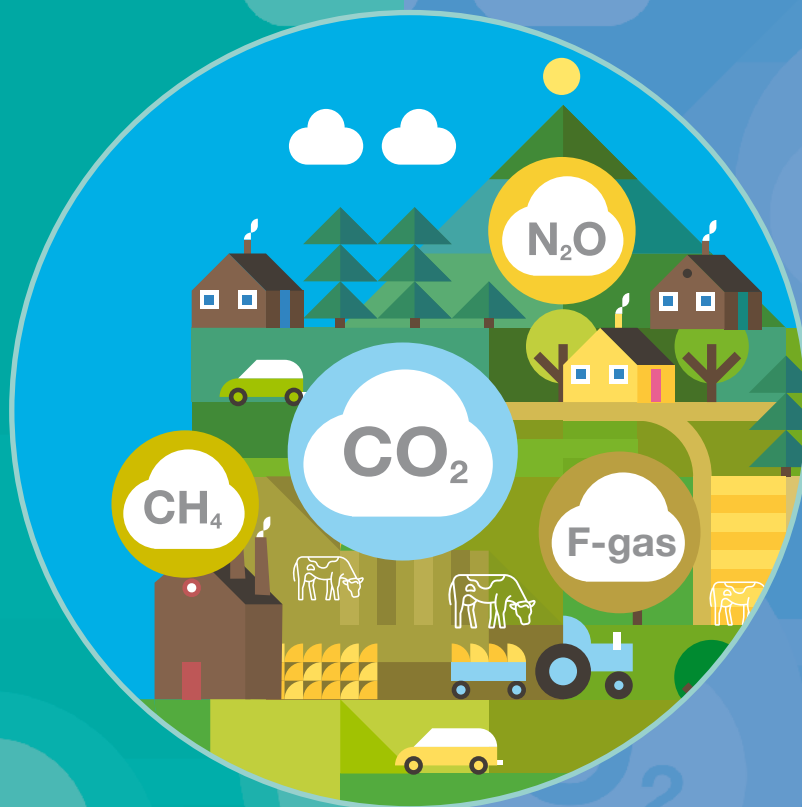


# Ireland's Greenhouse Gas Emissions Projections

2021-2040

June 2022



# Environmental Protection Agency

The Environmental Protection Agency (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:** We implement effective regulation and environmental compliance systems to deliver good environmental outcomes and target those who don't comply.
- **Knowledge:** We provide high quality, targeted and timely environmental data, information and assessment to inform decision making at all levels.
- **Advocacy:** We work with others to advocate for a clean, productive and well protected environment and for sustainable environmental behaviour.

## Our Responsibilities

### LICENSING

We regulate the following activities so that they do not endanger human health or harm the environment:

- waste facilities (e.g. landfills, incinerators, waste transfer stations);
- large scale industrial activities (e.g. pharmaceutical, cement manufacturing, power plants);
- intensive agriculture (e.g. pigs, poultry);
- the contained use and controlled release of Genetically Modified Organisms (GMOs);
- sources of ionising radiation (e.g. x-ray and radiotherapy equipment, industrial sources);
- large petrol storage facilities;
- waste water discharges;
- dumping at sea activities.

### NATIONAL ENVIRONMENTAL ENFORCEMENT

- Conducting an annual programme of audits and inspections of EPA licensed facilities.
- Overseeing local authorities' environmental protection responsibilities.
- Supervising the supply of drinking water by public water suppliers.
- Working with local authorities and other agencies to tackle environmental crime by coordinating a national enforcement network, targeting offenders and overseeing remediation.
- Enforcing Regulations such as Waste Electrical and Electronic Equipment (WEEE), Restriction of Hazardous Substances (RoHS) and substances that deplete the ozone layer.
- Prosecuting those who flout environmental law and damage the environment.

### WATER MANAGEMENT

- Monitoring and reporting on the quality of rivers, lakes, transitional and coastal waters of Ireland and groundwaters; measuring water levels and river flows.
- National coordination and oversight of the Water Framework Directive.
- Monitoring and reporting on Bathing Water Quality.

### MONITORING, ANALYSING AND REPORTING ON THE ENVIRONMENT

- Monitoring air quality and implementing the EU Clean Air for Europe (CAFÉ) Directive.
- Independent reporting to inform decision making by national and local government (e.g. periodic reporting on the State of Ireland's Environment and Indicator Reports).

### REGULATING IRELAND'S GREENHOUSE GAS EMISSIONS

- Preparing Ireland's greenhouse gas inventories and projections.
- Implementing the Emissions Trading Directive, for over 100 of the largest producers of carbon dioxide in Ireland.

### ENVIRONMENTAL RESEARCH AND DEVELOPMENT

- Funding environmental research to identify pressures, inform policy and provide solutions in the areas of climate, water and sustainability.

### STRATEGIC ENVIRONMENTAL ASSESSMENT

- Assessing the impact of proposed plans and programmes on the Irish environment (e.g. major development plans).

### RADIOLOGICAL PROTECTION

- Monitoring radiation levels, assessing exposure of people in Ireland to ionising radiation.
- Assisting in developing national plans for emergencies arising from nuclear accidents.
- Monitoring developments abroad relating to nuclear installations and radiological safety.
- Providing, or overseeing the provision of, specialist radiation protection services.

### GUIDANCE, ACCESSIBLE INFORMATION AND EDUCATION

- Providing advice and guidance to industry and the public on environmental and radiological protection topics.
- Providing timely and easily accessible environmental information to encourage public participation in environmental decision-making (e.g. My Local Environment, Radon Maps).
- Advising Government on matters relating to radiological safety and emergency response.
- Developing a National Hazardous Waste Management Plan to prevent and manage hazardous waste.

### AWARENESS RAISING AND BEHAVIOURAL CHANGE

- Generating greater environmental awareness and influencing positive behavioural change by supporting businesses, communities and householders to become more resource efficient.
- Promoting radon testing in homes and workplaces and encouraging remediation where necessary.

### 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 an Advisory Committee of twelve members who meet regularly to discuss issues of concern and provide advice to the Board.

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## Key Findings

<b>Ireland's Climate Act Ambition</b>	Urgent implementation of all climate plans and policies, plus further new measures, are needed for Ireland to meet the 51 per cent emissions reduction target and put Ireland on track for climate neutrality by 2050.
<b>EU targets</b>	Ireland can meet its non-ETS EU targets of a 30 per cent emission reduction by 2030 (compared to 2005) assuming implementation of planned policies and measures and the use of the flexibilities available. These include a land use flexibility using the Climate Action Plan 2021 afforestation rate of 8,000 hectares per annum.
<b>Implementation gap</b>	The gap between the 'Existing Measures' and Additional Measures scenarios in these projections highlights that the current pace of implementation will not achieve the change required to meet the Climate Act targets. Faster implementation of 'Additional Measures' is needed to close this gap.
<b>Carbon Budgets</b>	Carbon budgets proposed by the Climate Change Advisory Council have recently been approved by the Oireachtas for the periods 2021-25, 2026-30 and 2031-35. The Projections highlight that there is currently a significant gap between the budgets and the projected emissions over the budget periods. This gap will need to be addressed very quickly if Ireland is to stay within the Carbon Budgets.
<b>Electricity generation</b>	Under the Additional Measures scenario, renewable energy is projected to increase to 78 per cent of electricity generation by 2030 with emissions from the Energy Industry decreasing by 10 per cent per annum from 2021-30. Increased coal use from 2021 and growing energy demand, including from data centres, threaten to negatively impact achievement of National targets, particularly for the first carbon budget period.
<b>Action in Agriculture</b>	Under the Existing Measures scenario emissions are projected to increase by 1.9 per cent over the 2020-2030 period. A methane emissions reduction of almost 30 per cent is required to achieve a 22 per cent reduction in Agriculture emissions compared to 2018, as committed to in the 2021 Climate Action Plan. The sector must clearly set out how this will be achieved to address uncertainty regarding its ability to deliver even the lower end of the range of its sectoral targets within the ever-shortening timeframe to 2030.
<b>Transport</b>	The end of COVID travel restrictions is projected to result in transport emissions increasing by 18-19 per cent from 2020 to 2022. Emissions from the sector are projected to reduce to 39 per cent below 2018 levels by 2030 and achieve a 31.7 per cent renewable transport share if the additional measures in plans and policies are implemented, this includes over 940,000 electric vehicles on the road by 2030, increased biofuel blend rates and measures to support more sustainable transport.
<b>More efficient homes</b>	Spending more time at home due to hybrid working and the increasing cost of fossil fuels highlights the need for our houses to become far more efficient. Implementing currently planned measures for the installation of 680,000 heat-pumps by 2030 as well as retrofitting 500,000 homes is projected to achieve a 41.5 per cent reduction in residential emissions in 2030 (compared to 2018).

# 1. Introduction

The Environmental Protection Agency (EPA) is the national body with responsibility to develop, prepare and publish projections of greenhouse gas emissions for Ireland. The EPA produces national greenhouse gas emission projections on an annual basis. These projections are compiled in line with EU guidelines to meet EU reporting obligations<sup>1</sup> and to inform national policy development.

This report provides an assessment of Ireland's total projected greenhouse gas (GHG) emissions from 2021 to 2040, using the latest Inventory data for 2020 as the starting point. As the first projected year (2021) has passed, indicator data is used where possible instead of projections. The report provides an assessment of Ireland's progress towards achieving its National ambitions under the Climate Action and Low Carbon Development (Amendment) Act 2021<sup>2</sup> and EU emission reduction targets for 2030 as set out under the Effort Sharing Regulation (ESR)<sup>3</sup>.

Preparing the EPA projections involves compiling and processing key data sets such as energy projections (projected fuel use), animal numbers and emissions from industry, businesses and homes in Ireland.

The EPA has produced GHG projections using two scenarios or levels of ambition. The two scenarios represent different possible trajectories for Ireland's GHG emissions and are explained in more detail in the Explainer in Section 2. The first scenario, *With Existing Measures* (WEM), forecasts Ireland's emissions including all national policies and measures implemented by the end of 2020. This is the cut off point for which the latest national greenhouse gas emission inventory data is available, known as the 'base year' for projections. Implemented measures such as those in the National Development Plan (NDP)<sup>4</sup> and Climate Action Plan 2019<sup>5</sup> are included in this scenario.

The second scenario *With Additional Measures* (WAM) has a higher level of ambition and includes government policies and measures to reduce emissions such as those in Ireland's Climate Action Plan 2021<sup>6</sup>. This was published in November 2021 and the included measures have not yet moved into implementation phase. As implementation happens the measures will be migrated into the *With Existing Measures* scenario.

Ireland's EU and National legislative commitments have different emissions reduction requirements and timeframes for achievement. Ireland's 2030 target under the EU's Effort Sharing Regulation (ESR) is to deliver a 30% reduction of emissions compared to 2005 levels by 2030. There are also annual binding emission allocations over the 2021-2030 period to meet that target. Ireland's compliance status at 2030 can only be determined when the 2030 inventory is compiled. Under the ESR two flexibilities may be utilised (use of EU Emissions Trading System<sup>7</sup> allowances and credit from action undertaken in the Land use, Land use Change and Forestry (LULUCF) sector) to allow for a fair and cost-efficient achievement of the targets. Ireland's situation in relation to the use of the LULUCF flexibility has changed significantly since last years report and this is explained in Section 4.

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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](https://www.irishstatutebook.ie))

3 Regulation (EU) 2018/842 of 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.

4 <https://www.gov.ie/en/publication/774e2-national-development-plan-2021-2030/>

5 <https://www.gov.ie/en/publication/ccb2e0-the-climate-action-plan-2019/>

6 <https://www.gov.ie/en/publication/6223e-climate-action-plan-2021/>

7 [https://ec.europa.eu/clima/eu-action/eu-emissions-trading-system-eu-ets\\_en](https://ec.europa.eu/clima/eu-action/eu-emissions-trading-system-eu-ets_en)

Ireland's national emission reduction objectives as set in the Climate Action and Low Carbon Development (Amendment) Act 2021, are to achieve a 51% emissions reduction by 2030 compared to 2018 and achieve a climate neutral economy by no later than the end of 2050. The Act provides for the establishment of carbon budgets to support achievement of Ireland's climate ambition. The 51% target, relative to 2018, is the primary constraint on carbon budgets over the course of the first two budget periods ending on 31 December 2030. The Climate Action Plan 2021 sets out a major programme of policies and measures that aim to achieve significant progress towards those objectives. This is the first set of projections prepared following the enactment of the Climate Act and the 51% target contained therein.

Ireland's projected emissions trajectory 2021-2040 is 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.

In the case of the National targets (Section 3) a base year of 2018 is used, and for the EU Effort Sharing Regulation targets (Section 4) the base year is 2005. For the sectoral analysis in Section 5 the latest inventory year (2020) is the base year as this aligns with the current EU Projections reporting requirements.

## 2. Approach

As described in the Introduction the EPA has produced the projected greenhouse gas emissions for 2021 to 2040 using two scenarios; *With Existing Measures* and the more ambitious *With Additional Measures*. Our analysis in this report focuses on projected emissions as far as 2030 as most currently known policies and measures are focused on this period.

These emissions projections take into account projected activity data provided by a number of key data providers including:

- Energy projections provided by the Sustainable Energy Authority of Ireland (SEAI). Determination of anticipated progress in the implementation of energy related policies and measures was coordinated by EPA and SEAI in discussion with the relevant Government Departments.
- Agricultural projections provided by Teagasc (Agriculture and Food Development Authority) which consider the impact of strategies on the development of the agri-food sector such as Food Wise 2025<sup>8</sup> and post Brexit trade for the agriculture sector. 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) and Teagasc.

Both scenarios use fuel prices from the UK Department of Business, Energy and Industrial Strategy (BEIS)<sup>9</sup>. The EPA has used the central BEIS price projections (compared to low BEIS price projections used in last years projections) as this more closely reflects recent fuel price developments.

Projected emissions data is reported for the following gases: Carbon Dioxide (CO<sub>2</sub>), Methane (CH<sub>4</sub>), Nitrous oxide (N<sub>2</sub>O) and F-gases. Emissions are classified into nine sectors; Energy Industries, Transport, Agriculture, Residential, Manufacturing Combustion, Commercial & Public Services, Industrial Processes, Waste and F-Gases<sup>10</sup>.

### 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 2020 (the latest inventory year) and the projected emissions reduction is commensurate with the resources or legislation already in place or committed to Government Departments or Agencies. For example, the WEM scenario includes a measure where the Carbon tax increases annually and reaches €100 per tonne by 2030. This policy is considered to be implemented because annual Carbon tax increases have been committed to politically and applied to date (e.g. most recently in Budget 2022).

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

The WAM scenario is the projection of future emissions based on the measures outlined in the latest Government plans at the time Projections are compiled. This includes all policies and measures included in the WEM scenario, plus those included in government plans but not yet implemented. For example, the WAM scenario includes the target of 944,600 Electric Vehicles on the road by 2030 in the Climate Action Plan 2021. The full amount of this ambition is not currently in the existing measures scenario as actions still remain to be taken that would deliver it.

8 <https://www.gov.ie/en/publication/a6b0d-food-wise-2025>

9 BEIS fossil fuel price assumptions 2019 (publishing.service.gov.uk)

10 F-gases are Hydrofluorocarbons (HFCs), Perfluorocarbons (PFCs), Sulphur Hexafluoride (SF<sub>6</sub>), and Nitrogen Trifluoride (NF<sub>3</sub>).

### 3. Assessment of Projected Performance against National Policy targets

The Climate Action and Low Carbon Development (Amendment) Act 2021 sets a national climate objective to achieve a reduction of 51% in total emissions (including from Land Use, Land Use Change and Forestry - LULUCF) over the period 2018 to 2030. This is the first set of national projections prepared by the EPA following the enactment of this legislation and since the Climate Action Plan 2021 was published in November 2021.

The policies and measures contained in the Climate Action Plan 2021 are included in these projections with a number of exceptions including:

- Accounting for forestry removals post 2030 (2.1 Mt CO<sub>2</sub> eq);
- Measures aimed at achieving emissions savings from a decrease in embodied carbon in construction materials (0.8 to 2.2 Mt CO<sub>2</sub> eq);
- Emissions reductions associated with Carbon Capture and Storage (~1.5 Mt CO<sub>2</sub> eq);
- Unallocated savings as stated in table 3.1 of Chapter 3 of the Climate Action Plan 2021 (4 Mt CO<sub>2</sub> eq) and 'further measures' in the transport sector where no specific measures have been identified (~0.9 Mt CO<sub>2</sub> eq).

These savings combined add up to ~9.3-10.7 Mt CO<sub>2</sub> eq, based on the modelling used for the Climate Action Plan 2021. These projections are informed by the EPA's most recent inventories, updated macro-economic inputs and new modelling data and research (e.g. on peatland forestry).

#### Reference/Base years

Ireland's EU and National legislative commitments, as discussed in the introduction, have different levels of emissions reduction requirements, base years and timeframes for achievement.

The Climate Act 2021 has specified 2018 as the base year from which a 51% emission reduction is to be achieved by 2030. Therefore, the percentage changes referred to within the text of the following assessment are referring to the period 2018 to 2030.

This is a different target and timeframe than that specified in the EU Effort Sharing Regulation (ESR) on greenhouse gas reduction which requires a 30% reduction of emissions compared to 2005 levels by 2030, this is discussed in Section 4. This is also a different timeframe than referenced in the sectoral analysis in Section 5, which uses the latest inventory year (2020) as a base year for projections to align with the current EU Projections reporting requirements.

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.

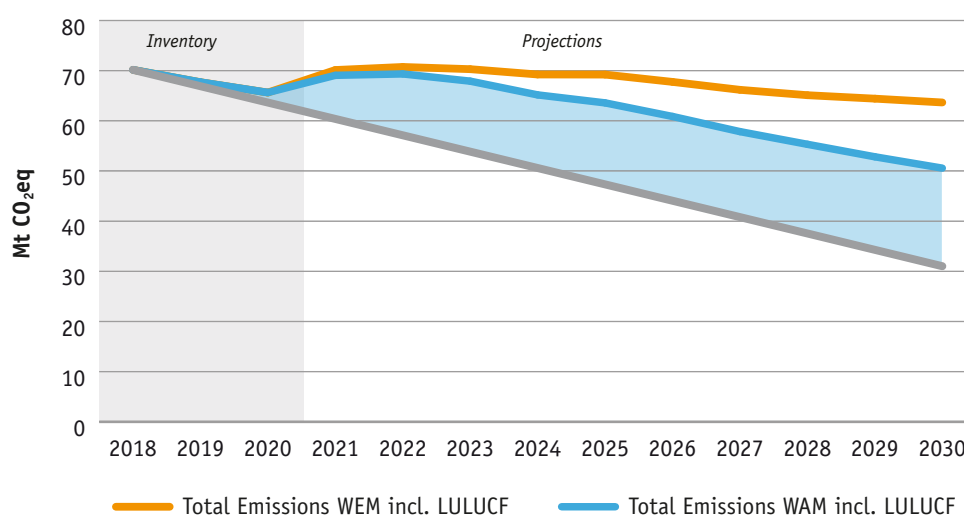
#### Assessment

Implemented policies and measures in the *With Existing Measures* (WEM) scenario can deliver a 9% reduction in Greenhouse Gas emissions by 2030 compared to the 2018 level. The "*With Additional Measures*" (WAM) scenario, including measures from the 2021 Climate Action Plan, is projected to deliver a 28% emissions reduction over the same period.



Both projected scenarios indicate that implementation of all climate plans and policies, plus further new measures, are needed for Ireland to meet the 51 per cent emissions reduction target and put the country on track for climate neutrality by 2050. The shaded area in Figure 1. below demonstrates the 'gap' between (With Additional Measures scenario) projections and the 51% target.

**Figure 1: Total Greenhouse Gas Emissions (Mt CO<sub>2</sub> eq) including LuLuCF under the *With Existing Measures* and *With Additional Measures* scenarios**



A sectoral and overall comparison of the emissions reductions seen in the WEM and WAM scenarios compared to the target ranges specified in the Climate Action Plan 2021 is set out in Table 1. below.

**Table 1: Comparison of WEM, WAM and the Climate Action Plan 2021 Targets against 2018 base year**

Sector	WEM Proj 2030 vs 2018	WAM Proj 2030 vs 2018	CAP 21 2030 v's 2018
Agriculture	-0.8%	-22.4%	-22% -> -30%
LULUCF	61.5%	20.9%	-37% -> -58%
Transport	-15.1%	-39.3%	-42% -> -50%
Energy Industries	-49.0%	-58.1%	-62% -> -81%
Enterprise (ManComb+IndProc)	-13.5%	-12.8%	-29% -> -41%
<i>Man. Combustion</i>	-21.9%	-21.0%	
<i>Ind. Processes</i>	3.7%	3.7%	
F-gases*	-25.1%	-22.8%	
Built Env (Residential+Comm)	-24.1%	-42.2%	-44% -> -56%
<i>Residential</i>	-24.2%	-41.5%	
<i>Comm. Pub. Services</i>	-23.6%	-44.7%	
Waste	-16.7%	-16.7%	-15.4%
<b>Total (excl LULUCF)</b>	<b>-17.0%</b>	<b>-33.2%</b>	<b>-51%</b>
<b>Total including LULUCF</b>	<b>-9.3%</b>	<b>-27.9%</b>	<b>-51%</b>

## Agriculture

These projections include an assumption that the Agriculture sector will meet the lower end of its the emissions reduction target within the 2021 Climate Action Plan, in the absence of specific detail and data on the sectors methane reduction measures. This approach to the treatment of the projected emissions from this sector is consistent with that used in the preparation of the 2021 projections. The rationale for this assumption is that while not fully quantified, methane reduction measures have been identified in Climate Action Plan 2019, Teagasc Marginal Abatement Cost Curve<sup>11</sup> and AgClimate<sup>12</sup>. These projections indicate that this assumption implies that methane emissions will need to reduce by up to 30 per cent by 2030 compared to 2018 levels to achieve this target.

This approach will be examined again in the preparation of the next years projections. At that time, it may not be appropriate to continue to include methane reduction measures without more explicit quantification of what each methane reduction measure is expected to achieve and details of the planned implementation pathway.

## Carbon Budgets

The Climate Action and Low Carbon Development (Amendment) Act 2021 provides for the establishment of carbon budgets in 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 for 2031 to 2035 continues the trajectory towards climate neutrality by 2050<sup>13</sup>.

Three Carbon budgets have been proposed over the period 2021 to 2035, with sectoral budgets set to be determined in mid-2022. Figure 2 shows the annualised carbon budgets and the extent to which these budgets are exceeded with the latest projected emissions data, both in the *With Existing Measures* and higher ambition *With Additional Measures* scenarios.

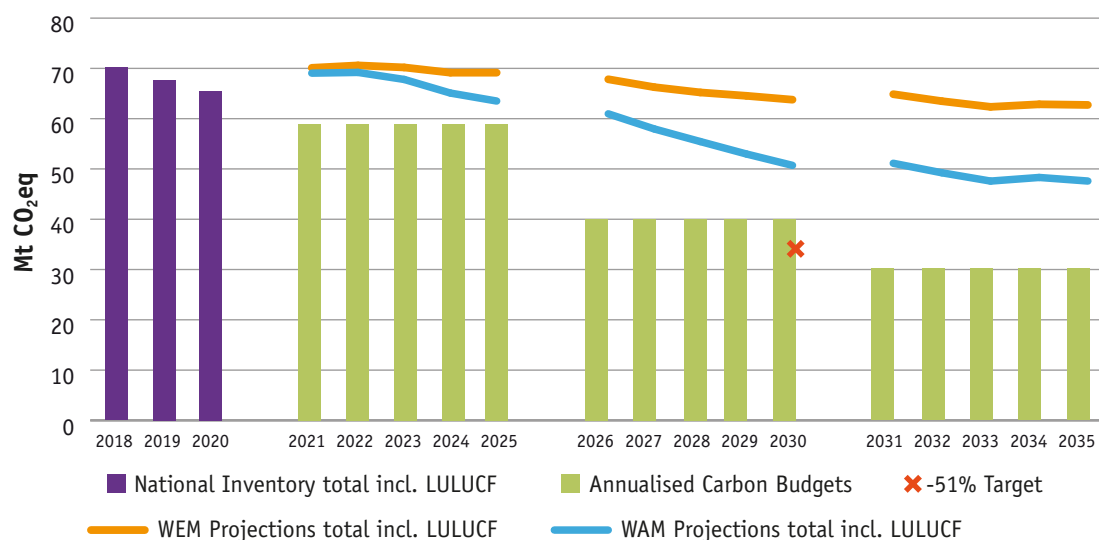
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11 <https://www.teagasc.ie/media/website/publications/2018/An-Analysis-of-Abatement-Potential-of-Greenhouse-GasEmissions-in-Irish-Agriculture-2021-2030.pdf>

12 <https://www.gov.ie/en/publication/07fbc-ag-climate-a-roadmap-towards-climate-neutrality/?msckid=1fd7acdcf7b11ec9166e0de1cce740b>

13 <https://www.climatecouncil.ie/media/climatechangeadvisorycouncil/Technical%20report%20on%20carbon%20budgets%2025.10.2021.pdf>

**Figure 2: Annualised carbon budgets (2021-25, 2026-30 and 2031-35) and projected emissions data (Mt CO<sub>2</sub> eq) (including LuLuCF) under the *With Existing Measures* and *With Additional Measures* scenarios**



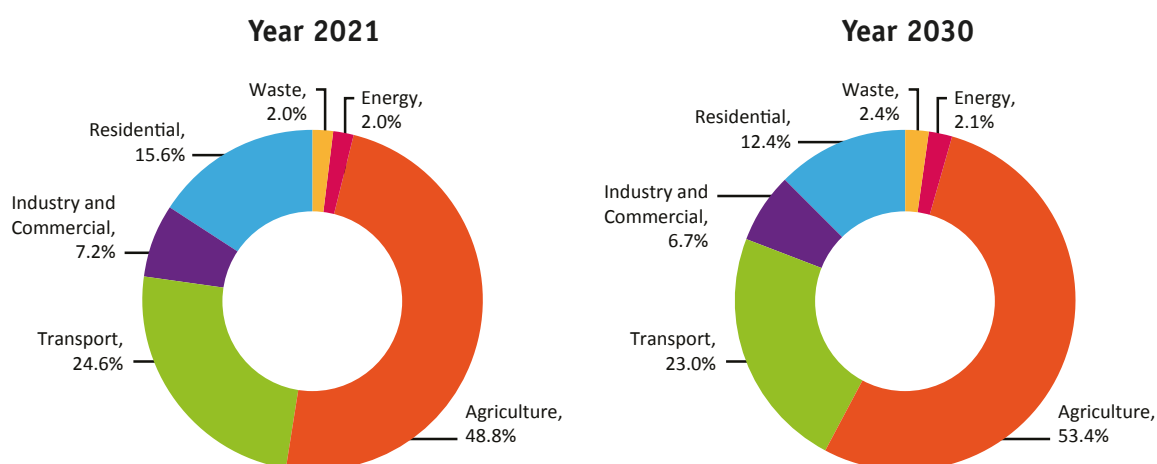
Budget pathways for each period are yet to be finalised, so the budget is split evenly across each period. LULUCF is included in the carbon budgeting process so the projections in Figure 2 also include LULUCF emissions.

- Budget 1 from 2021-2025 has been proposed at 295 Mt CO<sub>2</sub> eq. In the WEM scenario this is projected to be exceeded by 55 Mt CO<sub>2</sub> eq and in the WAM scenario by 40 Mt CO<sub>2</sub> eq.
- Budget 2 from 2026-2030 has been proposed at 200 Mt CO<sub>2</sub> eq. In the WEM scenario this is projected to be exceeded by 127 Mt CO<sub>2</sub> eq and in the WAM scenario by 77 Mt CO<sub>2</sub> eq.
- Budget 2 from 2031-2035 has been proposed at 151 Mt CO<sub>2</sub> eq. In the WEM scenario this is projected to be exceeded by 166 Mt CO<sub>2</sub> eq and in the WAM scenario by 94 Mt CO<sub>2</sub> eq.

## 4. Assessment of projected performance against EU targets

Ireland's 2030 target under the EU's Effort Sharing Regulation (ESR) on greenhouse gas reduction is a 30% reduction of emissions compared to 2005 levels by 2030. The ESR includes the sectors outside the scope of the EU Emissions Trading System (ETS). The latest EPA projections show that currently implemented measures (*With Existing Measures*) will achieve a reduction of 10% on 2005 levels by 2030, significantly short of the 30% reduction target. If measures in the higher ambition (*With Additional Measures*) scenario are implemented, the 30% reduction target by 2030 can be achieved. The ESR also sets out binding emission reduction targets for Member States for the period 2021-2030. The non EU-ETS sectors are shown in Figure 3 below. The Projections show that Agriculture and Transport emissions dominate the non-ETS sector and together they account for 73% and 76% of emissions in 2021 and 2030 respectively.

**Figure 3: Projected sectoral share of Effort Sharing Decision sector greenhouse gas emissions in 2021 and 2030 under the *With Existing Measures* scenario**



The ESR maintains existing flexibilities under the current Effort Sharing Decision (e.g. banking, borrowing and buying and selling between Member States) and provides two flexibilities (use of ETS allowances and credit from action undertaken in the Land use, Land use Change and Forestry (LULUCF) sector to allow for a fair and cost-efficient achievement of the targets. The 2021-2030 targets under the ESR include Annual Emission Allocations (AEAs) for each year from 2021-2030<sup>14</sup> calculated using Global Warming Potentials (GWPs) specified in the 5th IPCC assessment report (AR5). GWPs allow methane, nitrous oxide and other greenhouse gases to be expressed in CO<sub>2</sub> equivalent terms. In this report AR5 values are used to reflect the new legislation.

<sup>14</sup> Specified in Commission Implementing Decision (2020/2126)

Previous EPA Projections reports have referred to use of the full (theoretically available under the ESR) LULUCF flexibility of 26.8 Mt CO<sub>2</sub> eq in order to achieve compliance with EU 2030 targets. Research published since last year's projections has led to a revision to the emission factor associated with forestry on organic (peat) soils and this has led to decreased removals/increased emissions associated with forest land for all periods, with over 2 Mt CO<sub>2</sub> eq less removals in 2019. Although wetland rehabilitation and grassland water-table management offset this to some degree, in future years the 'credits' available from the LULUCF regulation accounting mechanism are much reduced. The situation is as follows:

- WEM: No flexibility is projected to be available to be used in either the 2021-25 or 2026-30 accounting periods. The 'no-debit rule' pre-condition is not met for either period (i.e. total 'debits' exceed total 'credits' as measured under the LULUCF regulation accounting rules).
- WAM: For the 2021-25 accounting period it is projected that 5 Mt CO<sub>2</sub> eq of LULUCF flexibility will be achieved and for the 2026-30 period 1.7 Mt CO<sub>2</sub> eq. The 6.7 Mt CO<sub>2</sub> eq flexibility can only be achieved if the Climate Action Plan 2021 afforestation rate of 8,000 hectares per annum is implemented.

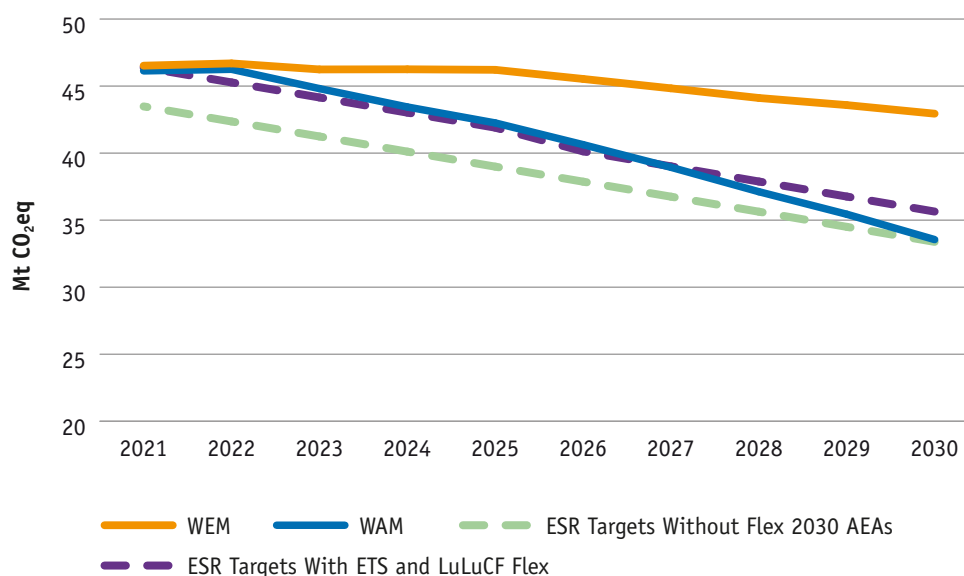
The projected non-ETS emissions and estimated Annual Emission Allocations (AEAs) with and without use of flexibilities under the Effort Sharing Regulation for the period 2021-2030 are shown in Figure 4.

Under the *With Existing Measures* scenario, the projections indicate that Ireland will cumulatively exceed its ESR emissions allocation of 384.3 Mt CO<sub>2</sub> eq by 68.6 Mt CO<sub>2</sub> eq over the 2021-2030 period without the use of flexibilities. If both the LULUCF and ETS flexibilities are used the exceedance will reduce to 49.5 Mt CO<sub>2</sub> eq.

Under the *With Additional Measures scenario*, the projections indicate that Ireland will cumulatively exceed the ESR emissions allocation by 24.3 Mt CO<sub>2</sub> eq over the 2021-2030 period.

The projections show that Ireland can achieve compliance under the ESR (in the *With Additional Measures scenario*) – using both flexibilities but only with implementation of the Climate Action Plan 2021. Using both flexibilities gives a surplus under the ESR of only 1.5 Mt CO<sub>2</sub> eq, this is a small amount of headroom and only highlights the need for full and rapid implementation of policies and measures in the Climate Action Plan 2021.

**Figure 4: Projected Non-ETS emissions and estimated Annual Emission Allocations (AEAs) with and without use of flexibilities under the Effort Sharing Regulation (ESR) for the period 2021-2030**

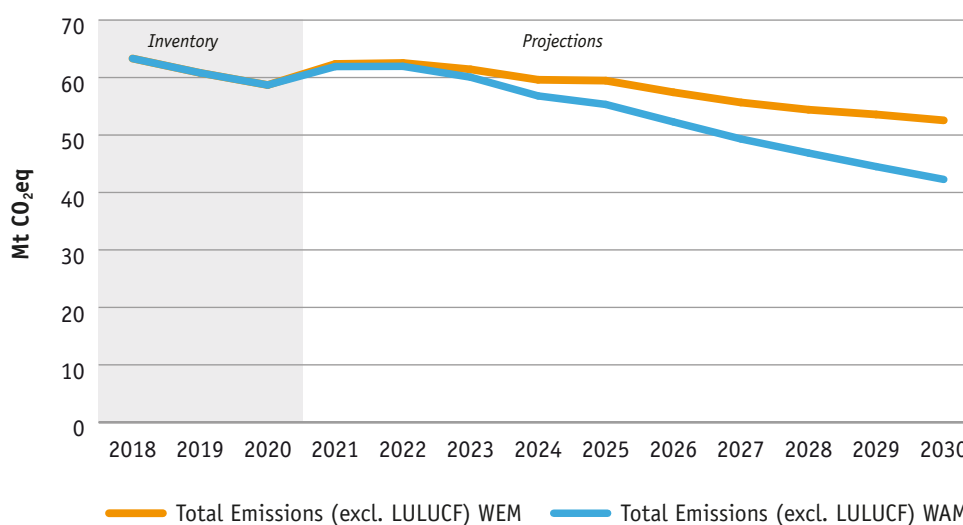


## 5. Key Trends – Emissions Projections out to 2030

This section aims to show the projected trends in total emissions and sectoral greenhouse gas emissions from the latest inventory year (2020) to 2030. Greenhouse gas emissions projections show total emissions decreasing from the latest Inventory (2020) levels by 10.5% by 2030 under the *With Existing Measures* (WEM) scenario and by 28% under the more ambitious *With Additional Measures* (WAM) scenario. As explained in the introduction the WAM scenario includes government policies and measures that have not yet moved into implementation phase and it is a more ambitious scenario than the WEM.

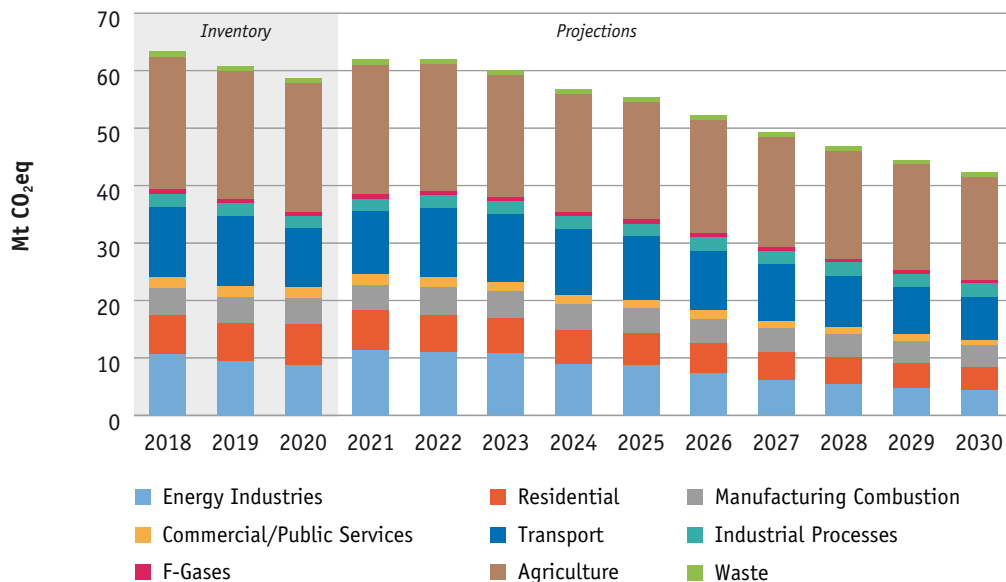
The expected trend in total greenhouse gas emissions under both scenarios is shown in Figure 5. The difference between both scenarios is largely attributed to significant emissions reductions in key sectors such as power generation, residential, transport, commercial and public services and agriculture as a result of measures outlined in the Climate Action Plan 2021. This is described in more detail for each sector throughout this section.

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

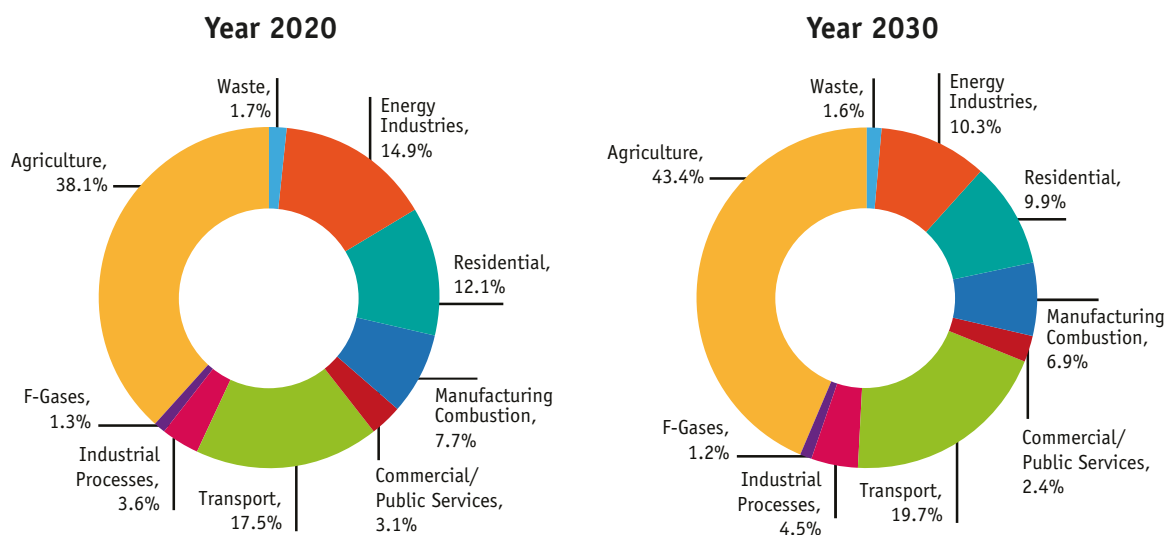


The sectoral percentage share throughout the projected time-period under the *With Existing Measures* scenario is shown in Figure 6 and Figure 7 compares projected emissions in 2020 with those in 2030. Three key sectors consistently have the largest share of emissions: Agriculture, Transport and Energy Industries. Under the WEM scenario, emissions from Agriculture and Transport are projected to increase by 1.9% and 0.6% over the period 2020 to 2030. Emissions from Energy Industries are projected to decrease by 38% over the same period. When we look at the more ambitious WAM scenario, Agriculture, Transport and Energy Industries are projected to decrease by 20%, 28% and 49% over the period 2020 to 2030. When using 2020 as a base year it must be taken into account that COVID restrictions were in place and these restrictions impacted transport emissions in particular.

**Figure 6: Total Greenhouse Gas Emissions Projections by sector out to the year 2030 under *With Existing Measures* scenario**



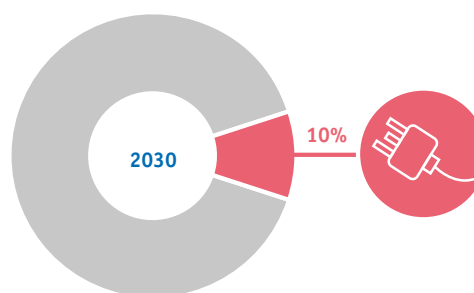
**Figure 7: Total Greenhouse Gas Emissions Projections by sector share under the *With Existing Measures* scenario in the years 2020 and 2030**



The increased proportion of emissions in 2030 from Agriculture (which is predominately from Methane (CH<sub>4</sub>) and Nitrous Oxide (N<sub>2</sub>O)) is a consequence of other sectors of the economy projected to decarbonise more swiftly.

## 5.1 Energy Industries

The majority of emissions within Energy industries come from power generation and are largely regulated under the EU Emissions Trading Scheme (ETS). In addition, emissions from manufacture of solid fuels, petroleum refining (also largely included within ETS) and fugitive emissions are included. This sector contributed 14.9% of Ireland's total emissions in 2020 and is projected to reduce to 10.3% in 2030 (in the *With Existing Measures* scenario). The projected trend in emissions from energy industries from 2020 to 2030 is shown in Figure 8. The WEM and WAM projections are described below.



### *With Existing Measures* scenario

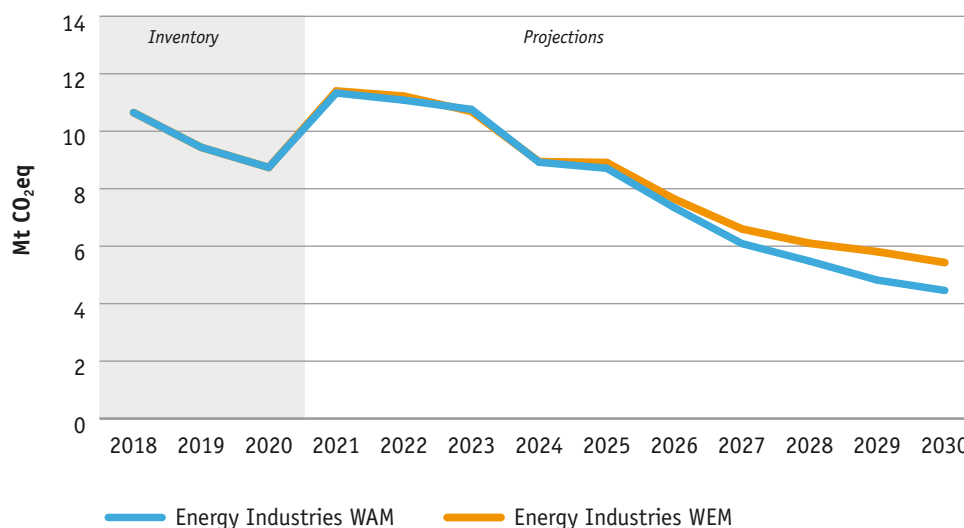
- Under the *With Existing Measures* scenario, emissions from the energy industries sector are projected to decrease by 37.8% from 8.7 to 5.4 Mt CO<sub>2</sub> eq over the period 2020 to 2030 (Figure 8).
- This scenario projects Ireland reaching approximately 70% of electricity consumption from renewable energy by 2030. Renewable electricity generation capacity is dominated by wind energy, with solar and hydro sources also contributing to the mix.
- In the assumptions underpinning the WEM scenario, one power station generating electricity from peat (cofiring with 30% biomass) continues to operate until planning permission expires in 2023. Ireland's non-renewable energy generation is from a mix of fuels such as natural gas, coal and peat.
- The WEM scenario assumptions have the Moneypoint power station operating in the market up to the end of 2025, at which point this power station no longer generated electricity from coal.
- In terms of inter-connection, the *With Existing Measures* scenario has the Greenlink 500MW interconnector to the UK coming on stream in 2025 and the Celtic 700MW interconnector to France coming on stream in 2027.
- The *With Existing Measures* scenario assumes a roll out of approximately 2.25 million smart meters by 2024, on a phased basis. Allowing greater control of energy usage in homes and businesses will support reduced energy usage leading to reduced emissions.

### *With Additional Measures* scenario

- Under the *With Additional Measures* scenario, emissions from the energy industries sector are projected to decrease by 48.9% from 8.7 to 4.5 Mt CO<sub>2</sub> eq over the period 2020 to 2030 (Figure 8), this is an additional 1.0 Mt CO<sub>2</sub> eq more than the WEM scenario.
- In this scenario it is assumed that by 2030 renewable energy generation increases to approximately 80% of electricity consumption (as set out in the Climate Action Plan 2021). This is mainly a result of further expansion in wind energy (comprising 5.0 GW offshore). Expansion of other renewables (e.g. solar photovoltaics increasing to 2.2 GW by 2030) also occurs under this scenario.
- Under the *With Additional Measures* the same assumptions are in place as for the WEM scenario for peat, electricity generation, Moneypoint power station and inter-connection.
- 2 GW storage is to be in place by 2030 in the WAM scenario, including Turlough Hill pumped storage.

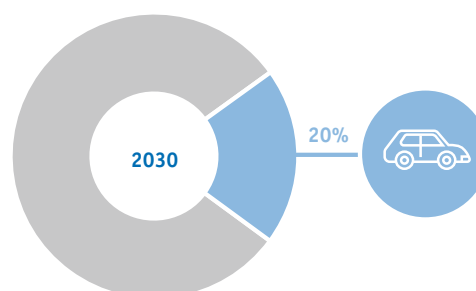


**Figure 8: Greenhouse Gas Emissions Projections from the Energy Industries Sector under the *With Existing Measures* and *With Additional Measures* scenarios out to 2030**



## 5.2 Transport

The main source of emissions from the transport sector is road transport, accounting for approximately 94% of transport emissions in 2020. 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 the oil price. This sector also includes combustion of fuel used in rail, navigation, domestic aviation and pipeline gas transport. This sector is projected to contribute to almost 20% of Ireland's total emissions by 2030 in the *With Existing Measures* scenario. Figure 9 shows the trend in emissions from Transport from 2020 to 2030 in the WEM and WAM scenarios.



### *With Existing Measures* scenario

- Under the *With Existing Measures* scenario, transport emissions are projected to increase by 0.6% over the period 2020-2030 from 10.3 to 10.4 Mt CO<sub>2</sub> eq. When using 2020 as a base year it must be taken into account that COVID restrictions were in place and these restrictions impacted transport emissions in particular (see Figure 9).
- The main policy instruments impacting transport emissions in this scenario are the move from diesel and petrol to electric vehicles and a mix of renewable fuels in petrol and diesel at the pumps. The Biofuel Obligation Scheme places an obligation on fuel suppliers to blend an increasing percentage of biofuel

with their fuel. For road transport in the WEM scenario a statutory target of approximately 12% biofuel applies from 1 January 2020.

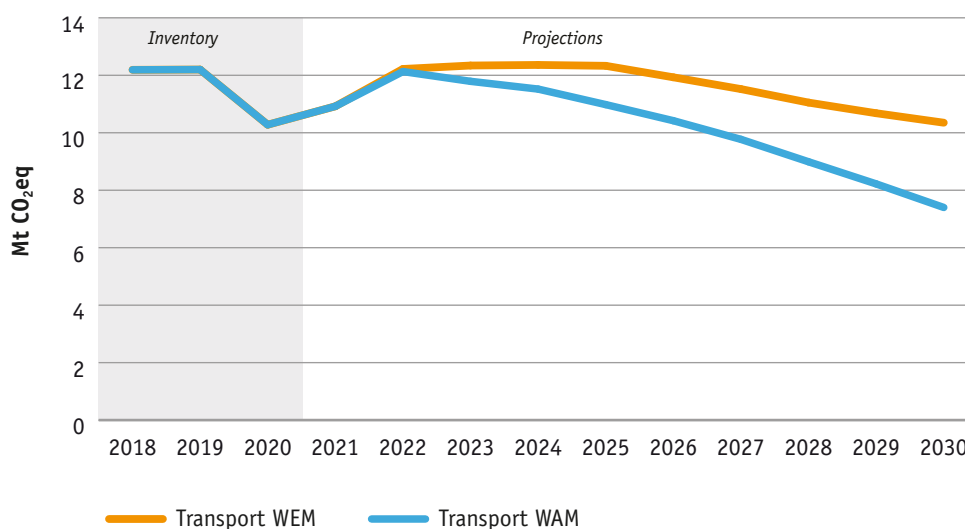
- In terms of the uptake of Electric Vehicles, the *With Existing Measures* scenario assumes approximately 556,000 electric vehicles on the road by 2030. This includes approximately 363,000 passenger battery electric vehicles and 178,000 passenger plug in hybrid electric vehicles.
- The WEM scenario includes the impact of transport infrastructure projects such as the DART Expansion and BusConnects programmes, which aim to reduce car passenger journeys in the Dublin area.

### With Additional Measures scenario

- Under the *With Additional Measures* scenario, transport emissions are projected to decrease by 28% over the period 2020 to 2030 from 10.3 to 7.4 Mt CO<sub>2</sub> eq (see Figure 9).
- For the *With Additional Measures* scenario, it is assumed that incremental increases will occur in the Biofuel Obligations Scheme with 10% blend for petrol and a 20% blend for diesel at the pumps by 2030.
- This scenario assumes 944,600 electric vehicles on the road by 2030, as a result of the implementation of the Climate Action Plan 2021. This includes approximately 661,000 battery electric vehicles, 183,000 plug in hybrid electric vehicles and 95,000 electric delivery vans.
- This scenario also includes the impact of transport infrastructure projects such as the DART Expansion and BusConnects programmes and extension of Smarter Travel measures to promote greater sustainable mobility with particular emphasis on schools, colleges and workplaces.

The projected trend in emissions from the transport sector out to 2030 under the *With Existing Measures* and *With Additional Measures* scenarios is shown in Figure 9. The extent of the impact of ambitious additional measures in the Climate Action Plan 2021 over the period can be clearly seen, as well as the significant impact of COVID restrictions on transport emissions in 2020 and 2021.

**Figure 9: Greenhouse Gas Emissions Projections from the Transport Sector under the *With Existing Measures* and *With Additional Measures* scenarios out to 2030**

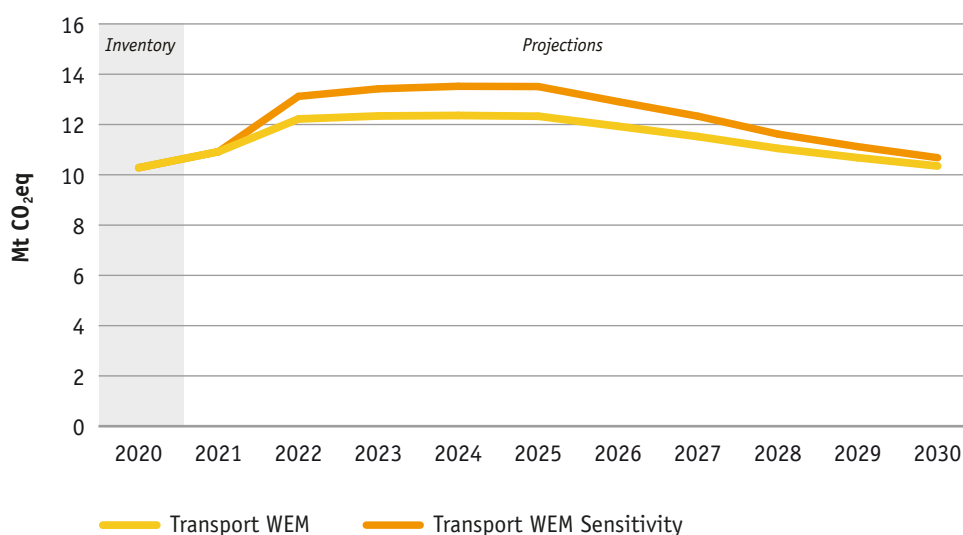


## Sensitivity Analysis

A sensitivity analysis of the *With Existing Measures* emissions scenario has been undertaken for the transport emissions projections based on alternative projected activity data. A sensitivity analysis involves modelling how much projection results change when key parameters are varied. Different sensitivity analyses can be performed to examine the effects that various economic and policy impacts could have on the projected emissions. Performing sensitivity analyses is also a part of producing projections in compliance with Article 39 of the Governance of the Energy Union and Climate Action Regulation.

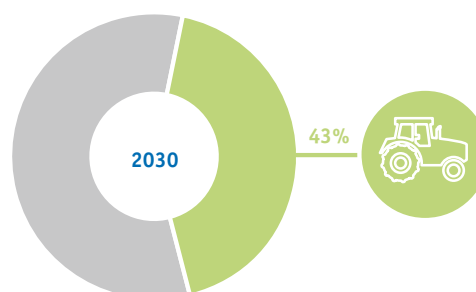
The sensitivity analysis undertaken for the transport emissions projections is based on lower fuel prices. Low fuel prices from the UK Department of Business, Energy and Industrial Strategy (BEIS) were used. The alternative scenario is presented in Figure 10 alongside the WEM scenario. It shows that lower fuel prices would likely lead to higher emissions over the projected period.

**Figure 10: Sensitivity assessment of the Transport Sector under the *With Existing Measures* scenario out to 2030**



## 5.3 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 over 38% of Ireland's total emissions in 2020 and is projected to rise to 43.4% by 2030 (in the *With Existing Measures* scenario). Emissions from agriculture are projected to remain static from 2020 to 2030 in the *With Existing Measures* scenario. The WEM and WAM projections are described below and the projected trajectory for both scenarios is shown in Figure 11.



The data underpinning the agriculture projections are based on an updated analysis undertaken by Teagasc of the projected national herd population, crop areas and fertiliser use which takes into account national strategies on the development of the agri-food sector (such as Food Wise 2025 and Food Vision 2030<sup>15</sup>), post Brexit trade for the agriculture sector and trends in agricultural production at the time of preparing the projected activity data.

### *With Existing Measures scenario*

- Total emissions from agriculture are projected to increase by 1.9% over the period 2020-2030 from 22.3 to 22.8 Mt CO<sub>2</sub> eq under the *With Existing Measures* scenario.
- The data that underpins the *With Existing Measures* Scenario comes from Teagasc's Base Case Scenario. Under this scenario dairy cow numbers are projected to increase by 13.3% (202k cows) in 2030 relative to 2020. In contrast, beef cow numbers are projected to decrease by 30.1% by 2030. Total cattle in 2030 are projected to be 6.8 million, a 6% (428k cattle) decrease relative to 2020. As dairy cows produce more methane per animal than other cattle, this overall decline in animal numbers does not reduce methane emissions.
- Dairy production systems operate at a higher stocking rate than beef production systems and this higher stocking rate is reflected in higher projected use of nitrogen fertiliser per hectare and in total aggregate nitrogen fertiliser use by the Irish agricultural sector. Total nitrogen fertiliser use in 2030 is projected to be 407,169 tonnes. This represents a 7.3% increase relative to 2020.
- Irish ewe and total sheep numbers are projected to increase over the period to 2030. By 2030 total Irish sheep numbers are projected to increase to 5.3 million. This represents a 1% increase relative to 2020. This increase reflects the increased profitability of sheep production in the period to 2030.
- The total crop land area is projected to continue to decline due to the higher level of profits per hectare in dairy farming as compared to tillage farming. By 2030 total cereal area harvested in Ireland is projected to decline from 265,600 to 224,350 hectares. This represents a 16% decrease relative to 2020.

### *With Additional Measures scenario*

- Under the *With Additional Measures* scenario emissions are projected to decrease to approximately 17.8 Mt CO<sub>2</sub> eq by 2030 which is a 20.3% reduction over the period 2020-2030.
- The *With Additional Measures scenario* assumes implementation of additional measures committed to in the Climate Action Plan 2021 in order to achieve the minimum level of emission reductions in the plan. Some of the key measures include nitrogen use efficiency, use of protected urea products, improved animal health, extended grazing, reducing crude protein in pigs, low emission slurry spreading and inclusion of clover in pasture swards.

The projected trend in emissions from the agriculture sector out to 2030 under the *With Existing Measures* and *With Additional Measures* scenario is shown in Figure 11. The difference between both scenarios is attributed to the implementation of additional measures committed to in the Climate Action Plan 2021.

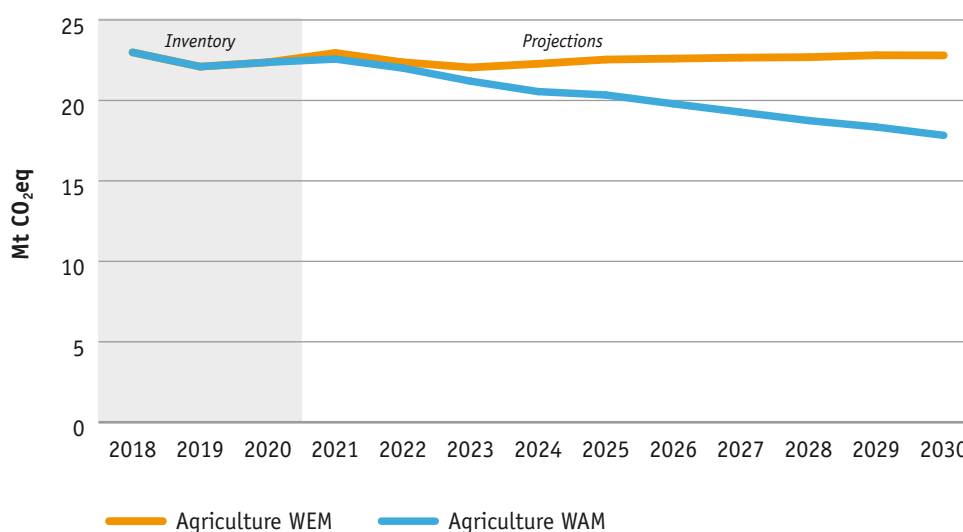
It is important to note that the WAM measures for the reduction of Agricultural methane are as yet undefined and the EPA does not have information on the planned implementation pathway for these measures (e.g. an implied reduction of up to 30% in methane emissions compared to 2018). The detail, timing and impact of these methane measures needs to be specified as a matter of urgency to facilitate

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15 <https://www.gov.ie/en/publication/c73a3-food-vision-2030-a-world-leader-in-sustainable-food-systems/>

widespread implementation. The approach to the treatment of the projected emissions from this sector is consistent with that used in the preparation of the 2021 projections. This approach will be examined again in the preparation of next years projections. At that time, it may not be appropriate to continue to include methane reduction measures without more explicit quantification of what each methane reduction measure is expected to achieve and details of the planned implementation pathway.

**Figure 11: 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. The sensitivity analysis undertaken for the agriculture emissions projections is based on alternative projected activity data that assumes stronger growth in agricultural activity levels. The resulting alternative scenario is described in more detail below and presented in Figure 12 alongside the WEM scenario. It shows that stronger growth would likely lead to higher emissions over the projected period.

### Alternative Scenario (stronger growth in agricultural activity levels)

For the agriculture projections the sensitivity scenario is based on stronger growth in agriculture activity levels in comparison to the *Baseline* agriculture (WEM) projection. This scenario assumes continued growth in the dairy herd accompanied by a stable, rather than contracting beef cow herd. Under this scenario the allocation of Ireland's Common Agricultural Policy (CAP) budget is assumed to change from 2020 onwards to provide additional coupled support to beef cow numbers. Irish farm gate milk prices are also assumed to be higher than under the WEM scenario by approximately 10%. These two assumptions are used to generate a larger dairy and beef cow inventory.

Under this scenario, dairy cow numbers in 2030 are projected to reach 1.8 million. This represents a 19% increase relative to 2020.

Under this scenario the provision of coupled direct payments from 2020 slows the projected decline in the Irish beef cow inventory. By 2030, Irish beef cow numbers reach 0.808 million. This represents a 15.2% decrease relative to 2020.

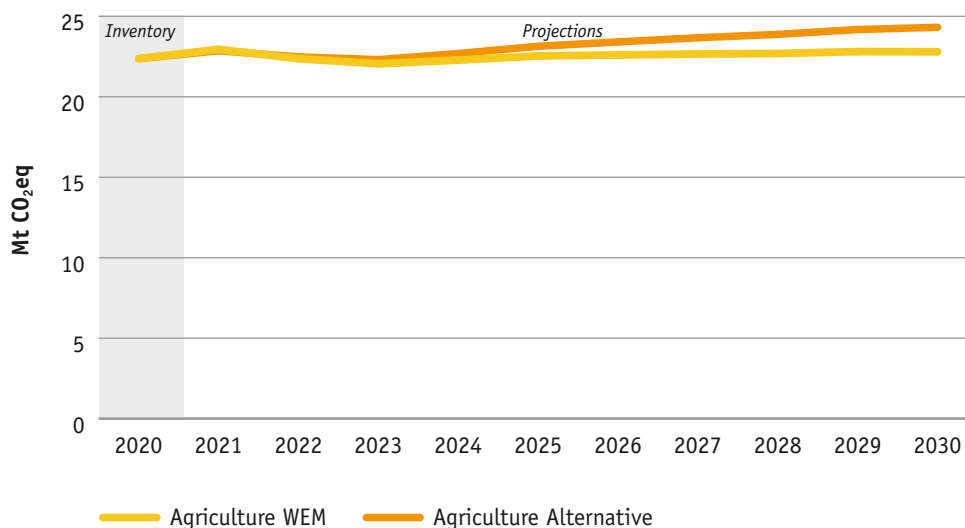
By 2030 projected total cattle inventories are 7.26 million. This represents a 0.58% increase relative to 2020.

Under this scenario, the modest projected contraction in beef cow numbers is more than offset by a strong increase in dairy cow numbers. The dairy share of the total cattle population increases, and the higher stocking rate is reflected in a higher level of nitrogen use per hectare and in total nitrogen use in aggregate over the period to 2030. In 2030 the total use of nitrogen is projected to be 437,553 tonnes.

Under this scenario Irish ewe and total sheep numbers are also projected to increase over the period to 2030. By 2030 Irish total sheep numbers are projected to increase to 5.18 million. This represents a 2% decrease relative to 2020. This slower rate of expansion reflects the assumed decline in the relative profitability of sheep systems as compared to beef systems, which receive coupled direct payments in the sensitivity scenario.

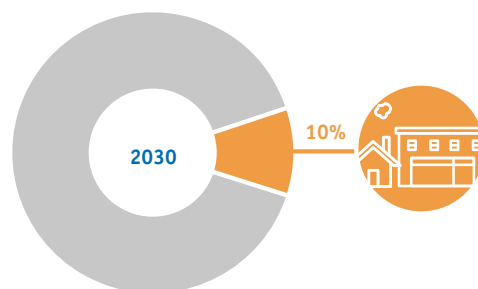
Total crop land area is projected to decline over the period to 2030. The higher profitability of land use in dairy production systems leads to a shift of land from tillage to grassland use. By 2030 total cereal area harvested in Ireland declines to 216,988 hectares. This represents a 18% decrease relative to 2020.

**Figure 12: Sensitivity assessment of the Agriculture Sector under the *With Existing Measures* scenario out to 2030**



## 5.4 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. This sector contributed 12.1% of Ireland's total emissions in 2020. Residential energy demand is influenced by the weather, fuel prices and more recently the move to home working. By 2030 emissions from the residential sector are projected to reduce to 9.9% of Ireland's total emissions (in the *With Existing Measures* scenario). The projected decline in emissions from the residential sector from 2020 to 2030 is shown in Figure 13. The WEM and WAM projections are described below.



### *With Existing Measures* scenario

- Under the *With Existing Measures* scenario, emissions from the residential sector are projected to decrease by 27.2% between 2020 and 2030 from 7.1 to 5.2 Mt CO<sub>2</sub> eq (Figure 13).
- The *With Existing Measures* scenario assumes heat pump uptakes based on grant rates funded by National Development Plan 2021-2030 allocation (annual delivery in line with estimated funding allocation) and a ban on oil boilers (from 2022) and gas boilers (from 2025) in new dwellings.
- The *With Existing Measures* scenario also assumes implementation of a range of residential energy efficiency programmes including, for example, Greener Homes, Better Energy Homes and Warmer Homes Schemes, Better Energy Communities Programme 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.

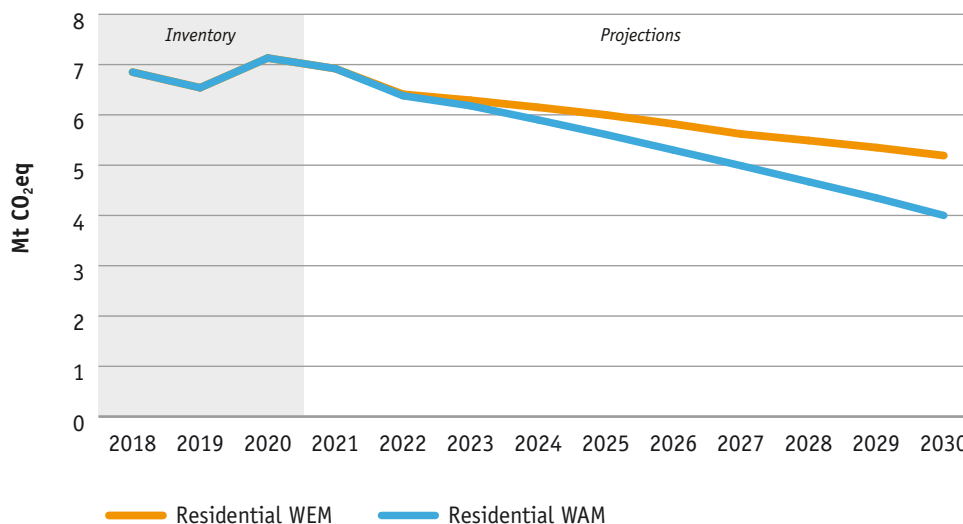
### *With Additional Measures* scenario

- Under the *With Additional Measures* scenario, emissions are projected to decrease by 43.8% between 2020 and 2030 from 7.1 to 4 Mt CO<sub>2</sub> eq (Figure 13). This scenario assumes full implementation of the relevant measures in the Climate Action Plan 2021.

Measures in the Climate Action Plan 2021 include:

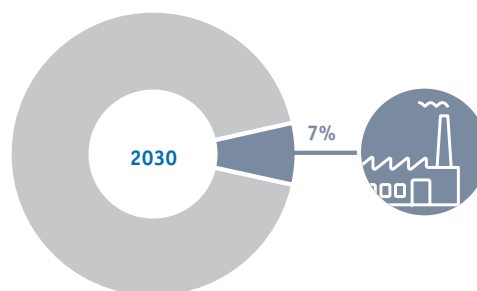
- A ban on oil boilers (from 2022) and gas boilers (from 2025) in new dwellings.
- The installation of 680,000 heat pumps by 2030.
- As indicated in the Climate Action Plan 2021; a total of 1,600GWh of biomethane use across the heat and transport sectors by 2030
- Energy Efficiency programmes involving upgrades to homes, and retrofits to achieve BER 'B2' rating;
- District heating growth to 2.7TWh in 2030, as outlined in the Climate Action Plan 2021.

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



## 5.5 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 7.7% of Ireland's total emissions in 2020. This is projected to reduce only slightly to 6.9% in 2030 (in the *With Existing Measures* scenario).



The projected trajectory of emissions from the manufacturing combustion sector from 2020 to 2030 is shown in Figure 14. The WEM and WAM projections are described below.

### *With Existing Measures* scenario

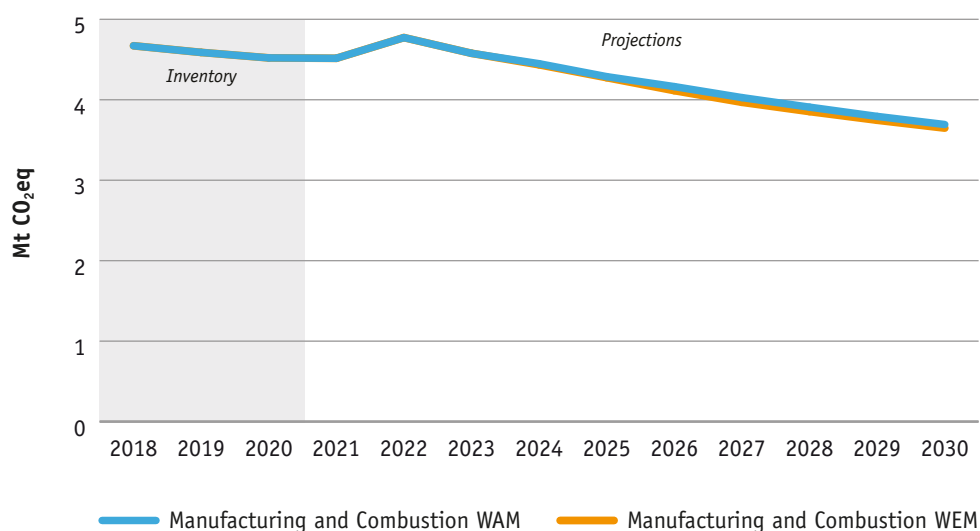
- Under the *With Existing Measures* scenario, emissions from manufacturing combustion are projected to reduce by 19.3% between 2020 and 2030, from 4.5 to 3.7 Mt CO<sub>2</sub> eq (Figure 14). This scenario assumes implementation of existing energy efficiency programmes such as SEAI's Large Industry 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 *With Additional Measures* scenario, emissions from manufacturing combustion are projected to also decrease from 4.5 to 3.7 Mt CO<sub>2</sub> eq between 2020 and 2030 (Figure 14). This scenario assumes further roll out of energy efficiency programmes including those listed above.

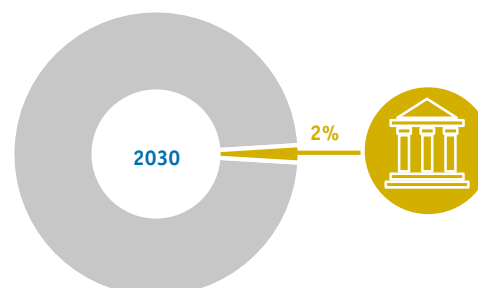


**Figure 14: Greenhouse Gas Emissions Projections from the Manufacturing Combustion Sector under the *With Existing Measures* and *With Additional Measures* scenarios out to 2030**



## 5.6 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 3% of Ireland's total emissions in 2020 and is projected to reduce to 2.4% in 2030 (in the *With Existing Measures* scenario) The projected trajectory of emissions from the commercial and public services sector from 2020 to 2030 is shown in Figure 15. The WEM and WAM projections are described below.



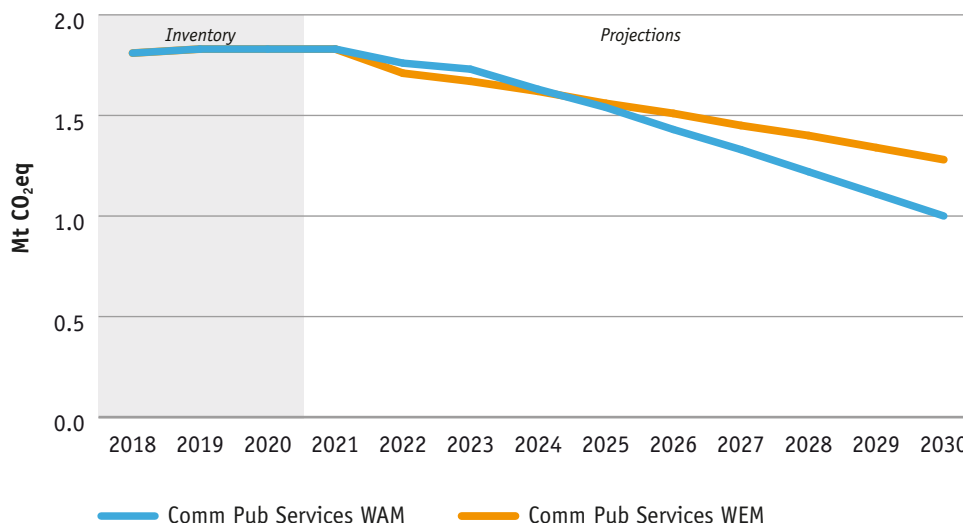
### *With Existing Measures* scenario

- Under the *With Existing Measures* scenario, emissions from the commercial and public services sector are projected to decrease by 30.3% between 2020 and 2030 from 1.8 to 1.3 Mt CO<sub>2</sub> eq (Figure 15). 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 public Sector Capital Exemplars.

### *With Additional Measures* scenario

- Under the *With Additional Measures* scenario, emissions from the commercial and public services sector are projected to decrease by 45.5% between 2020 and 2030 from 1.8 to 1 Mt CO<sub>2</sub> eq (Figure 15). This scenario also assumes implementation of a range of energy efficiency programmes including the retrofit of public building stock with a focus on decarbonisation and the Energy Performance Contract scheme (introduced from 2024 to 2030) as outlined in the Climate Action Plan 2021.

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



## 5.7 Emissions from Industrial processes and Waste

The Industrial Processes and Waste sectors contributed 3.6% and 1.7% of Ireland's total emissions in 2020 respectively. There is only one scenario (*With Existing Measures*) for greenhouse gas emissions projections from these sectors based on available data. Ireland's landfill rate for municipal waste dropped to 15% in 2019, reflecting a steep decline from 62% in 2008 and is on track to comply with the Landfill Directive target of less than 10% of Municipal waste landfilled by 2035.

- Emissions from Industrial Processes include process emissions from mineral, chemical, metal industries, non-energy products and solvents. Emissions are projected to increase by 13% between 2020 and 2030 from 2.1 to 2.4 Mt CO<sub>2</sub> eq. The majority of emissions come from cement and lime industries and the projections are based on growth forecasts from the cement industry.
- Waste sector emissions are projected to decrease by 15.7% between 2020 and 2030 from 1.0 to 0.8 Mt CO<sub>2</sub> eq. The waste sector includes landfill, incineration and open burning of waste, mechanical & 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 there. It is assumed that the amount of landfill gas flared and utilised for energy production is 57% in 2020 and is projected to decrease to 46% in 2030 in line with more recent trends in the latest inventory.

## 5.8 Fluorinated-gas emissions

Fluorinated gases accounted for approximately 1.3% of Ireland's total national greenhouse gas emissions in 2020. 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, metered dose inhalers and electrical switch-gear).

### *With Existing Measures scenario*

- Fluorinated-Gas (F-Gas) emissions are projected to decrease by 11.5% from 0.74 to 0.65 Mt CO<sub>2</sub> eq between 2020 and 2030 under the *With Existing Measures* scenario. 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 by 8.8% between 2020 and 2030 from 0.7 to 0.67 Mt CO<sub>2</sub> eq under the *With Additional Measures* scenario.

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 over double the number in the WEM scenario by 2030. The switch to lower Global Warming Potential gas (R32) in and heat pumps and air conditioning units over the projected period in the *With Additional Measures* scenario means that despite this large increase in heat pump numbers, the increase in GHG emissions is small.

## 5.9 Cross cutting measures

The 2021-2030 projections include a number of cross cutting measures that have a significant impact across a number of sectors in terms of energy consumption and emissions reduction. The most significant include carbon tax and supports for renewable heat which are outlined below.

- Carbon tax on fossil fuels applies to industry, residential, commercial services, transport and agriculture sectors. Both scenarios include a varying carbon tax that reaches €100 per tonne by 2030. This has the effect of reducing the energy demand across all sectors outside of the Emissions Trading Scheme.
- The Support Scheme for Renewable Heat (SSRH) supports the adoption of renewable heating systems by commercial, industrial, agricultural, district heating, public sector and other non-domestic heat users not covered by the emissions trading system. Both the *With Existing Measures* and *With Additional Measures* scenario assumes 1,600GWh of additional renewable heat (six year ramp up from 2020 to 2025) supported under the Support Scheme for Renewable Heat (SSRH).
- Under the *With Existing Measures* scenario 175,000 residential oil boilers are replaced with heat pumps by 2030. Under the *With Additional Measures* scenario it is projected that 680,000 existing residential oil boilers, gas boilers and electric heaters are replaced with heat pumps and that district heating is deployed in Dublin (2.7 TWh by 2030 as outlined in the Climate Action Plan 2021).
- Under the *With Additional Measures* scenario, a total of 1,600GWh of biogas is projected to be used across the heat and transport sectors by 2030, a non-linear increase from 2025 is assumed.

## 6. Conclusion

The two scenarios presented in these latest Projections highlight two key messages in relation to Ireland's emissions reduction targets.

Firstly, the *With Additional Measures* scenario, which captures many of the expected impacts of measures described in the Climate Action Plan 2021, highlights that those measures, if fully implemented, can achieve compliance with the EU Effort Sharing Regulation target. Secondly, the *With Existing Measures* scenario, which attempts to reflect the likely impact of the measures for which resources and commitments are currently in place, highlights the need for swifter action to implement those measures that have already been identified in plans.

The Working Group III contribution to the IPCC's sixth assessment report (Climate Change 2022: Mitigation of Climate Change<sup>16</sup>) launched in April 2022 strongly highlighted that the world is at a crossroads in relation to limiting global warming to 1.5 degrees. The message is that it is 'now or never' in terms of implementing effective mitigation measures if that target is to be achieved. The report also highlighted that globally an 'implementation gap' exists when comparing those policies that have been implemented and those contained within countries Nationally Determined Contributions for 2030, a similar situation to that presented for Ireland in these Projections.

These latest Projections highlight the pace and scale of action needed to reduce greenhouse emissions in time to contribute to arresting global temperature rise. Implementation has consistently lagged behind planning. The message from the IPCC is that no further delays are possible to avoid the worst climate outcomes.

Urgent implementation of all climate plans and policies, plus further new measures, are needed for Ireland to meet the 51 per cent emissions reduction target and put Ireland on track for climate neutrality by 2050.

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<sup>16</sup> <https://www.ipcc.ch/report/ar6/wg3/>

## Appendix – Underlying assumptions and additional data

Two emissions projections scenarios are presented which show two potential outlooks to 2040 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 Baseline energy projection which incorporates the anticipated impact of policies and measures that were in place (and legislatively provided for) by the end of 2020.

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 (including the Climate Action Plan 2021).

Energy demand projections underpinning the latest emissions projections were prepared by SEAI in conjunction with the Economic and Social Research Institute (ESRI) and University College Cork. The ESRI produce energy demand projections using the I3E model (Ireland Environment, Energy and Economy model)<sup>17</sup>. Future international fossil fuel prices are given as input to the I3E model. For the low and central fossil fuel price scenario (i.e. in the case of the energy related projections described in this document), the UK Department for Business, Energy and Industrial Strategy (BEIS) central price scenario is applied<sup>18</sup>.

The recommended ETS carbon prices are based on the EU Reference Scenario. The software used for to model the Irish Electricity Market is PLEXOS which is a power systems modelling tool used for electricity market modelling and planning.

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 measures put in place before the end of 2020 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 2021.

Key parameters underlying the macroeconomic outlook and therefore the *With Existing Measures* and *With Additional Measures* emission projections scenarios are shown in Table 2.

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

<sup>18</sup> BEIS fossil fuel price assumptions 2019 ([publishing.service.gov.uk](https://publishing.service.gov.uk))

**Table 2: Key macroeconomic assumptions underlying the projections out to 2040**

	2020	2021-2025	2026-2030	2031-2035	2036-2040
Average Annual % Growth Rate					
<b>GDP</b>	-6.6	3.2	3.1	3.2	3.2
<b>GNP</b>	-10.4	3.2	3.1	3.1	3.2
	2020	2025	2030	2035	2040
<b>Housing Stock ('000)</b>	2,083	2,208	2,377	2,566	2,772
<b>Population ('000)</b>	4,612	4,800	4,995	5,198	5,409
<b>EUETS: Carbon €2016/ tCO<sub>2</sub></b>	25	69	100	113	125
<b>Carbon tax €/tCO<sub>2</sub> (WEM Scenario)</b>	33.5	63.5	100	100	100
<b>Coal €2016/boe</b>	11.3	11.3	12.0	12.9	12.9
<b>Oil €2016/boe</b>	48.3	54.0	63.0	72.0	72.0
<b>Gas €2016/boe</b>	30.6	34.0	39.4	44.5	44.5
<b>Peat €/MWh</b>	25.0	25.0	25.0	25.0	25.0

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

- 71.5% renewable electricity (RES-E) share
- 21.6% renewable heat (RES-H) share
- 15.3% renewable transport (RES-T) share
- 32.4% 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*:

- 78.3% renewable electricity (RES-E) share
- 30.4% renewable heat (RES-H) share
- 31.7% renewable transport (RES-T) share
- 42.4% Overall Renewable Energy (RES) share

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

The data underpinning the agriculture projections are based on an updated analysis undertaken by Teagasc of the projected national herd population, crop areas and fertiliser use which takes into account Food Wise 2025 policy targets and reflects trends in agricultural production at the time of preparing the projected activity data.

The breakdown of historical and projected emissions for the non-ETS and ETS sectors (Mt CO<sub>2</sub> eq) under the *With Existing Measures* and *With Additional Measures* scenarios is shown in Table 3

**Table 3: Historical and projected emissions for the non-ETS and ETS sectors (kt CO<sub>2</sub> eq<sup>19</sup>) for *With Existing Measures* and *With Additional Measures***

		Non-ETS sector	ETS sector	Total
Historical	2005	48,832	22,333	71,166
	2008	48,635	20,351	68,986
	2009	46,004	17,184	63,187
	2010	45,375	17,322	62,697
	2011	42,806	15,729	58,535
	2012	42,786	16,822	59,608
	2013	43,700	15,679	59,380
	2014	42,921	15,951	58,873
	2015	44,584	16,815	61,398
	2016	45,943	17,724	63,667
	2017	46,142	16,880	63,022
	2018	47,822	15,485	63,307
	2019	46,680	14,132	60,812
	2020	45,445	13,253	58,698
Projected	<i>With Existing Measures scenario</i>			
	2021	46,516	15,841	62,357
	2025	46,213	13,252	59,465
	2030	42,941	9,612	52,552
	2035	40,826	9,490	50,316
	2040	40,245	8,953	49,198
	<i>With Additional Measures scenario</i>			
	2021	46,134	15,772	61,906
	2025	42,252	13,064	55,316
	2030	33,553	8,714	42,267
	2035	29,402	8,995	38,397
	2040	27,536	8,106	35,643

Note: Totals excludes Land Use, Land Use Change and Forestry (LULUCF)

19 Units: 1,000 kilotonnes (kt) = 1000 gigagram (Gg).

CO<sub>2</sub> Equivalent: greenhouse gases other than CO<sub>2</sub> (i.e. methane, nitrous oxide and so-called F-gases) may be converted to CO<sub>2</sub> equivalent using their global warming potentials.

**Table 4: Projected non-ETS emissions and allowances for the 2021 to 2030 ESR compliance period for *With Existing Measures* and *With Additional Measures* scenarios<sup>20</sup>**

<i>Mt CO<sub>2</sub> equivalent</i>	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	Total
Non-ETS Projections – WEM	46.5	46.7	46.2	46.2	46.2	45.5	44.8	44.1	43.6	42.9	452.9
Non-ETS Projections – WAM	46.1	46.3	44.8	43.4	42.3	40.6	38.9	37.1	35.4	33.6	408.6
Projected Annual Emission Allocations (WEM)	43.5	42.4	41.2	40.1	39.0	37.9	36.7	35.6	34.5	33.4	384.3
Gross Exceedance – WEM	3.0	4.3	5.0	6.1	7.2	7.7	8.1	8.5	9.1	9.6	68.6
Gross Exceedance – WAM	2.7	3.9	3.6	3.3	3.3	2.8	2.2	1.5	0.9	0.2	24.3
<b>Total LULUCF Flexibility</b>	<b>1.0</b>	<b>1.0</b>	<b>1.0</b>	<b>1.0</b>	<b>1.0</b>	<b>0.3</b>	<b>0.3</b>	<b>0.3</b>	<b>0.3</b>	<b>0.3</b>	<b>6.7</b>
<b>Total ETS Flexibility</b>	<b>1.9</b>	<b>1.9</b>	<b>1.9</b>	<b>1.9</b>	<b>1.9</b>	<b>1.9</b>	<b>1.9</b>	<b>1.9</b>	<b>1.9</b>	<b>1.9</b>	<b>19.1</b>
Net Exceedance – WEM	1.1	2.4	3.1	4.2	5.3	5.8	6.2	6.6	7.2	7.7	49.5
Net Exceedance – WAM	-0.3	1.0	0.7	0.4	0.4	0.5	-0.1	-0.8	-1.3	-2.1	-1.5
Net Exceedance – WAM – LULUCF Flexibility only	1.7	2.9	2.6	2.3	2.3	2.4	1.8	1.2	0.6	-0.2	17.5
Net Exceedance – WEM – ETS Flexibility only	1.1	2.4	3.1	4.2	5.3	5.8	6.2	6.6	7.2	7.7	49.5
Net Exceedance – WAM – ETS Flexibility only	0.7	2.0	1.7	1.4	1.4	0.9	0.3	-0.4	-1.0	-1.7	5.2

<sup>20</sup> 1 Mt = 1,000,000 tonnes.



## Sectoral Breakdown

Under Section 3 of this report 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 ETS and non-ETS);
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<sup>21</sup> (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).

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) are included in the 2022 submission made under Article 18 of Regulation (EU) 2018/1999 on the Governance of the Energy Union and Climate Action. This is available in relevant 2022 submission folders at the following link:

<https://reportnet.europa.eu/public/dataflows>

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<sup>21</sup> F-gases are Hydrofluorocarbons (HFCs), Perfluorocarbons (PFCs), Sulphur Hexafluoride (SF<sub>6</sub>), and Nitrogen Trifluoride (NF<sub>3</sub>).



# An Gníomhaireacht um Chaomhnú Comhshaoil

Tá an Gníomhaireacht um Chaomhnú Comhshaoil (GCC) freagrach as an gcomhshaoil a chaomhnú agus a fheabhsú mar shócmhainn luachmhar do mhuintir na hÉireann. Táimid tiomanta do dhaoine agus don chomhshaoil a chosaint ar thionchar díobhálach na radaíochta agus an truailithe.

Is féidir obair na Gníomhaireachta a roinnt ina trí phríomhréimse:

- Rialú:** Déanaimid córais éifeachtacha rialaithe agus comhlíonta comhshaoil a chur i bhfeidhm chun torthaí maithe comhshaoil a sholáthar agus chun díriú orthu siúd nach gcloíonn leis na córais sin.
- Eolas:** Soláthraímid sonraí, faisnéis agus measúnú comhshaoil atá ar ardchaighdeán, spriocdhírthe agus tráthúil chun bonn eolais a chur faoin gcinnteoireacht ar gach leibhéal.
- Tacaíocht:** Bímid ag saothrú i gcomhar le grúpaí eile chun tacú le comhshaoil atá glan, táirgiúil agus cosanta go maith, agus le hiompar a chuirfidh le comhshaoil inbhuanaithe.

## Ár bhFreagrachtaí

### CEADÚNÚ

Déanaimid na gníomhaíochtaí seo a leanas a rialú ionas nach ndéanann siad dochar do shláinte an phobail ná don chomhshaoil:

- saoráidí dramhaíola (m.sh. láithreáin líonta talún, loisceoirí, stáisiúin aistrithe dramhaíola);
- gníomhaíochtaí tionsclaíoch ar scála mór (m.sh. déantúsaíocht cógaisíochta, déantúsaíocht stroighne, stáisiúin chumhachta);
- an diantalmhaíocht (m.sh. muca, éanlaith);
- úsáid ghlanscartha agus scaoileadh rialaithe Orgánach Géinmhodhnaithe (OGanna);
- foinsí radaíochta ianúcháin (m.sh. trealamh x-gha agus radaiteiripe, foinsí tionsclaíoch);
- áiseanna móra stórála peitрил;
- sceitheadh fuíolluisce;
- gníomhaíochtaí dumpála ar farraige.

### FORFHEIDHMIÚ NÁISIÚNTA I LEITH CÚRSAÍ COMHSHAOIL

- Clár náisiúnta iniúchtaí agus cigireachtaí a dhéanamh gach bliain ar shaoráidí a bhfuil ceadúnas ón nGníomhaireacht acu.
- Maoirseacht a dhéanamh ar fhreagrachtaí cosanta comhshaoil na n-údarás áitiúil.
- Caighdeán an uisce óil, arna sholáthar ag soláthraithe uisce phoiblí, a mhaoirsiú.
- Obair le húdarás áitiúla agus gníomhaireachtaí eile chun dul i ngleic le coireacht comhshaoil trí chomhordú a dhéanamh ar líonra forfheidhmiúcháin náisiúnta, díriú ar chiontóirí, agus maoirsiú a dhéanamh ar fheabhsúcháin.
- Cur i bhfeidhm rialachán ar nós na Rialachán um Dhramhthrealamh Leictreach agus Leictreonach (WEEE), um Shrian ar Shubstaintí Guaiseacha agus na Rialachán um rialú ar shubstaintí a ídionn an ciseal ózóin.
- An dlí a chur orthu siúd a bhriseann dlí an chomhshaoil agus a dhéanann dochar don chomhshaoil.

### BAINISTÍOCHT UISCE

- Monatóireacht agus tuairisciú a dhéanamh ar cháilíocht aibhneacha, lochanna, uisce idirchreasa agus cósta na hÉireann, agus screamhuiscí; leibhéal uisce agus sruthanna aibhneacha a thomhas.
- Comhordú náisiúnta agus maoirsiú a dhéanamh ar an gCreat-Treoir Uisce.
- Monatóireacht agus tuairisciú a dhéanamh ar Cháilíocht an Uisce Snámha.

### MONATÓIREACHT, ANAILÍS AGUS TUAIRISCIÚ AR AN GCOMHSHAOIL

- Monatóireacht a dhéanamh ar cháilíocht an aeir agus Treoir an AE maidir le hAer Glan don Eoraip (CAFÉ) a chur chun feidhme.
- Tuairisciú neamhspleách le cabhrú le cinnteoireacht an rialtais náisiúnta agus áitiúil (m.sh. tuairisciú tréimhsíúil ar Staid Chomhshaoil na hÉireann agus Tuarascálacha ar Tháscairí).
- Rialú Astaíochtaí na nGás Ceaptha Teasa in Éirinn
- Fardail agus réamh-mheastacháin na hÉireann maidir le gás ceaptha teasa a ullmhú.
- An Treoir maidir le Trádáil Astaíochtaí a chur chun feidhme i gcomhair breis agus 100 de na táirgeoirí dé-ocsaíde carbóin is mó in Éirinn.

### TAIGHDE AGUS FORBAIRT COMHSHAOIL

- Taighde comhshaoil a chistiú chun brúnna a shainaithint, bonn eolais a chur faoi bheartais, agus réitigh a sholáthar i réimsí na haeráide, an uisce agus na hinbhuanaitheachta.

### MEASÚNÚ STRAITÉISEACH COMHSHAOIL

- Measúnacht a dhéanamh ar thionchar pleananna agus clár beartaithe ar an gcomhshaoil in Éirinn (m.sh. mórfheananna forbartha).

### COSAINN RAIDEOLAÍOCH

- Monatóireacht a dhéanamh ar leibhéal radaíochta, agus measúnacht a dhéanamh ar a oiread is atá muintir na hÉireann gan chosaint ar an radaíocht ianúcháin.
- Cabhrú le pleananna náisiúnta a fhorbairt le haghaidh éigeandálaí ag eascairt as tairmí núicléacha.
- Monatóireacht a dhéanamh ar fhorbairtí thar lear a bhaineann le saoráidí núicléacha agus leis an tsábháilteacht raideolaíochta.
- Sainseirbhísí cosanta ar an radaíocht a sholáthar, nó maoirsiú a dhéanamh ar sholáthar na seirbhísí sin.

### TREOIR, FAISNÉIS INROCHTANA AGUS OIDEACHAS

- Comhairle agus treoir a chur ar fáil d'earnáil na tionsclaíochta agus don phobal maidir le hábhair a bhaineann le caomhnú an chomhshaoil agus leis an gcosaint raideolaíoch.
- Faisnéis thráthúil ar an gcomhshaoil ar a bhfuil fáil éasca a chur ar fáil chun rannpháirtíocht an phobail a spreagadh sa chinnteoireacht i ndáil leis an gcomhshaoil (m.sh. Timpeall an Tí, Mapaí Radóin).
- Comhairle a chur ar fáil don Rialtas maidir le hábhair a bhaineann leis an tsábháilteacht raideolaíoch agus le cúrsaí práinnfhreagartha.
- Plean Náisiúnta Bainistíochta Dramhaíola Guaisí a fhorbairt chun dramhaíl ghuaiseach a chosc agus a bhainistiú.

### MÚSCAILT FEASACHTA AGUS ATHRÚ IOMPRAÍOCHTA

- Feasacht comhshaoil níos fearr a ghiniúint agus dul i bhfeidhm ar athrú iompraíochta dearfach trí thacú le gnóthais, le pobail agus le teaghlaigh a bheith níos éifeachtúla ar acmhainní.
- Tástáil le haghaidh radóin a chur chun cinn i dtithe agus in ionaid oibre, agus gníomhartha leasúcháin a spreagadh nuair is gá.

### BAINISTÍOCHT AGUS STRUCTÚR AN GCC

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

- An Oifig um Inbhuanaitheacht Comhshaoil
- An Oifig Forfheidhmithe i leith cúrsaí Comhshaoil
- An Oifig um Fhianaise agus Measúnú
- An Oifig um Chosaint Radaíochta agus Monatóireacht Comhshaoil
- An Oifig Cumarsáide agus Seirbhísí Corparáideacha

Tá Coiste Comhairleach ag an nGníomhaireacht le cabhrú léi. Tá dáréag comhaltaí air agus tagann siad le chéile go rialta le plé a dhéanamh ar ábhair inné agus le comhairle a chur ar an mBord.

