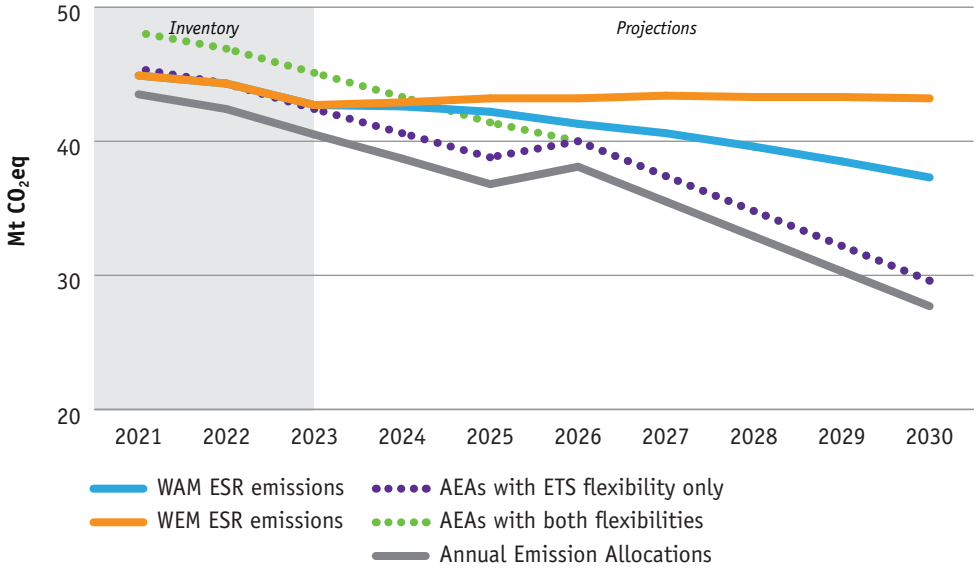
The revised LULUCF Regulation (2023)[27] incorporates new rules around LULUCF flexibilities for the period 2021-2025 and 2026-2030. There is a high degree of uncertainty relating to the availability of the LULUCF flexibility and, if available, the quantity of flexibility in each budgetary period. This uncertainty is primarily due to the availability of the LULUCF flexibility being dependent on the EU collectively achieving its LULUCF target of a 310 Mt CO_2eq reduction by 2030[28]. If this EU-wide target is not achieved, based on a compliance check to be completed by the European Commission in 2032, then the LULUCF flexibility will not be available to Ireland.

In the interim, based on latest LULUCF inventory[5] and projections data, the maximum amount of LULUCF flexibility projected to be available is 13.4 Mt CO_2eq in the first 5-year period (or 2.68 Mt CO_2eq per annum), with no flexibility available in the second five-year period (Figure 2).

EPA projections show that use of the EU-ETS flexibility alone will not bring Ireland into compliance under the ESR (Figure 2). When the ETS flexibility is applied projections indicate that Ireland will cumulatively exceed the ESR 2021-2030 emissions allocation by 28.5 Mt CO_2eq even with implementation of policies and measures in the WAM scenario.

When both ETS and LULUCF flexibilities are applied, the projections still indicate that Ireland will cumulatively exceed the ESR 2021-2030 emissions allocation by 15.1 Mt CO_2eq even with full implementation of policies and measures in the WAM scenario.

Figure 2: Projected emissions and Annual Emission Allocations (AEAs) under the Effort Sharing Regulation for the period 2021-2030



27 Regulation (EU) 2023/839 of the European Parliament and of the Council of 19 April 2023 Regulation – 2023/839 – EN – EUR-Lex

28 Regulation (EU) 2018/841 of the European Parliament and of the Council of 30 May 2018 https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A02018R0841-20230511

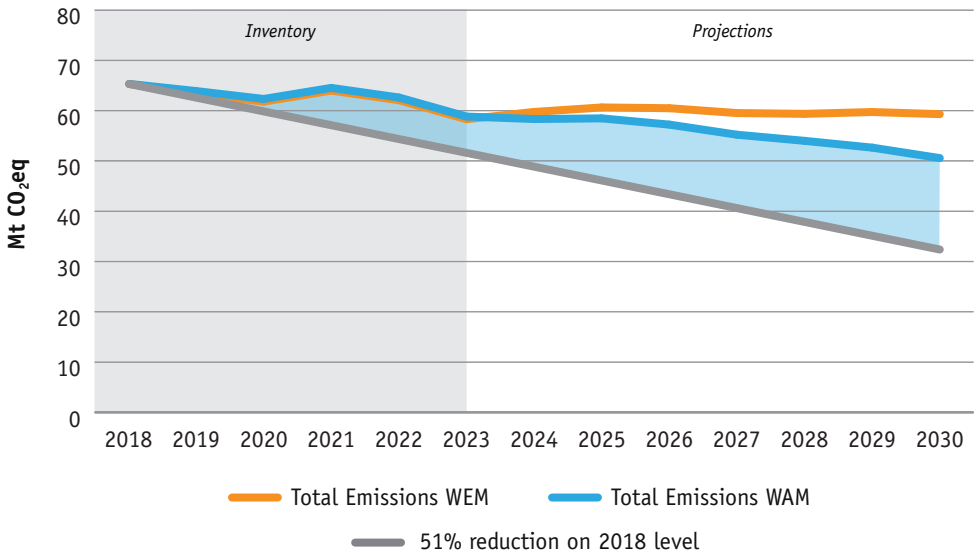
3.2 National Climate Objective

The Climate Action and Low Carbon Development (Amendment) Act 2021 sets a national climate objective of achieving a climate resilient and climate neutral economy by the end of the year 2050. An interim target has been set out to achieve a reduction of 51% in total emissions (including LULUCF) over the period 2018 to 2030.

The projections show that implemented policies and measures in the *With Existing Measures* (WEM) scenario can deliver an 8.8% reduction in greenhouse gas emissions by 2030 compared to the 2018 baseline level. This is less than the 11.1% reduction projected in last year's figures. The WAM scenario, including policies and measures from the 2024 Climate Action Plan, is projected to deliver a 22.9% emissions reduction over the same period, also less than the 29.0% reduction projected in last year's figures. This is largely driven by updated input assumptions for the WEM and WAM scenarios between this year's and last year's projections in certain sectors such as Electricity Generation, Transport and Buildings.

Both projected scenarios indicate that even with implementation of climate policies and measures Ireland is not projected to meet the 51% emissions reduction target by 2030. Figure 3 below demonstrates the 'gap' between the WAM scenario projections and the 51% target.

Figure 3: Total Greenhouse Gas Emissions (including LULUCF) under the *With Existing Measures* and *With Additional Measures* scenarios out to the year 2030



Earlier in the report it was highlighted that approximately 13 Mt CO_2eq of savings in 2030 are not included in these projections. If that amount of savings were realised in 2030, the percentage reduction in emissions achieved in total (with LULUCF) would be approximately 43% by 2030 relative to 2018.

3.2.1 Carbon Budgets

The Climate Action and Low Carbon Development (Amendment) Act 2021 provides for the establishment of carbon budgets to support achieving Ireland's climate ambition. The 51% target is the primary constraint on carbon budgets over the course of the first two budget periods ending on 31 December 2030, relative to 2018. The provisional carbon budget proposed by the Climate Change Advisory Council for 2031 to 2035 continues the trajectory towards climate neutrality by 2050.

Two carbon budgets have been set for the period 2021 to 2030, with a provisional budget proposed for 2031-2035:

- Budget 1 from 2021-2025, 295 Mt CO_2eq;
- Budget 2 from 2026-2030, 200 Mt CO_2eq;
- Budget 3 from 2031-2035 (provisional), 151 Mt CO_2eq.

For Budget period 1 the latest EPA projections show that this is projected to be exceeded by 12 Mt CO_2eq in the WEM scenario and 8 Mt CO_2eq in the WAM scenario. This is an improvement on the numbers projected for Budget period 1 in last year's projections report and reflects inventory adjustments since last year's projections. It should be noted that carbon budgets have not been adjusted to account for updated science-based movement in the national greenhouse gas inventory and projection estimates.

It is an obligation under Section 6D(5) of the Climate Act that, where the total greenhouse gas emissions for a preceding budget period exceed the carbon budget for that period, the excess greenhouse gas emissions (from the preceding budget period) are carried forward to the next period. The carbon budget for the next period is then decreased by the amount carried forward.

Using the projections presented for the period of Budget 1 from 2021-2025, Budget 2 from 2026-2030 would decrease by 12 Mt CO_2eq in the WEM scenario to 188 Mt CO_2eq and decrease by 8 Mt CO_2eq in the WAM scenario to 192 Mt CO_2eq. With this carryover, Budget 2 is projected to be exceeded by 114 Mt CO_2eq in the WEM scenario and by 77 Mt CO_2eq in the WAM scenario. Consequently, far higher emissions cuts will be needed to comply with Budget period 3 and subsequent carbon budgets.

Table 2: Total greenhouse gas emissions in Budgets 1, 2 and 3 as published in 2022[29] and budgets (with carryover) in the *With Existing Measures* and *With Additional Measures* scenarios

	Budget 1 2021-2025	Budget 2 2026-2030	Budget 3 (provisional) 2031-2035
Total emissions allowed Mt CO_2eq	295	200	151
Adjusted total emissions WEM Mt CO_2eq*	295	188	37
Adjusted total emissions WAM Mt CO_2eq**	295	192	74

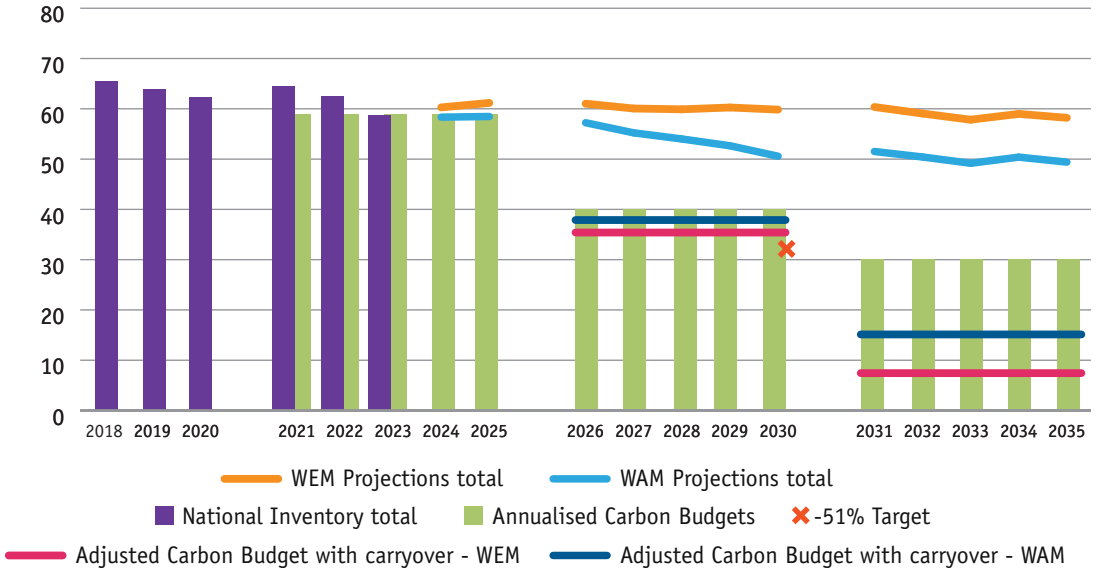
* Based on the *With Existing Measures* scenario from latest EPA GHG Projections 2024-2055

** Based on the *With Additional Measures* scenario from latest EPA GHG Projections 2024-2055

Figure 4 shows the annualised carbon budgets and the extent to which these budgets are exceeded with the latest projected emissions data, both in the WEM and higher ambition WAM scenarios. As the LULUCF sector is included in the carbon budgeting process, Figure 4 also includes LULUCF emissions and removals.

29 https://www.gov.ie/en/publication/9af1b-carbon-budgets/

Figure 4: Annualised carbon budgets (2021-25, 2026-30 and 2031-35) and projected emissions data (including LULUCF) in Mt CO_2eq with and without potential emissions carry over under the *With Existing Measures* and *With Additional Measures* scenarios



3.2.2 Sectoral Emissions Ceilings and associated percentage change in emissions

Sectoral emissions ceilings[30] assist with the achievement of carbon budgets and the ambition in the Climate Act 2021. Each sectoral ceiling has an associated "Reduction in Emissions", a percentage target change in emissions per sector (relative to 2018 levels). Sectoral ceilings are legally binding and set out the maximum amount of greenhouse gas emissions permitted in different sectors that align with Governmental responsibility. The sectors do not align exactly with the sectors reported under the EU reporting obligations[31] but can be mapped to them. The Electricity sector, for example, largely maps to the sector the EPA refers to as Energy Industries in reporting to the EU. There is no ceiling set for LULUCF as yet, however the Climate Action Plan 2024 suggests that the target set in the LULUCF Regulations (2023)[32] will be adopted.

In percentage terms, Table 3 shows that in the WAM scenario the percentage reduction is not achieved for any sector. When the percentage reduction is compared with last year's projections, there has been an improvement in Electricity based on inventory updates since last year's projections. Deteriorations are projected for Agriculture, Industry, Buildings and Transport. This is due to updated input assumptions for the WAM scenario between this year's and last year's projections[33].

For example, in Transport the total number of electric vehicles (EVs) assumed to be on the road by 2030 is 640,750. In last year's projections, the full CAP 2024 target of 945,000 EVs on the road by 2030 was assumed. In the Buildings sector, the district heating target in CAP 2024 of 2.7 TWh by 2030 was not used in the WAM scenario based on updated implementation timelines. Instead, an assumption that 0.214 TWh district heating in place by 2030 was used which is split across the Residential and Commercial/Public Services buildings sectors.

30 https://www.gov.ie/en/publication/76864-sectoral-emissions-ceilings/

31 Regulation (EU) 2018/1999 on the Governance of the Energy Union and Climate Action.

32 https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A02018R0841-20230511

33 Relevant Government Departments are consulted each year in order to determine the most appropriate input assumptions for the *With Existing Measures* and *With Additional Measures* scenario.

More detail on the input assumptions associated with each sector is included in Section 4 and a list of all input assumptions is provided as a separate download accompanying this report.

Table 3: Assessment of Achievement of Sectoral Percentage Targets under the *With Additional Measures* scenario

Sectors	Emissions 2018 (Mt CO_2eq)	Projected Emissions 2030 (Mt CO_2eq)	Percentage Change 2030 vs 2018	Target Reduction 2030 vs 2018	Percentage Change (Reported in 2024) 2030 v 2018
Electricity	10.2	3.1	-70%	-75%	-66%
Transport	12.3	9.7	-21%	-50%	-29%
Buildings (Residential)	7.0	5.4	-22%	-40%	-40%
Buildings (Comm and Public)	1.5	1.0	-36%	-45%	-60%
Industry	7.0	6.1	-12%	-35%	-24%
Agriculture*	21.4	18.0	-16%	-25%	-18%
Other**	2.1	1.6	-25%	-50%	-25%
LULUCF (no ceiling currently)***	4.0	5.5	+39%	N/A	+17%
Total with LULUCF	65.6	50.6	-23%	-51%	-29%

* A direct comparison of emissions in the Agriculture sector against its Sectoral Emission Ceilings is no longer viable. Discussed below.

** Waste, F-gases and Petroleum Refining

*** National objective includes LULUCF

Table 4 summarises the projected emissions against the Sectoral Emissions Ceilings in million tonnes of CO_2 equivalent in the WAM scenario. The sectoral ceilings projected to be achieved in the first budget period (2021-25) are in the Electricity, Buildings and 'Other' sectors. For the second budget period (2026-2030) the Sectoral Ceiling projected to be achieved is for the 'Other' sector only.

Improvements on last year's projections are noted in Residential Buildings, due to a 7% annual reduction in 2023, mostly driven by reductions in coal and natural gas use.

The Sectoral Emissions Ceilings for Agriculture is no longer aligned with the reduction target for the sector[34], mainly due to the impact of updated science to the Agricultural inventory in 2023. Consequently, direct comparison of emissions in the Agriculture sector against its Sectoral Emission Ceilings is no longer viable. The Climate Act provides for the revision of Carbon Budgets and Sectoral Emission Ceilings where "there are significant developments in scientific knowledge in relation to climate change".

The incorporation of updated science in the Agricultural inventory is a "significant development", highlighting the need to revise the Carbon Budgets and Sectoral Emission Ceilings to support the National Climate objective of a 51% reduction by 2030.

Table 4: Assessment of Achievement of Carbon Budget Sectoral Ceilings under the *With Additional Measures* Scenario

Sectors	Projected WAM Emissions 2021-2025 (Mt CO_2eq)	Sectoral Ceiling 2021-2025 (Mt CO_2eq)	Projected WAM Emissions 2026-2030 (Mt CO_2eq)	Sectoral Ceiling 2026-2030 (Mt CO_2eq)
Electricity	40.4	40	21.6	20
Transport	58.0	54	52.5	37
Buildings (Residential)	28.9	29	27.5	23
Buildings (Comm and Public)	7.2	7	6.3	5
Industry	32.3	30	31.5	24
Agriculture*	105.3	106	94.7	96
LULUCF (no ceiling currently)**	21.7	N/A	27.3	N/A
Other***	9.1	9	8.3	8
Total with LULUCF	302.8	295	269.7	200

* A direct comparison of emissions in the Agriculture sector against its Sectoral Emission Ceilings is no longer viable. Discussed above.

** National objective includes LULUCF

*** Waste, F-gases and Petroleum Refining

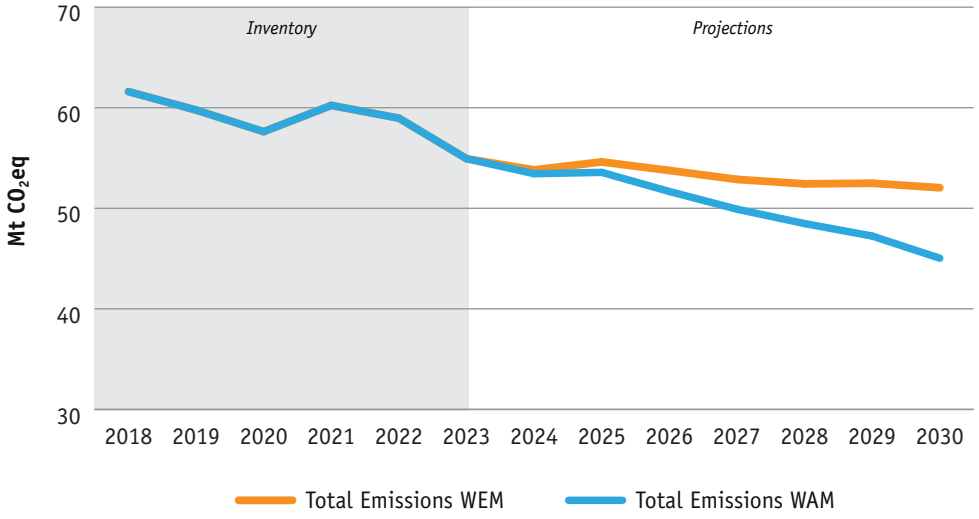
34 The most recent methodological changes to the Agriculture emissions Inventory are described in a box on page 9 of the report on Ireland's Provisional Greenhouse Gas Emission 1990-2023, published by the EPA in July 2024

4. Sectoral Assessment of Projections out to 2030

This section aims to show the projected trends in total emissions and sectoral greenhouse gas emissions from 2018 to 2030. As outlined in the introduction, the WAM scenario includes planned Government policies and measures that have not yet moved into an implementation phase and it is a more ambitious scenario than the WEM.

The expected trend in total greenhouse gas emissions under both scenarios is shown in Figure 5. The difference between both scenarios is largely attributed to projected significant emissions reductions in key sectors such as Energy Industries, Residential, Transport, Commercial/Public services and Agriculture as a result of measures outlined in the Climate Action Plan 2024[35] and other policy documents such as Ag Climatise[36]. This is described in more detail for each sector throughout this section of the report.

Figure 5: Total Greenhouse Gas Emissions (excluding LULUCF) under the *With Existing Measures* and *With Additional Measures* scenarios out to 2030



Total emissions by sector out to 2030 under the WEM scenario is shown in Figure 6. In Figure 7 emissions in 2018 are compared with projected emissions in 2030 by sectoral share in both the WEM and WAM scenarios. Both Figures show that in 2018 three key sectors have the largest share of emissions: Agriculture, Transport and Energy Industries (35%, 20% and 17% of emissions respectively).

35 Refer to Section 2.2 of this report for an overview of the Climate Action Plan 2024 measures that were not included in these projections.

36 https://www.gov.ie/en/publication/07fbe-ag-climatise-a-roadmap-towards-climate-neutrality/

Figure 6: Total Greenhouse Gas Emissions Projections (excluding LULUCF) by sector out to the year 2030 under the WEM scenario

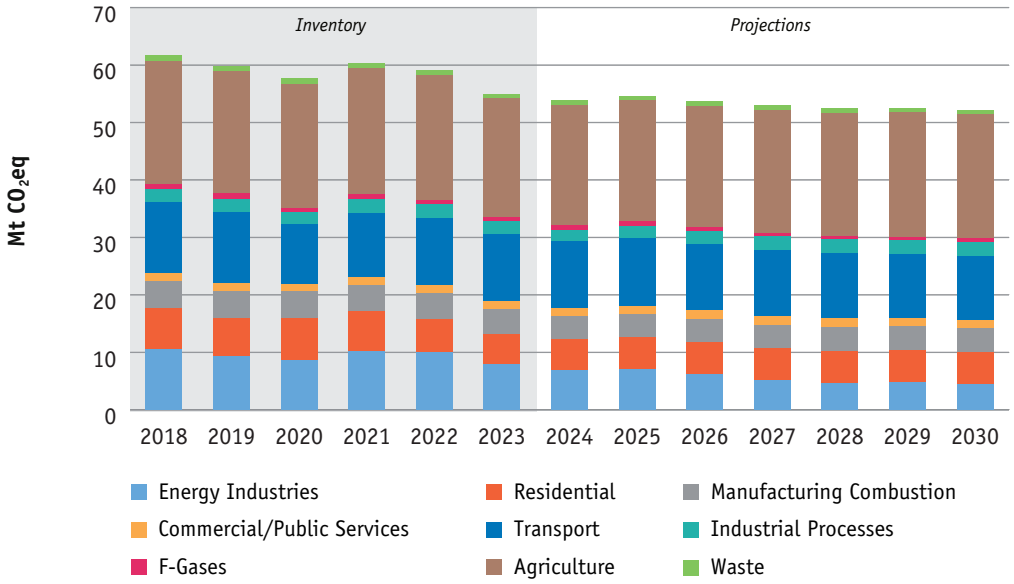
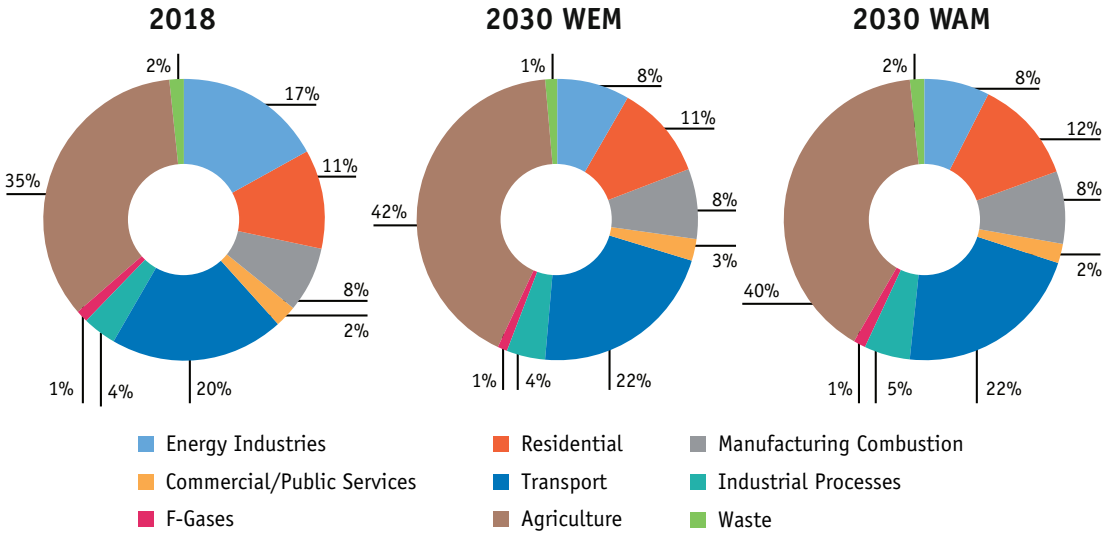
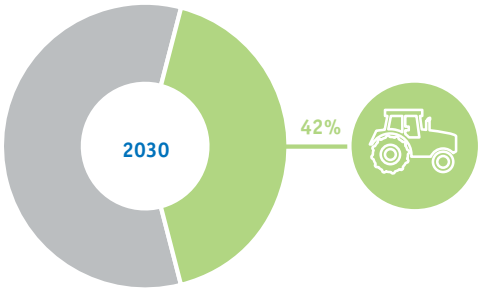


Figure 7: Greenhouse Gas Emissions by sector share (excluding LULUCF) in 2018 and Projected Greenhouse Gas Emissions by sector share under the WEM and WAM scenario in 2030



The Agriculture and Transport sectors remain the largest contributors of emissions in 2030 in both the WEM and WAM scenarios as other sectors of the economy are projected to decarbonise faster. Under the WAM scenario, the share of total emissions (excluding LULUCF) from Energy Industries (mainly electricity generation) is projected to decrease by almost 10% from 2018 to 2030. This reflects the projected ongoing phase out of coal, oil and gas usage in power generation, implementation of Ireland's renewable power generation production targets and increased electricity interconnection capacity.

4.1 Agriculture



Agriculture sector emissions arise from enteric fermentation (methane emissions arising from digestive process in livestock), manure management and nitrogen and urea application to soils. In addition, fuel combustion from agriculture, forestry and fishing is included. This sector contributed 37.7% of Ireland's total emissions in 2023 (excluding LULUCF) and is projected to rise to 41.6% in 2030 in the WEM scenario (excluding LULUCF) (see Figure 7).

The data underpinning the agriculture projections are based on an updated analysis undertaken by Teagasc of the projected animal populations, crop areas and fertiliser use which are aligned with University of Missouri Food and Agricultural Policy Research Institute (FAPRI[37]) Projections (February 2025) for medium term developments in EU and world agricultural commodity markets. Measures from AgClimatise, Nitrates Action Plan, Teagasc MACC and Climate Action Plan 2024 are included.

Agriculture emissions decreased by 4.9% or 1.1 Mt CO_2eq in 2023. This was primarily due to an 18% reduction in fertiliser nitrogen use, leading to less emissions from agricultural soils. In combination, a 26.6% decrease in liming and a 2.4% reduction in methane from livestock result in a decrease of -0.54 Mt CO_2eq.

The WEM and WAM projections from 2018 to 2030 are described below and the projected trajectory for both scenarios is shown in Figure 8.

With Existing Measures scenario

Total emissions from Agriculture (including fuel used in agriculture, forestry and fishing) are projected to remain relatively static and increase by 1% from 21.4 to 21.6 Mt CO_2eq in the WEM scenario over the period 2018 to 2030 (Figure 8). This increase is being driven by dairy cow population increase, somewhat offset by a projected contraction in non-dairy populations out to 2030. In addition, sheep, pig and poultry populations are expected to increase, along with increased fertiliser use. The WEM scenario includes measures that have legislative levers in place before the end of 2023. These include:

- The Nitrates Action Programme[38] which includes the use of low emission spreading technologies (LESS) on farms. The target of 90% of slurries spread by LESS by 2027 as per AgClimatise is applied given the growth in use of technologies in recent years. Use of low emission slurry spreading for pigs is 100% from 2024 as per the Nitrates Action Plan.
- The target for lime application of 2 Mt per annum by 2030 is reached (AgClimatise), including enhanced nutrient use efficiency (reduced fertiliser N requirements) as a result.
- Inhibited urea fertiliser use remains at 2024 levels.

37 Agricultural Economics – Teagasc | Agriculture and Food Development Authority

38 https://assets.gov.ie/218449/f1a6725a-6269-442b-bff1-2730fe2dc06c.pdf

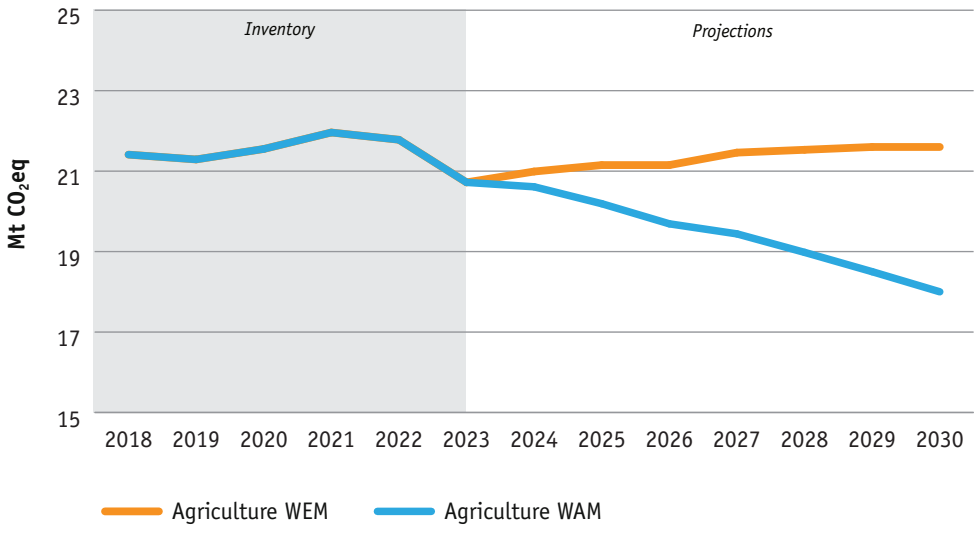
With Additional Measures scenario

Under the WAM scenario emissions are projected to decrease by 16% from 21.4 Mt CO_2eq in 2018 to 18.0 Mt CO_2eq by 2030. The WAM scenario assumes the WEM measures plus the measures outlined in Climate Action Plan 2024, the Teagasc GHG MACC, AgClimatise and Teagasc NH_3 MACC are in place, these include:

- Reduction in crude protein in pig diets.
- All slurry stores (cattle and pig) to be covered by 2027.
- Drying of poultry manure.
- Further 1% reduction in the crude protein content of Dairy cow concentrates during grazing season.
- Increased adoption of protected urea, 80-90% uptake of protected urea on grassland farms by 2025 and 90-100% uptake by 2030.
- Limit sales of straight urea to 20 kt per annum from 2025.
- Target fertiliser sales ceilings at 330 kt N by 2025 and 300 kt N by 2030.
- Methane reduction measures including slurry additives, reduced slaughter age for beef cattle, reduced age to first calving, feed additives (cattle) and further improvements in the dairy economic breeding index (EBI).
- Water Table Management (peat soils) to include 80k ha of water table manipulation.

As detailed in Section 2, diversification measures in Agriculture with savings of 1.5 Mt CO_2eq by 2030 are not included in the WAM scenario. Further information is needed to model an implementation pathway for these measures.

Figure 8: Greenhouse Gas Emissions Projections from the Agriculture Sector under the *With Existing Measures* and *With Additional Measures* scenarios out to 2030

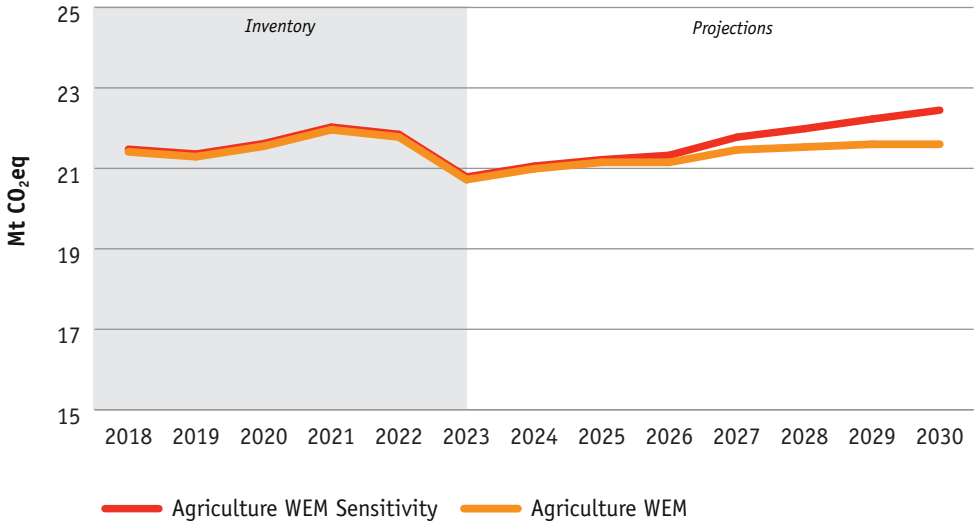


Sensitivity Analysis

A sensitivity analysis of the *With Existing Measures* emissions scenario has been undertaken for the agriculture emissions projections based on alternative projected activity data that assumes stronger growth in agricultural activity levels. The resulting alternative scenario is presented in Figure 9 alongside the WEM scenario. It shows that stronger growth would likely lead to marginally higher emissions over the projected period.

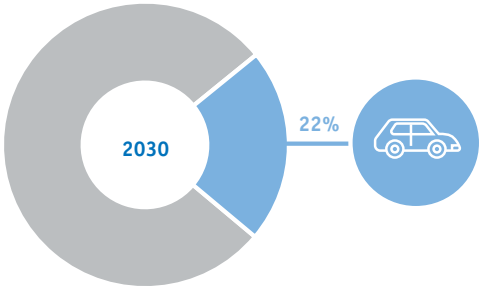
The sensitivity scenario examines the consequences of continued strong growth in the dairy herd accompanied by beef cow herd that is projected to contract at a slower rate than the rate of decline observed since the end of the milk quota regime in 2015.

Figure 9: Sensitivity assessment of the Agriculture Sector under the *With Existing Measures* scenario out to 2030



4.2 Transport

The main source of emissions from the Transport sector is road transport. Freight transport energy demand is strongly influenced by the level of commercial activity in the economy. Personal transport energy demand is significantly influenced by both the level of employment as well as prevailing oil price. This sector also includes combustion of fuel used in rail, navigation, domestic aviation and pipeline gas transport. This sector contributed to 21.5% of Ireland's total emissions in 2023 (excluding LULUCF) and is projected to contribute to 21.6% of Ireland's total emissions by 2030 in the WEM scenario (excluding LULUCF) (see Figure 7).



The main policy instruments impacting transport emissions are the electrification of the vehicle fleet, an increase in the mix of renewable fuels in petrol and diesel at the pumps and 'avoid and shift' measures as detailed in Climate Action Plan 2024. WEM and WAM have differing levels of ambition in terms of the electric vehicle targets. Increased ambition in terms of avoiding transport emissions and moving to sustainable transport is included in the WAM scenario only.

The latest projections indicate that the share of total road transport CO_2 emissions from Heavy Duty Vehicles (HDVs) and Light Goods Vehicles (LGVs) is projected to increase from approximately 35% in 2018 to 50% by 2030 and 83% by 2050 in the WAM. This is as a result of continued projected growth in demand for freight transport services as well as faster reduction of emissions from passenger cars.

With Existing Measures scenario

Under the WEM scenario, transport emissions are projected to decrease by 9% from 12.3 Mt CO_2eq to 11.2 Mt CO_2eq over the period 2018-2030 (see Figure 10). Measures included in the WEM scenario are:

- A 10% blend for petrol and a 20% blend for diesel at the pumps by 2030 is assumed. The diesel blend rate of 20% by 2030 has moved from planned (WAM) to implemented (WEM) measures since the last projections report[39].
- For uptake of Electric Vehicles, the WEM scenario assumes approximately 564,000 electric vehicles on the road by 2030. This includes approximately 270,000 passenger battery electric vehicles (or 11% of total car stock in 2030) and almost 280,000 passenger plug-in hybrid electric vehicles.

With Additional Measures scenario

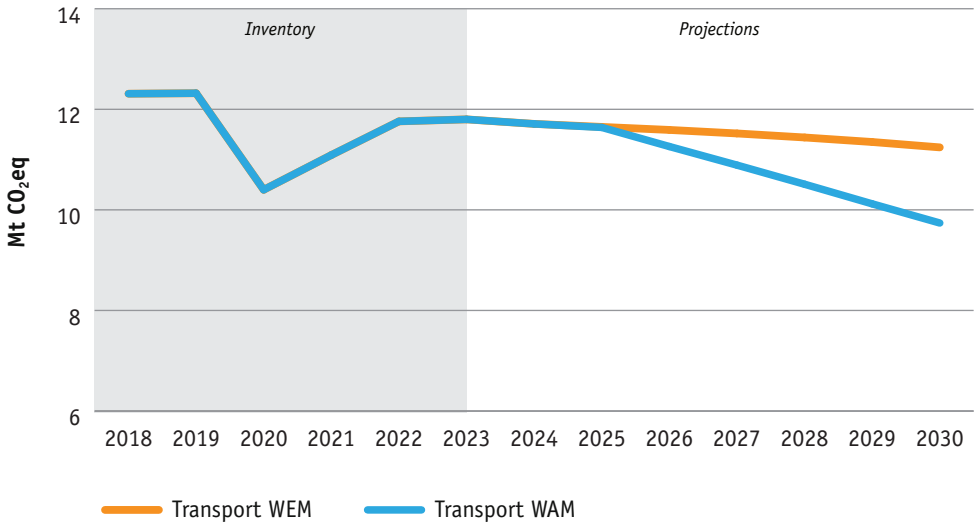
Under the WAM scenario, transport emissions are projected to decrease by 21% from 12.3 Mt CO_2eq to 9.7 Mt CO_2eq over the period 2018-2030 (see Figure 10). Measures in the WAM scenario include:

- Uptake of electric vehicles of 640,750 by 2030.
- Reduction in total vehicle kilometers travelled to be achieved by behavioural and sustainable transport measures outlined in the Climate Action Plan 2024, such as a 50% increase in daily active travel journeys and a 130% increase in daily public transport journeys.[40]

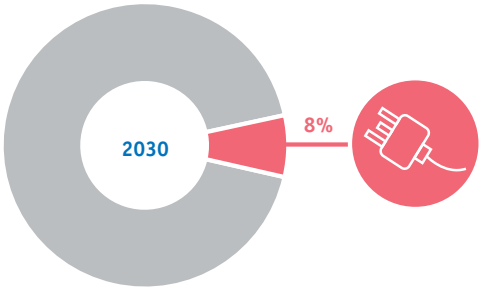
39 Underpinned by the Renewable Transport Fuel Obligation.

40 As noted in Section 2, one of the modelled measures relating to fuel price increase as part of this behavioural change approach has no supporting policy and is not included in the EPA projections.

Figure 10: Greenhouse Gas Emissions Projections from the Transport Sector under the *With Existing Measures* and *With Additional Measures* scenarios out to 2030



4.3 Energy Industries



The majority of emissions within Energy Industries come from power generation and are largely regulated under the EU Emissions Trading Scheme (EU-ETS). In addition, emissions from the manufacture of solid fuels, petroleum refining (also largely included within EU-ETS) and fugitive emissions are included. This sector contributed 14.3% of Ireland's total emissions in 2023 (excluding LULUCF) and is projected to reduce to 8.4% in 2030 in the WEM scenario (excluding LULUCF) (see Figure 7). The projected trend in emissions from Energy Industries is shown in Figure 11.

Decarbonisation of power generation is a key measure in the Energy Industries sector, with the use of peat in power generation ceased in 2023 and the use of coal at Moneypoint to be phased out in 2025. The majority of Ireland's non-renewable energy generation is projected to come from natural gas by 2030.

There was a significant drop in emissions from the Energy Industries sector between 2022 and 2023 (down 2.1 Mt CO_2eq or 21.4%). This reduction in emissions was partly due to a 12-fold increase in the amount of imported electricity (9.5% of electricity supply in 2023), in combination with an increase in the share of renewable energy from 38.6% in 2022 to 40.7% in 2023. This step change in interconnector behaviour is projected to increase to 22% in WEM and 19% in WAM by 2030 into the near future but there is uncertainty in the longer term as importation of electricity from other countries outside the EU will require a carbon price to be paid under the EU's Carbon Border Adjustment Mechanism[41].

41 EU Carbon Border Adjustment Mechanism | Environmental Protection Agency (epa.ie)

A Government Policy on Interconnection[42] was published in July 2023 and policy levers on interconnection are included in the WEM and WAM projections scenarios described below. The emissions intensity of power generation also decreased, from 334 g CO_2/kWh in 2022 to a historic low of 254 g CO_2/kWh in 2023.

With Existing Measures scenario

Under the WEM scenario, emissions from the Energy Industries sector are projected to decrease by 59% from 10.6 to 4.4 Mt CO_2eq over the period 2018 to 2030 (Figure 11). Measures in the WEM scenario include:

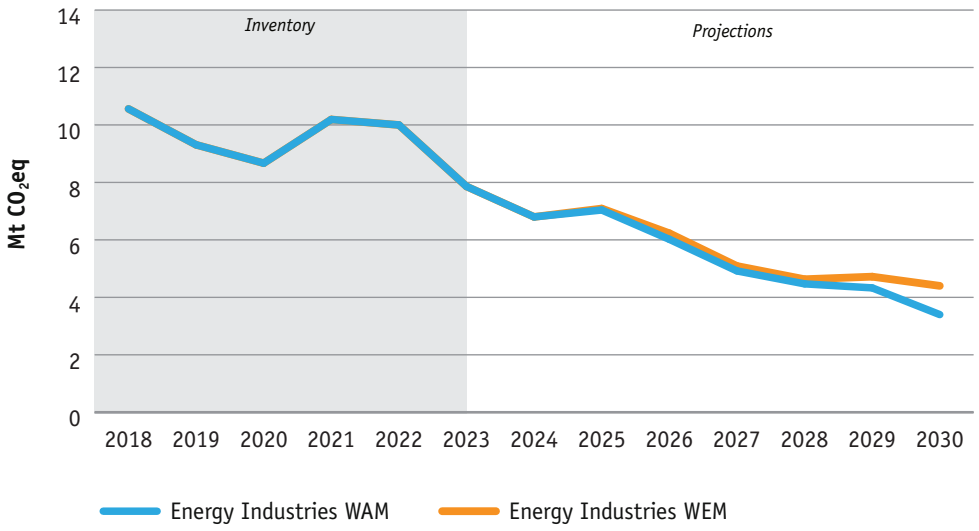
- Ireland reaching 60% of renewable electricity share by 2030. Renewable electricity generation capacity is dominated by wind and solar sources.
- In terms of interconnection, the WEM scenario has the Greenlink 500 MW interconnector to the UK coming on stream in January 2025 and the Celtic 700 MW interconnector to France on stream in January 2027. The scenario also includes an increase in capacity of the existing North-South Interconnector from 400 MW to 1,350 MW from January 2027.
- New 1.4 GW of net gas-fired generation capacity added by 2030.

With Additional Measures scenario

Under the WAM scenario, emissions from the Energy Industries sector are projected to decrease by 68% from 10.6 to 3.4 Mt CO_2eq over the period 2018 to 2030 (Figure 11). In addition to the WEM measures, the WAM scenario includes:

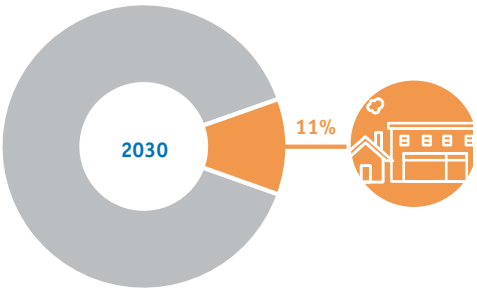
- A renewable electricity share of 68.3% by 2030 mainly a result of expansion in wind and solar energy.
- Battery energy storage of 1.8 GW by 2030.

Figure 11: Greenhouse Gas Emissions Projections from the Energy Industries Sector under the *With Existing Measures* and *With Additional Measures* scenarios out to 2030



42 https://www.gov.ie/en/department-of-the-environment-climate-and-communications/publications/national-policy-statement-on-electricity-interconnection-2023/

4.4 Residential



Emissions from the Residential Sector arise from fuel combustion for domestic space and hot water heating such as natural gas, oil, coal and peat. Residential energy demand is influenced by the weather and fuel prices. This sector contributed 9.7% of Ireland's total emissions in 2023 (excluding LULUCF). By 2030 emissions from the Residential sector are projected to increase to 11.0% of Ireland's total emissions in the WEM scenario (excluding LULUCF) (see Figure 7). The WEM and WAM projections for residential emissions are described below. It should be noted that emissions in the Residential Sector decreased by 0.4 Mt CO_2eq between 2022 and 2023 due to high fuel prices, a mild winter leading to reductions in fossil fuel use and the introduction of nationwide solid fuel regulations.

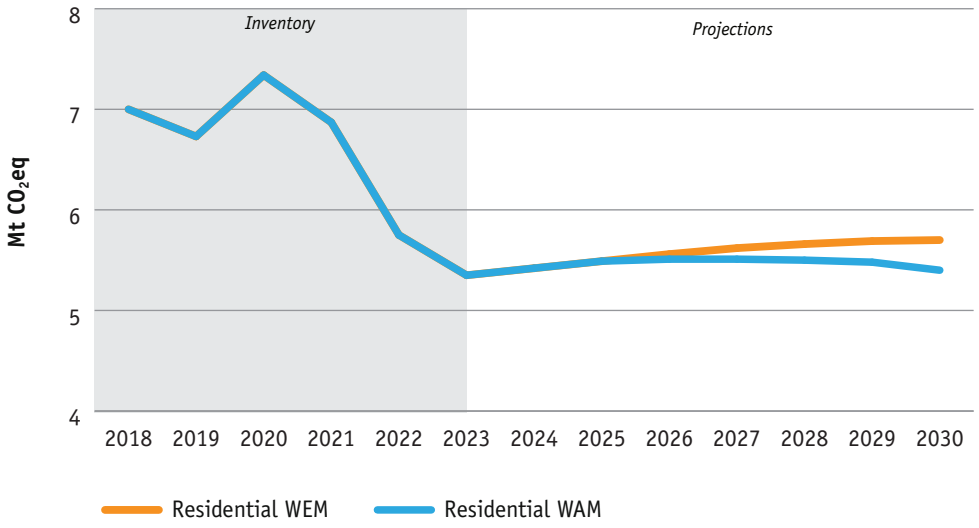
With Existing Measures scenario

Under the WEM scenario, emissions from the Residential sector are projected to decrease by 19% from 7.0 to 5.7 Mt CO_2eq over the period 2018 to 2030 (Figure 12).

The *With Existing Measures* scenario assumes the following:

- Domestic heat pump uptake based on 2024 grant rates (funded by National Development Plan 2021-2030 allocation) to achieve total installed heat pumps of 81,000 by 2030 in existing homes and an 'effective' ban on gas boilers (from 2025) in new dwellings.
- Implementation of a range of residential energy efficiency programmes in line with the National Development Plan and the impact of building regulations. These programmes provide funding for renewable heating systems, attic and wall insulation and other energy efficiency upgrades for private households and communities.
- Expected expansion of two district heating schemes currently under development with a combined capacity of 0.074 TWh by 2030. Energy from district heating to be split across Commercial/Public and Residential buildings sectors.

Figure 12: Greenhouse Gas Emissions Projections from the Residential Sector under the *With Existing Measures* and *With Additional Measures* scenarios out to 2030

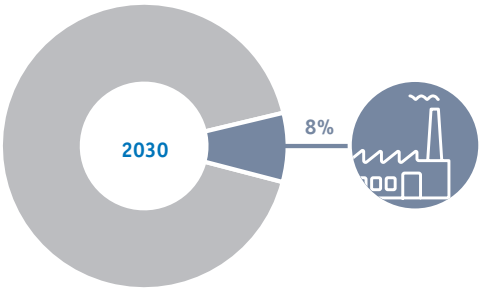


With Additional Measures scenario

Under the WAM scenario, a decrease in emissions of 22% is projected (7.0 to 5.4 Mt CO_2eq) over the period 2018 to 2030 (Figure 12). This scenario assumes full implementation of the relevant WEM scenario and relevant measures in the Climate Action Plan 2024, these include:

- Total installed heat pumps of 571,000 by 2030.
- Residential Energy Efficiency programmes involving upgrades to homes, and retrofits to achieve the installation of 143,000 heat pumps in existing homes by 2030.
- District heating growth to 0.214 TWh in 2030. Energy from district heating to be split across the Commercial/Public and Residential buildings sectors.
- An effective ban on fossil fuel boilers from 2040 based on changes to building regulations.

4.5 Manufacturing Combustion



Emissions from this sector arise from fuel combustion used in manufacturing industries in Ireland. It also includes combustion for combined heat and power systems for own use in these industries. Fuel combustion in manufacturing contributed 7.6% of Ireland's total emissions in 2023 (excluding LULUCF). This is projected to increase in 2030 in the *With Existing Measures* scenario to 7.8% (excluding LULUCF) (see Figure 7).

The projected trajectory of emissions from the manufacturing combustion sector from 2018 out to 2030 is shown in Figure 13. The WEM and WAM projections are described below.

With Existing Measures scenario

Under the WEM scenario, emissions from manufacturing combustion are projected to reduce by 13% from 4.7 to 4.1 Mt CO_2eq over the period 2018 to 2030 (Figure 13).

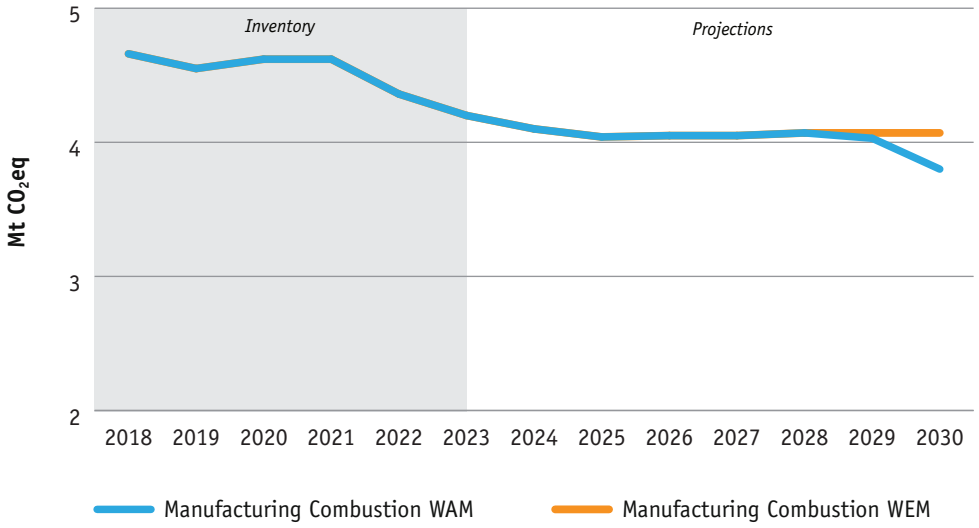
This scenario assumes implementation of existing energy efficiency programmes such as SEAI's Large Industry Programme (to maintain strong energy management and environmental protection practices in industry), Accelerated Capital Allowances programme (aims to improve the energy efficiency of Irish companies by encouraging them to purchase energy saving technologies) and the Excellence in Energy Efficiency Design programme (EXEED), a process for energy efficiency design management in businesses.

With Additional Measures scenario

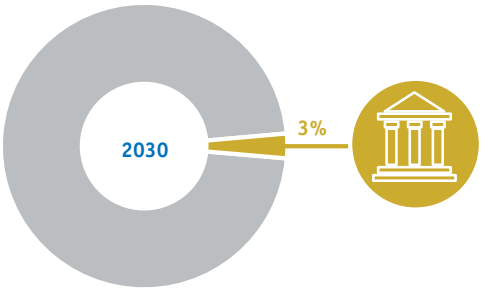
Under the WAM scenario, emissions from manufacturing combustion are projected to decrease by 19% from 4.7 to 3.8 Mt CO_2eq between 2018 and 2030 (Figure 13). This scenario assumes further roll out of energy efficiency programmes including those listed above. It also includes:

- A total of 4.3 TWh of biomethane use across the heat sector by 2030 (split between Commercial/Public Services and Manufacturing Combustion for these Projections).
- An increase in carbon-neutral heating in low and high temperature heat in Manufacturing and Industry.

Figure 13: Greenhouse Gas Emissions Projections from the Manufacturing Combustion Sector under the *With Existing Measures* and *With Additional Measures* scenarios out to 2030



4.6 Commercial and Public Services



Emissions from the Commercial and Public Services Sector arise from fuel combustion for space and hot water heating. This sector contributed 2.5% of Ireland's total emissions in 2023 (excluding LULUCF) and is projected to contribute 2.7% by 2030 in the WEM scenario (excluding LULUCF) (see Figure 7). The projected trajectory of emissions from the Commercial and Public Services sector is shown in Figure 14. The WEM and WAM projections are described below.

With Existing Measures scenario

Under the WEM scenario, emissions from the Commercial and Public Services sector are projected to reduce by 10% from 1.6 to 1.4 Mt CO_2eq from 2018 to 2030 (Figure 14).

- This scenario assumes implementation of a range of energy efficiency programmes including retrofit of public building stock, with a focus on decarbonisation through schemes such as the Support Scheme for Renewable Heat and SEAI's Pathfinder programme.

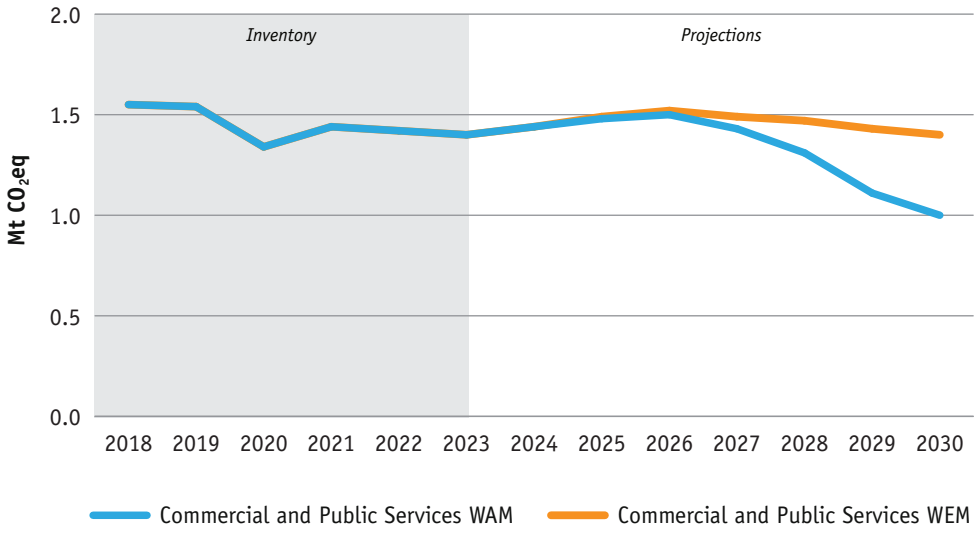
With Additional Measures scenario

Under the WAM scenario, emissions from the Commercial and Public Services sector are projected to decrease by 36% from 1.6 to 1.0 Mt CO_2eq from 2018 to 2030 (Figure 14).

- This scenario assumes implementation of a range of energy efficiency programmes including the retrofit of public building stock and commercial buildings with a focus on decarbonisation and the Energy Performance Contract scheme (introduced from 2024 to 2030).
- A total of 4.3 TWh of biomethane use across the heat sector by 2030 (split between Commercial/Public Services and Manufacturing Combustion for these Projections).
- District heating growth to 0.214 TWh in 2030. Energy from district heating to be split across Commercial, Public and Residential buildings sectors in these projections.
- Of relevance to post-2030 projections, an effective ban on fossil fuel boilers in new non-residential buildings after 2040 based on the Energy Performance of Buildings Directive (EU)[43].

43 Directive (EU) 2024/1275 of the European Parliament and of the Council of 24 April 2024 on the energy performance of buildings Directive – EU – 2024/1275 – EN – EUR-Lex

Figure 14: Greenhouse Gas Emissions Projections from the Commercial and Public Services Sector under the *With Existing Measures* and *With Additional Measures* scenarios out to 2030



4.7 Other (Industrial Processes, Waste, F-gases)

The Industrial Processes and Waste sectors contributed 3.9% and 1.5% of Ireland's total emissions in 2023 respectively (excluding LULUCF). Only the WEM scenario is projected for these sectors.

- Emissions from Industrial Processes include process emissions from mineral, chemical, metal industries, non-energy products and solvents. Emissions are projected to increase by 3% from 2.3 to 2.4 Mt CO_2eq from 2018 to 2030. The majority of emissions come from the production of cement and lime and the projections are based on growth forecasts from the cement industry in Ireland.
- Waste sector emissions are projected to decrease by 25% from 0.9 to 0.7 Mt CO_2eq from 2018 to 2030. The Waste sector includes landfill, incineration and open burning of waste, mechanical and biological treatment and wastewater treatment. Emissions are primarily attributable to methane emissions from landfill which reduce over the projected period in line with the projected reduction in waste going to landfill and the age of the waste already placed in them.

Fluorinated gases (F-gases) accounted for 1.2% of Ireland's total national greenhouse gas emissions in 2023 (excluding LULUCF). The key sources of fluorinated gas emissions in Ireland are production, use and disposal of equipment containing these fluids (e.g. refrigerators, mobile air conditioning systems, heat pumps and electrical switchgear).

With Existing Measures scenario

Fluorinated-Gas (F-Gas) emissions are projected to decrease from 0.9 to 0.59 Mt CO_2eq between 2018 and 2030 under the *With Existing Measures* scenario, a reduction of 33%. This is largely due to the move away from mobile air-conditioning systems in vehicles that contain F-gases with a high global warming potential.

With Additional Measures scenario

Emissions are projected to reduce from 0.9 to 0.6 Mt CO_2eq under the WAM scenario, a reduction of 32%. The results show that in the more ambitious WAM scenario fluorinated-gas emissions are slightly higher than in the WEM scenario by 2030. The reason for this is the different projected uptake rates in heat pumps in each scenario. In the WAM scenario the number of heat pumps being deployed annually is 36% higher than the number in the WEM scenario by 2030. The switch to lower Global Warming Potential gas (R32) in heat pumps and air conditioning units over the projected period in the WAM scenario means that despite this large increase in heat pump numbers, the increase in GHG emissions is small.

4.8 LULUCF

The LULUCF sector is made up of six land use categories (Forest Land, Cropland, Grassland, Wetlands, Settlements, and Other Land) and Harvested Wood Products. These categories are sub-divided into land remaining in the same category (e.g. forest land remaining forest land) and land converted from one category into another (e.g. grassland converted to forest land). In 2023 LULUCF accounted for 6.6% of total national emissions and this is expected to increase to 13.0% by 2030 in the WEM scenario.

The LULUCF Regulation[44] was amended in 2023 to include specific targets for each Member State for the second phase of reporting from 2026-2030. Ireland's binding country-specific target by the end of this second phase is to reduce net LULUCF emissions by 0.626 Mt CO_2eq, below an average of 2016, 2017 and 2018 emissions for this sector, to reach a currently estimated target of 3.4 Mt CO_2eq. While compliance with this target in WEM and WAM projections is assessed below, it should be noted that, under the LULUCF Regulation, compliance checks will be carried out by the European Commission in 2027 for the period 2021-2025 and 2032 for the period 2026-2030.

With Existing Measures scenario

Under the WEM scenario, net emissions from the LULUCF sector are projected to increase by 95% from 4.0 Mt CO_2eq in 2018 to 7.8 Mt CO_2eq in 2030. This increase is largely due to projected forest harvesting given an aging forest estate (Figure 15) and will exceed our current LULUCF Regulation target by 4.4 Mt CO_2eq.

The WEM scenario includes measures that were implemented prior to the end of 2023, these are:

- Savings associated with Bord na Móna rewetting/restoration/rehabilitation under the Peatlands Climate Action Scheme (PCAS).
- The WEM scenario also assumes that afforestation rates are consistent with current practice which is 2,000 hectares per annum

With Additional Measures scenario

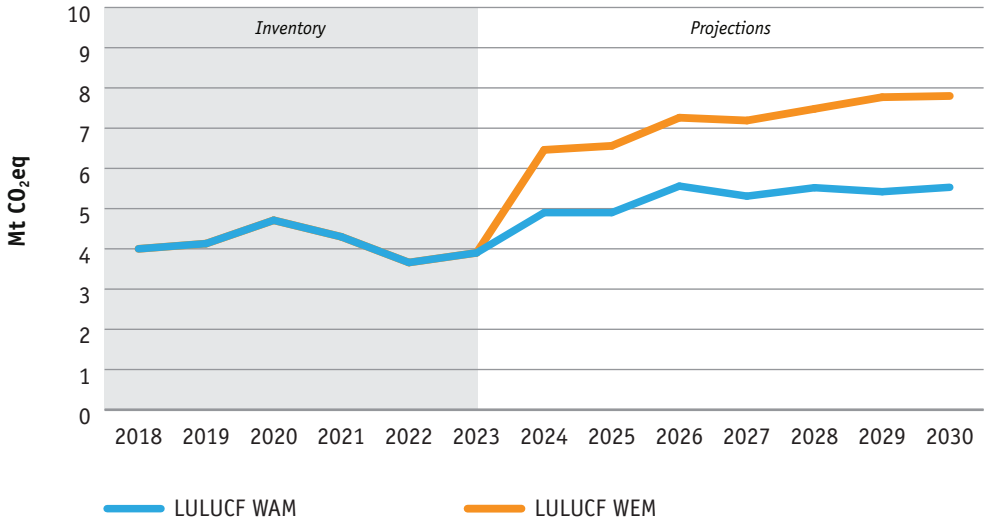
Under the WAM scenario, emissions from the LULUCF sector are projected to increase by 42% from 4.0 Mt CO_2eq in 2018 to 5.5 Mt CO_2eq in 2030 (Figure 15), exceeding our current LULUCF Regulation target by 2.1 Mt CO_2eq. The WAM scenario assumes that the measures outlined in the Climate Action Plan 2024 are implemented, including:

- Afforestation rates increased to 8,000 hectares per annum from 2026-2030;
- Extended forestry rotation as outlined in CAP 2024;
- Agroforestry targets of 2,000 hectares as outlined in CAP 2024;

44 https://eur-lex.europa.eu/eli/reg/2023/839/oj?eliuri=eli:reg:2023:839:oj

- Water table management on 80,000 hectares of grassland on drained organic soils and improved management of 750,000 hectares grassland on mineral soils;
- Additional wetlands rewetted, restored, and rehabilitated over and above those included in PCAS as per CAP 2024.

Figure 15: Greenhouse Gas Emissions Projections from the LULUCF Sector under the *With Existing Measures* and *With Additional Measures* scenarios out to 2030



5. Effects of policies and measures on greenhouse gas emission reductions

As outlined in Section 2 of this Report, the EPA GHG projections provide an indication of a future path of GHG emissions based on the current climate policy and measure framework. The WEM projection scenario captures the effects of implemented policies and measures on GHG emissions while the WAM projection scenario captures the effects of implemented policies and measures as well as planned policies and measures that are deemed to have a realistic chance of implementation in the future. In turn, a quantitative understanding of the effects of individual policies and measures (PaMs) on GHG emission reductions[45] can complement GHG projections and provide further insight into the current climate policy and measure landscape.

The EPA is the Competent Authority with responsibility for preparing a quantitative assessment of the effects of individual PaMs on GHG emissions reductions as required by EU reporting obligations outlined below. The assessment is compiled in line with EU guidelines and is produced on an annual basis.

In 2023, reporting on PaMs as part of the national energy and climate progress reports (NECPRs)[46] was integrated with reporting under Article 18 of the Governance Regulation[47], expanding pre-existing reporting requirements to cover all five dimensions of the Energy Union[48]. Quantifying the effects of individual PaMs on GHG emission reductions is underpinned by the same set of projected activity data and underlying scenario assumptions as those used to produce the national GHG projections (see Section 2 and Appendix).

The EPA has assessed the expected annual GHG emissions reductions[49] from 40 implemented PaMs under the WEM projection scenario and 40 planned PaMs under the WAM projection scenario for the period 2024-2055. In most cases, an implemented PaM under WEM has a related planned PaM under WAM which represents additional ambition. In other cases, a measure is implemented and there are no realistic plans for further ambition so the PaM exists only under the WEM scenario. Alternatively, some planned measures under WAM do not have a related PaM under WEM that has already been implemented.

The scope of the assessment covers measures related to energy efficiency, renewable energy and non-energy measures within the Agriculture, LULUCF, Industrial Processes and Waste sectors. While the assessment does not cover all PaMs included in the WEM and WAM projection scenarios, the number of PaMs with quantified effects is significantly higher than other EU Member States, where quantitative information on PaMs is limited[50]. A dataset containing quantitative and qualitative information on individual PaMs included in the assessment is available as a separate download[51] on the EU's online system Reportnet 3 at the following link: https://reportnet.europa.eu/public/dataflow/1464.

45 GHG emission reductions represent the GHG emissions avoided compared to a scenario where the individual policies and measures do not exist.

46 Article 17 of Regulation (EU) 2018/1999 on the Governance of the Energy Union and Climate Action.

47 Article 18 of Regulation (EU) 2018/1999 on the Governance of the Energy Union and Climate Action.

48 https://energy.ec.europa.eu/strategy/energy-union_en. The Energy Union covers five dimensions: Decarbonisation (split by GHG emissions and removals and Renewable energy); Energy efficiency; Energy security; Internal energy market; and Research, innovation and competitiveness.

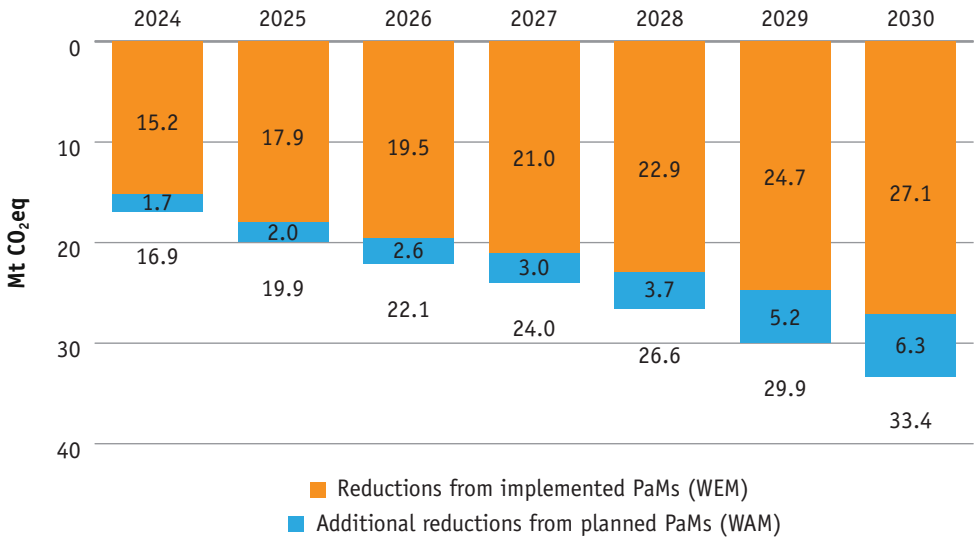
49 Annual GHG emissions reductions account for the effects of individual PaMs from the time they were established.

50 The latest information on PaMs across EU Member States is available at https://climate-energy.eea.europa.eu/topics/policies-and-measures/climate-and-energy-policies-and-measures/data

51 Annex (PaMs attributes and progress)

The total expected effect of 80 PaMs on GHG emission reductions for the period 2024-2030 is shown in Figure 16. GHG emission reductions from 40 implemented PaMs are estimated to increase from 15.2 Mt CO_2eq in 2024 to 27.1 Mt CO_2eq in 2030. Additional GHG emission reductions from 40 planned PaMs are expected to increase from 1.7 Mt CO_2eq in 2024 to 6.3 Mt CO_2eq in 2030. The total potential GHG emission reduction[52] from these implemented and planned PaMs is projected to be 33.4 Mt CO_2eq in 2030.

Figure 16: GHG emission reductions from implemented and planned policies and measures (PaMs) for the period 2024-2030



The ten PaMs estimated to achieve the largest potential GHG emission reductions in 2030 are outlined in Table 5. Collectively, these PaMs account for 77% of the total potential GHG emission reduction in 2030.

52 Total potential GHG emission reduction represents the sum of GHG emission reductions from implemented PaMs under WEM plus additional reductions from planned PaMs under WAM.

Table 5: PaMs projected to achieve the largest potential GHG emission reductions in 2030

PaM	Sector	Mt CO_2eq
RES-E (electricity generated from renewable energy)	Energy Industries	11.76
RES-H (consumption of renewable heat)	Cross-sectoral (Agriculture; Manufacturing Combustion; Residential; Commercial and Public Services)	4.87
RES-T (consumption of biofuels)	Transport	1.61
Energy Efficiency Obligation Scheme (EEOS)*	Cross-sectoral (Residential; Commercial and Public Services; Transport)	1.32
Electric Vehicle Deployment	Transport	1.25
Methane inhibiting feed additives in bovine diets**	Agriculture	1.19
Extended forestry rotation**	LULUCF	0.98
Carbon tax	Cross-sectoral (Agriculture; Transport; Manufacturing Combustion; Residential; Commercial and Public Services)	0.96
Private car demand reduction*	Transport	0.94
Large Industry Energy Network	Manufacturing combustion	0.88

* Includes support provided by the obligated party only

** Planned measure under WAM only with no related implemented PaM under WEM

The EPA will continue to enhance information on the quantitative effects of PaMs in future reports and on its website in the coming years.

Appendix – Underlying Assumptions and Additional Data

Sectoral Breakdown

Ireland's Greenhouse Gas Emission Sectors are categorised as the following for analysis:

1. Energy Industries (electricity generation, waste to energy incineration, oil refining, briquetting manufacture and fugitive emissions);
2. Residential (combustion for domestic space and hot water heating);
3. Manufacturing Combustion (combustion for Manufacturing industries in EU-ETS and ESR);
4. Commercial and Public Services (combustion for Commercial and Public Services space and hot water heating);
5. Transport (combustion of fuel used in road, rail, navigation, domestic aviation and pipeline gas transport);
6. Industrial Processes (process emissions from mineral, chemical, metal industries, non-energy products and solvents);
7. F-gases (gases used in refrigeration, air conditioning and semiconductor manufacture);
8. Agriculture (emissions from fertiliser application, ruminant digestion, manure management, agricultural soils and fuel used in agriculture/forestry/fishing);
9. Waste (emissions from solid waste disposal on land, solid waste treatment (composting), wastewater treatment, waste incineration and open burning of waste);
10. Land Use, Land-use Change and Forestry (LULUCF) covers the following categories; Forest land, Cropland, Grassland, Wetlands, Settlements, Other land and Harvested Wood products.

Scenarios and Input Assumptions

Two emissions projections scenarios are presented which show two potential outlooks to 2055 depending on policy development and implementation. These are called:

- *With Existing Measures*
- *With Additional Measures*

The *With Existing Measures* (WEM) scenario is based primarily on SEAI's With Existing Measures energy projection which incorporates the anticipated impact of policies and measures that were in place (and legislatively provided for) by the end of 2023.

The With Additional Measures (WAM) scenario is based primarily on SEAI's energy projection that accounts for implementation of the With Existing Measures scenario as well as planned policies and measures. Energy demand projections underpinning the latest emissions projections were prepared by SEAI in conjunction with the Economic and Social Research Institute (ESRI) and the Department of Finance. The ESRI produce energy demand projections using the i3E model[53] (Ireland Environment, Energy and Economy model). Future

53 The I3E Model | ESRI

international fossil fuel prices are given as input to the i3E model. In the case of the energy related projections described in this document the fuel price assumptions use European Commission recommended harmonised trajectories. A varying carbon tax that increases by €7.50 per annum and reaches €100 per tonne by 2030 and is constant thereafter is used in both scenarios. The recommended EU-ETS carbon prices are based on the EU Reference Scenario.

Energy Projections for WEM transport activity are based on projections of private car and goods vehicle activity from the National Transport Authority's (NTA) Reference Case scenario for 2030. Fuel price assumptions are implicit in the NTA Reference Case scenario modelling. For the WAM scenario these projections align with the NTA CAP23 scenario and do not assume any reduction in transport activity due to fuel price changes.

To produce the finalised WEM energy projections, SEAI amends the output of the energy demand produced by ESRI to take account of the expected impact of energy efficiency policies and measures put in place before the end of 2023 but which are considered too recent to be detectable in any time-series analysis. The WAM energy projections builds on the WEM projections with adjustments made to account for implementation of additional policies and measures outlined in the Climate Action Plan 2024. A list of the WEM and WAM input assumptions used for these projections is published with this report at https://www.epa.ie/publications/monitoring--assessment/climate-change/air-emissions/irelands-greenhouse-gas-emissions-projections-2024-2055.php

Key parameters underlying the macroeconomic outlook and therefore the *With Existing Measures* and *With Additional Measures* emission projections scenarios are shown in Table A.1.

Table A.1: Key macroeconomic assumptions underlying the projections out to 2055

	2024	2025	2030	2035	2040	2045	2050	2055
Average Annual % Growth Rate								
GDP	-1.6	3.0	2.6	2.1	1.7	1.5	1.5	1.6
	2024	**2025**	**2030**	**2035**	**2040**	**2045**	**2050**	**2055**
Housing Stock ('000)*	1,972	2,008	2,243	2,484	2,670	2,835	2,997	3,157
Population ('000)	5,322	5,422	5,728	5,954	6,140	6,308	6,453	6,453
EUETS: Carbon €/tCO_2	95	95	95	100	100	160	190	220
Carbon tax €/tCO_2 (WEM Scenario)	56	63.5	100	100	100	100	100	100
Coal €/toe	127	120	84	79	74	70	65	65
Oil €/toe	466	443	468	446	424	402	380	380
Gas €/toe	298	336	222	212	203	194	184	184

* With Additional Measures Scenario

The data underpinning the agriculture projections are based on an updated analysis undertaken by Teagasc of the projected animal populations, crop areas and fertiliser use which are aligned with University of Missouri Food and Agricultural Policy Research Institute (FAPRI[54]) Projections (February 2025) for medium term developments in EU and World agricultural commodity markets. Measures from AgClimatise, Nitrates Action Plan, Teagasc MACC, and Climate Action Plan 2024 are included.

Progress with Renewable Energy Targets

The following is the expected progress by 2030 in terms of Renewable Energy targets under the *With Existing Measures* Scenario:

- 60.0% Renewable Electricity (RES-E) share
- 19.6% Renewable Heat (RES-H) share
- 16.3% Renewable Transport (RES-T) share
- 27.9% Overall Renewable Energy (RES) share

The following is the expected progress by 2030 in terms of Renewable Energy targets under the *With Additional Measures* Scenario:

- 68.3% Renewable Electricity (RES-E) share
- 27.0% Renewable Heat (RES-H) share
- 17.2% Renewable Transport (RES-T) share
- 33.9% Overall Renewable Energy (RES) share

The above information is based on model input assumptions underpinning the energy projections provided by SEAI.

Effort Sharing Regulation and EU Emissions Trading Scheme

The breakdown of projected emissions for the Effort Sharing Regulation (also referred to as the non-ETS) and EU-ETS sectors (Mt CO_2eq) under the *With Existing Measures* and *With Additional Measures* scenarios are published with this report at https://www.epa.ie/publications/monitoring--assessment/climate-change/air-emissions/irelands-greenhouse-gas-emissions-projections-2024-2055.php

Projections by Gas in the WEM and WAM Scenarios

Further detail on GHG emissions projections by gas are included in the 2025 submission made under Article 18 of Regulation (EU) 2018/1999 on the Governance of the Energy Union and Climate Action. This is available in the 2023 submission folders at the following link: https://reportnet.europa.eu/public/dataflow/1478. Summary details on GHG emissions projections by gas are provided in Figures A.1 and A.2.

54 https://www.teagasc.ie/rural-economy/rural-economy/agricultural-economics/

Figure A.1: Share of emissions by gas (excluding LULUCF) in 2023 and projected share of emissions by gas in 2030 under the WEM and WAM scenarios

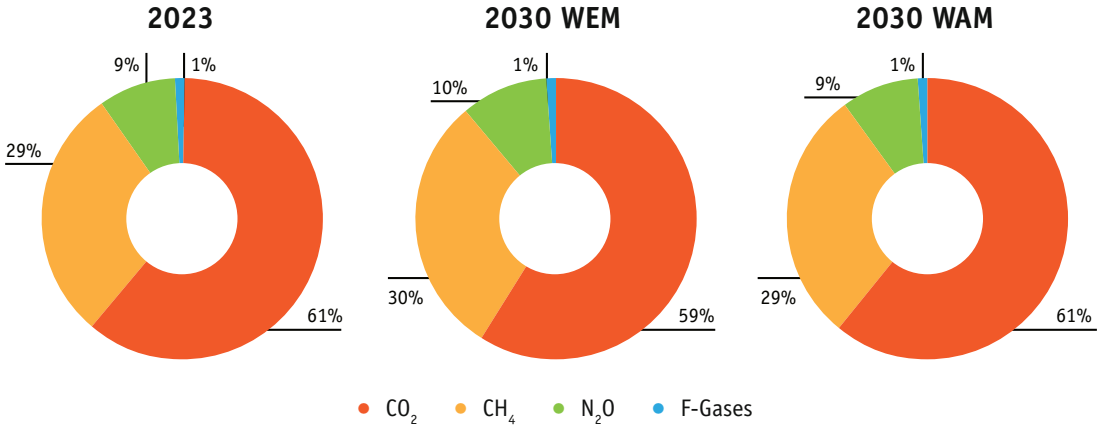
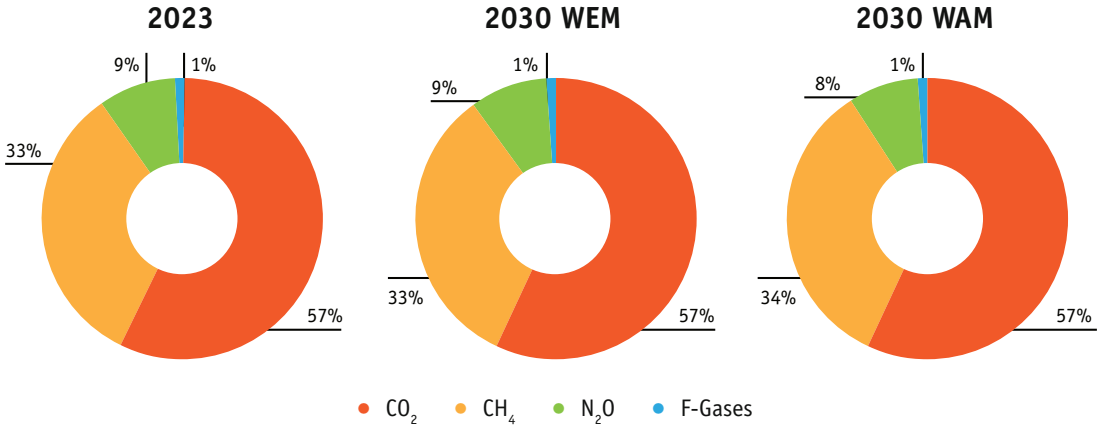


Figure A.2: Share of emissions by gas (including LULUCF) in 2023 and projected share of emissions by gas in 2030 under the WEM and WAM scenarios



Models Used

Further details on the models used for preparing the energy projections (i.e. i3E, Plexos Integrated Energy Model, SEAI National Energy Modelling Framework, SEAI BioHeat Model) and agriculture projections are included in the 2025 submission made under Article 18 of Regulation (EU) 2018/1999 on the Governance of the Energy Union and Climate Action. This is available in the 2025 submission folders at the following link: https://reportnet.europa.eu/public/dataflow/1478

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