Rialtas na hÉireann
Government of Ireland

Ireland's integrated National Energy and Climate Plan 2021-2030

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Prepared by the Department of the Environment, Climate & Communications

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Preface

Our climate is changing rapidly and is transforming our world. Since 1850 there has been an increase of over 1.1°C in average global temperature, and the increase since 1970 has been faster than in any other 50-year period over at least the last 2,000 years. Warming is being propelled by increases in greenhouse gases (GHGs) in the atmosphere mainly produced when we burn fossil fuels and power industrial processes, together with emissions associated with land-use. Over the period 2013 to 2022, human-induced warming has been increasing at an unprecedented rate of 0.2°C per decade and reached 1.26°C in 2022. In 2024, the World Meteorological Organisation's Global Annual to Decadal Climate Update indicated that global temperatures are likely to surge to record levels in the next five years. The report suggested that there is an 86% chance that one of the years between 2024-2028 will set a new temperature record, beating 2023 which is currently the warmest year on record. Increased GHG emissions are being driven by unsustainable patterns of production and consumption.

Today, atmospheric carbon dioxide (CO_2) concentrations are higher than at any time in at least 2 million years, and concentrations of methane (CH_4) and nitrous oxide (N_2O) are higher than at any time in at least 800,000 years. The consequences of this are already apparent across Europe and throughout the wider world. There has been an increase in dangerous forest fires, extreme weather events, flooding, and droughts. This is already having an impact on infrastructure, food production, the natural environment, and public health. It is becoming increasingly clear that a concerted effort is required to reverse human impact on the climate as much as possible in the coming decades, on a global and local scale.

In 2015, UN Member States translated their vision of sustainable development into a blueprint for achieving it: the 2030 Agenda for Sustainable Development. Its 17 Sustainable Development Goals (SDGs) —with ambitious targets to achieve by 2030— cover the three dimensions of sustainable development: the economy, social development and the environment, and Action 23 of Ireland's National Implementation Plan 2021 – 2022 for the SDGs, outlines how all new national policies must incorporate reference to relevant SDGs and targets, and reflect how the policy interacts with Agenda 2030. An update to the National Implementation Plan, published in 2022, strengthened Ireland's commitment to implementation of structures to achieve the SDGs, setting out strategic objectives to achieve this, including embedding the SDG framework in Government and Local Authority work,

forging greater partnerships and stronger reporting mechanisms, and further incorporating the principle of Leave No One Behind into Ireland's implementation of the goals. The SDG framework provides a roadmap to a more secure, sustainable, and fairer global community and the principles that underpin the SDGs also inform the development of policy in Ireland, including the National Energy and Climate Plan (NECP).

At the EU level, the European Green Deal commits to delivering net-zero GHG emissions by 2050. It also increases the EU-wide GHG emissions reduction target to at least 55% for 2030 to limit warming to 1.5 °C and align with the goal of the Paris Agreement. The EU has completed work on the revision of its climate, energy and transport-related legislation under the 'Fit for 55 Package' in order to align current laws with the 2030 and 2050 ambitions. Ireland fully supports this enhanced ambition at EU level, while also recognising that the increased targets will present a challenge in the short-term. There will need to be a greater acceleration of efforts at a local and European-wide level in order to ensure that we are in a position to meet the objectives of the Green Deal.

The war in Ukraine has had a significant impact on the cost and security of our energy supply. In response to this, the EU launched the REPowerEU Plan in 2022 which aims to phase out the use of Russian fossil fuels and fast-forward the green transition. This includes enhanced energy savings, diversification of energy supplies and accelerated roll out of renewable energy in homes, industry and power generation by 2027. The resulting acceleration of targets have seen Europe and Ireland's 2030 targets on GHG emissions, renewable energy, and energy efficiency increase substantially. While many of these measures were necessary due to the gas supply crisis at the outbreak of the war, it has become clear that there are many co-benefits to decreasing reliance on imported fossil fuels and accelerating the rollout of renewables, from enhanced energy security to more stable energy prices.

At the national level, in 2015 the Irish Government enacted the Climate Action and Low Carbon Development Act 2015. The Act was further strengthened in 2021, the key aim is that the 'State shall … pursue and achieve, by no later than the end of 2050, the transition to a climate resilient, biodiversity rich, environmentally sustainable and climate neutral economy'. Ireland committed to meeting ambitious targets for reducing GHG emissions through a suite of policy documents including the Climate Action Plan (CAP), National Energy and Climate Plan (NECP) 2021-2030 and the National Adaptation Framework (2018 & 2024).

National Energy and Climate Plans (NECPs) are the framework within which European Union Member States must set out their climate and energy objectives, targets, policies, and measures to the European Commission. Member States were required to develop NECPs on a ten-year rolling basis. The aim is to outline our energy and climate policies in detail for the period from 2021 to 2030 and look onwards to 2050. The NECP covers five dimensions of the EU Energy Union:

- Decarbonisation
- Energy efficiency
- Energy security
- Internal energy markets
- Research, innovation and competitiveness

The NECP brings together the policies, targets, tools and associated material from across Government bodies and departments in one document. It provides clarity on what current measures are in place and highlights areas where further efforts are needed. The NECP consists of 5 chapters:

- Chapter 1 provides a general overview of policies and measures around energy and climate in Ireland and looks at the process of establishing the plan;
- Chapter 2 outlines national objectives and targets in the five dimensions of the Energy Union and gives a broad outline of how these policies are implemented;
- Chapter 3 discusses in more detail the current policies and measures that are in place relating to the five dimensions;
- Chapter 4 provides an analysis of the current situation along with data and projections for WEM and WAM scenarios, and;
- Chapter 5 explores the potential impacts and benefits of planned policies and measures, including areas like financing and employment.

The annual Climate Action Plan is the Irish Government's main vehicle for introducing new climate and energy policies and, as such, provides the basis of the content of the NECP. Climate Action Plan 2024 (CAP24) is the third annual update to Ireland's Climate action Plan. The Plan was approved by Government in 2023. CAP 2024 builds upon the previous Plan by refining and updating the measures and actions required to deliver the carbon budgets and sectoral emissions ceilings. CAP 24 provides a roadmap for taking decisive action to reduce Ireland's emissions towards 2030 and reach net zero by no later than 2050, as committed to in the Climate Action and Low Carbon Development (Amendment) Act

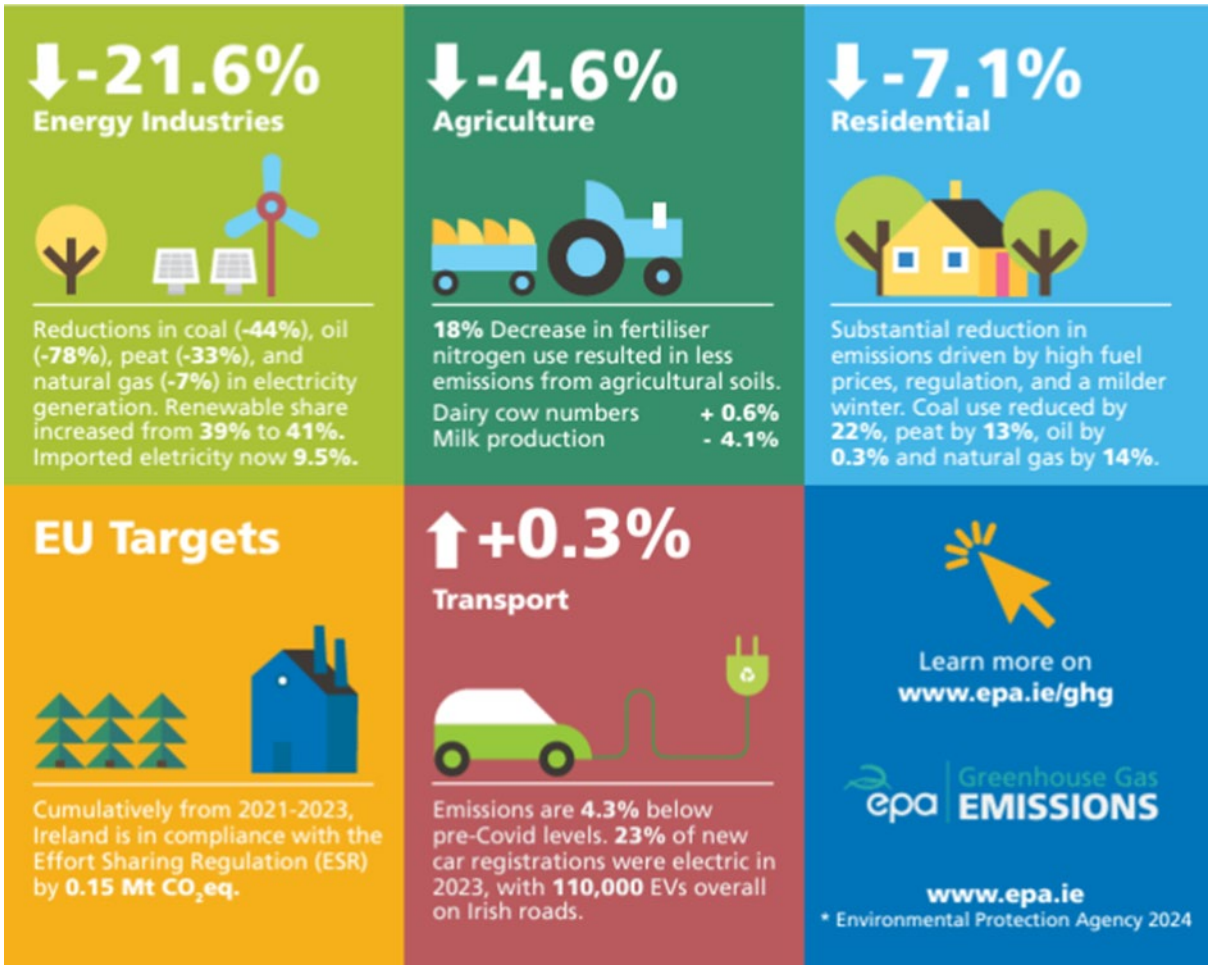
2021. The CAP details measures, policies and programmes which the State intends to deliver.

The climate and energy projections that underpin Ireland's NECP come from the annual reporting cycles of the Sustainable Energy Authority of Ireland (SEAI) and the Environmental Protection Agency (EPA). The SEAI are responsible for monitoring and reporting on Ireland's energy usage, covering areas like renewable electricity and energy efficiency. The EPA are responsible for monitoring and reporting Ireland's progress in reducing GHG emissions across different sectors. For both energy and climate projections, these are two scenarios that are projected; the With Existing Measures scenario and the With Additional Measures scenario.

- 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 2022 (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.
- 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.

There are restrictions on what can be included in both the WEM and WAM scenarios and they will not include all measures that the Irish Government have implemented, especially more recent policies that are less developed. Because of this, the WEM and WAM scenarios act as a snapshot of a point in time and provide a range of scenarios for how we will perform against our European targets if no further ambitious measures are introduced. It is clear from the projections that there are gaps to many of our targets. This will require further policy development and a broader effort from Irish society at large to ensure that we can close these gaps. While there will be many challenges involved in reaching the ambitious EU targets on GHG emissions, energy efficiency and renewable energy, the Irish government is committed to achieving these targets. The NECP provides an overview of the real progress we have made on climate change mitigation and energy policy in recent years but also shows that there are areas where we can accelerate our efforts.

Despite challenges in meeting our targets, and an obligation to improve our current trajectories, the policies we have implemented and the choices we are making as a society to reduce our emissions are working. Ireland's GHG emissions reduced by 6.8% in 2023 with reductions achieved in almost all sectors. This represents the lowest overall level in three decades and is below the 1990 baseline. This has been achieved against the backdrop of a growing economy and population. Emissions data show the largest single year reduction in the energy and agriculture sectors and the lowest level of residential emissions since 1990, while transport emissions were below pre-Covid levels.



The above figures show us that the policies enacted under previous Climate Action Plans are working and we should continue to see reductions in emissions as newer policies and supports deliver results over the coming years. It is critical that we build on this progress and implement, in full, Climate Action Plan 24 as well as focus on developing further measures to address areas where emissions remain high. This document lays out what the current state of play is in climate action and energy policy in Ireland, pointing to real progress in recent

decades. Climate change is one of the most pressing issues our society has faced, and this document shows that Ireland is committed to limiting its effects and transitioning to a carbon-neutral society.

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Minister’s Foreword

Climate Action is the most pressing long-term global challenge of our time and is a significant priority for this Government. Through our strengthened climate legislation, Our Shared Future, and our annually updated Climate Action Plan, we have set ourselves the ambition of halving Ireland’s greenhouse gas emissions by the end of the decade, and of putting Ireland on course to becoming carbon neutral by 2050. We are determined that Ireland will play its full part in EU and global efforts to stop climate change and, in so doing, harness the opportunities and rewards that will come from moving quickly to a low-carbon society.

The IPCC (Intergovernmental Panel on Climate Change) issued a 'final warning' in March 2023 that, with global warming having already reached 1.1°C above pre-industrial levels, climate change is causing widespread and increasingly irreversible losses and damages. This warning was amplified in March 2024 with the publication of the latest World Meteorological Organisation report. We have a rapidly closing window of opportunity to maintain a liveable and sustainable future for all.

Making the changes we must make will not be easy. However, I believe that Ireland can and will be leaders in taking climate action that protects us firstly from the impact of climate change already here, like flooding or extreme heat, and that ensures that we can continue to thrive as an economy and as a society – making homes warmer and more efficient with new green energy sources, creating new jobs and ensuring that our agricultural sector is viable and sustainable, for example.

While we have yet to see the large emissions reductions that will be required to achieve our goals, we will continue to put in place the policies and measures that will allow these reductions to be achieved over the remainder of the decade and beyond. We will also continue to deal with the climate change that is already upon us and strengthen our resilience to the adverse impacts of extreme weather events that are becoming increasingly frequent. The policies we have implemented through the Climate Action Plan are beginning to deliver results. Ireland’s GHG emissions reduced by 6.8% in 2023 with reductions achieved in almost all sectors. This represents the lowest overall level in three decades and is below the 1990 baseline. This has been achieved against the backdrop of a growing

economy and population. Emissions data show the largest single year reductions in the energy and agriculture sectors and the lowest level of residential emissions since 1990. This document outlines the framework within which we will deliver the emissions reductions required to meet our prescribed targets.

Eamon Ryan TD

Minister for the Environment, Climate and Communications

Section A: National Plan

1 Overview and Process for Establishing the Plan

1.1 Executive Summary

1.1.1 Political, economic, environmental, and social context of the plan

The UN Framework Convention on Climate Change (UNFCCC, 1992) was adopted with the objective of preventing 'dangerous anthropogenic interference with the climate system' and the Paris Agreement (2015)[1] established the long-term goals of 'holding the increase in global average temperature to well below 2°C above pre-industrial levels and pursuing efforts to limit the temperature increase to 1.5°C above pre-industrial levels' and of achieving 'a balance between anthropogenic emissions by sources and removals by sinks of greenhouse gases in the second half of this century'. Remaining within the 'safe' temperature limits outlined in the Paris Agreement 2015 will require radical changes in energy and land-use across the globe.

The Intergovernmental Panel on Climate Change (IPCC) Sixth Assessment Report which was completed in 2023 provides a clear message on the scale and pace of climate action required to avoid the worst impacts of climate change. "Deep, rapid and sustained mitigation and accelerated implementation of adaptation actions in this decade would reduce projected losses and damages for humans and ecosystems, and deliver many co-benefits, especially for air quality and health"[2].

[i]Widespread, pervasive impacts to ecosystems, people, settlements, and infrastructure have resulted from observed increases in the frequency and intensity of climate and weather extremes, including heat extremes on land and in the ocean, heavy precipitation events, drought, and fire weather[3]. These extremes are occurring simultaneously, causing

[1] UNFCCC (2015): Paris Agreement: Available at: ADOPTION OF THE PARIS AGREEMENT - Paris Agreement text English. Available at: https://unfccc.int/sites/default/files/english_paris_agreement.pdf

[2] IPCC (2023). Climate Change 2023 Synthesis Report. Available at: https://www.ipcc.ch/report/ar6/syr/downloads/report/IPCC_AR6_SYR_LongerReport.pdf

[3] IPCC (2023). Climate Change 2023 WGII, SPM. Available at: https://www.ipcc.ch/report/ar6/wg2/chapter/summary-for-policymakers/

cascading impacts that are increasingly difficult to manage. Human activities, principally through emissions of greenhouse gases have caused global warming, with global surface temperature reaching 1.1°C above 1850–1900 levels in 2011–2020.

Across Ireland, annual average temperatures are now approximately 1°C higher than the early 20th century with 16 of the 20 warmest years occurring since 1990, and 2022 being the hottest year on record to date. Overall, there has been an increase in heavy precipitation extremes over Ireland across a range of indicators. Recent studies have highlighted higher rates of sea level rise than the global average since the late 20th century in Cork and Dublin[4].

Climate change is a multigenerational issue. Many aspects of the climate system are fast responding and when we stop emitting, they will stabilise. Other aspects, however, are irreversible in our lifetimes: such as the rise in sea levels. It is essential, therefore, that we act now to protect future generations from the worst effects of climate change. Climate change risks to cities, settlements and key infrastructure will rise rapidly in the medium- and long-term with further global warming, especially in places already exposed to high temperatures, along coastlines, or with high vulnerabilities. To avoid loss of life, biodiversity, and infrastructure, accelerated action is required to adapt to climate change. Here in Ireland, we will need to increase the rate of decarbonisation activities across all sectors of the economy. It will involve a significant change in lifestyles over the period to 2030. The necessary rate of change is unprecedented in terms of scale and speed. Irish national policy for 2050 is to work toward a climate neutral society and this is reflected in policies across Government. These changes can enhance our environment and people's lives as we move to a greener, carbon neutral, energy indepednent and fairer society.

In 2015 the Government enacted the Climate Action and Low Carbon Development Act 2015, which provides for the approval of plans by the Government in relation to climate change. The Climate Action and Low Carbon Development (Amendment) Act 2021 strengthens the governance framework on climate action. The key aim is that the 'State shall … pursue and achieve, by no later than the end of 2050, the transition to a climate resilient, biodiversity rich, environmentally sustainable and climate neutral economy'. Ireland committed to meeting ambitious targets for reducing GHG emissions in the short (2020),

[4] Clare Noone, Deirdre McClean, Danielle Gallagher, Jennifer McElwain, and Peter Thorne, 2023, IRELAND'S CLIMATE CHANGE ASSESSMENT Summary for Policymakers in Volume 1: Climate Science – Ireland in a Changing World, Environmental Protection Agency, Ireland, 22 pp.

medium (2030) and longer term (2050) through a suite of policy documents including the Climate Action Plan (CAP), National Energy and Climate Plan (NECP) 2021-2030, Long Term Strategy on Greenhouse Gas Emissions Reductions and the National Adaptation Framework (2018 & 2024).

The transition to a climate-neutral society in Ireland is both an urgent challenge and an opportunity to build a resilient future for generations to come. Climate neutrality, which takes into account all greenhouse gasses (as opposed to net zero CO_2, which looks at CO_2 only), is a state in which human activities contribute no additional net effect on our climate system.

Transformative change can deliver rapid, deep and sustained emissions reduction, build resilience to impacts and deliver a range of benefits and opportunities. Such an approach can realise benefits for the wellbeing of people and nature and achieve greater equity across society. Pursuing transformative change allows the realisation of opportunities that would be missed if such a holistic and systemic approach is not followed. Realisation of transformative change can entail mobilising society to fundamentally reorganise the systems driving greenhouse gas emissions, biodiversity loss and vulnerability to the impacts of climate change[5].

Ireland is currently experiencing the impacts of climate change and will need to be resilient to ongoing and future climate change impacts. Recent years have seen erratic weather patterns, exemplified by extended wet periods in Ireland in 2023 and 2024, adversely affecting agricultural yields and harvests, underscoring the urgent need for proactive measures to reduce or remove its effects.

Ireland's second statutory National Adaptation Framework (NAF), which was approved by Government in June 2024 sets out a pathway to achieving a more resilient economy and society which can deal with the enormous challenges climate change is likely to present. The NAF and the Sectoral Adaptation Plans developed under it are the primary adaptation policy documents at national level aimed at better integrating adaptation across Government. The flood risk sectoral adaptation plan, for example, prepared by OPW, will inform the significant capital investment in flood adaptation measures to be made over the lifetime of the Ten-Year Capital Plan. Climate change affects everyone but not equally. We need to engage, enable,

[5] Róisín Moriarty, Tadhg O'Mahony and Agnieszka Stefaniec, Jean L. Boucher, Brian Caulfield, Hannah Daly and Diarmuid Torney, 2023, IRELAND'S CLIMATE CHANGE ASSESSMENT Volume 4: Realising the Benefits of Transition and Transformation, Environmental Protection Agency, Ireland, 284 pp.

and empower organisations, and individuals. Under the National Dialogue on Climate Action (NDCA) the annual Climate Conversations is the mechanism through which the Government can engage with a range of people across society. In 2023, the NDCA expanded its outreach to proactively engage with populations not yet engaged with, and those particularly vulnerable to the transition to carbon neutrality through focus groups, workshops and interviews as well as focusing in on issues of significant concern; namely the gap emerging between people's intention to take climate action and their capacity to do so.

The second wave of the EPA's Climate Change in the Irish Mind survey published in February 2024 shows that there is widespread agreement within the Irish public on many climate change attitudes and strong majority support for climate action. The findings indicate that 89% of people report that change is important to them personally and 79 % say climate change should be either a "very high" or "high" priority for Government, with high overall support for a range of climate action policies. Irish people think that climate action will increase economic growth and create jobs (56%), and actions to reduce climate change will improve quality of life in Ireland (74%).

Overview of key objectives, targets, and contributions in the NECP

The European Green Deal, the fast-evolving geopolitical context and the energy crisis have led the EU and its Member States to accelerate the energy transition and set more ambitious energy and climate objectives. These developments are reflected in the legislative and policy framework adopted under both the 'Fit for 55' package[6], the REPowerEU Plan (2022), the Recovery and Resilience Facility (2020) and the Green Deal Industrial Plan (2023).

Further initiatives to support the green transition that followed the Commission's presentation of the European Green Deal and Fit for 55 Package include:

- The Recovery and Resilience Facility (2020): Recover from the pandemic better prepared for the green and digital transitions;
- REPowerEU (2022): Respond to energy market disruption caused by Russia's invasion of Ukraine with affordable, secure and sustainable energy for Europe, and;

[6] Fit for 55: reducing emissions from transport, buildings, agriculture and waste. Available at: https://www.consilium.europa.eu/en/infographics/fit-for-55-effort-sharing-regulation/

- The Green Deal Industrial Plan (2023): Build the industrial capacity for the clean technologies that make up the Green Deal.

Taking this new context into account, Member States have updated their National Energy and Climate Plans (NECPs) for the first time since 2019. The European Commission has assessed Ireland's draft updated NECP, submitted on 8 December 2023.

In February 2024 the Commission published country-specific recommendations on the Draft NECPs for each Member State. Ireland has sought to address the EC recommendations in this document.

1.1.2 Strategy relating to the five dimensions of the Energy Union

Historical emissions in Ireland differ to most other developed countries, with the most rapid growth in activity taking place from 1960. Following a peak in 2005, the economic downturn led to a fall in energy-related CO_2 emissions until a recovery in 2012. The Irish economy has recovered well from the economic crisis. However, the improved economic outlook in recent years has seen emissions grow once more, highlighting that Ireland has not completely broken the link between emissions and economic growth. Ensuring the complete decoupling of energy consumption from economic and population growth will be vital in successfully decarbonising our economy. In the context of COVID-19, emissions in Ireland decreased by 3.5% in 2020 and rose again by 5.1% in 2021 as some sectors recovered. More recent trends have seen emissions fall in the last two years with GHG emissions reduced by 1.9% in 2022 and 6.8% in 2023. This reduction has been achieved against the backdrop of continued economic and population growth.

Prior to Russia's invasion of Ukraine, analysis. was already being undertaken in relation to the security of Ireland's electricity supply. Potential supply challenges have been highlighted by energy experts and EirGrid's annually released planning statements have highlighted vulnerabilities in the grid due to tight supply-demand margins, and a need to upgrade key elements of our electricity generation and transmission infrastructure. Ireland is committed to achieving an energy resilient union with a forward-looking climate policy.

This Plan builds on previous national strategies and sets out in detail our objectives regarding the five energy dimensions together with our planned policies and measures to ensure that we achieve those objectives. In June 2019, the Government agreed to support

the adoption of a net zero target by 2050 at EU level, and to pursue a trajectory of emissions reduction nationally which is in line with reaching climate neutrality in Ireland by 2050.

Decarbonisation – GHG Emissions and Removals

Building on the policy framework of the National Mitigation Plan (NMP) and Project Ireland 2040, the Government published its first CAP in June 2019. Following the introduction of the Climate Action and Low Carbon Development (Amendment) Act 2021, updates to CAP are required annually with Plans published in 2021, 2022, 2023 and 2024. The CAPs set out how Ireland will achieve its 2030 emission reduction targets compared to 2018 levels, in a manner consistent with a trajectory to achieve climate neutrality by 2050. The CAPs must also include a roadmap of actions to achieve Ireland's carbon budgets and sectoral emission ceilings and address any failure or projected failure to meet these requirements.

The Non-ETS (Emissions Trading System) sector accounts for 75% of total EU emissions in Ireland. The "Effort Sharing Regulation" (ESR) enshrines a GHG emissions reduction target for Ireland of 42% by 2030 relative to 2005 levels. CAP sets out a number of high-impact actions that need to be taken and which embraces every relevant sector: electricity, industry, enterprise, housing, heating, transport, agriculture, waste, and the public sector.

Reflecting the central priority of climate change in our political and administrative systems into the future, Ireland is continuing to develop new governance arrangements including carbon-proofing our policies to assess the climate impact of policy proposals, establishment of carbon budgets, a strengthened Climate Change Advisory Council (CCAC)[7] and greater accountability to the Parliament. We have introduced measures to ensure that citizens become engaged and mobilised to take climate action, while ensuring that the necessary societal and economic transition that we must make is fair, both in Ireland and globally.

The CCAC is an independent advisory body tasked with advising on how Ireland can achieve the transition to a climate-resilient, biodiversity-rich, environmentally sustainable, and climate-neutral economy. The Council was established in January 2016, under Section 8 of the Climate Action and Low-Carbon Development Act 2015. The CCAC provides annual and periodic reports on Irelands progress in achieving its national policy goals and GHG emissions targets agreed by the European Union. The Council also has a wide-ranging work programme to provide continuous input to and assessment of national climate change

[7] Home | Climate Change Advisory Council (climatecouncil.ie)

initiatives. In addition to this, the Council are involved in preparing and proposing carbon budgets to ensure they align with the national climate objective.

Decarbonisation – Renewable Electricity

Ireland has excellent renewable energy (RE) resources. These are a critical and growing component of Irish energy supply and a keystone in enabling widespread decarbonisation. Indigenous RE already plays a vital role in our domestic fuel mix. The share of RE sources used in the generation of electricity in Ireland has increased from 5% in 1990 to 36.4% in 2021 and renewable fuels accounted for 4% of Ireland's total final energy consumption (FEC) in 2021. Ireland has the potential to dramatically increase the supply of wind, solar, marine and bioenergy alongside developing new technologies that support the integration of renewables. RE also increases sustainability through the use of clean power sources, improves air quality where replacing solid fuels and enhances energy security by reducing Ireland's dependence on imported fuels.

Ireland has established an ambitious and challenging target of increasing the percentage of electricity generated from renewable sources from around 40% to 80% (annual average) by 2030. There are also plans to increase the electricity network's capacity to accommodate variable renewable energy at a given moment in time from 75% currently to 95-100% by 2030 to support national decarbonisation objectives. Ireland is committed to delivering a complete phase-out of coal and peat-fired electricity generation. In order to facilitate the unprecedented level of development required, alignment between different elements of the planning and permitting system to support the accelerated rollout of renewable energy generation infrastructure is urgently required. This will require a supportive policy framework is in place across national, regional, and local levels. The first revision to the National Planning Framework is currently underway, and is scheduled for public consultation, with the final revised NPF to be brought to Government for approval in September 2024.

Ireland adopted a phased approach to the transposition of Directive 2018/2001 of the European Parliament and of the Council of 11 December 2018 on the promotion of the use of energy from renewable sources ('RED II'). Phase 1 was completed in September 2020 by way of SI 365/2020. Phase 2 was completed in February 2022 by way of SI 76/2022, which legally transposed Articles 21 and 22.

Phase 3 was completed by way of SI 350/2022 in May 2022. This represented significant progress in Ireland's transposition of RED II. This included, among other things, the legal

transposition of Article 19 in relation to the supervisory framework required for guarantees of origin for gas, Article 25 in relation to mainstreaming RE in the transport sector, and the verification of biomass fuels and bioliquids with the sustainability and GHG emissions criteria under Articles 29 and 30.

In addition, the guidance function for the Single Point of Contact under Article 16 was assigned to the Sustainable Energy Authority of Ireland ('SEAI') under SI 350/2022. The SEAI launched their website in October 2023, providing guidance to applications for RE projects.

Directive 2023/2413 ('RED III'), which amends Directive 2018/2001 ('RED II'), came into force in November 2023. RED III sets a binding renewable energy target for the EU of at least 42.5% by 2030. Member States shall collectively endeavour to reach 45% by 2030.

Following a decision by the Government of Ireland, Ireland's objective is to contribute to this target by achieving a 43% share of renewable energy in total energy consumption by 2030. This target will be achieved through a variety of policies and measures, including those set out in annual Climate Action Plans. Under CAP 2023 and 2024, a number of cross-government taskforces have been established to address the challenge of implementing cross-cutting actions and drive delivery in key areas, including in the context of renewable energy.

For example, the Accelerating Renewable Electricity Taskforce has been established, whose functions include coordinating elements of compliance with EU legislation, including RED III. Preparations for transposition and implementation of the broader requirements of RED III within the required timelines are also underway.

In relation to the timeframes for the permit-granting process under the Renewable Energy Directives, a comprehensive review of the Planning and Development Act 2000 (as amended) was initiated in May 2021, led by the Office of the Attorney General. This process included extensive stakeholder engagement, particularly with the Planning Advisory Forum established in December 2021. The review culminated in the publication of the draft Planning and Development Bill 2022 in January 2023. The draft Bill subsequently underwent a very extensive pre-legislative scrutiny process over a three-month period, undertaken by the Joint Oireachtas Committee on Housing, Local Government and Heritage. Taking consideration of this and further stakeholder engagement, the Bill was further updated and on 3rd October the Cabinet agreed the publication of the Planning and Development Bill

2023. The Bill was published on 22nd November 2023 with a guide to the Bill published by the Department on 3rd October 2023. The Bill completed Report Stage in the Dáil on 12 June 2024.

Second Stage in the Seanad was completed on 27 June 2024.The Bill will now proceed to Seanad Committee Stage on 15 July 2024 and is intended to fully complete all legislative stages in the Oireachtas in the autumn. A parallel programme to update the associated regulations is well underway. The Bill, once enacted, will be enacted on a phased basis over a period of 12-18 months to allow the planning system to embed the changes contained therein.

As the new Planning and Development Bill will be commenced on a phased basis over the next 21 to 18 months, legislative amendments to the existing planning code are well advanced which aim to transpose the permit granting timelines provided for in RED III as soon as possible.

In Ireland, the Commission for Regulation of Utilities (CRU) is responsible for grid connection policy. In accordance with the Climate Action Plan, the CRU has been tasked with reviewing and publishing a successor to the annual Enduring Connection Policy (ECP), which has been the main pathway for large-scale generators, storage and other system service providers to connect to the electricity system since 2018. The aim of this new policy, the Electricity Generation & System Services Connection Policy, which will be published in Q3, 2024, is to support the decarbonisation of the electricity sector, facilitate ambitious renewable targets and accelerate the pace of grid connections for renewable projects. The Electricity Generation & System Services Connection Policy will require significant changes to previous iterations of the Enduring Connection Policy and include a review of timelines to support the implementation of Article 16 of the Renewable Energy Directive which seeks to reform the permit-granting procedures for renewable projects.

In addition to the development of a new grid connection policy, the CRU is acutely aware that urgency is required in relation to grid upgrades and reinforcements to meet renewable energy targets and timelines. To make the most efficient use of the electricity grid and assist with connecting renewables to the electricity system, last year a proposal was made by the System Operators to the CRU for the introduction of Renewable Hubs.

Renewable hubs involve the anticipatory building of substations in selected areas based upon the known pipeline of renewable projects with planning permission or in the planning

process. The Government is of the view that renewable hubs have the potential to be one of the key enablers for connecting renewable projects at the pace and scale required for Ireland to meet its decarbonisation targets to 2030 and beyond. Following consultation, a decision paper was published by the CRU last year which saw the approval of a renewable hubs pilot to take place at five locations on the distribution network, running in parallel with the opening of the ECP-2.4 batch window in October 2023. As well as supporting RED permitting timelines, by streamlining the connection offer process, renewable hubs can help optimise the use of critical grid infrastructure and reduce the need for costly interventions on the distribution and transmission network.

Energy Efficiency

Ireland recognises the major economic, environmental, health and social benefits arising from embracing energy efficiency. These benefits include:

1. Financial savings and reliable investment returns for households and businesses.
2. Enhanced cost competitiveness for businesses.
3. Reduced usage of fossil fuels and associated greenhouse gas emissions, assisting Ireland to meet its climate obligations.
4. Enhanced energy security, giving greater certainty to businesses and households given Ireland's very high dependence on energy imports.
5. Improved air quality and associated health outcomes
6. A reduction in energy poverty and enhanced financial and health outcomes for vulnerable citizens.
7. Job creation through retrofitting and other schemes.

Ireland successfully achieved its 2020 energy efficiency targets under the 2012 Energy Efficiency Directive (EED), updated in 2018, and has made considerable progress since then. Further improvement in energy efficiency is central to our transition to a low carbon economy and society.

The Recast EED, which came into force in October 2023, requires all Member States to reduce their final energy consumption (FEC) across the EU to 763 million tonnes of oil equivalent (Mtoe) by 2030.

On 20th February 2024, the Government of Ireland approved Ireland's indicative national energy efficiency contribution under Article 4 of the EED. Ireland's indicative national energy efficiency contribution is 10.451 Mtoe in Final Energy Consumption (FEC) and 11.294 Mtoe in Primary Energy Consumption (PEC) by 2030, which represents a 12.6% reduction in Ireland's FEC relative to 2022. This reduction in energy use is extremely ambitious and goes beyond what would be delivered by existing policies, particularly in the context of Ireland's fast-growing population and economy. A cross-government Interdepartmental Working Group on the Energy Efficiency Directive has been established to tackle this challenge, and to oversee the implementation of the EED in Ireland.

While there is significant potential for energy efficiency gains in Ireland from the electrification of heat and transport, Ireland's population continues to grow very strongly, and is expected to increase by 4.69% by 2030.[8] According to Eurostat, Ireland is projected to have the 3rd highest percentage increase in population in the EU up to 2030, behind only Malta and Luxembourg, both Member States with far smaller populations. Ireland has also had significantly faster GDP growth than projections anticipated, including in the Primes model for Ireland. With a growing population and a growing economy, Ireland aims to achieve the 'twin transitions' of economic growth and decarbonisation of our economy and society, but the challenges are significant. These transitions can and must be complementary. While the EED makes no distinction between renewable and fossil-fuel based energy, the reduction of fossil fuel energy demand will be Ireland's priority, to best meet the challenge of decarbonising Ireland's economy and society.

Under Article 3 of the Recast EED, Ireland must implement the Energy Efficiency First Principle across planning, policy, and major investment decision processes, as required. We are currently considering how to most effectively achieve this, in the context of specific governance and legal structures. Pending receipt of additional guidance from the European Commission, consideration is currently being given as to whether adaptations need to be made to the following processes to embed the Energy Efficiency First Principle across all major planning, policy, and investment decisions in Ireland:

- Consideration of whether any elements of the Energy Efficiency First Principle need to be reflected in Ireland's planning or building control processes, at the appropriate level.

[8] https://ec.europa.eu/eurostat/databrowser/view/proj_23np/default/table?lang=en

- Consideration of how the Energy Efficiency First Principle can be accounted for within the public spending appraisal processes.
- Consideration of how the Energy Efficiency First Principle can be incorporated within the policies governing the energy infrastructure system.

Given the large share of FEC used in the transport sector in Ireland (41.7% in 2022), it is noted that the National Investment Framework for Transport in Ireland (NIFTI, published December 2022) already commits to identifying and delivering future investment in a sustainable manner, and establishes decarbonisation as an investment priority. NIFTI objectives are aligned, in general means, to energy efficiency first principles. The framework encourages the use of active travel and public transport ahead of solutions reliant on private transport and seeks to ensure that the maintenance and optimisation of existing assets (including through demand management), is also preferred to extensive enhancements or outright new infrastructure.

Where further Energy Efficiency First criteria may be introduced within Central Government's Infrastructure Guidelines, then the Department of Transport's sectoral specific appraisal and implementation guidance, the Transport Appraisal Framework, will be updated accordingly. While the precise combination of mechanisms required to implement the Energy Efficiency First Principle has yet to be finalised, Ireland is committed to embracing the Energy Efficiency First Principle as a key stepping stone towards creating a more sustainable, competitive and resource efficient society.

Energy Security

Ireland's objectives are to maintain and, where necessary, facilitate the enhancement of resilience of our electricity and gas networks. Ireland is committed to maintaining the security of our energy system in the most cost-effective manner and Ireland is aware of the risks posed by the impacts of climate change to our energy security. The policies and measures set out under this Plan, both in terms of mitigation and adaptation, serve to offset those risks. The impact of the wide range of policies and measures aimed at increasing energy efficiency will contribute considerably to ensuring security of our energy system. DECC published the Energy Security in Ireland Report to 2030[9] in November 2023. This report outlines a new strategy to ensure energy security in Ireland for this decade, while ensuring a sustainable

[9] Energy Security in Ireland Report to 2030 Available here: gov - Energy Security in Ireland to 2030 (www.gov.ie)

transition to climate neutrality by 2050. Given the increasing dependence of electricity production on natural gas and the increasing dependence on imports from the United Kingdom (UK), it is important that close co-operation on security of supply continues with EU Member States and the UK. The comprehensive report, which has 28 actions in total, is a roadmap to ensuring a sustainable, affordable, and secure energy landscape that balances energy risk and resilience against our binding European and domestic energy and climate commitments.

Informed by the Government's energy security policy objectives – to ensure energy is affordable, sustainable, and secure – the review considered the risks to oil, natural gas, and electricity. This Energy Security review sets out a strategic approach to ensure a secure transition for Ireland's energy systems in line with its climate objectives. It considers lessons, including the disruption to European energy supplies following the invasion of Ukraine and the domestic capacity shortfall experienced in the electricity sector.

The Energy Security in Ireland Report to 2030 states that Ireland must ensure energy security is prioritised, monitored, and reviewed regularly. It includes a range of measures to implement this approach in the short and medium term by prioritising:

1. Reduced and Responsive Demand.
2. More Resilient Systems.
3. Robust Risk Governance.
4. Renewables Focus.

Under each of these four areas, the report sets out a range of mitigation measures, including the need for additional capacity of indigenous RE but also energy imports, energy storage, fuel diversification, demand side response and renewable gases. The governance structures supporting the energy system, including oversight and accountability reforms were also examined. The need for increased cooperation with EU Member States and the UK is set out in Action 23 of the Energy Security in Ireland to 2030 strategy where the Government has committed to extend international Energy Agreements to support energy security.

Internal Energy Market

Ireland's wholesale electricity market, together with other related initiatives, form an interlinked policy-aligned system of measures which underpin and facilitate greater renewable electricity penetration in Ireland and progressive decarbonisation of its wholesale

electricity sector, and ensure efficiency and security of electricity supply. Ireland's national objective relating to the EU internal energy market (IEM) is, and has been over the long term, to continue to deepen the integration of Ireland's wholesale electricity market, and its regulation, with the EU IEM, building on well-known ongoing plans, programmes, and actions.

As of 1st January 2021, the Day Ahead Market (DAM) in the Single Electricity Market (SEM) is no longer coupled, with cross border trading taking place only in the intraday timeframe (IDA) with Great Britain (GB). Scheduling of flows on each of the interconnectors is determined by the price spread between the SEM and GB in the IDA 1 and IDA 2 auctions. The Trade & Cooperation Agreement (TCA) provides a mechanism to ensure that the current system is made more efficient and should be based on the concept of multi-regional loose volume coupling (MRLVC). Ireland is committed to supporting customers' participation in the energy system and enabling them to sell excess electricity they have produced back to the grid. Ireland's peripheral location at the north-western edge of mainland Europe presents obvious challenges to interconnection, not least in costs, yet may also highlight the desirability of interconnection, particularly in the context of security and diversification of electricity supply. The national and regulatory policies combined have now created a model environment for the proposal of additional interconnection, as appropriate, to assist in meeting our national targets.

Research, Innovation and Competitiveness

Given the level of Ireland's ambition regarding reduction of GHG emissions new low-carbon technologies must be developed in the coming years. There is a need to ensure that the best scientific evidence is available to underpin policy and support the measures set out under this Plan. The national research and innovation strategy, Impact 2030, positions research and innovation (R&I) at the heart of addressing Ireland's societal, economic, and environmental challenges and identifies 'Climate, Environment and Sustainability' (including energy) as a key challenge area. It commits to maximising the collective impact of research and innovation in meeting Ireland's climate targets. To enhance the resilience of Ireland's economy, the Government will continue its efforts to reduce the debt and deficit levels and avoid any narrowing of the tax base.

Ireland has built a strong research and innovation (R&I) system in recent years, comprising of actors from the academic, public, private, and non-profit sectors. The creation of a new Research and Innovation Agency, provided for in the Research and Innovation Bill 2023, will

increase the opportunities to fund the multi-, and trans-disciplinary research that is needed. Research Classification Ireland was published and will help to classify public investment in R&I, facilitating improved insights, evidence, and transparency in relation to publicly funded climate and energy research.

The Sustainable Energy Authority of Ireland (SEAI) and the Environmental Protection Agency (EPA) play a strong role in delivering and funding energy and climate-related research. They are supported by a wide range of domain-specific and domain-agnostic research funders, including Science Foundation Ireland, the Irish Research Council and Geological Survey Ireland.

Collaboration with our international partners is essential; Ireland participates in a range of climate and energy-relevant EU and international networks, EU Partnerships and Horizon Europe collaborative R&I projects and initiatives. Ireland is active in international organisations including the International Energy Agency (IEA), the IPCC, WMO (World Meteorological Organisation) and GCOS (Global Carbon Observing System), and actively engages with the UNFCCC. The Environmental Protection Agency (EPA) is coordinating Irish participation in the Integrated Carbon Observation System Research Infrastructure Consortium (ICOS-RI). DECC is supporting participation by Dublin and Cork cities in the Horizon Europe Climate-Neutral and Smart Cities Mission, Galway City in the Horizon Europe Net Zero Cities Pilot Cities Programme, and seven Local Authorities have signed the Climate Adaptation Mission Charter.

Ireland has ongoing and emerging plans to deliver low-carbon technologies such as geothermal energy, solar, on-shore and off-shore wind, renewable hydrogen, biomethane and carbon capture and storage. These are outlined in the annual Climate Action Plans and a range of sectoral policy/ strategy documents.

1.1.3 Overview table with key objectives, policies, and measures of plan

Table 1: Key objectives, policies, and measures of the plans

Dimension	Objectives	Key Policies and Measures
Decarbonisation - GHG emissions and removals	Ireland has committed to a legally binding national target of climate neutrality by 2050. Under the Effort Sharing Regulation Ireland's target is a 42% reduction in GHG emissions from sectors outside the EU's Emissions Trading System by 2030, relative to 2005 levels.	• A range of policies and measures promoting RE and EE (set out further below). • Launch targeted calls under Climate Action Fund • Trajectory of carbon pricing to create behavioural change and avoid locking in carbon intensive technologies. • A system of 5-year carbon budgets and sectoral targets. • Carbon proofing all Government decisions and major investments. • 2021 Climate Action Act included a 2050 target. • Eliminate non-recyclable plastic and impose higher fees on the production of materials which are difficult to recycle. • Implement measures to ban single-use plastic plates, cutlery, straws, balloon sticks and cotton buds. • Promote the sustainable development of Ireland's geothermal resources in support of Ireland's climate action commitments (a Policy Statement on Geothermal Energy was published in July 2023) • Ensure a stable, robust, and transparent regulatory framework that maximises the contribution that sustainable mineral exploration and mining can make to our society, economic development, and the transition to net-zero GHG emissions through the supply of the raw materials necessary for our sustainable development. (a Policy Statement on Mineral Exploration and Mining was published in December 2022) • Expanding the network of cycling paths and "Park and Ride" facilities. • Making growth less transport intensive through better planning, remote working, and modal shift • Specified range of improvements in farming practice in line with recommendations from Teagasc. • Promoting the increased use of domestic harvested wood in longer lived products, which will enhance the storage of carbon in these products and act as a substitute for materials with a higher carbon intensity. • Deliver expansion of forestry planting and soil management to ensure that carbon abatement from land-use is delivered in 2021-30 and in the years beyond. • Support diversification within Agriculture and land use to develop sustainable and circular value chains and business models for lower carbon intensity farming. • Reduce the vulnerability of the State to the negative effects of climate change and to avail of any positive impacts that may occur. • Mainstream biodiversity across the decision-making process in the State.
Decarbonisation - Renewable energy	Ireland has established an objective of achieving a 43% share of RE by 2030. Increase electricity generated from renewable sources to 80%	• Accelerate the delivery of onshore wind, offshore wind, and solar through a competitive framework to reach 80% of electricity demand from RE by 2030; • Target 6 GW of onshore wind and up to 5 GW of solar by 2025; • Target 9 GW onshore wind, 8 GW solar, and at least 5 GW of offshore wind by 2030 • Support at least 500 MW of local community based RE projects and increased levels of new micro-generation and small-scale generation. • The National Smart Metering Programme will make smart meters available for every home by the end of 2024.

		• Support the ocean energy research, development and demonstration pathway for emerging marine technologies and associated test infrastructure. • Accelerate the penetration of EVs so that 30% of our private car fleet is switched to electric by 2030, underpinned by policy tools such as vehicle and fuel taxation measures, and a strong carbon tax trajectory. • Increase the proportion of renewable transport fuel in road transport through the renewable transport fuel obligation (RTFO). • No diesel-only purchases for urban public buses from July 2019 onwards. • Develop the alternatively fuelled infrastructure network to support the uptake of zero-and renewable transport fuelled vehicles in line with the Alternative Fuels Infrastructure Regulation. • Target delivery of up to 2.7 TWh of district heating by 2030 • Target delivery of up to 5.7 TWh of indigenously produced biomethane by 2030 • Increase the proportion of heat delivery from renewable sources through the introduction of a Renewable Heat Obligation • Development of a Heat Policy Statement • Publication of a Roadmap for the Phase Out of Fossil Fuel Heating Systems
Energy efficiency	Reduce Ireland's Final Energy Consumption to 10.451 Mtoe and Primary Energy Consumption to 11.294 Mtoe by 2030, contributing to the achievement of the EU's overall target of 763 Mtoe in FEC and 992.5 Mtoe in PEC, in line with Article 4 of the EED. Reduce FEC in the public sector by 1.9% each year compared to 2021, in line with Article 5 of the EED. Meet obligations in accordance with the requirements of Article 6 of the EED. Achieve end use energy savings, via the Energy Efficiency Obligation Scheme and additional measures, in line with the targets set out in Article 8 of the EED. Implement the Energy Efficiency First Principle across planning, policy and major investment decision processes.	<u>Overarching & Cross-Sectoral Policies:</u> • Increase electricity generated from renewable sources to 80%, reducing transformation losses and reducing overall PEC. • Reduce fossil fuel use from 64% of final consumption (2021) to 45% by 2025 and further by 2030. • Implement the Energy Efficiency First Principle, as defined in the Governance Regulations on the Energy Union, (Regulation (EU) 2018/1999), in planning, policy and major investment decisions for projects over €100 million or public transport projects over €175 million, as required under Article 3 of the EED. <u>Transport Measures (41.7% of FEC in 2022)</u> • Continue to embed practice and use of 'Avoid-Shift-Improve' principles in all major transport and climate policies, and application of the intervention and modal hierarchies established in the National Investment Framework for Transport in Ireland (NIFTI) in future transport scheme appraisal, to better align with energy efficiency first principles. • Finalise and implement a national transport demand management strategy, in line with CAP ambition of reducing total vehicle kilometres (relative to projected 2030 business-as-usual) by 20%, and draft 'Moving Together' strategy. • Facilitate modal shift from private car usage through continued investment in major public transport infrastructure, including BusConnects in each of our five cities, DART+ rail programme, Cork Commuter Rail, and for delivery beyond 2030, MetroLink. • Facilitate modal shift from private car usage through continued investment in public transport services, such as NTA's Connecting Ireland Rural Mobility Programme, which seeks to ensure that 70% of rural communities have enhanced access to public transport services that provide at least three return trips to the closest large town. • Ensure that Metropolitan Area Transport Strategies in each of our five cities reflect national climate ambitions. • Encourage greater levels of walking, wheeling, and cycling over private car usage through accelerated delivery of e.g. Safe Routes to School programme, Sustainable Mobility Policy Pathfinder schemes, and National Cycle Network and Cycle Connects strategies. • Support the uptake of c. 845,000 private electric vehicles (c.30% of anticipated future fleet share) through

		implementation of National EV Charging Infrastructure strategy, and in line with EU AFIR Regulation (EU) 2023/1084 requirements. • Support the uptake of c. 95,000 commercial electric vehicles (c. 20% of anticipated future fleet share) and c 3,500 low-emission trucks and 1,500 EV buses in the public transport fleet. • In line with the Global Memorandum of Understanding on Zero-Emission Medium and Heavy-Duty Vehicles, target 30% of new MHDV sales to be zero-emission by 2030. • Triple length of electrified rail services (from c. 50km to 150 km) under DART+ programme and develop long-term plan for rail network in line with Strategic Rail Review. <u>Residential (22.5% of FEC in 2022)</u> • All new dwellings built to NZEB standard from 1 November 2019. All new "Buildings other than dwellings" are built to NZEB from 1st Jan 2019. • Setting stricter requirements for new buildings and substantial refurbishments, in line with the Energy Performance in Buildings Directive. • Range of measures set out in the National Retrofit Plan and Climate Action Plan which set out the measures to achieve the equivalent of 500,000 homes retrofitted to a B2 Building Energy Rating or cost optimal equivalent by 2030. • 680,000 heat pumps installed over the period 2021- 2030 in new and existing dwellings. • Development of regulations and Domestic Energy Assessment Procedure to effectively ban fossil fuel boilers in new dwellings and those undergoing major renovation, where practical. • Ensure a suitable policy framework is in place to support district heating. <u>Industry (17.8% of FEC in 2022) & Commercial Services (11.1% of FEC in 2022)</u> • Reduce fossil fuel demand in industry by 10% through energy efficiency measures. • Through the work of the Industrial Heat Decarbonisation Working Group, increase the electrification and decarbonisation of industry, with associated energy efficiency gains, so that 70-75% of industrial heating is carbon neutral by 2030. • Expand and enhance supports from the Sustainable Energy Authority of Ireland, IDA Ireland, and Enterprise Ireland with a focus on achieving energy demand reduction, electrification, and biomass adoption in industry. • Electrification of new and current manufacturing processes displacing the use of fossil fuels where possible and as soon as possible • Implement energy management systems for enterprises using more than 85 TJ of energy over the previous 3 years, in line with Article 11 of the EED. • The SEAI's Large Industry Energy Network will support organisations in adopting energy management systems, developing emissions management systems, improving energy performance metrics, and adopting best practice in energy efficiency and emissions reductions. • The SEAI will provide enhanced support partnership to a cross section of 10-15 large energy users to demonstrate and support ambitious action in key sectors. • An assessment will be made on whether mandated caps on any increase in fossil fuel demand by large energy users could be put in place from 2026. • Support industry-led initiatives, such as Business in the Community Ireland, to support decarbonisation programmes, such as low carbon pledges.

		Public Services (4.3% of FEC in 2022) • Public sector buildings to have a B Building Energy Rating (BER) by 2030. • A 50% energy efficiency target for the Public Sector by 2030. Agriculture & Fisheries (2.6% of FEC in 2022) • The Targeted Agricultural Modernisation Scheme (TAMS) II Scheme provides grant aid for a number of investments specifically aimed at improving energy efficiency in the farming sector. Other Energy Efficiency Policies & Measures • Scale-up and improve the Sustainable Energy Communities and Community Energy Grants (CEG) programmes and enlist a wider range of organisations to anchor its collective approach. • Develop the necessary supply chain, including working with Regional Skills Fora to train skilled workers.
Energy security	Ireland is committed to maintaining the security of supply in an affordable and sustainable manner.	• The Energy Security in Ireland Report to 2030 outlines the strategy to ensure energy security in Ireland 2030, but in the context of ensuring a sustainable transition to a net zero energy system up to 2050. The review considered the risks to oil, natural gas, and electricity and has actions across these sectors out to 2030 to support a secure energy transition. • Support efforts to increase indigenous renewable sources in the energy mix, including wind, solar, geothermal, biomethane and bioenergy. • Facilitate infrastructure projects, including private sector commercial projects (subject to the outcomes of applicable environmental assessments and the planning process), which enhance Ireland's security of supply and are in keeping with Ireland's overall climate and energy objectives. • Work closely with our EU partners to maintain existing good regional co-operation between Ireland and the United Kingdom (UK) in relation to Emergency Preparedness and Response. • The National Cyber Security Council (NCSC) having due regard to the Commission recommendation is working with providers of critical national infrastructure to improve the overall level of cybersecurity in the energy sector.
Internal energy market	Continue to deepen the integration of Ireland's wholesale electricity market with the EU IEM, building on well-known ongoing plans, programmes, and actions in this regard. Develop further interconnection to facilitate Ireland's 2030 target of 80% renewable electricity. Continue to align further IRL's retail electricity market, with the EU internal energy market.	• Maintain and develop the successful all island wholesale Single Electricity Market, or SEM, to include ensuring that all aspects of the market, the capacity mechanism and other planned/signalled reforms are fully implemented. • Implement the requirements of EU rules and legislation such as Network Codes, CEP along with upcoming legislative proposals such as EMD and REMIT, in the Irish electricity market. • Ensure continued compliance of Ireland's SEM capacity mechanism with the obligations in the CEP and in the European Commission's November 2017 State Aid approval. Ireland is currently in process of updating our Reliability Standard in this regard. • Design and implement the next phase of the DS3 System Services programme (System Services Future Arrangements) to provide enhanced system flexibility to accommodate increased renewables on the electricity system. • Ireland is committed to supporting customers' participation in the energy system and enabling them to sell excess electricity they have produced back to the grid. • Ireland is developing the regulatory and market regime necessary to allow renewable gas to be injected into the natural gas grid and used in the heat and transport sectors. • Ireland's independent energy regulator is charged with closely monitoring electricity and gas retail markets to ensure that competition continues to develop and that the interests of electricity and gas customers are protected.

	Continue to develop Ireland's natural gas market in line with European energy policy.	• Alleviate the burden of energy poverty on the most vulnerable in society through actions focused on improving the efficiency of homes.
Research, innovation, and competitiveness	Ensure that the best scientific evidence and advice is available to underpin Government policy and support the objectives, policies, and measures in Ireland's NECP. Given the level of Ireland's ambition regarding reduction of GHG emissions new technologies must be developed and deployed in the coming years.	• The national research and innovation strategy, Impact 2030, positions research and innovation (R&I) at the heart of addressing Ireland's societal, economic, and environmental challenges and identifies 'Climate, Environment and Sustainability' (including energy) as a key challenge area. It commits to maximising the collective impact of research and innovation in meeting Ireland's climate targets. • Strengthen delivery of public funding for basic and applied research to meet Ireland's decarbonisation objectives and open up new economic opportunities. • Continue to engage strongly in relevant European and international R&I initiatives. • Increase in a stepwise fashion public funding for the SEAI National Energy Research Development & Demonstration Funding Programme • Implementation of the National Biomethane Strategy to facilitate the use of biomethane as a direct substitute for fossil gas in various applications. • Undertake research and gather and make available geological data to promote the sustainable development of Ireland's geothermal resources to decarbonise the heating and cooling of buildings and for industrial uses and power generation. The Government's Policy Statement on Geothermal Energy, published July 2023, sets out the scope for a strategy to promote geothermal energy, which includes research and data gathering. • Consider of the role of hydrogen in the decarbonisation of Ireland's energy system including the potential production of renewable hydrogen from excess renewable electricity. • Examine the feasibility of the utilisation of Carbon Capture and Storage (CCS) in Ireland and to develop policy in the area. • Build a successful, vibrant, and impactful offshore wind energy industry in Ireland.

1.2 Overview of Current Policy Situation

1.2.1 National and Union energy system and policy context of the national plan

The Paris Agreement is a legally binding international treaty on climate change adopted by 196 Parties in 2015. The EU and all its Member States have ratified the Paris Agreement and are strongly committed to its implementation. EU countries have agreed to set the EU on course to becoming the first climate-neutral economy and society by 2050. In line with the agreement, the EU pledged to reduce net GHG emissions by at least 55% by 2030, relative to 1990 levels. These efforts are now represented by 188 Nationally Determined Contributions (NDCs) which will increase in ambition over time.

The Paris Agreement will measure the effectiveness of NDCs in achieving the goals of the Agreement via a series of global stocktakes, to be held in five-year cycles, the first of which took place in 2023.

Ireland is firmly committed to the concept of the Energy Union and its ultimate goal of achieving an energy-resilient union with a forward-looking climate policy. As a peripheral, less-well-connected country, the Energy Union has the potential to greatly enable Ireland's transition to a low carbon future, just as the Single Market led to an economic transition for many Member States. As part of the European Green Deal, with the European Climate Law, the EU has set itself a binding target of achieving climate neutrality by 2050 and sets an intermediate 2030 target of an at least 55% reduction in greenhouse gas emissions, relative to 1990 levels. The EU has been working on the revision of its climate, energy, and transport-related legislation under the 'Fit for 55 packages' to ensure that EU policies are in line with the new EU 2030, and 2050, targets. The European Climate Law also requires the EU to establish a further intermediate target for 2040. The Commission published its communication and impact assessment on the 2040 target on 6th February 2024. European goals and targets to tackle climate and energy have been set in the form of the EU Climate and Energy Packages. The EU 2030 Climate and Energy Framework continues from the base set out from the preceding 20-20-20 Agreement and sets new targets and measures to make the EU's economy and energy system more competitive, secure, and sustainable. The agreement on the 2030 framework, specifically the EU domestic GHG reduction target of at least 55% compared to 1990 levels, forms the basis of the EU's contribution to global climate change. The 2040 target and post-2030 framework will further drive the transition to a climate-neutral economy.

The Climate Action and Low Carbon Development Acts 2015 to 2021 commits Ireland to legally binding targets for 2030 and 2050 for reducing GHG emissions and providing the governance framework to achieve this. Ireland's 2050 target is to achieve climate neutrality no later than 2050, and Ireland's 2030 target is to achieve a 51% reduction in emissions by 2030 relative to 2018 levels. The Climate Action and Low Carbon Development Acts 2015 to 2021 strengthens the governance framework on climate action. Ireland has committed to meeting ambitious targets for reducing GHG emissions through a suite of policy documents including the Long-term Strategy and Climate Action Plans.

1.2.2 Current energy and climate policies and measures relating to the five dimensions of the Energy Union

See section 1.1 for a summary of the key policies and measures relating to the five dimensions of the Energy Union. A more detailed description on each dimension can be found at section 3.

1.2.3 Key issues of cross-border relevance

The UK's decision to leave the European Union meant that Ireland was left with no electricity interconnection with another Member State. The result is that aspects of the plan that have cross–border impacts are limited to proposed or planned projects with other Member States. The Celtic Interconnector with France, once operational, will directly connect Ireland to the EU's IEM post-Brexit. Given the increasing dependence of electricity production on natural gas and the increasing dependence on imports from the UK, it is important that close co-operation on security of supply continues with EU Member States and the UK. This includes continued regional co-operation with the UK on emergency preparedness and response for electricity and gas security of supply. Additionally, it will be important that Ireland retains access to EU funding for energy infrastructure projects to improve Ireland's energy security of supply.

Ireland is currently reliant on the UK for approximately 60% of its petroleum product imports and for about 25% of its crude oil imports. The 2022 Policy Statement on Petroleum Exploration and Production in Ireland outlines the Government's policy and legislative position to end the issuing of new licenses for the exploration and extraction of gas on the same basis as the decision taken in 2019 relating to oil exploration and extraction.

Ireland receives most of its natural gas from the UK and this reliance will increase as the Corrib gas field declines. There is close cooperation with the UK at Departmental, Regulator and Transmission System Operator (TSO) level on gas emergency planning and testing. Ireland continues to work closely with the UK on energy matters, although this cooperation has evolved following the exit of the UK from the European Union.

The British and Irish Governments have agreed and will begin to implement a Memorandum of Understanding (MoU) to strengthen existing arrangements in the event of a gas supply shock. The MoU details how both States will cooperate on gas security of supply, and it

supports the principle of natural gas supplies to Ireland and Northern Ireland being reduced equitably along with the four Distribution Network companies in Great Britain (GB).

DECC will also continue to work collaboratively with the European Commission on the implementation of arrangements for energy security under the Trade and Cooperation Agreement between the European Union and the UK.

The UK's continuing adherence to the established European standards mechanisms and the close proximity of UK refineries to Ireland should mean a continuation of this trade, in the aftermath of the UK withdrawal from the EU, 21% of Ireland's emergency oil stockholding is currently physically stored in the UK.

Ireland is committed to regional energy co-operation and is a member of the North Seas Energy Co-operation (NSEC), the British-Irish Council (BIC) and is a signatory to the EU Islands forum. These fora are discussed in more detail in Section 1.4. Ireland's policy position on interconnection is outlined in the 2018 National Policy Statement on Electricity Interconnection. It emphasises the important role of interconnection in the transition to a low carbon energy future. It reflects the increasing importance of interconnection to national and EU policy. Further details are set out under Section 3.

Trade in electricity across the interconnectors between GB and the SEM has continued with no tariffs since 1st January 2021. However, this trade is less efficient, as day ahead trading can no longer be used on these interconnectors. Scheduling of flows on each of the interconnectors is determined by the price spread between the SEM and GB in the IDA 1 and IDA 2 auctions. The Trade & Cooperation Agreement (TCA) provides a mechanism to ensure that the current system is made more efficient and should be based on the concept of multi-regional loose volume coupling (MRLVC).

1.2.4 Administrative structure of implementing national energy and climate policies

DECC is the lead Government Department (ministry) with responsibility for setting Ireland's overall energy, climate, and environment policy. Delivering and implementing the wide range of policies and measures necessary to achieve our energy and climate goals requires a deep level of collaboration across Government, local authorities, and agencies.

Ireland's Climate Action and Low Carbon Development Acts 2015 to 2021 provide for a detailed governance structure to ensure full and proper implementation of Ireland's climate

action agenda and achievement of our climate goals. Our governance structure was enhanced from 2021 onwards following the establishment of a Climate Action Delivery Board, the ongoing development of climate proofing of Government policies, the establishment of a Climate Change Advisory Council, and the adoption of a new carbon budget system with clear sectoral targets. These governance structures will be fundamental in driving the implementation of the policies set out under this plan.

The key policy document for the implementation of our stated climate and energy objectives is the Climate Action Plan. The purpose of the CAP is to lay out a roadmap of actions which will ultimately lead us to meeting our national climate objective of pursuing and achieving, by no later than the end of the year 2050, the transition to a climate resilient, biodiversity rich, environmentally sustainable and climate neutral economy. The development of the document is an interdepartmental initiative with a formal governance structure which tracks progress with regular reporting and manages the sign off and approval of the document at Government level.

The Department of the Taoiseach provides overall oversight on the Climate Action Plan. This is achieved via the publication of quarterly progress reports throughout the year. Each Department supplies their own set of data for their actions which is then combined and published on the gov.ie website, usually in the following quarter. These reports provide a snapshot of how the CAP is progressing as the year advances; it details delivery rates per department and agency, highlights issues or problems encountered and provides an opportunity for management to intervene when problems arise to achieve the highest possible delivery rate. At the end of the year, there is a ‘legacy actions’ exercise. This lists the actions that have failed to complete on schedule and decides whether they should carry forward into the next CAP for reporting purposes or if they have been superseded instead by new actions.

1.3 Consultations and Involvement of National and Union Entities and Their Outcome

1.3.1 Involvement of the national parliament

The broad nature of the NECP means that the development of the document has been an inter-departmental and multi-agency effort, led by DECC. Senior officials across and policy experts from across Government have been involved in the development of the NECP throughout the process with the final version of the NECP having received Government approval. A project structure was put in place with appropriate governance structures

enacted to ensure engagement and approval of this important document. To support in this a Working Group was established on the NECP including officials from a range of departments, which met at regular intervals to discuss the development of the update to the plan and the wider process. The NECP has been before Cabinet for review on two occasions with the most recent engagement seeking and achieving final approval and sign off. Constituent parts of the NECP, such as CAP 24 and our EU targets, were brought to Government prior to the NECP approval. The key policy instrument, CAP24, has its own formal governance structure that involves senior officials across Government Departments and requires sign off at Cabinet.

Ireland's Programme for a Partnership Government, published in May 2016, committed the Government to the establishment of a Citizens' Assembly to consider some of the most important issues facing Ireland's future. The purpose of the Citizens Assembly is to bring citizens together to discuss important legal policy and societal issues in Ireland. Citizen Assemblies and the National Dialogue on Climate have become an important part of the Irish democratic process.

In 2022, the Citizen's Assembly on Biodiversity Loss took place, with the final meeting held in January 2023. During this time members of the public deliberated on how the Government can improve its response to the issue of biodiversity loss. This was achieved through the consideration of other views, examining reports and studies, hearing from experts in the field and those impacted by the subject matter. The Assembly agreed on 159 recommendations, including 73 high-level recommendations and 86 sectoral-specific recommendations, through a mixture of consensus agreement and ballots. The Assembly presented its final report in April 2023[10]. In October 2022, Ireland held its first Children and Young People's Assembly on Biodiversity Loss. Over two weekends, the Assembly brought together 35 members aged 7–17 from across Ireland to explore, discuss and create calls to action on how to protect and restore biodiversity in Ireland. The Children and Young People's Assembly members presented their experiences and the Assembly's vision statement, key messages, and calls to action to the Citizens' Assembly on Biodiversity Loss in November 2022[11].

[10] Citizen's Assembly on Biodiversity Loss. Available here: Report-on-Biodiversity-Loss_mid-res.pdf (citizensassembly.ie)

[11] The Children and Young People's Assembly Vision Statement. Available here: Home - Children and Young People's Assembly on Biodiversity Loss (cyp-biodiversity.ie)

1.3.2 Involvement of local and regional authorities

Ireland's Local Authorities play a pivotal role in their local communities and can act to demonstrate public sector leadership on climate action in their localities as well as being key mobilisers of change. Local Government in Ireland comprises 31 Local Authorities and three Regional Assemblies. Local Authorities have a key role to play in implementing the measures needed to meet Ireland's national climate targets. This role will increase in importance with the development and implementation of Local Authority Climate Action Plans (LACAP) in each Local Authority area.

Ireland has three regional assemblies - the Northern and Western, the Eastern and Midland, and the Southern Regional Assemblies. The Assemblies provide the strategic link between the EU, national and local levels, and coordinate spatial, environmental, and economic planning through the statutory Regional Spatial and Economic Strategies (RSES). They administer European funding and provide a coordination function with a democratic mandate provided through elected members from Local Authorities. Local Authorities are multi-purpose bodies which are responsible for delivering a broad range of services which impact on climate. These include economic and community development, environment, recreation and amenity, roads and active travel, social housing, spatial planning, and waste management. Both Local Authorities and Regional Assemblies have major roles to play in supporting the alignment of local plans with Ireland's national renewable energy targets.

As well as playing a critical role in climate mitigation, the sector is at the front line of climate adaptation and emergency planning. In 2021, Local Authorities invested almost €9.5bn in services provided to the public. They provide around 135,000 social homes, construct, manage and maintain almost 100,000 km of regional and local roads, and employ close to 30,000 people. Local Authorities and Regional Assemblies are independent corporate entities. The Department of Housing, Local Government and Heritage oversees the operation of the local Government system in broad terms, providing the general policy and statutory framework within which Local Authorities and Regional Assemblies work and deliver services. The Irish Constitution recognises the role of local Government in providing a forum for the democratic representation of communities and in exercising and performing powers conferred by law.

Ireland's Local Authority system has limited direct functions in many sectoral areas related to climate, with decision making responsibility frequently resting with Government departments

and central agencies. Irish Government expenditure is relatively centralised, with 77% of expenditure undertaken by Central Government. This can limit a Local Authority in its ability to respond directly to climate issues and orientates much of its action towards taking on a partner or champion role rather than direct delivery.

Local Government collaborated with DECC to agree a Climate Action Charter (2019) which acknowledges that local Government is ideally placed to provide robust leadership in advancing the climate objective at the local and regional level. The Climate Action Charter will be reviewed in 2024. The Delivering Effective Climate Action 2030 Strategy (2020) sets out a roadmap to deliver on climate commitments by the local Government sector. It sets out objectives for Local Authorities to maximise their collective impact on Ireland's national climate targets.

Several Irish Local Authorities are signatories to the Global Covenant of Mayors for Climate and Energy, an initiative supported by the European Commission bringing together thousands of local Governments that want to secure a better future for their citizens. Local Government impacts on the day-to-day life of citizens by performing vital services that support local communities and economic development. Local Authorities prioritise different needs and implement different climate actions based on prevailing climate change risks, demographics, and the characteristics of the area. The public regards their Local Authority as a key player in delivering solutions to address the climate and biodiversity challenge. In the Climate Conversations survey, 69% of respondents identified Local Authorities as having an extremely important role in delivering on climate action. They were placed fourth highest in importance after the Irish Government, the EU, and business and industry.

Local connectedness and attachment can be powerful motivating factors in climate decisions. The regional and local scale is a key area for participation to influence policy and gain public acceptance for policy proposals and local Government is best placed to harness this. Local Authorities can build momentum as the most direct connection that citizens and local communities have with Government.

Local Authorities are the primary vehicles for engagement with community groups and organisations. They should be conduits for information and consultation and assist these groups in delivering local projects and initiatives. In each Local Authority area, there are Local Community Development Committees which operate as independent committees of the Local Authority and bring together elected members and officials, state agencies and those working in local and community development and economic, cultural, and

environmental organisations. They work closely with communities and were established to develop and implement a coherent and integrated approach to local and community development through a Local Economic and Community Plan (LECP) which has a climate focus.

In 2018 four (CAROs) were established to assist the Local Authority sector in building capacity to engage effectively on climate change. On adaptation the role of LAs in implementing adaptation policies in Ireland has significantly evolved since the publication of the NAF in 2018. LAs have been proactive in developing their adaptation policies, educating their staff on climate change impacts, and engaging the public. They have also played a crucial role in supporting adaptation initiatives across various sectors.

Under the first statutory NAF all 31 LAs prepared local adaptation strategies by end October 2019. This requirement has been superseded by a statutory requirement for Local Authorities to prepare and implement Local Authority Climate Action Plans (LACAPs). The first LACAPS were adopted by all LAs by in early 2024 and will be revised every five years. Each LACAP includes a Climate Change Risk Assessment for the administrative area of the local authority prepared in line with national guidelines.

1.3.3 Consultations of stakeholders, including the social partners, and engagement of civil society and the general public.

Since finalising the first NECP, in 2019, the Irish Government has built on the plan and continued to engage and consult widely with individual members of the public, key stakeholders and wider society on energy and climate change policy. The NECP brings together the polices, targets, tools and associated material from across Government bodies and departments in one document. These existing initiatives are and continue to be consulted on in depth. The component parts of the NECP have been previously consulted on in detail and in some cases have been subject to SEA. More broadly the Department continues to engage with stakeholders on climate and energy to see how we can meet our targets in a just way. The Department has met with stakeholders on numerous occasions over the last number of months to update and seek feedback in relation to the development of the NECP.

Stakeholder Engagement

Stakeholder engagement has been enhanced since the last NECP by increasing the staffing of DECC, including providing resources dedicated to communicating Energy and Climate issues. The Irish Government is committed to an ongoing dialogue to inform and listen to citizens and stakeholders in an effort to ensure greater engagement and understanding of our energy and climate change plans and policies, and the public's role in the transition to climate neutrality. The approach to ensuring a continuous flow of information and engagement is enhanced by research undertaken to establish the public's evolving awareness and opinions of energy and climate actions. The following section provides a summary of some of the consumer research undertaken as well as Governmental activities undertaken to engage with the public on Energy and Climate Action, all of which has informed the development of the updated NECP.

The first NECP public consultation on the draft updated document ran from 8th February to 7th March 2024. The process began in December when the Department of Energy and Climate Change (DECC) compiled a list of 500 stakeholders – comprising public sector, industry, transport, education, youth, food / agriculture, energy, community, NGO, and others – to whom emails were sent advising them of the consultation process and encouraging them to participate.

During the month-long consultation period, a total of 38 organisations / individuals made submissions, either directly by email or through an online feedback form. Respondents included the agriculture, energy, environmental, NGO, renewable energy, trade, and transport sectors, as well as individuals.

A second public consultation on the updated NECP ran from 30th May to 27th June 2024, the aim of which was to gather stakeholder feedback on aspects of the update to Ireland's National Energy and Climate Plan (NECP). In addition, the department hosted an NECP consultation webinar on June 20th June to outline more details about the process undertaken and the role of the NECP. The panel included colleagues from other key government Departments and state agencies.

Research

The population's understanding of climate change and energy use is a key element in developing suitable future engagement methods, and communications materials. Research was therefore undertaken by the Environmental Protection Agency (EPA) and supported by

the National Dialogue on Climate Action (NDCA)[12]. The research study, Climate Change in the Irish Minds, provided nationally representative data on the attitudes and behaviours of 4,000 members of the Irish public.

The full Research Report was published on the EPA website and includes the finding that most people in Ireland believe climate change is happening and that it is caused by human activities. The research also found that most people are willing to take actions to reduce climate change and to support Government climate policy. DECC also undertook independent research to track consumer sentiment and reported behaviour regarding energy usage in 2022/23. The Energy Tracker Research Report details the findings.

Engagement on Energy

DECC has undertaken considerable public consultation, engagement, and information campaigns to raise awareness, generate understanding, and stimulate ownership of Energy issues amongst the public and stakeholders. Extensive stakeholder engagement and focused periods of public consultation have been undertaken over the past five years to inform Energy policy and plans. A sample of this engagement is provided below:

Energy Security

The Irish Government published its Energy Security in Ireland to 2030 strategy in November 2023. It is a roadmap to ensuring a sustainable, affordable, and secure energy landscape that balances energy risk and resilience against our binding European and domestic energy and climate commitments. This key strategy was informed by over 450 submissions received through formal public consultation. A high-profile communications and stakeholder engagement plan was implemented by Eirgrid in 2023 to ensure the public was aware of the commencement of construction work on the Celtic Interconnector project. Extensive media and social media coverage was generated for the signing of a Joint Declaration of Intent on 'Energy Transition Cooperation' between Ireland and France**.** This engagement officially marked the beginning of construction of this high-voltage subsea power cable that will link the electricity grids of Ireland and France, generating enough capacity to power 450,000 homes and creating a direct electricity link from Ireland to the European Union. Since 2019, the Celtic Interconnector was the focus of a series of public consultations. Extensive

[12] gov - National Dialogue on Climate Action (NDCA) (www.gov.ie)

stakeholder engagement was carried out in the South of Ireland, for a number of years, before it secured planning consent.

Renewable Energy

DECC has established strong sectoral engagement with all of the key organisations representing the RE, offshore renewables, fishing, and related sectors to inform its approach to RE policy. This includes establishing Advisory Forums for key policy initiatives and proactively reaching out to sectoral interests to speak at seminars and provide regular briefings. At the start of 2023, the Government announced a shift in policy from project-led to a State, plan-led approach for offshore RE development. DECC launched a public consultation on its first Designated Marine Area Plan (DMAP)[13] for the South coast in August 2023, that has so far engaged with nearly 2,000 people and organisations. This public consultation included public meetings in partnership with EirGrid (State-owned Transmission System Operator – TSO); as well as a dedicated Fishers Liaison Officer to engage with the fishing and seafood production industries. Further statutory public consultation was carried out through 2024, with public events held in coastal towns and communities across counties Wexford, Waterford and Cork in the south-west. One public consultation event was held entirely through the Irish language to ensure that affected communities in local Gaeltacht region of the south-west were afforded the opportunity to have their voices heard. There were dedicated events held in third-level university campuses across the region ensure the voices of young people were considered, and online events including webinars were conducted as an additional forum and opportunity for stakeholders to have their voices heard.

In 2023, DECC ran a series of community engagement and regional workshops as part of its public consultation on the National Spatial Strategy for Offshore Renewable Energy in 2023. That public consultation engaged with over 1,100 people and organisations throughout Ireland, including in coastal communities through both English and Irish. This included both the Minister for the Environment and the Tánaiste attending stakeholder workshops in coastal communities, along with Government officials who are developing the policy. Also in 2023, the Irish Government generated extensive national and international awareness through traditional and social media, for the results of its first Offshore Wind auction – ORESS1. Over 3 Gigawatts (GW) of capacity has been procured from four offshore wind

[13] gov - Designated Maritime Area Plan (DMAP) Proposal for Offshore Renewable Energy (www.gov.ie)

projects under ORESS1, which will deliver over 12 Terawatt hours (TWh) of renewable electricity per year.

DECC has also participated in large public events to meet with stakeholders. These include (but are not limited to) the Skipper trade show where thousands of people working in the marine and fishing industry congregate annually; the National Ploughing Championships which attracts over 200,000 attendees annually, and conferences and trade expos hosted by Wind Energy Ireland. At all these events, officials from the Department proactively engaged formally and informally with the public and sectoral stakeholders to generate awareness and understanding of Energy policy and plans and listen to people's feedback.

Other Initiatives

The Government engaged with stakeholders and delivered communications to ensure widespread awareness and uptake of other key energy initiatives including the development of the National Biomethane Strategy[14], Retrofit Grants for homeowners and expanded supports for businesses to invest in energy efficiency and renewable heating. In 2021, the Government ran a public consultation on a draft Territorial Just Transition Plan, as Ireland moves away from fossil fuels. This was particularly relevant for communities facing the cessation of commercial peat extraction, located in the Midlands and the West of Ireland, where peat extraction was an important part of culture and livelihoods for many generations. Public consultation generated greater awareness and understanding of the transition. Similarly, in January 2024, the draft National Biomethane Strategy was published for public consultation and the feedback received as part of that exercise informed the final Strategy.

National Dialogue on Climate Action (NDCA)

The Irish Government's National Dialogue on Climate Action has also helped to inform all stages of development of the NECP; and provides an opportunity to create awareness, engagement, and motivation amongst the public, to act on challenges presented by climate change. The NDCA is being delivered under three pillars:

- Improving climate literacy by creating awareness about, and promoting understanding of, climate change through communications and education;

[14] National Biomethane Strategy, available here: https://www.gov.ie/en/publication/d115e-national-biomethane-strategy/

- Funding, supporting, and enabling active engagement in climate action at a local and national level, conducting public consultations, and empowering the public to adopt more sustainable behaviours;
- Capturing insights from engagement activities and conducting social and behavioural research to inform the CAP and climate policies.

Climate Conversations

The annual Climate Conversations is the mechanism though which the NDCA engages with a broad range of people across society through an online public consultation; workshops with populations vulnerable to the transition to climate neutrality; and interviews with people taking climate action to capture their stories. In 2022 the outputs from the Climate Conversations demonstrated that while there is, at present, widespread support for climate action from the public, and people are taking some action, there is a significant deficit in people's capacities, access to resources and motivation to act. Lasting change requires that all citizens understand the urgency and scale of threat of the crisis.

The National Dialogue on Climate Action in 2023

In 2023, the Climate Conversations articulated a voice of the public and stakeholders that is clear, responsive, and conveys a sense of urgency and enthusiasm to work with Government. It has allowed us to identify where people are making changes, and where they lacked information, knowledge, resources, or capacity to take climate action. These conversations showed that people need to learn by doing and need to see that the transition to a climate neutral future is fair and that everyone is contributing. The findings are analysed and directly inform the annual CAP.

In 2023, the NDCA expanded its outreach to proactively engage with populations not yet engaged and those particularly vulnerable to the transition to climate neutrality, by exploring on a number of significant issues of concern including the gap emerging between people's intention to take climate action and their capacity to do so.

Under the NDCA two Stakeholder Forums were held in 2023, as well as a National Youth Assembly on Climate. The Advisory Group on Social and Behavioural Change met six times in 2023 to provide guidance on climate policy. The Climate Communications and Engagement Taskforce (CCET) was also established during 2023.

A National Campaign of Communication and Engagement on Climate Action in 2024

On March 28th Minister Eamon Ryan launched the ‘Climate Actions Work’ programme, a new, first of its kind national engagement and communications campaign to support and encourage action on climate and community resilience over the coming year. This campaign will be delivered through a communications and engagement campaign and supported with training guides and programmes as well as funding to support community groups deliver their own communications and engagement activities.

So far in 2024 the NDCA has delivered one of two National Climate Stakeholder Forums and a 3rd National Youth Assembly on Climate. The 2024 Climate Conversations were launched on May 30th and will run until September 22nd. The National Dialogue on Climate Action also supports the EPA’s Climate Change in the Irish Minds research and other behavioural studies to provide an evidence base to inform climate policy.

Local Government

Ireland’s Local Government sector also supports delivery of climate action communications and stakeholder engagement throughout the country. The CAROs provide a shared service to Local Authorities to coordinate and deliver on climate action, while each Local Authority is developing CAP’s and appointing Climate Action Awareness Officers to engage directly with local communities and stakeholders. Local Authorities are thus strengthening the alignment between national climate policy and the delivery of effective local climate action.

Transport

Achieving a shift to transport modes with zero- or low-carbon emissions, such as active travel (walking and cycling) and public transport, requires unprecedented levels of public buy-in and engagement. In line with commitments under the National Sustainable Mobility Policy and CAP 2023, the Department of Transport undertook a dedicated media advertising campaign ‘Your Journey Counts’ in 2023, which outlines government investment in transport and encourages people to think about their journey and the difference it can make to cutting carbon emissions. Research undertaken to inform this campaign shows that 72% already agree that every journey choice can make a difference in lowering carbon emissions, and this campaign aims to encourage even more people to consider the impact their travel choices can make.

The Department of Transport is also currently finalising a Public Engagement Strategy on Climate Action. The main objective of the Strategy is to build awareness and inspire ownership for action in individuals, private organisations, and public sector bodies, while also

increasing support and acceptance for the delivery of critical infrastructure. The Strategy will embed findings from the Department's own stakeholder engagement, wider whole-of Government stakeholder workshops, and National Dialogue on Climate Action events held over the past year, considering the transport sector's decarbonisation pathway, and achieving a just transition.

In line with the Sustainable Mobility Policy (SMP), the Department of Transport engages extensively with stakeholders. As well as convening an annual National Sustainable Mobility Forum with all key stakeholders across government, local authorities and civil society, stakeholders are being encouraged to engage as part of public consultation processes e.g. on the development of a new policy on shared mobility hubs (launched March 2024) and on a new demand management strategy for transport - 'Moving Together: A Strategic Approach to Improving the Efficiency of the Transport System in Ireland' (launched April 2024).

In respect of 'Moving Together', the Department took a co-creation approach to developing this strategy from the outset. Six expert subgroups were established to input to recommendations across key areas of focus in transport demand management including (1) Integrated Land Use and Transport Planning; (2) Optimal Use of Space; (3) Fiscal Measures; (4) Generators of Demand (Movement of People); (5) Generators of Demand (Movement of Goods); (6) Captive Car Users. The latter was established to ensure appropriate consideration of issues relating to Just Transition. These subgroups were comprised of over 100 stakeholders (across 57 different organisations) from other government departments and agencies, local authorities, industry, academia, and NGOs. The work of the subgroups, which spanned all sectors with a role in demand management, are reflected through separate reports which have been published alongside the draft Strategy and associated Implementation Plan. This unique approach to early stakeholder engagement has helped to develop a more holistic and coherent draft Strategy and to raise awareness and understanding of the systems-change needed, and the particular challenges, opportunities and benefits associated with reducing transport demand including the target of reducing vehicle kilometres travelled by 20% by 2030 in line with the CAP 2023.
Zero Emission Vehicles Ireland (ZEVI), an office within the Department of Transport, engages and consults with the public and stakeholders around the transition to zero emission vehicles. To facilitate collaboration, ZEVI has established two infrastructure stakeholder groups, a vehicles stakeholder group and freight subgroup to share knowledge and best practice, and to identify barriers and potential solutions across the public and private sectors. ZEVI has also held public consultations around the Electric Vehicle Charging

Infrastructure Strategy 2022-2025, the National Road EV Charging Network Plan, Electric Vehicle Charging Infrastructure Universal Design Guidelines and the Regional and Local EV Charging Network Plan.

Other Activities

Communication and engagement for all ages was also a key target of the CCAC 2023 Annual Review. It stated that: “There must be effective and consistent engagement with communities, ensuring there is a fair and equitable transition, building and maintaining public support and action.” “The momentum forged by the NDCA in 2022 must not be lost but must be built on to increase citizen engagement on climate issues … Critical to the programme’s success are sufficient resources to ensure its delivery of outputs in 2023 and executing and reporting on the feedback loop, as set out in the NCAP, to demonstrate its effectiveness.” The Advisory Group on Social and Behavioural Change met six times in 2023 to provide guidance on climate policy. The Climate Communications and Engagement Taskforce (CCET) was also established during 2023.

Future Engagement

Looking ahead, we will build on the momentum achieved to date by developing and providing more accessible information on climate change to educate the public; and we will continue to engage in an inclusive, fair, and accessible manner to ensure all interests are heard. Further research will be undertaken by the Government to measure changing levels of awareness, understanding, and actions on climate issues among the population. The NDCA and Climate Conversations will continue; as will the work of the Climate Advisory Council, CCET and other key fora. The Government will continue to undertake public consultation and stakeholder engagement to inform its Energy and Climate policies and plans, including on Designated Maritime Area Plans for offshore renewable energy in the coming months and years.

Public Consultation on NECP in 2024

DECC is committed to ensuring that the voices of the public and organisations throughout Ireland continue to play a meaningful role in co-creating policies that support the transition towards an environmentally sustainable, carbon neutral and climate resilient society. Key to this was providing meaningful, accessible, and accountable public consultation on the NECP.

From 8th February – 7th March 2024, a 4-week public consultation was held on the Draft NECP. The consultation was advertised through DECC's social media channels, and received approximately 38 responses in total, from a variety of public, semi-state & private organisations, as well as members of the public. Following the end of the consultation process, a Consultation Findings Report was carried out by DECC's independent consultants on the NECP, RPS Group, outlining the consultation process undertaken and presenting the feedback received. The feedback received has been analysed and has informed the update of the NECP.

Certain issues raised in the consultation process were addressed in the subsequent draft of the document. For example, the addition of With Additional Measures projections showed a more positive trajectory on renewable energy and energy efficiency targets, taking into account policies that did not meet the criteria for the With Existing Measures projections. More recent EU targets, e.g. the updated RED III target of achieving a 43% share of renewable energy in total energy consumption by 2030, were also included.

One common theme among responses was a lack of consideration of the agriculture sector in the draft document, which is the largest sectoral contributor to GHG emissions in Ireland. The document was subsequently updated with the collaboration of colleagues from the Department of Agriculture, Food and the Marine, to provide detail on the latest policies and measures as reflected in CAP 24, including initiatives to focus on low methane traits in animal breeding, low emission feed and fertiliser, and increased organic farming.

In general, concerns were raised about why the most recent policy document, CAP24, was not included in the 2023 draft. The final document has been adjusted to reflect the latest policy developments in all areas, including CAP 24 with additional text gone in to explain how CAP 24 relates to the NECP. For example, sections on Transport have also substantially updated to reflect the latest developments on renewable fuels and supports for electric vehicles.

Another issue raised in the first consultation was confusion over the purpose of the NECP and how it is distinguished from other Government documents covering similar topics, such as the Climate Action Plan. It was clear that a second consultation would be beneficial to ensure that the public was fully informed and had the opportunity to meaningfully engage with the process. An online information session was also organised to provide more information.

The second public consultation on the updated NECP ran from 30th May to 27th June 2024, the aim of which was to gather stakeholder feedback on aspects of the update to Ireland's NECP. The department hosted an NECP consultation webinar on June 20th to outline more details about the process undertaken and the role of the NECP. The panel included colleagues from other key government Departments and state agencies.

As well as this, more information was published on the DECC website along with the second consultation questionnaire, including the Findings Report from the first consultation, and reports on the Strategic Environmental Assessment and Appropriate Assessment screening. This provided more context for the plan and allowed for a more informed response. 31 responses were received in total to this consultation.

A wide variety of responses were received across the two consultation periods, from industry bodies, environmental groups and members of the general public. Analysis was conducted on the issues raised and, where possible, the final plan has been updated to reflect these responses. Common themes that arose throughout the consultation process were concerns around Ireland's ability to reach our various EU targets, a desire to see more research and funding for new technologies in renewables and energy efficiency, concerns around permitting and planning procedures, and seeking assurances that Ireland's climate policies and move towards a carbon-neutral society will take into account the principles of Just Transition.

It was not always possible to reflect these responses in the final document due to the time constraints involved and also the fact that some policy areas are not developed enough to include in this NECP. Where issues raised in consultation could not be addressed by this document, they will be circulated to the relevant policy experts and Departments to address in future policy cycles. Some issues, e.g. concerns about GHG emissions projections showing a gap to EU targets, will require broader policy development and delivery over the coming years and cannot be adequately dealt with in the timespan in which this NECP was developed. Despite this, updates to sections on Agriculture, LULUCF, transport, etc. show a greater level of ambition and set out a pathway to closing the gaps identified.

Other areas of the document were expanded to reflect concerns raised during the consultation process, especially where it was pointed out that there were omissions or areas that could be expanded on. For example, sections on Just Transition were developed to emphasise how its principles underpin the Irish Government's approach to climate action. This not only reflects the consultations on the NECP, but also broader initiatives like the

National Dialogue on Climate Action, which seeks to understand public understanding of climate action on an ongoing basis.

As well as this, the final NECP document updates on some policies that were approved and implemented only after the publication of the draft document for consultation. An example of this is the National Adaptation Framework 2024, which was published in June.

A second consultation report, along with a Strategic Environmental Assessment report, will be published after the submission of the final NECP to the European Commission and will contain more detail about how the consultation process influenced the final plan and detail about the specific details raised by respondents. Although not all issues could be adequately addressed in the final document, DECC is committed to ensuring that the feedback received will be considered and actioned by the relevant Departments and teams where appropriate.

Strategic Environmental Assessment

Strategic Environmental Assessment (SEA) is a process for evaluating, at the earliest appropriate stage, the environmental consequences of implementing plan or programme initiatives. The purpose is to ensure that the environmental consequences of plans and programmes are assessed both during their preparation and prior to adoption. The SEA process also gives interested parties an opportunity to comment on the environmental impacts of the proposed plan or programme and to be kept informed during the decision-making process. In accordance with European Directive (2001/42/EC) (the SEA Directive) the European Communities (Environmental Assessment of Certain Plans and Programmes) Regulations 2004 (S.I. No. 435/2004), as amended, the NECP has been subject to an SEA.

Overarching SEA Mitigation

The following overarching mitigation was recommended by the SEA of the draft NECP and is included as follows: It is recognised that the NECP is a whole of Government ‘umbrella’ plan. The NECP builds on previous national plans and strategies, namely the Climate Action Plans, and sets out in detail the Government’s objectives regarding the five dimensions of the Energy Union, together with the planned policies and measures to achieve those objectives. Relevant Departments and Agencies have fed into the development of these policy measures. As such, all relevant Departments and Agencies have legal obligations in relation to protection of the environment. Many of the Department and Agencies have ongoing plans, programmes and projects prepared or in preparation:

- In the first instance, these plans, programmes, and projects must be consistently screened for relevant statutory processes as appropriate to the governing legislation to ensure that protection of the environment and sustainable development are driving principles of integrated energy and climate action implementation.
- Where statutory processes have been or are being undertaken on plans, programmes and projects, the mitigation measures, and measures to reduce, remedy and offset negative effects must be given effect along with any associated planning conditions, at the appropriate scale and level of detail, again to ensure protection of the environment and sustainable development are driving principles of integrated energy and climate action implementation.
- The principle of robust constraints, site and route selection, and environmental assessment, reporting and monitoring, shall be applied to all infrastructure projects as best practice, to avoid significant negative environmental effects in the first instance.

Appropriate Assessment

The EU Habitats Directive[15] places strict legal obligations on member states to ensure the protection, conservation and management of the habitats and species of conservation interest in all European Sites. The Habitats Directive has been transposed into Irish law by the Planning and Development Act 2000, as amended, and the European Communities (Birds and Natural Habitats) Regulations 2011, as amended. Article 6 of the Directive obliges member states to undertake an 'appropriate assessment' (AA) for any plan or project which may have a likely significant effect on any European Site. The outcomes of such AA's fundamentally affect the decisions that may lawfully be made by competent national authorities in relation to the approval of plans or projects. As part of the development of the NECP, for the NECP has been subject to screening for AA.

1.3.4 Consultations of other member states

Ireland consulted on its NECP in relation to planned offshore wind deployment until 2030 and related grid planning aspects with the other North Seas countries within the framework of the North Seas Energy Co-operation (NSEC). Regional co-operation with other Member

[15] EU Habitats Directive. Available at: https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A01992L0043-20130701

States is critical to facilitating and accelerating the green transition. While Ireland is not currently connected to other Member States regional co-operation on aspects of green transition has strengthened ties with other countries and been mutually beneficial. In addition to larger and more established initiatives, such as the NSEC, Ireland has engaged bilaterally with neighbours through ad hoc groups and bilateral engagement throughout the development of the document. As pollutants and effects of GHG emissions know no boundaries Ireland sought to engage with the United Kingdom and Northern Ireland. In development of the NECP, DECC engaged with counterparts in Northern Ireland on the Plan, formally inviting feedback through the consultation process and opening that up to all relevant stakeholders. DECC also engaged with Great Britan and France, seeking input and opening the consultation process to the relevant stakeholders. Again, this is in addition to the many ongoing and policy specific initiatives in areas such as interconnectors and offshore development that are underway.

1.3.5 Iterative process with the Commission

Pursuant to the requirements of the Governance Regulation, Ireland submitted its draft NECP in December 2023. The submission of the draft plan represented the first official milestone of the iterative process between the Commission and Ireland for the purpose of the finalisation of the plan and its subsequent implementation. This submission was preceded by numerous meetings and workshops with the Commission and their representatives. Ireland also engaged in bilateral discussions with the Commission and their consultants to further the plan.

The Commission issued its assessment of Ireland's draft NECP on 23rd February 2024, and extensive efforts have been made to ensure that the various points raised by the Commission in its assessment of the draft have been addressed in the final version of the NECP. Bilateral meetings have taken place between the Department of the Environment, Climate & Communications and the Directorate Generals for Energy and Climate of the European Commission to discuss the implementation of these changes. This included a visit by the Commission to Dublin. This meeting discussed elements of the Plan with several key Departments and subject matter experts from DECC.

1.4 Regional Co-operation in Preparing the Plan

1.4.1 Elements subject to joint or coordinated planning with other Member States

1.4.1.1 North Seas Energy Cooperation – Regional Offshore Renewable Energy Cooperation

Ireland is part of the wider North Seas region, which has a large RE potential. The deployment of offshore wind energy will play an increasingly important role in reaching Europe's energy and climate goals. The EU Offshore Strategy has set the ambitious goal of 300 GW of offshore wind and 40 GW of ocean energy installed capacity by 2050. On 19th January 2023, the North Seas Energy Cooperation (NSEC) facilitated the development of the non-binding agreement on goals for offshore RE generation in 2050 with intermediate steps in 2040 and 2030 for priority Northern Seas offshore grids (NSOG) under the TEN-E Regulation. Targets for the NSOG priority offshore grid corridor constitute 60,3 GW in 2030, between 134,9 and 158 GW in 2040, and between 171,6 and 218 GW in 2050. This means a significant change of scale for the offshore sector, RE deployment and strategic integrated offshore development. High energy prices, e.g. in 2022, and geopolitical events threatening the European energy system have underlined the imperative of accelerating deployment of domestic RE generation capacities and regional offshore transmission networks as quickly as possible, thereby significantly improving energy security.

Ireland works together with the other NSEC countries on identifying, analysing, and realising possibilities for concrete cooperation projects. NSEC is a voluntary, bottom-up, market-oriented, regional co-operation initiative established in 2016, which seeks to:

- Create synergies;
- Avoid incompatibilities between national policies;
- Share knowledge on international best practices;
- Foster joint strategies where possible and beneficial.

Ministers responsible for energy regularly meet in the NSEC format. In 2023, NSEC consists of Belgium, Denmark, France, Germany, Ireland, Luxembourg, the Netherlands, Norway, and Sweden with the participation of the European Commission. On December 18th, 2022, NSEC energy ministers and the EU Commissioner for energy signed a Memorandum of Understanding on offshore RE cooperation with the UK. The establishment of this MoU was

provided by the Trade and Cooperation Agreement between the European Union and the United Kingdom of 30th December 2020, builds on NSEC, and is distinct yet complementary to the NSEC framework.

For the offshore wind sector, it is vital to offer a predictable and stable long-term operating environment to facilitate long-term investments and further cost reductions. To this end, existing barriers must be removed, and attractive investment conditions should be created. NSEC members work together to make an important contribution to achieving these goals through a regular exchange of expertise focused on several topics within the four NSEC Support Groups (SGs):

- SG1: development of hybrid and joint projects;
- SG2: permitting, maritime spatial planning (MSP) and environmental considerations;
- SG3: financing and support frameworks;
- SG4: long term grid and infrastructure planning;

For each support group to deliver on its goal, the exchange between and within support groups is strongly encouraged and overseen at the NSEC coordinators level. Examples of this are on ports with SG1 and SG4, MSP and grid-planning with SG2 and SG4, and how non-price criteria can strengthen innovation on key challenges for an accelerated, cost-efficient, and responsible deployment of offshore wind with SG1, SG3 and SG4. Finally, the support groups also liaise closely with other international fora, such as the Penta lateral Energy Forum and the Clean Industrial Forum in regard to onshore grid planning, market-arrangements, and stakeholder-engagement.

Development of Hybrid and Joint Projects

NSEC's SG1 serves as a platform to collaborate on concepts for potential offshore wind projects and a coordinated electricity infrastructure, including transmission infrastructure. The group has increased its activity as NSEC countries have started more joint and hybrid projects in the North Seas to facilitate technical and ministerial discussions and sharing of best practices as the projects progress. Besides joint projects on offshore wind, which will be connected and supported by several countries, the support group also works on possible "hybrid" solutions that use cross-border options to connect offshore wind farms to more than one electricity market and create synergies between countries, as well as the corresponding EU and national market arrangements. The members of SG1 develop opportunities for

collaboration on hybrid projects as well as on possible legal, regulatory, and commercial barriers. SG1 will continue to work on overcoming barriers and taking steps toward hybrid and joint projects, which can be addressed on the national and regional level. Furthermore, the collaboration will continue to function as a forum to reflect on how to work on issues with legislative processes at the EU and national level.

Permitting, Maritime Spatial Planning and Environmental Considerations

In order to reach our energy and climate targets within the EU, there is a need to accelerate planning and permitting procedures at EU and national level, and at the same time better understand the possible ecological limits of large-scale wind development in the North Seas and the impacts on other users of the sea. SG2 made an inventory of spatial tensions of 2030 offshore wind farm developments on a regional sea scale. The next steps are to set to better define the ecological tensions and potential threats for development and define spatial strategies to avoid or mitigate such threats. To increase knowledge and support the deployment of offshore wind in the North Seas, the North Seas countries will continue to cooperate closely on MSP, environmental research, cumulative impact assessment of wind farms between responsible authorities for energy, maritime spatial planning, and environment.

Financing and Support Frameworks

Offshore tenders are a central topic for financing and support frameworks. NSEC members coordinate the offshore tenders by means of sharing information regarding the national tender schedules as a part of SG3. In the working group, the countries also exchange best practices concerning tender design, zero-subsidy support, design elements to foster system and sector integration as well as grid connection regimes. To achieve the ambitious goals that have been set out, joint projects are also becoming increasingly important. For this reason, the group also addresses financing opportunities for joint cross-border offshore projects, including via EU financing instruments such as the Connecting Europe Facility (CEF) and the Union Renewable Energy Financing mechanism. Finally, Power Purchase Agreements (PPAs) play an increasingly important role in the financing of offshore projects. The countries will address the issues, barriers, and solutions for a wider uptake of PPAs. Further, the group exchanges information on the decommissioning, lifetime extension and repowering of wind farms. The aim of the exchanges is also to jointly develop and discuss ideas for the medium-term future of the offshore energy system in terms of installed capacity, e.g. through the coordinated tender schedules.

Delivering 2050: Long-term Grid and Infrastructure Planning

NSEC's SG4 works with the European Network of TSOs for Electricity (ENTSO-E) to provide and coordinate input on the Offshore Network Development Plan for the Northern Seas offshore grids under the EU TEN-E regulation. Furthermore, SG4 aims to broaden the discussion on long-term grid planning to also include the early development and upscaling of green offshore hydrogen production and transportation, and its potential role in an increasingly interconnected North Seas energy system. Depending on production methods, hydrogen can be grey, blue, or green. Green hydrogen is the only type produced in a climate-neutral manner making it critical to reach net zero by 2050 and therefore will be important in decarbonising our energy system. Power-to-x, and especially hydrogen, will play a key role in providing flexibility where and when it is needed. Hydrogen demand is expected to grow significantly, especially after 2030 due to both its potential as a storable energy carrier and, as a fuel and raw material for hard-to-electrify activities. Several NSEC countries have announced targets for onshore and offshore green hydrogen production. In SG4, NSEC countries will exchange first experiences with hydrogen in correlation to offshore wind, and exchange knowledge on transport infrastructure, RES development and offshore Power-to-x production. They will work together to provide insights on offshore hydrogen production, to discuss the roll-out of electrolysis, and to increase the synergies between the long-term offshore grid and hydrogen network planning. In all aspects of medium- and long-term infrastructure planning, SG4 underlines the importance of broad engagement on this planning process with member states and relevant stakeholders, including industry and Non-Governmental Organisations (NGOs), to anticipate and tackle supply-chain bottlenecks (e.g., ports' development and availability) in the rollout and acceleration of delivering our North Seas energy system. This closely relates to the importance of safeguarding the security of offshore and underwater critical infrastructure, and the supply of critical raw materials, through innovation and enhanced circularity.

A new national policy on offshore islands was launched by Minister for Rural and Community Development in June 2023. Its goal is to see more people living and working on the islands with good career prospects, regardless of where their employer is headquartered. The vision is also to see offshore islands contributing to and benefiting from the transition to a low carbon economy and a climate-neutral society, with island communities, especially young people, having an active role in shaping the future for Ireland's islands.

Regional Co-operation

Since the UK's departure from the European Union Ireland has been physically isolated from the European Union. This will change in the coming years as the Celtic interconnector comes online. As pollutants and effects of GHG emissions know no boundaries Ireland sought to engage with the United Kingdom and Northern Ireland. In development of the NECP DECC engaged with counterparts in Northern Ireland on the Plan, formally inviting feedback through the consultation process and opening that up to all relevant stakeholders. DECC also engaged with Great Britan and France, seeking input and opening the consultation process to the relevant stakeholders. This is in addition to the existing collaborative and working relationships that Ireland has cultivated with its nearest neighbours. These relationships will continue to develop as Ireland seeks to develop internationally significant renewable projects and PCIs such as the Celtic interconnector.

Clean Energy for EU Islands Initiative

As part of the 'Clean energy for all Europeans' package[16], the Clean Energy for EU islands initiative, launched in 2017, provides a long-term framework to help islands generate their own sustainable, low-cost energy. This will result in:

- Reduced energy costs and greatly increased production of RE;
- Construction of energy storage facilities and demand response systems, using the latest technologies;
- Better energy security for islands, which will be less reliant on imports;
- Improved air quality, lower GHG emissions, and less impact on islands' natural environments;
- The creation of new jobs and business opportunities, boosting islands' economic self-sufficiency;

The initiative builds on a political declaration signed by the European Commission and 14 EU countries with large island populations (Croatia, Cyprus, Denmark, Estonia, Finland, France, Germany, Greece, Ireland, Italy, Malta, Portugal, Spain, and Sweden). As a follow-up, the parties also signed a Memorandum of Understanding in June 2020 to establish a

[16] Available here: https://energy.ec.europa.eu/topics/energy-strategy/clean-energy-all-europeans-package_en

long-term framework for cooperation to advance the energy transition and identify best practices on challenges that cannot be addressed at the island level.

Ireland has 5 island groups involved with the Clean Islands Energy Transition; Aran Islands, Bere Island, Cape Clear, Rathlin and Valentia. DECC has some responsibilities relating to Clean Energy Islands in the national policy on offshore islands as follows:

- Consider innovative solutions including funding and regulatory sandboxes to harness the RE potential of island communities including storage and connectivity solutions, as part of the Clean Energy for EU islands initiative. (DECC CRU Eirgrid ESB Networks Q4 2024);
- Support the transition to RE on the islands based on the Study on Regulatory Barriers and Recommendations for Clean Energy Transition on the islands of Ireland (DECC Eirgrid ESB Networks SEAI CRU DRCD Comhar na nOileáin ÚnaG Other Relevant Public Bodies Q4 2024);
- Extend the tools and techniques developed as part of the EU territorial cooperation initiative (InterReg) EU Ireland-Wales CHERISH project to island areas to inform their climate change plans and actions (DECC GSI Q3 2025); Provide grants and supports for energy-efficiency community projects, including Energy Master Plans for islands, through relevant SEAI schemes.

2. National Objectives and Targets

2.1 Dimension Decarbonisation

2.1.1 GHG Emissions and Removals

2.1.1.1 The Elements set out in point (a)(1) of Article 4 Effort Sharing Regulation

The EU and Member States contribute to their commitments under the United Nations Framework Convention on Climate Change (Kyoto Protocol and Paris Agreement) collectively through the EU Emissions Trading System (EU ETS) and EU Effort Sharing legislation. With the adoption of the European Climate Law in 2021, the EU and its Member States made a legal commitment to reduce EU emissions to net-zero by 2050 at the latest and aim to achieve negative emissions thereafter. The law also sets the intermediate target of reducing net GHG emissions by at least 55% by 2030 compared to 1990 emissions levels and requires the Commission to propose a next intermediate target for 2040, for which a recommendation of 90% emissions reductions has been put forward, published on 6th February 2024. This is a big step up in ambition from the previous 2030 targets, and to ensure that EU climate and energy legislation aligned with the new EU 2030, and 2050 targets, the Fit for 55 Package was introduced. Two pieces of legislation that required updating as part of the EU Fit for 55 package to align with the more ambitious 2030 target were the Emissions Trading Scheme (ETS) Directive and the Effort Sharing Regulation (ESR).

The ETS covers certain high-emitting sectors. Within the ETS, participants are required to purchase allowances for every tonne of emissions emitted, with the amount of these allowances declining over time to ensure achievement of an EU-wide target of a 62% GHG emissions reduction by 2030, relative to 2005 levels. Ireland has 109 installations in the ETS sector.

For non-ETS sectors, which includes emissions from agriculture, transport, buildings, and light industry, Member States' nationally binding targets (for the period 2021 to 2030) are covered by the ESR. The Regulation is the follow-up to the Effort Sharing Decision (ESD), which established national emissions targets for Member States in the non-ETS sectors between 2013 and 2020. Ireland was fully compliant with its emission reduction obligations under the ESD.

National contributions under the ESR were determined with consideration of the different capacities and cost-efficiency opportunities in Member States so as to ensure a fair and balanced distribution of the effort. Targets were determined according to the relative GDP per capita of each Member State, with higher income Member States taking on more ambitious targets than those with a lower GDP per capita. To ensure efficiency, these targets were adjusted to reflect cost-effectiveness for those Member States with a GDP per capita above the EU average and to avoid some Member States' targets from increasing much more than the collective target. Member States' target increases were limited to 12 percentage points.

Ireland's revised 2030 target that the European Commission proposed, and Ireland accepted, reflects a 12% increase on our previous 2030 target. Ireland is required to reduce its emissions by 42% by 2030, relative to 2005 levels. Together, the ETS and ESR will facilitate achievement of the EU-wide target of at least a 55% GHG emissions reduction by 2030 as set in the European Climate Law. Table 2, below, presents the step up in ambition from the previous 2030 targets.

Table 2: Previous vs current 2030 emissions reduction targets

By 2030	Previous (pre- Fit for 55 package)	Current	Relative to
EU economy-wide target	40%	At least 55%	1990
EU ETS contribution	43%	62%	2005
EU ESR contribution	30%	40%	2005
IE ESR legally binding share	30%	42%	2005

The revised ESR became effective on 16th May 2023 and provides for the establishment of binding annual GHG emissions limits for each Member State for the period 2021–2030. The annual limits are calculated using methodologies outlined in Article 4 of the ESR. For the years 2021 to 2025 inclusive, Ireland's annual emissions allocations are set out in Implementing Decision (EU) 2023/1319, shown in the table below. The annual emissions allocations for the years 2026 to 2030 will be determined by the European Commission in 2025, following review of the latest available emissions data, and these will be set out in a further, separate Implementing Decision.

Table 3: Ireland's Annual Emissions Allocations (AEAs) 2021-2025

AEAs	2021	2022	2023	2024	2025
ESR (tCO_2eq)	43479.4	42357.4	40520.1	38682.7	36845.4

The legislative framework of the ESR provides for a number of compliance options beyond direct emissions reductions, including banking, borrowing, and trading annual allowances. This approach supports flexibility among Member States to achieve targets as efficiently and as fairly as possible. The stated objective of government policy is to comply with our targets through direct emissions reductions and, if necessary, to avail of other compliance options available under the relevant EU legislation.

Use of ESR Flexibilities

Flexibility options built into the ESR agreement allow Ireland to transfer 4% of credits from the EU Emissions Trading System (ETS) and to account for Land Use, Land-Use Change and Forestry (LULUCF) credits equivalent to a maximum of 26.8 Mt CO_2eq over the period 2021-2030. Following the revision of Regulation (EU) 2018/841 on GHG Emissions and Removals from LULUCF, the methodology to access the flexibility in the 2026-2030 period has changed making it extremely difficult to access 50% of this flexibility. The accounting rules will change to gross-net accounting of all sectoral emissions and removals post 2026.

ETS flexibility

Eligible Member States had to notify the Commission by the end of 2019 of the amount of this flexibility they will use over the period. Since the transfer was strictly limited in volume, and decided beforehand, predictability and environmental integrity are maintained. The total quantities, as notified by the relevant Member States, are set out in Commission Implementing Decision (EU) 2020/2126, Annex III. Ireland notified the Commission that it would use the full amount of this flexibility towards compliance with the ESR. This equates to 4% of 2005 emissions as per the Annex II of the ESR, or 1,907,504 tCO_2 annually. Member States may decide to revise the notified percentage once in 2024 and once in 2027.

LULUCF Flexibility

Ireland was afforded a 26.8 Mt CO_2eq LULUCF Flexibility under the 2018 Effort Sharing Regulation to be used against the ESR target. This was for the period 2021-2030. Under the amended 2023 EU LULUCF Regulation, the accounting rules regarding how the LULUCF

Flexibility credits are calculated remained the same in the first period (2021-2025) but changed for the second period (2026-2030). Therefore, the LULUCF Flexibility has effectively been split in two, with 13.4 Mt CO_2eq of LULUCF Flexibility credits available for each period. Based on latest projections included in this plan, there will not be any credits available from the second period.

Revision of Regulation (EU) 2018/841 on GHG Emissions and Removals from Land use, Land-use Change and Forestry

Under the European Green Deal, the European Union (EU) has committed to achieve net-zero GHG emissions by 2050 and set a more ambitious climate target of net-55% emissions reductions by 2030 compared to 1990 levels. Both ambitions rely fundamentally on the role of natural sinks from the LULUCF sector to compensate residual emissions. However, they also come at a time in which the EU's natural sinks are in decline. Over the last two decades, the EU's net-removals have fallen from a peak of -329 Mt CO_2eq in 2009 to -243 Mt CO_2eq in 2019, mainly due to an increase in forest harvesting rates, including for bioenergy. Therefore, achieving the EU's climate goals will require reversing this negative trend and securing a strong contribution from the land-use sector towards the EU's climate-objectives. For this to be achieved, climate change mitigation in the land-use sector needs to reduce risks to environmental integrity. Environmental integrity is achieved by ensuring that aggregated global GHG emissions do not increase because of a mitigation activity or implementation of instruments. Among the most discussed risks to environmental integrity are additionality of mitigation measures, non-permanence (reversals) of emission reductions or removals, uncertainty in monitoring and risk of incomplete reporting, but also the challenge of ensuring other environmental and social safeguards.

The LULUCF Regulation (EU) 2018/841 regulates the EU emissions and removals from the land-use sector for the period 2021 to 2030. In 2030, LULUCF carbon removals will need to reach 310 Mt CO_2eq. Parliament approved the agreed text on 14th March 2023 and the regulation was published in the Official Journal on 21st April 2023 entering into force on 11th May 2023. The amended regulation is considered a paradigm shift in the treatment of the LULUCF sector in the EU's climate target architecture. The 2020 Kyoto protocol climate targets did not include the LULUCF sector due to the large uncertainties in emissions calculations and, whilst the 2018 LULUCF regulation included a no-debit rule which meant you must not disimprove from a baseline, it also provided substantial flexibilities to generate credits to use against the ESR targets. The 2023 amendment represents a major step-up in ambition for the LULUCF sector as it sets an extremely ambitious target for the EU LULUCF

sector, with binding national contribution targets and additional limitations on existing flexibilities.

Main Changes and Implications for Ireland

The accounting rules will change to gross-net accounting of all sectoral emissions and removals post-2026. Therefore, the accounting rules will now be different for the two commitment periods of 2021-2025 and 2026-2030. For the first period (2021-2025), the original land accounting categories (e.g., afforested land) and the national “no-debit” rule remain in place. The adoption of this reporting format means that the accounting rules established through projected baselines (i.e., Forest Reference Level) and different historic reference periods (i.e., Grasslands, Croplands, Wetlands) will no longer be used. These changes are aimed at making the accounting rules more transparent to provide methodological consistency with the ESR (Regulation (EU) 2018/842). By changing the accounting rules for 2026-2030, all land emissions must be included in the accounts which will make the distance to the proposed annual targets from 2026-2030 much larger due to increased forest land emissions, which now cannot be factored out. The Commission has calculated Ireland’s target to be a reduction in emissions of 0.626 Mt CO_2eq to 3.7 Mt CO_2eq by 2030 and to meet a 4-year budget period based on linear trajectory from 2026-2029.

CAP 2024 outlines how the LULUCF sector will now pursue an approach that is more aligned to how the EU LULUCF Regulation deals with the fluctuations and limits within the LULUCF sector. The ambition for this sector shall now be a fixed reduction of 0.626 Mt CO_2eq. by 2030 below a baseline set at the average of the 2016-2018 emissions. This EU-type approach also retains the core ambition of the Climate Action and Low Carbon Development Act 2015, as amended; the LULUCF sector will have binding and ambitious emissions-reduction targets, and actions that are updated annually, as with other sectors, with the Minister for Agriculture, Food, and the Marine, coordinating with the Minister for Housing, Local Government and Heritage, having responsibility for its delivery. This new approach will set Ireland on a pathway to achieve our goals for this sector allowing for; the setting of activity targets and annual key performance indicators, sectoral accountability, and a 2030 emissions reduction target.

These activity levels are based on the abatement levers from established research and the LULUCF Marginal Abatement Cost Curve (MACC) published by Teagasc in 2023. The abatement levers in the MACC must undergo a feasibility assessment, as part of the Climate Action Plan 2024, to assess the socio-economic impacts of such measures. This will be the

first step to allow Ireland to comply with its existing commitments under the Revised EU LULUCF Regulation within the biophysical limits of the sector. The pathway will be subject to future reviews considering the Land Use Review, ongoing inventory refinements, evolving science, and any future developments in terms of international and national commitments.

National Policy Position

In June 2019, the Irish Government agreed to support the adoption of climate neutrality targets by 2050 at the EU level, and to pursue a trajectory of emissions reduction nationally which is in line with reaching climate neutrality in Ireland by 2050, and to evaluate in detail the changes which would be necessary to achieve this target at national level. Ireland's Climate Action and Low Carbon Development Acts 2015 to 2021 was enacted in July 2021. It establishes in law Ireland's commitment to achieve 'climate neutrality' by 2050 at the latest. The Act also provides for a 51% reduction in GHG by 2030, compared to 2018 levels, and puts in place a rigorous governance structure to ensure that Ireland achieves its national, EU and international climate commitments in the near- and long-term. This framework includes a system of carbon budgets and sectoral emissions ceilings, and a requirement for Government to prepare and update a national CAP annually and a National Long-term Climate Action Strategy at least once every five years.

Ireland's Long-term Strategy on GHG Emissions Reductions was published in April 2023 and shared with the European Commission as stipulated by Article 15 of Regulation (EU) 2018/1999 on the Governance of the Energy Union and Climate Action (Governance Regulation). The Strategy seeks to identify the optimal pathways, beyond 2030, towards achieving a climate-neutral economy in Ireland by 2050. Taking a 30-year perspective, the strategy builds upon the decarbonisation pathways set by the carbon budgets, sectoral emissions ceilings, and CAPs, and provides a crucial link between Ireland's 2030 climate targets and the long-term goal set by Ireland's National Climate Act and the European Climate Law. The Strategy is underpinned by robust technical analysis of potential decarbonisation pathways, across all key sectors of the economy. The Strategy provides clarity on the long-term sectoral adjustments that will be required to reach climate neutrality; allowing Ireland to avoid costly investments in high-emissions technologies, support a just and equitable transition, promote technological innovation, plan for new sustainable infrastructure in light of future climate risks, and send early and predictable signals to investors about envisaged long-term societal changes. The strategy has been informed by extensive public consultation. In addition to the EU legal requirement for Ireland to prepare a

Long-term Strategy on GHG Emissions Reductions, Ireland has a national commitment to prepare such a Strategy.

While Ireland's Long-term Strategy, published in 2023, was updated to reflect the increased ambition set out in the Climate Action and Low Carbon Development Acts 2015 to 2021 and CAP 2023, there are additional requirements, beyond increased ambition, in our national legislation pertaining to Ireland's Long-term Strategy. Ireland is therefore updating the Strategy submitted to the Commission in 2023 to ensure it fully aligns with our national obligations and will publish in 2024 Ireland's first strategy for GHG reduction prepared in line with the Climate Action and Low Carbon Development Acts 2015 to 2021. It will conform to the requirements of both EU and national legislation and, as such, will be submitted to the European Commission following its approval by government.

Table 4: Projected trends in GHG emissions (WEM)

	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2035	2040	2050
ETS sector	15336.81	14707.3	11927.59	11954.29	11473.36	11296.81	10213.9	9455.70	9342.20	8700.91	8713.06	7914.55	7729.9
Effort Sharing sector	46418.31	45897.5	45466.1	45241.11	45070.2	45096.9	44719.0	44346.7	43958.46	43466.9	39988.4	37011.2	34917.65
LULUCF	4627.79	3983.34	5613.80	6643.15	6768.08	7456.84	7383.35	7628.86	7905.57	7944.19	9391.77	8511.11	7645.45

Table 5: Projected trends in GHG emissions (WAM)

	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2035	2040	2050
ETS sector	15336.81	14707.39	11927.8	11902.14	11390.46	11204.32	10147.14	9196.13	8465.06	7540.1	7405.8	6078.73	5399.88
Effort Sharing sector	46418.3	45897.5	45031.1	44265.95	43266.76	42001.67	40572.47	39056.64	37462.14	35559.17	31449.73	28240.8	26760.34
LULUCF	4627.79	3983.34	5077.87	4885.36	4896.56	5480.30	5087.93	5042.53	4846.46	4912.01	7529.66	6253.12	6312.93

Table 6: Projections of Sectoral Developments (WEM)

ktCO2eq	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2035	2040	2050
Energy Industry	10261.93	10078.17	7513.39	7616.57	7119.66	6944.43	5852.88	5091.86	4988.69	4347.12	4428.81	3887.13	3998.75
Residential	6878.72	5787.38	5793.3	5799.21	5745.72	5649.87	5523.78	5358.26	5166.02	4906.69	3052.13	1895.33	1507.62
Manufacturing Combustion	4613.57	4302.06	4167.33	4032.61	4021.77	3995.36	3942.60	3891.89	3840.67	3788.38	3452.79	3108.61	2720.80
Commercial/ Public Services	1436.54	1422.04	1386.09	1350.14	1321.89	1293.75	1264.42	1232.84	1198.36	1152.81	962.40	933.13	1036.69
Transport	11088.58	11751.29	11781.61	11575.45	11450.67	11454.85	11435.98	11386.86	11305.40	11188.26	9657.08	7641.92	5057.05
Industrial Processes	2471.83	2287.99	2178.61	2205.22	2231.72	2258.34	2286.6	2315.25	2344.28	2373.7	2556.75	2562.23	2571.85
F-Gases	744.76	741.27	727.51	726.74	679.54	648.84	637.82	615.43	607.38	612.60	685.29	822.13	1166.53
Agriculture	23435.75	23356.81	22997.21	23069.24	23178.62	23379	23243.07	23187.37	23149.98	23120.95	23320.74	23551.9	24136.35
Waste	823.43	877.87	848.74	820.23	794.01	769.36	745.80	722.67	699.87	677.31	585.51	523.40	451.92

Table 7: Projections of sectoral developments (WAM)

ktCO2eq	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2035	2040	2050
Energy Industry	10261.93	10078.17	7513.44	7563.05	7036.4	6857.92	5809.96	4902.73	4321.49	3850.51	3790.72	2835.18	2716.72
Residential	6878.72	5787.38	5802.11	5816.83	5769.27	5512.22	5231.75	4926.51	4598.89	4205.23	2091.18	601.67	221.69
Manufacturing Combustion	4613.57	4302.06	4167.33	4032.61	4019.27	3986.11	3912.58	3798.48	3552.85	2909.43	2561.61	2053.80	1315.47
Commercial/ Public Services	1436.54	1422.04	1395.79	1369.53	1345.97	1259.70	1166.61	1055.39	898.03	611.74	388.35	232.91	51.66
Transport	11088.58	11751.29	11772.26	11545.27	11389.51	10896.08	10391.94	9868.84	9320.59	8730.5	7127.06	5656.71	4657.62
Industrial Processes	2471.83	2287.99	2178.61	2205.22	2231.72	2258.34	2286.6	2315.25	2344.28	2373.7	2556.75	2562.23	2571.85
F-Gases	744.76	741.27	727.56	726.73	679.45	651.02	642.13	621.68	615.41	622.56	703.35	856.46	1261.45
Agriculture	23435.75	23356.81	22553.19	22088.62	21391.62	21015.26	20532.24	20041.24	19575.78	19118.28	19050.99	18997.18	18911.83
Waste	823.43	877.87	848.74	820.23	794.01	769.36	745.80	722.67	699.87	677.31	585.51	523.40	451.92

2.1.1.2 Where applicable, other national objectives and targets consistent with the Paris Agreement and the existing long-term strategies. Where applicable for the contribution to the overall Union commitment of reducing the GHG emissions, other objectives and targets, including sector targets and adaptation goals, if available

Climate Adaptation

Ireland is committed to reducing the vulnerability of the State to the negative effects of climate change. Ireland's first statutory National Adaptation Framework (NAF) was published in January 2018, was subject to statutory review in 2022 and a new statutory NAF was approved by Government in June 2024[17]. The new NAF identifies 14 key national sectors, including Electricity and Gas Networks, under the remit of 7 Government Ministers where sectoral adaptation plans are required to be submitted to Government for approval by 30th September 2025.

Following the statutory review of the NAF undertaken in 2022, which identified a number of recommendations to improve Ireland's adaptation policies. With the growth in national-level data and knowledge about climate change, and the noticeable rise in both the frequency and severity of climate impacts, a new NAF was developed and approved by Government in June 2024. This new NAF builds on the first NAF and introduces a broader set of guiding principles, emphasising the urgency for more intelligent, rapid, and far-reaching adaptation strategies. It advocates for a pathway planning approach, which considers a variety of potential future warming and impact scenarios, to ensure flexible and effective adaptation measures. The new NAF also emphasises the need to avoid maladaptation, encourages greater use of nature-based solutions and promotes greater consideration of socioeconomic vulnerability and just resilience considerations.

At local level in Ireland, the NAF sets out the statutory requirement under the Climate Act, for all LAs to develop Local Authority Climate Action Plans (LACAPs) covering a five-year period in consultation with adjoining LAs and relevant stakeholders. These plans must specify mitigation and adaptation measures consistent with national strategies and policies. The first LACAPs were adopted by all 31 local authorities in early 2024. These plans bring forward adaptation and mitigation measures in an integrated manner, building on work previously undertaken through the development of LA Climate Change Adaptation

[17] NAF, 2024. Available here: https://www.gov.ie/pdf/?file=https://assets.gov.ie/281278/ac892520-3f2a-4964-8c8a-7406c931d287.pdf#page=null

Strategies, prescribed under the first NAF in 2018. The LACAPs will strengthen the alignment between national climate policy and the delivery of effective local climate action. Importantly, the responsibility for implementing these LACAPs lies with the respective LAs, recognising the unique challenges presented by climate change at the local and community level. These LACAPs will be consistent with the approved national Climate Action Plan and NAF. Following adoption, the plans are valid for 5 years.

Circular Economy

Ireland's national waste policy is based on the waste hierarchy: waste prevention; preparing for reuse; recycling; and energy recovery; with disposal, namely landfill, being the least desirable option. The current national Waste Action Plan for a Circular Economy (2020-2025) sets out a roadmap for Ireland to transition to a circular economy. This has been supported by the enactment of the Circular Economy and Miscellaneous Provisions Act 2022, which underpins Ireland's shift to a circular economy, as well as the ongoing implementation of the first Whole-of-Government Circular Economy Strategy. Work is continuing on the next iteration of the Whole-of-Government Circular Economy Strategy. It will have a statutory basis and will include targets for specified sectors, delivering on the potential to make significant contributions to the circular transition. To inform the strategy, a circularity gap report is being prepared. The purpose of this gap report is to enable us to better understand the levers for change in moving to a circular economy and the benefits these levers could bring based on solid analysis.

We need to size Ireland's circularity gap to understand further how raw materials are processed and assembled to become the products that address the country's needs. Understanding what happens at the end-of-use stage sheds light on the accumulation of materials in products, goods and the built environment around us. Furthermore, it reveals the extent to which Ireland currently achieves the recycling of resources back into the economy to provide a clear starting point to identify where different sectors and supply chains should focus their strategies going forward to deliver the biggest results in terms of reducing environmental impacts and increasing secondary material use ultimately narrowing our circularity gap. As part of a series of measures included in CAP 2024, DECC plans to transform the national approach to resource management in line with modern, circular economy principles.

Biodiversity

Biodiversity provides us with clean air, water, food, materials, medicines, and health benefits. It supports pollination and soil fertility, regulates climate, and protects us from extreme weather and other impacts arising from climate change. Biodiversity contributes to health, wellbeing and sustainable development as set out in the UN Sustainable Development Goals (SDGs). Despite the important role that biodiversity plays in underpinning our economy, health, and resilience to climate change, we are losing biodiversity at a rate seen only during previous mass extinctions. By the end of the century, climate change is likely to become the most significant driver of biodiversity loss. Increases in temperature will change the timing of life cycle events and the distribution of species. The physical impact of more intense storms and increased winter/spring rainfall will accelerate the degradation of habitats that are already compromised by unsustainable practices. The conservation and sustainable use of biodiversity needs to be escalated. Actions within the Biodiversity Climate Change Sectoral Adaptation Plan build on the foundations of the National Biodiversity Action Plan (2017-2021) and are aimed at improving sustainable agriculture and fisheries, better soil and land management and, most urgently, the restoration of natural systems. The Biodiversity Climate Change Sectoral Adaptation Plan also emphasises the need to consider biodiversity as an adaptation tool for other sectors. The primary objective of the Biodiversity Climate Change Sectoral Adaptation Plan is to protect biodiversity from the impacts of climate change and to conserve and manage ecosystems so that they increase the adaptive capacity of people and biodiversity while also contributing to climate change mitigation. A new and updated Fourth Biodiversity Action Plan 2023-2030 was published in January 2024. A new Biodiversity Sectoral Adaptation Plan will now be prepared for delivery in 2025 under the recently approved second statutory NAF.

The 4th NBAP takes account of the wide range of policies, strategies, conventions, laws and targets at the global, EU and national level that influence our shared environment in order to scale up biodiversity action.

Action for biodiversity has increased significantly in recent years, with a strong emphasis being placed on collaboration with landowners and local communities to enable a collective response to the challenge. A wide array of initiatives, projects and funding streams are delivering positive change for a range of habitats and species all across the country including through ACRES, EU LIFE programmes and the Local Biodiversity Action Fund.

Ireland's Natura 2000 Network comprises of a network of sites that are ecologically important at a European level. These special places for biodiversity are designated under the EU's two Nature Directives: Special Protection Areas (SPAs) under the Birds Directive

and/or Special Areas of Conservation (SACs) under the Habitats Directive. There are more than 600 such sites in both public and private ownership across all counties in Ireland with recent expansions in the marine environment. The NPWS is developing and rolling out a comprehensive Conservation Measures Programme that is linked to sites' Conservation Objectives and underpinned by incentives, supports and a collaborative approach. Conservation measures are specific to each site and can involve a wide variety of actions – from woodland management and bog restoration to grazing management, the erection of fences and invasive species removal, etc. – depending on the habitat and its condition. The overall aim of the programme is to contribute to the restoration and maintenance of favourable conservation status of species and habitats across the entire Natura 2000 Network, protecting nature at these important sites. All of these initiatives will contribute towards EU and Global Biodiversity Targets, including actions linked to the preparation of a National Restoration Plan (NRP).

The Government is committed to developing a NRP by 2026, either as part of the 4th NBAP or in the event of the entry into force of the EU Nature Restoration Regulation, also known as the Nature Restoration Law (NRL). The NRL sets out a framework for Member States to restore nature, with binding targets for a wide range of ecosystems including rivers, forests, oceans, urban areas and agricultural ecosystems, as well as protected habitats and species throughout the State. The NRP will seek to address restoration measures in each of these ecosystems. Completion of the NRP will be aligned with the opening of the Government's €3.15bn Climate and Nature Fund in 2026. This fund is expected to play an important role in resourcing the measures in the Plan.

Against this background, work has already started on a participatory stakeholder engagement process to support the development of the NRP over the next 24 months. The development process will comprise a series of interactive workshops aligned with key themes focussing on the impact of the Regulation on Land, Marine and Urban environments. Stakeholders, including farmers and farming representatives, will be encouraged to get involved.

Bioeconomy

The EU's 2050 long-term strategy outlines the bioeconomy as one of the strategic priorities in the road to a climate neutral economy. The Department of Agriculture, Food and the Marine and DECC co-chair the National Bioeconomy Implementation and Development Group through which Ireland's bioeconomy is promoted and action is scaled up. A National

policy statement on the bioeconomy was published in 2018, followed by two Progress Reports, published in 2019[18] and 2023[19]. In October 2023, Ireland's first Bioeconomy Action Plan, for 2023 – 2025, was published. The Action Plan sets out a number of actions and steps across seven key pillars, including a pillar covering Nature, Climate, Energy and Circular Economy. Under this pillar, the bioeconomy is recognised as having a central role in the emerging development of renewable energy. As outlined in CAP 2023, Government has committed to delivering up to 5.7 TWh of indigenously produced biomethane, based on agricultural feedstocks, supported by the National Biomethane Strategy. The guiding principles of the Action Plan include sustainability, the application of the cascading principle, the precautionary principle, priority for food and nutrition security, and the support of local and regional bioeconomy development.

The importance of the bioeconomy is also recognised in the Government's CAP and other cross-sectoral policies including Future Jobs Ireland. The Government recognises that the bioeconomy is crucial for sustainability while also providing an impetus for rural development and employment. The Department of Rural and Community Development's 'Our Rural Future: Rural Development Policy 2021-2025' underlines how the bioeconomy can contribute to decarbonisation, sustainable growth, and job creation in the agricultural, industrial, and technological sectors in rural areas. With 80% of the agri-food sector based in rural Ireland, the potential for the bioeconomy to boost employment in regions is clear.

Ireland's key objective is to grow our ambition to be a global leader for the bioeconomy through a co-ordinated approach that harnesses Ireland's natural resources and competitive advantage and that fully exploits the opportunities available while monitoring and avoiding unintended consequences. Our goal is to move Ireland beyond simply a focus on target compliance and carbon mitigation to integrating sustainable economic development into our economic model as we transition to a low carbon and circular economy.

Geothermal Energy

The Government's 'Policy Statement on Geothermal Energy for a Circular Economy', published July 2023, sets out the broad approach to be adopted in regulating the exploration for, and the utilisation of, geothermal energy as a natural resource and the scope of a strategy to promote the sustainable development of Ireland's geothermal resources to

[18] First Implementation Report of the Bioeconomy Implementation Group

[19] Second Progress Report of the Bioeconomy Implementation Group

decarbonise the heating and cooling of buildings and for industrial uses and power generation.

On 18th January 2024, the European Parliament's Plenary voted in favour of a resolution to support a European geothermal energy strategy, including to develop a European strategy for geothermal energy; a Geothermal Industrial Alliance; a harmonised risk-reduction scheme; encouraging Member States to design national strategies for geothermal. On the latter, the Irish Government is noted as one of six that has undertaken this already.

Geological Survey Ireland, a division of DECC, is Ireland's public earth science information centre, and is undertaking a significant amount of work to increase our understanding of deep geothermal resources and support the development of deep and shallow geothermal resources for heating and cooling through the creation of maps, databases, and tools for users in various markets (e.g. domestic, industrial, commercial, local government & hospitals, etc.).

Air Quality

There are two key elements considered when we monitor our air quality standards: the level of total national emissions of pollutants (otherwise known as our total annual emissions), and local air quality level or ambient air quality.

Ireland's key objective in this area is to reduce harmful emissions and improve air quality in a manner which meets national, EU and international obligations and ensures reductions in the health impacts associated with air pollution. Ireland's first National Clean Air Strategy was published in April 2023 and provides the high-level strategic policy framework necessary to identify and promote the integrated measures across Government policy that are required to reduce air pollution and promote cleaner ambient air, while also delivering on wider national objectives. It outlines how we will enhance and protect the quality of the air that we breathe and realise the full environmental and health benefits of cleaner air. This high-level strategic framework complements the more technical National Air Pollution Control Programme (NAPCP), which identifies the pathway to compliance with our national emissions targets for each pollutant.

Our total national emissions are measured on an annual basis and Ireland has specific responsibilities and targets under a number of international and European agreements. The most notable of these are the international Convention on Long Range Transboundary Air

Pollution (CLRTAP) and the EU National Emission Ceilings (NEC) Directive ((EU) 2016/2284).

There are a number of air pollutants that Ireland has been monitoring and reducing over the last few decades, and details of all these can be found in Ireland's informative Inventory report 2022 (1990-2030)[20]. However, the priority air pollutants are as follows:

- Nitrogen oxide (NO_x);
- Ammonia (NH_3);
- Fine particulate matter ($PM_{2.5}$ and PM_{10});
- Non-methane volatile organic compounds (NMVOCs, such as Benzene);
- Sulphur dioxide (SO_2).

The latest emissions data shows we are in compliance with our 2022 national emissions reduction commitments for all pollutants except NH_3.

The NAPCP is a technical document which sets out the key policies and strategies to ensure that we meet our air quality commitments. It details our current air pollutant emissions (for five key pollutants) and our projected future emissions in relation to key EU target levels. Ireland submitted its first NAPCP in 2019 and an update to the programme was submitted to the EU in February 2021. Our second NAPCP was submitted in May 2024. The predicted impact of a range of cross-governmental policies and measures on air quality are incorporated into this report and the annual EPA national emissions projections.

The most recent projections show that these measures will have significant co-benefits and, if fully implemented, will ensure that we meet all our legally binding emission reduction commitments and, as such, they also form the basis of our NAPCP. Ireland recognises the significance of clean air to the health and well-being of its citizens and its environment and is aware of its international obligations in this area.

The Clean Air for Europe (CAFE)[21] Directive underpins our responsibilities for ambient air quality, and this sets maximum concentration levels for a range of priority pollutants that impact on human health. The EU has revised the limit values set under the CAFE Directive,

[20] Available at: Ireland's UNECE Submissions 2022 | Environmental Protection Agency (epa.ie)

[21] CAFÉ. Available at: Clean Air for Europe (CAFE) Programme - Publications Office of the EU (europa.eu)

taking the more stringent World Health Organisation (WHO) guidelines into consideration. The revision of the Ambient Air Quality Directives will set interim 2030 EU air quality standards, aligned more closely with WHO guidelines, while putting the EU on a trajectory to achieve zero air pollution by 2050 at the latest, in synergy with climate-neutrality efforts.

Ambient Air Quality in Ireland is generally good; however, air pollution is still a contributory factor in approximately 1,410 premature deaths per year in Ireland[22]. There are specific pollutants of concern and certain localised air pollution issues which arise, specifically in relation to particulate matter ($PM_{2.5}$ and PM_{10}), which is associated with residential burning of solid fuel and nitrogen oxides from road transport. The new solid fuel regulations took effect from 31st October 2022. They include more stringent technical standards for all solid fuels to ensure that approved products are of the highest quality and that the most polluting products can no longer be made available on the Irish market and to assist the public in transitioning to less polluting alternatives.

As the population and economy grow, and as sectors develop, there are both challenges and opportunities in managing future air quality. In this regard Ireland is fully committed to developing and deploying further measures and initiatives to enhance and protect air quality in parallel with broader national policy priorities of relevance.

Noise

The European Communities (Environmental Noise) Regulations 2018 (S.I. No. 549/2018) transposes the Environmental Noise Directive 2002/49/EC which is the main EU law to identify noise pollution levels and act on them. The Directive aims to provide a common framework to avoid, prevent or reduce, on a prioritised basis, the harmful effects of exposure to environmental noise, including noise emitted by means of transport, road traffic, rail traffic, air traffic, and from sites of industrial activity. It focuses on four action areas:

- Determining exposure to environmental noise and assessing its health effects at single dwelling level;
- Ensuring that information on environmental noise and its effects is made available to the public;
- Preventing and reducing environmental noise;

[22] 2023 02 24 NEW CAS WIP (www.gov.ie)

- Preserving environmental noise quality in areas where it is good.

The Department's goal is to promote good health and a good quality of life through the effective management of noise within the context of Government policy on sustainable development. Our vision is in line with the Government's National Planning Framework Objective 65 which states the aim to 'Promote the proactive management of noise where it is likely to have significant adverse impacts on health and quality of life and support the aims of the Environmental Noise Regulations through national planning guidance and Noise Action Plans.'

2.1.2 Renewable Energy

Directive 2023/2413 increases the binding EU renewable energy target to at least 42.5% by 2030, with the ambition to reach 45%.

Following a decision by the Government of Ireland, Ireland's objective is to contribute to this target by achieving a 43% share of renewable energy in total energy consumption by 2030. This target is in line with the formula set out in the Governance Regulation.

Ireland is committed to meeting its obligations under RED III, RED II and the Governance Regulation with regards to the expansion and promotion of renewable energy, with a suite of policies and measures planned or underway.

2.1.2.1 The elements set out in point (a)(2) of Article 4

Article 4(a)(2) of the Governance Regulation (Regulation 2018/1999) provides for interim renewable energy targets in 2022, 2025 and 2027.

Tables 8 and 9 set out the estimated trajectory for the overall share of RE for the below scenarios:

- With Existing Measures (WEM), EU recommended harmonised fuel price trajectories with variable carbon tax to 2030, constant thereafter;
- With Additional Measures (WAM).

The tables also provide a comparison between the estimated trajectory and the one set out in the Governance Regulation, and sets out the evolution of RES-E, RES-H and RES-T over the modelled horizon. The modelling indicates Ireland's overall renewable energy share (RES) of gross final energy consumption across the three energy sectors, for 2020-23, for a projection over the years between 2024 and 2030 and a snapshot for 2040 and 2050.

Table 8: Trajectories for renewable heating and cooling, electricity, and transport (WEM)

Renewable Trajectories	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2040	2050
RES-H&C (%)	6.3%	4.9%	6.3%	10.1%	12.2%	13.1%	14.3	15.9	17.6%	19.5%	21.7	43.4%	47.4%
RES-E (%)	39.0%	36.4%	36.8%	39.5%	44.1%	46.4%	50.5	53.7	56.3%	60.3%	68.9	87.0%	96.7%
RES-T (%)	10.1%	4.4%	5.5%	7.5%	8.5%	9.3%	10.1	10.9	12.1%	13.8%	16.3	45.3%	60.1%
Overall, RES Share (%)	13.5%	12.5%	13.1%	15.2%	18.5%	20.1%	21.9%	23.6	25.2%	27.3%	30.9	49.6%	58.9%
Art 4(a)(2) Target for RES Increase	0.0%	-	18.0%	-	-	43.0%	-	65.0	-	-	100.0	-	-
RES Min Traj (%)	16.0%	-	20.9%	-	-	27.6%	-	33.6	-	-	43.0	-	-
RES (%)	13.5%	12.5%	13.1%	15.2%	18.5%	20.1%	21.9	23.6	25.2%	27.3%	30.9	-	-
Shortfall (%)	2.5%	-	7.8%	-	-	7.6%	-	10.0	-	-	12.1	-	-

Table 9: Trajectories for renewable heating and cooling, electricity, and transport (WAM)

Renewable Trajectories	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2040	2050
RES-H&C (%)	6.3%	4.9%	6.3%	10.1%	12.1%	12.9%	14.9%	17.5%	20.8%	26.0%	36.6%	71.6%	84.0%
RES-E (%)	39.0%	36.4%	36.8%	40%	44%	47%	52%	56%	60%	70%	80%	103%	114%
RES-T (%)	10.1%	4.4%	5.5%	7.5%	8.6%	9.5%	10.5%	11.6%	13.1%	15.2%	18.2%	49.3%	58.5%
Overall, RES Share (%)	13.5%	12.5%	13.1%	15.2%	18.5%	20.3%	23.1%	25.9%	29.0%	34.7%	42.7%	68.1%	79.1%
Art 4(a)(2) Target RES Increase	0.0%	-	18.0%	-	-	43.0%	-	65.0%	-	-	100.0	-	-
RES Min Traj (%)	16.0%	-	20.9%	-	-	27.6%	-	33.6%	-	-	43.0%	-	-
RES Proj Traj (%)	13.5%	12.5%	13.1%	15.2%	18.5%	20.3%	23.1%	25.9%	29.0%	34.7%	42.7%	-	-
Shortfall (%)	2.5	-	7.8%	-	-	7.3%	-	7.7%	-	-	0.3%	-	-

It can be noted from the above tables that Ireland's proposed trajectory will not be in line with the desired trajectory set out in the Governance Regulation. This is primarily due to the fact that large projects, particularly offshore wind projects, cannot be constructed in shorter timeframes and will not be fully operational by the end of the decade. A similar situation occurs in a district heating context, with Ireland requiring the construction of pipe networks to realise the potential identified for district heating in Ireland in the National Heat Study.

2.1.2.2 Estimated trajectories for the sectoral share of renewable energy in final energy consumption from 2021 to 2030 in the electricity, heating and cooling, and transport sector

The table at section 2.1.2.1 sets out the estimated trajectory for the share of RE by sector. The figures provided for RES-T are based on actual energy share and do not include the use of multipliers as set out in the Renewable Energy Directive (RED). In order to promote the use of RE in the heating and cooling sector, in line with Article 23.1 of the 2018 Directive on the promotion of the use of energy from renewable sources (recast), Ireland is adhering to the indicative 1.1 percentage point increase (i.e., without the inclusion of waste heat and cold). The use of district heating and cooling in Ireland is currently at a very low level and is estimated to account for less than 1% of heat consumption. Structural barriers to its expansion exist due to Ireland's historic use of fossil fuel boilers for heating and the absence of policy and legislation. However, the 2022 National Heat Study, produced by the SEAI, highlights the potential for up to 54% of heat in buildings to be supplied by district heating. In 2023, a Government approved Steering Group Report made a suite of recommendations that would realise that potential and facilitate expansion of the sector, utilising renewable and waste heat.

Measures to deploy energy from renewable sources in the heating and cooling sector include policy measures such as; developing a legislative and regulatory framework and establishing a district heating centre of excellence, to support the expansion of district heating that uses renewable and/or waste heat sources, modification of Ireland's Support Scheme for Renewable Heat (SSRH) to increase the impact of the scheme by supporting district heating projects and the development, and forthcoming introduction, of a Renewable Heat Obligation (RHO) which will incentivise suppliers of fossil fuels used for heat to ensure a proportion of the energy they provide is supplied from a renewable source. The RHO will also contribute towards delivery of Ireland's target of up to 5.7 TWh of indigenously produced biomethane by 2030.

The SSRH has the primary objective of increasing the level of RES-H in the non-domestic heat sector. Heat pump uptake through building regulations and support schemes will also drive the growth of renewables.

The Department of Enterprise, Trade and Employment, as part of the CAP process, published a Roadmap for the Decarbonisation of Industrial Heat in June 2024. This Roadmap advises manufacturers about what to expect from Government in the coming

years and what the operating environment for decarbonised manufacturing will look like up to the end of the decade, including: supports available to help business, policies that will facilitate decarbonisation, and regulations that will incentivise decarbonisation.

In the transport sector, Ireland is endeavouring to adhere to the renewable energy share in transport consumption targets in Article 25 of the EU RED, through a mandate on fuel suppliers. The Renewable Transport Fuel Obligation (RTFO) introduced in 2010 is a means of achieving national CAP targets to reduce transport emissions by 50% by 2030 and European targets for renewable energy share in transport and the State ensuring compliance with European sustainability and greenhouse gas emissions reduction criteria.

The published Renewable Transport Fuel (RTF) Policy, which is updated biennially, sets out an indicative linear trajectory of annual increase in the RTFO percentage rate, which is required to meet 2030 targets, aligned to the EU RED. Contributing to the RTFO, a statutory sub-target advanced biofuel obligation percentage rate was established in 2023. The RTF Policy also sets out an indicative linear trajectory of annual increase in the advanced biofuel obligation percentage rate, which is required to meet 2030 targets, aligned to the EU RED. These indicative obligation rates are reviewed annually before the next rate increase is introduced for the coming obligation period, commencing in January each year.

Legislative amendments to transpose the 2023 EU RED amendments will see the introduction of a future renewable fuel of non-biological origin (RFNBO) obligation percentage rate contribution to the RTFO, and a similar indicative linear trajectory of annual increase for this RFNBO obligation rate, aligning to the EU RED, set out in the RTF Policy.

Achievement of the RES-T in Ireland is constrained by the EU RED limit of 2% on supply of biofuel and biogas from food and feedcrops. Article 26.1 paragraph 4 provides that a Member State may reduce the minimum share under Article 25.1 paragraph 1 accordingly up to a maximum 7 percentage points. There is also a limit in Ireland on supply of biofuel from high-ILUC-risk feedstock, no more than supply in 2019 and a linear reduction to 0% by 2030.

The 1.7% limit on Annex IX Part B is also adhered to in the calculation of the RES-T. Supply of biofuel from Annex IX Part B can otherwise be counted toward the renewable energy share in the State, but the double counting under Article 27.2(a).
Renewable electricity consumption in road and rail transport also contributes to the RES-T. Implementation of the 2023 EU RED amendments will see the introduction of legislation to

facilitate the award of RTFO certificates for renewable electricity supply at public charging points, which can be used by fossil fuel suppliers to meet their obligation, in line with Article 25.4 of the EU RED.

2.1.2.3 Estimated trajectories by renewable energy technology that the Member State projects to use to achieve the overall and sectoral trajectories for renewable energy from 2021 to 2030, including expected total gross final energy consumption per technology and sector in millions of tonnes of oil equivalent (ktoe) and total planned installed capacity (divided by new capacity and repowering) per technology and sector in MW

The following tables set out the trajectories under the WEM and WAM scenarios by renewable energy technology.

Table 10: Trajectories by renewable energy technology (WEM)

Renewable Electricity-Installed Capacities (MW)												
	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2040	2050
Hydro	234	234	234	234	234	234	234	234	234	234	234	234
Renew Waste	39	39	39	39	39	39	39	39	39	39	39	39
Landfill Gas and Biogas	28	28	28	28	28	28	28	28	28	28	28	28
Biomass CHP	30	30	30	30	30	30	30	30	30	30	30	30
Biomass Co-Firing	70	79	80	118	118	118	118	118	118	118	0	0
Onshore Wind	4,333	5,007	5,193	5,318	5,568	5,818	6,068	6,318	6,568	6,818	7,968	8,968
Offshore Wind	25	25	25	25	25	25	25	25	850	2,650	6,650	10,150
Solar PV	75	371	534	1,140	2,151	2,524	3,544	4,079	4,864	5,700	7,784	9,784
Marine	0	0	0	0	0	0	0	0	0	0	0	0
Renewable Electricity-Generation by Source (ktoe)												
	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2040	2050
Hydro (nor)	66	66	66	64	62	63	63	62	62	56	51	48
Renew Waste	30	30	26	23	23	23	23	23	23	23	23	23
Biogas (excl. sewage sludge gas)	3	3	3	3	3	3	3	3	3	3	3	3
Biomass	40	44	22	88	88	88	88	88	88	88	17	17
Landfill Gas and Biogas	10	9	9	3	3	3	3	3	3	3	3	3
Sewage Sludge gas	2	2	2	2	2	2	2	2	2	2	2	2
Marine	0	0	0	0	0	0	0	0	0	0	0	0

Wind (n)	928	959	959	1,180	1,239	1,362	1,472	1,545	1,714	2,104	3,781	4,880
Solar (PV)	7	13	64	93	183	280	359	453	524	587	773	935
Biomethane	0	0	0	0	0	0	0	0	0	0	0	0

Renewable Transport Consumption by Source (ktoe)

	2021	**2022**	**2023**	**2024**	**2025**	**2026**	**2027**	**2028**	**2029**	**2030**	**2040**	**2050**
Renewable Electricity	5	7	11	16	23	34	46	63	83	107	562	864
Biofuel & Biomethane ix A (Advanced)	0	19	50	61	115	117	118	120	133	161	170	175
Biofuel & Biomethane ix B (Alternative)	160	184	228	270	311	310	307	304	287	255	113	10
Biofuel & Biomethane Food & feed crop	9	4	6	7	9	9	10	10	10	10	6	1
Biofuel & Biomethane Other feedstock	13	19	28	34	0	0	0	0	0	0	0	0
Renewable fuels of non-biological origin	0	0	0	0	0	0	0	0	0	0	0	0

Renewable Heat Consumption by Source and Sector (ktoe)

	2021	**2022**	**2023**	**2024**	**2025**	**2026**	**2027**	**2028**	**2029**	**2030**	**2040**	**2050**
Industry												
Biogas	6	7	7	7	7	7	7	7	7	7	7	7
Biomass	121	126	157	189	191	200	221	243	265	288	564	650
Ambient Heat	0	0	6	11	14	17	19	21	24	26	50	55
Solid Recovered Fuel Renewable Portion	47	54	54	53	53	53	53	53	53	53	53	54
Solar Thermal	0	0	0	0	0	0	0	0	0	0	0	0
Biomethane	0	0	0	0	0	0	0	0	0	0	0	0
Residential												
Biogas	0	0	0	0	0	0	0	0	0	0	0	0
Biomass	26	23	31	38	39	39	41	44	47	52	67	41
Ambient Heat	57	77	119	160	188	223	261	302	344	390	725	856
Renewable Waste	0	0	0	0	0	0	0	0	1	1	1	1
Solar Thermal	14	14	14	14	14	14	14	14	15	15	19	20
Biomethane	0	0	0	0	0	0	0	0	0	0	0	0

Commercial and Public Services												
Biogas	6	7	7	7	7	7	7	7	7	7	7	7
Biomass	19	21	24	27	28	28	29	30	31	33	38	36
Ambient Heat	22	23	33	42	48	55	61	69	77	88	165	163
Renewable Waste	0	0	0	0	0	0	1	1	1	1	3	3
Solar Thermal	0	0	0	1	1	1	1	1	2	2	3	3
Biomethane	0	0	0	0	0	0	0	0	0	0	0	0
Agriculture and Fisheries												
Biogas	0	0	0	0	0	0	0	0	0	0	0	0
Biomass	0	0	3	5	6	6	9	12	15	18	41	15
Ambient Heat	0	0	0	0	0	0	0	0	0	0	0	0
Renewable Waste	0	0	0	0	0	0	0	0	0	0	0	0
Solar Thermal	0	0	0	0	0	0	0	0	0	0	0	0

Table 11: Trajectories by renewable energy technology (WAM)

Renewable Electricity-Installed Capacities (MW)												
	2021	**2022**	**2023**	**2024**	**2025**	**2026**	**2027**	**2028**	**2029**	**2030**	**2040**	**2050**
Hydro	234	234	234	234	234	234	234	234	234	234	234	234
Renewable Waste	39	39	39	39	39	39	39	39	39	39	39	39
Landfill Gas and Biogas	28	28	28	28	28	28	28	28	28	28	28	28
Biomass CHP	30	30	30	30	30	30	30	30	30	30	30	30
Biomass Co-Firing	70	79	80	118	118	118	118	118	118	118	0	0
Onshore Wind	4,333	5,007	5,193	5,318	5,824	6,065	6,565	6,805	7,105	7,155	9,155	10,000
Offshore Wind	25	25	25	25	25	25	25	850	2,650	4,000	11,300	18,300
Solar PV	75	371	560	1,194	2,249	2,687	3,575	4,192	5,324	6,500	9,450	12,000
Marine	0	0	0	0	0	0	0	0	0	0	225	475
Renewable Electricity-Generation by Source (ktoe)												
	2021	**2022**	**2023**	**2024**	**2025**	**2026**	**2027**	**2028**	**2029**	**2030**	**2040**	**2050**
Hydro (normalised)	66	66	66	64	62	63	63	61	59	53	51	48
Renewable Waste	30	30	26	23	23	23	23	23	23	23	23	23
Biogas (excl. sewage sludge gas)	3	3	3	3	3	3	3	3	3	3	3	3
Biomass	40	44	22	88	88	88	88	88	88	87	17	17

Landfill Gas	10	9	9	3	3	3	3	3	3	3	3	3
Sewage Sludge Gas	2	2	2	2	2	2	2	2	2	2	2	2
Marie	0	0	0	0	0	0	0	0	0	0	0	0
Wind (norm)	928	959	959	1,180	1,267	1,420	1,560	1,715	2,133	2,610	3,781	4,880
Solar PV	7	13	64	97	191	294	372	458	537	627	773	935
Biomethane	0	0	0	0	0	0	0	0	0	0	0	0

Renewable Transport Consumption by Source (ktoe)

	2021	**2022**	**2023**	**2024**	**2025**	**2026**	**2027**	**2028**	**2029**	**2030**	**2040**	**2050**
Renewable Electricity	5	7	11	17	25	38	53	73	95	124	568	721
Biofuel & Biomethane (Advanced)	0	19	50	61	114	115	115	114	124	147	154	160
Biofuel & Biomethane (Alternative)	160	184	228	269	309	339	365	388	395	384	192	138
Biofuel & Biomethane Food & feed crop	9	4	6	7	9	9	9	8	8	7	3	1
Biofuel & Biomethane Other feedstock	13	19	28	34	0	0	0	0	0	0	0	0
Renewable fuels of non-biological origin	0	0	0	0	0	0	0	0	0	0	0	0

Renewable Heat Consumption by Source and Sector (ktoe)

	2021	**2022**	**2023**	**2024**	**2025**	**2026**	**2027**	**2028**	**2029**	**2030**	**2040**	**2050**
Industry												
Biogas	6	7	7	7	7	7	7	7	7	7	7	7
Biomass	121	126	157	189	191	200	221	242	264	288	505	542
Ambient Heat	0	0	6	11	14	17	19	21	24	26	67	105
Solid Recovered Fuel Renewable Portion	47	54	54	53	53	53	53	53	53	53	43	26
Solar Thermal	0	0	0	0	0	0	0	0	0	0	0	0
Biomethane	0	0	0	0	1	4	13	39	121	370	380	329
Residential												
Biogas	0	0	0	0	0	0	0	0	0	0	0	0
Biomass	26	23	31	38	38	39	40	42	45	49	330	500
Ambient Heat	57	77	118	159	187	232	278	326	377	434	908	1,104
Renewable Waste	0	0	0	0	0	7	14	21	29	36	36	36

Solar Thermal	14	14	14	14	14	15	16	17	18	19	32	33
Biomethane	0	0	0	0	0	0	0	0	0	0	0	0
Commercial and Public Services												
Biogas	6	7	7	7	7	7	7	7	7	7	7	7
Biomass	19	21	24	26	27	27	28	29	30	31	36	39
Ambient Heat	22	23	31	39	44	54	63	74	85	99	234	299
Renewable Waste	0	0	0	0	0	8	16	24	32	41	47	51
Solar Thermal	0	0	0	1	1	1	1	1	1	2	6	8
Biomethane	0	0	0	0	0	2	5	15	42	120	109	130
Agriculture and Fisheries												
Biogas	0	0	0	0	0	0	0	0	0	0	0	0
Biomass	0	0	3	5	6	6	9	12	15	18	24	3
Ambient Heat	0	0	0	0	0	0	0	0	0	0	0	0
Solar Thermal	0	0	0	0	0	0	0	0	0	0	0	0
Biomethane	0	0	0	0	0	0	0	0	0	0	0	0

2.1.2.4 Estimated trajectories on bioenergy demand, disaggregated between heat, electricity, and transport

The following tables set out estimated trajectories on bioenergy demand by use.

Table 12: Bioenergy demand (WEM)

Bioenergy Demand, Total Final Consumption (ktoe)	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2040	2050
Electricity												
Solid Biomass	102	109	57	254	253	253	252	251	251	254	56	56
Biogas	10	11	11	11	11	11	11	11	11	11	11	11
Landfill Gas	29	26	26	22	22	22	22	22	22	22	22	22
Biodegradable Municipal Solid Waste	97	98	88	84	84	84	84	84	84	84	84	84
Sewage Sludge Gas	0	0	0	0	0	0	0	0	0	0	0	0
Heat												
Biomass	166	170	215	260	262	272	299	329	358	390	711	742
Renewable Waste	0	0	0	0	0	1	1	1	2	2	4	4
Solid Recovered Fuel Renewable Portion	47	54	54	53	53	53	53	53	53	53	53	54
Biogas	12	13	13	13	13	13	13	13	13	13	13	13
Biomethane	0	0	0	0	0	0	0	0	0	0	0	0

Transport												
Biodiesel	158	200	249	294	340	338	336	332	328	322	221	169
Bioethanol	20	23	34	42	51	52	53	54	55	56	33	3
Biomethane	0	0	0	0	0	0	0	0	0	0	0	0

Table 13: Biomass Supply by Feedstock (WEM)

Biomass Supply by Feedstock (ktoe)	2030	2040	2050
Biomass from Forestry	644	767	798
Domestic	349	439	380
Imported	295	328	418
Biomass from Agricultural Crops	0	0	0
Domestic	0	0	0
Imported	0	0	0
Biomass from Agricultural Residues	0	0	0
Domestic	0	0	0
Imported	0	0	0
Biomass from Waste	163	165	166
Domestic	163	165	166
Imported	0	0	0

Table 14: Bioenergy demand (WAM)

Bioenergy Demand, Total Final Consumption (ktoe)	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2040	2050
Electricity												
Solid Biomass	102	109	57	254	252	253	252	251	251	254	56	56
Biogas	10	11	11	11	11	11	11	11	11	11	11	11
Landfill Gas	29	26	26	22	22	22	22	22	22	22	22	22
Biodegradable Municipal Solid Waste	97	98	88	84	84	84	84	84	84	84	84	84
Sewage Sludge Gas	0	0	0	0	0	0	0	0	0	0	0	0
Heat												
Biomass	166	170	214	258	261	271	297	325	354	385	895	1084
Renewable Waste	0	0	0	0	0	15	30	45	61	77	83	88
Solid Recovered Fuel Renewable Portion	47	54	54	53	53	53	53	53	53	53	43	26
Biogas	12	13	13	13	13	13	13	13	13	13	13	13

Biomethane	0	0	0	0	2	5	18	54	163	489	489	459
Transport												
Biodiesel	158	200	248	294	338	370	399	424	444	459	312	290
Bioethanol	20	23	34	41	51	50	48	46	44	42	19	3
Biomethane	0	0	0	0	1	1	1	1	1	1	1	0

Table 15: Biomass Supply by Feedstock (WAM)

Biomass Supply by Feedstock (ktoe)	2030	2040	2050
Biomass from Forestry	638	950	1,139
Domestic	349	439	380
Imported	290	511	759
Biomass from Agricultural Crops	353	353	326
Domestic	353	353	326
Imported	0	0	0
Biomass from Agricultural Residues	96	96	92
Domestic	96	96	92
Imported	0	0	0
Biomass from Waste	279	275	262
Domestic	279	275	262
Imported	0	0	0

2.1.2.5 Where applicable, other national trajectories and objectives, including those that are long term or sectoral (e.g. share of renewable energy in district heating, renewable energy use in buildings, renewable energy produced by cities, renewable energy communities and renewables self-consumers, energy recovered from the sludge acquired through the treatment of wastewater)

All relevant national trajectories are set out in the above sections.

2.2 Dimension Energy Efficiency

2.2.1 The elements set out in point (b) of Article 4

(1) the indicative national energy efficiency contribution to achieving the Union's energy efficiency targets of at least 32,5 % in 2030 as referred to in Article 1(1) and Article 3(5) of Directive 2012/27/EU [Article 4 in the Recast EED], based on either

primary or final energy consumption, primary or final energy savings, or energy intensity.

Following Government approval, Ireland notified the European Commission on 26th February 2024 that Ireland's indicative national energy efficiency contributions under Article 4 of the Recast Energy Efficiency Directive (EED) are as follows:

- 10.451 Mtoe in FEC in 2030
- 11.294 Mtoe in PEC in 2030

Ireland is committed to meeting its obligations under the Recast EED, with a large range of energy efficiency policies and measures underway or planned across all sectors, with details set out in the summary box in Chapter 1, below and in Chapter 3.

However, the Article 4 targets which have been generated for Ireland via the formula in Annex I of the EED are extremely ambitious. According to Eurostat, Ireland is projected to have the third highest percentage increase in population in the EU up to 2030, behind only Luxembourg and Malta, which have much smaller populations. While population growth is considered in the calculation of the Article 4 figures, Ireland's population growth has been faster than modelled in recent years. Combining this substantial demographic growth with the significant economic growth that is projected for the Irish economy in the years ahead, and the associated necessary increases to public service provision, will most likely lead to upward increases in both FEC and PEC in Ireland in the short- to medium-term.

As with any economic good, the price of energy is a very important factor in determining the demand for energy. The European Commission's price projections for energy are therefore a very important factor in the calculation of the 2020 EU Reference scenario, which forms the basis of the indicative national energy efficiency contribution for Ireland calculated by the formula in Annex I of the EED. However, there has been considerable volatility in international wholesale energy prices in recent years, because of the Russian invasion of Ukraine and other factors. The energy price projections which the European Commission has used for the purposes of the EED Article 4 indicative national energy efficiency contributions are significantly different from the price projections of the International Energy Agency (IEA). The energy prices which the IEA has projected are significantly lower than the European Commission projections, which, if the IEA projections prove to be more accurate, will lead to energy demand being significantly higher in Ireland than would be the case under

higher energy prices. Indeed, international wholesale gas prices have dropped considerably in the last 12 months, which has traditionally put upward pressure on energy demand.

Even with the full implementation of the very ambitious High WAM scenario, there will still be a gap to the 2030 figure of 10.451 Mtoe, which will be met by as yet unidentified energy efficiency policies and measures.

Ireland also has ambitious targets for increasing the supply of renewable energy. However, given that clean renewable energy and carbon emitting fossil-fuel energy are treated the same under the EED, Ireland has concerns about the potential for conflict to arise between the targets outlined in these two Directives. Ireland looks forward to the review of this issue under Article 35 of the Energy Efficiency Directive, which must be completed by 28th February 2027.

Table 16: Energy efficiency primary and final energy consumption trajectories (WEM)

Energy Efficiency Directive – Energy (ktoe)	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2040	2050
Total Primary Energy	13,751	14,265	13,978	14,650	14,766	14,909	14,827	14,797	14,868	14,808	13,835	13,778
Total Final Energy	11,440	11,969	12,356	12,604	12,793	12,941	13,052	13,142	13,209	13,255	12,415	12,271

Table 17: Energy efficiency trajectories – projected energy consumption (WAM)

Energy Efficiency Directive – Energy (ktoe)	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2040	2050
Total Primary Energy	13,751	14,265	13,979	14,635	14,739	14,720	14,492	14,279	14,110	13,933	12,718	12,825
Total Final Energy	11,440	11,969	12,355	12,601	12,784	12,769	12,722	12,657	12,569	12,463	11,475	11,541

Table 18: Ireland's EED Article 4 Indicative National Energy Efficiency Contribution Trajectories

Year	FEC (Mtoe)	PEC (Mtoe)
2021	11.440	13.751
2022	11.969	14.265
2023	12.356	13.978
2024	14.095	16.330
2025	14.392	16.551

2026	13.603	15.500
2027	12.815	14.448
2028	12.027	13.397
2029	11.239	12.345
2030	10.451	11.294

As has been laid out in Chapter 1 of this document, Ireland recognises the significant economic, environmental, and social benefits for society arising from improved energy efficiency and is fully committed to implementing the Recast Energy Efficiency Directive (EED). The Irish Government has approved and notified to the European Commission an extremely ambitious indicative national energy efficiency contribution for 2030 in line with the figures generated by the formula in Annex I of the EED - a Primary Energy Consumption (PEC) of 11.294 Mtoe and Final Energy Consumption (FEC) of 10.451 Mtoe in 2030. For context, Ireland's FEC in 2022 was 11.969 Mtoe, and the 2030 figures represent a 12.6% reduction from 2022.

Article 4 of the Recast EED requires Member States to not only notify their 2030 indicative national energy efficiency contribution, but to also notify a corresponding trajectory to reach this indicative national energy efficiency contribution by 2030. However, neither the With Existing Measures (WEM) nor the With Additional Measures (WAM) trajectories described elsewhere in this document reach the 2030 indicative national energy efficiency contribution. Therefore, a bespoke trajectory towards the EED Article 4 indicative national energy efficiency contribution is required and is laid out in Table 18 above.

In the time since the Irish Government approved the EED indicative national energy efficiency contribution on 20th February, the projections for Ireland's energy use have been revised upwards due to changes in modelling assumptions. This has resulted in a 700 ktoe rise in Ireland's projected FEC in 2030, approximately equivalent to the energy consumption of 475,000 homes. The most optimistic scenario for energy use reductions that has been produced by the SEAI (the WAM projection), now projects that Ireland's FEC in 2030 to be 12.46 Mtoe, which is 2.01 Mtoe higher than Ireland's indicative national energy efficiency contribution for 2030 of 10.451 Mtoe.

Furthermore, there has been a high degree of volatility in international energy prices in recent years, with gas prices currently tracking to be 35% lower in 2024 than what was modelled by the European Commission, with oil and coal tracking close to the model. As gas provided 31.1% of Ireland primary energy requirement in 2022, there is a significant risk that lower wholesale gas prices will lead to an increase in energy demand, thereby creating a

challenge for Ireland to stay below trajectory for PEC and FEC. It should also be noted that the European Commission's energy price projections, which are used for the WEM and WAM scenarios in this document, are significantly higher than the price projections used by the International Energy Agency (IEA).The notified trajectory to 2030 for Ireland's national energy efficiency contribution is based on the WEM scenario for 2024 and 2025, using the IEA's price projections, with a 10% buffer for these two years, and changes to a linear trajectory to the indicative national energy efficiency contribution for 2026-2030. This buffer above the WEM trajectory using the IEA's price projections for 2024 and 2025 has been put in place to mitigate against potential adverse conditions that may unexpectedly drive Ireland above its WEM trajectory during these years, such as volatile energy prices (as laid out above), adverse weather scenarios which may increase energy demand, and changes in modelling calculations as occurred in early 2024. Two central drivers of energy consumption, Ireland's demographic and economic growth, have also consistently increased above and beyond expectations and projections in recent years, and this trend has been taken in account in the development of the trajectory.

Under both the WEM and WAM scenarios, Ireland has put in place a very ambitious programme of enhancing energy efficiency across all sectors, including transport, residential, industrial, and commercial, as laid out in the summary box in Chapter 1 of this document. Many of these policies and measures will take time to fully implement, and coupled with the macro-economic drivers outlined here, means Ireland's energy consumption is expected to increase in the short term before the full impact of the policies and measures is apparent.

Ireland will continue to develop further Policies and Measures through the iterative annual CAP process that will enhance Ireland's energy efficiency and will help us to reach our notified indicative national energy efficiency contribution. Ireland plans to increase the scope of energy efficiency enhancement programmes throughout Irish society in the coming years.

Ireland is also engaging with the Commission to identify any further mechanisms that may be available to help Ireland to reach its obligations under the EED.

2.2.2: The cumulative amount of end-use energy savings to be achieved over the period 2021-2030 under point (b) of Article 7(1) on the energy saving obligations pursuant to Directive 2012/27/EU;

Ireland currently intends to deliver the energy savings required by Article 8 of Directive 2023/1791 through a combination of an energy efficiency obligation scheme (EEOS) to achieve energy savings targets on certain energy companies (the "obligated parties") and a

range of alternative measures. SI 522/2022 (European Union EEOS) Regulations 2022 set a total EEOS target for the obligation period 2021-2030 of 36,424 GWh cumulative end-use energy savings on parties obligated under the EEOS.

The Recast Energy Efficiency (Directive 2023/1791) increases Ireland's cumulative energy savings target under Article 8 and considerations are underway as to how best to ensure that a significantly higher target can be achieved between EEOS and alternative measures. No decision has yet been taken as to the split between EEOS and alternative measures pending that analysis – under SI 522 of 2022 60% of the target is delivered via EEOS with the rest via alternative measures.

2.2.3: The total floor area to be renovated or equivalent annual energy savings to be achieved from 2021 to 2030 under Article 6 of Directive 2023/1791/EU on the exemplary role of public bodies' buildings;

Ireland signalled to the Commission in December 2023 that we are looking to the alternative approach rather than the 3% renovation rate. The 3% figure relates to buildings owned by the State, and the SEAI is still gathering data on owned buildings versus leased buildings. They have engaged consultants to assist in collating the data that we need to quantify the delivery of equivalent savings by 2030.

Extensive work is underway with a view to providing the Commission with this data in 2024. The SEAI has requested data on floor area from public bodies as part of the provision by public bodies to the SEAI of their 'building stock plans.' A review and analysis of this data will be performed prior to determining the relevant equivalent energy savings.

2.2.4 The indicative milestones for 2030, 2040 and 2050, the domestically established measurable progress indicators, an evidence-based estimate of expected energy savings and wider benefits, and their contributions to the Union's energy efficiency targets as included in the roadmaps set out in the long-term renovation strategies for the national stock of residential and non-residential buildings, both public and private, in accordance with Article 2a of Directive 2010/31/EU

Ireland's current Long Term Renovation Strategy (LTRS) outlines these milestones and indicators. The LTRS is available on the Irish Government's website. The LTRS reflects the

commitments in the National Development Plan (NDP) and the actions set out in the Irish Government's CAP. The CAP sets out a detailed roadmap for the period 2021-2030 with the objective of reducing CO_2eq emissions from the built environment by 40%-45% relative to 2030 projections. This includes the milestone targets for 2030.

In the residential sector, these include:

- Retrofitting the equivalent of 500,000 homes to a Building Energy Rating (BER) level of B2 or cost optimal equivalent or carbon equivalent;
- Local authorities in their administration of the social housing retrofit programme select homes for inclusion and measures to be implemented in order to contribute to the overall target of 36,500 dwelling retrofit to B2/Cost Optimal levels.
- Installing 680,000 heat pumps (400,000 in existing buildings); and;
- Advanced performance requirements in the current regulations combined with a mandatory renewables requirement, creating a rapid transition to low carbon heating systems in new dwellings.

Formal milestones have not been set for the residential sector for 2040, however as the 500,000 target for 2030 represents one third of the stock in the first of three decades, it is currently considered likely that a further 500,000 retrofits would be an expected milestone target for 2040 ahead of achieving 1.5m houses retrofitted by 2050.

Public Sector

The SEAI's Public Sector partnership programme is based around engagement with public bodies. This includes training; advice on operational actions public bodies can take to reduce day-to-day energy consumption and the administration of a system for monitoring and reporting of energy data in the public sector.

The SEAI's Public Sector Pathfinder programme has been the driving force in recent years behind retrofit and energy efficiency projects in public buildings. The programme is operated on the basis of individual agreements between the SEAI and the 'National Estate Portfolio Leads' i.e. the Department of Education, the Department of Further and Higher Education, Research, Innovation and Science, the Office of Public Works, the Health Service Executive, and the Local Authorities. The Pathfinder programme involves the SEAI collaborating with national estate portfolio leads in the public sector and providing match-funding as a means

of leveraging their willingness and commitment to engaging in retrofit projects, building from shallow to deep retrofit projects.

Table 19: SEAI Pathfinder Budgets and Expenditure

Year	Amount allocated (€m)	Amount spent (€m) *
2017	5	5.7
2018	9	12.7
2019	9.2	9.1
2020	9.5	8.2
2021	21	14.6
2022	27.5	35.2
2023	60	69.9
2024	63 (funding from Climate Action Fund)	N/A

*Note in some instances a greater amount was spent than allocated – this would have occurred from reallocation within SEAI's budget, with agreement of the Department.

- As funding for Pathfinder is 50/50 with the national estate portfolio leads, the investment made by SEAI will have been matched, meaning in total, double the amount was invested.
- An operational review of Pathfinder was carried out in 2022 with a view to informing future development of the programme. Amongst the findings were that moving to deeper retrofit and renewable heat resulted in a significant increase in costs. This is highly dependent on the design path chosen and level of retrofit and renovation. A key finding was that projects must consider additional co-occurring costs. These may arise with repair and maintenance issues, condition of buildings, regulatory requirements, and other accommodation needs. Moving to 90% renewable heat has a significant impact on the costs. Biomass heating is more cost effective than heat pumps in terms of cost per square metre (€/m^2) and cost per tonne of carbon emissions saved (€/tCO_2). Inflation in the construction industry has a significant impact on increasing costs.
- Currently, varied approaches are employed for project identification and selection. This is dependent on whether it lies within a centralised building estate management (schools, HSE, OPW), coordinated (DFHERIS, HEA, SOLAS), or buildings under direct ownership of local authorities. The competitive call process

used by the Higher Education Authority as a multi-stage process adds to overall project timeframes.

- Major upgrades to older buildings must include design assessment of additional provision of fire and safety measures. Issues have been identified at later project stage by onsite design teams or during construction. Where a regulatory issue needs to be addressed, this incurs knock-on costs and potential delays. Delays and unforeseen cost variations are also incurred as onsite design teams identify fire and safety issues. An assessment for asbestos and lead paint is necessary to determine presence and risk. As a specialist service, this assessment and treatment adds to project costs. Planning permission may be necessary with external wall insulation, heat pump compounds and biomass containers; this can vary on location and will impact on the programme delivery. In certain school buildings with restrictions around outside building façades, internal wall insulation may not be viable for classroom sizes.
- The Terms of Reference of the Public Sector Working Group (under the Heat and Built Environment Taskforce) includes a financial workstream that will develop the financial model to build a more thorough analysis for the costs of retrofitting the public sector building stock. More detailed work by all public bodies in the development of their own climate action roadmaps will enable better analysis on a national basis - public bodies will use their own data and apply a gap-to-target tool (developed by SEAI) to identify investment priorities.

EPBD IV, the latest revision to the Energy Performance of Buildings Directive (EPBD), was formally adopted in April 2024. The revised EPBD will increase the rate of renovation, particularly for the worst-performing buildings. The Directive sets out a range of measures to reduce the average primary energy use of residential buildings by 16% by 2030. The measures will have to ensure that at least 55% of the decrease is achieved through the renovation of the worst-performing buildings. For the non-residential building stock, the revised rules require renovating the 16% worst-performing buildings by 2030.

Improved Energy Performance Certificates (EPCs) called Building Energy Ratings or BERs in Ireland will be based on A to G scale to replace the existing A1 to G scale with the intention of better informing citizens and making financing decisions across the EU easier. The SEAI will be responsible for implementing the significant changes to the BER scheme arising from the revised EPBD.

Article 3 and Annex II of the new Directive include a requirement to implement National Building Renovation Plans, which will replace the Long-Term Renovation Strategy (LTRS). The first draft National Building Renovation Plan is due to be submitted to the Commission in December 2025.

2.2.5 Where applicable, other national objectives, including long-term targets or strategies and sectoral targets, and national objectives in areas such as energy efficiency in the transport sector and with regard to heating and cooling

The CAP defines a roadmap to climate neutrality by 2050 for Ireland and sets out a coherent set of policy actions and targets up to 2030 that will set us on track to achieve that goal. In terms of energy efficiency, several actions across various sectors will contribute to achievement of Ireland's national energy efficiency contribution.

Buildings

- The Plan sets out targets for the significant improvement of energy efficiency in our building stock with a target to retrofit the equivalent 500,000 existing dwellings to a B2 BER or cost optimal equivalent by 2030;
- All new dwellings built to NZEB standard from 1st November 2019. All new "Buildings other than dwellings" are built to NZEB from 1st Jan 2019;
- Electricity heating systems, the majority of which are heat pumps, were installed in 97% of new dwellings in 2023;
- Also of note is the establishment of a Heat and Built Environment Taskforce, which will accelerate and drive delivery in relation to retrofitting, renewable heat, district heat and decarbonisation of the building stock. The overarching aim of the Taskforce is to identify work on the critical path to key targets under each area, ensure alignment in the development of polices and activities underway across Government Departments, and proactively manage risks to ensure targets are achieved.

Heating

- The CAP commits to the publication of a National Heat Policy Statement in 2024 that will draw on the evidence of the National Heat Study and set out the overarching approach to decarbonising the heat sector in Ireland.

- A shift to alternative heating sources for residential heating is also set out in the Plan, with a target of 680,000 heat pumps installed over the period 2021-2030, with 400,000 of these in existing dwellings;
- Effectively ban the installation of oil boilers from 2022 and the installation of gas boilers from 2025 in all new dwellings through the introduction of new regulatory standards for home heating systems.
- Progressively phase out oil and gas boilers in existing dwellings through a combination of incentives, information, and regulatory measures and the development of a Roadmap for the Phase Out of Fossil Fuel Heating Systems;
- Local authorities in their administration of the social housing retrofit programme select homes for inclusion and measures to be implemented in order to contribute to the overall target of 36,500 dwelling retrofit to B2/Cost Optimal levels.
- Under the CAP, the retrofit target for local authority owned homes is to retrofit 36,500 to B2 BER/Cost Optimal Equivalent by 2030. As part of this new scheme over the period 2021-2023, 5,766 Local Authority homes have been retrofit to B2/Cost Optimal equivalent. Furthermore, retrofit works were completed on over 74,000 local authority owned dwellings since 2013 to the end of 2021 under the previous scheme.

As a result of the advanced performance requirements of building regulations, it is estimated that approximately 40,000 Local Authority dwellings have been constructed to a typical A or B rating since 2008. Taking account of new housing delivered by local authorities and the Energy Efficiency Retrofit Programme it is expected that approximately 70% of local authority housing will have a typical BER of “A” or “B” by 2030. In line with Government and EU policy an efficiency first approach is adopted for Local Authority retrofit programmes. Fabric measures and efficient renewable heat pumps systems are supported by the Energy Efficiency Retrofit Programme to achieve a BER B2 or cost optimal level. Fossil fuel boilers are not supported by the energy efficiency retrofit programme and have been effectively phased out in new dwellings.

In its Policy Statement on Geothermal Energy for a Circular Economy, the Government outlined the scope of a strategy for the greater deployment of geothermal energy in support of Ireland’s climate goals, in particular the decarbonisation of heating and cooling. The scope of the strategy is aligned with the energy efficiency dimension of the energy union. To manage peak seasonal loads on the electricity grid from the electrification of heating, the strategy will examine targets for the optimal deployment of ground-source heat pumps

relative to air-source heat pumps and promote the use of geothermal storage and re-use of heat to balance heating and cooling loads. Geothermal energy has been identified as a potentially significant source of heat for district heating networks and can play a role in balancing diverse loads in local networks, particularly those integrating industrial processes.

Transport

In the transport sector, CAP 2023 was the first action plan which took the legally binding national carbon budgets and established sectoral emissions ceilings into account, and a significant change in transport policy approach was also set out therein – adopting and applying the AVOID-SHIFT-IMPROVE framework for greater transport sustainability, which aligns in general means to the principles of energy efficiency first.

This update was underpinned by detailed transport modelling undertaken by the National Transport Authority, and targets were updated to better communicate the levels of change that are expected to be necessary to deliver a 50% reduction in transport emissions by 2030, in line with national carbon budget commitments.

It is important to note that while this modelling provided a high degree of specificity in terms of the potential impacts from a carbon emissions perspective from achieving such a level of change, it did not provide detailed design of the specific interventions or policies involved and both CAP 2023 and CAP 2024 commit to further actions in respect of progressing detailed policy development and scheme design to deliver on the level of ambition that is outlined.

Where the CAP 2019 had set out actions to accelerate the penetration of EVs, with the sale of cars and vans on the road to reach 100% of new vehicle sales by 2030 to be EVs, so that 936,000 EVs will be on the road by 2030, these targets were subject to a slight increase in the CAP 2021 Plan to a target of 945,000 by 2030. Acknowledging the findings of an in-depth OECD review of the Irish transport system that was undertaken in 2022 which highlighted high levels of car-dependency in Ireland, CAP 2023 then sought to better embed our vehicle electrification strategy within a wider sustainable framework and now places a greater focus on the overall electrified fleet share. The WAM target of 845,000 private EV cars thus equates to a target of having approximately 1 in 3 private cars electrified by 2030 (c.30% of the expected future car fleet).

Again, where the 2019 CAP had also committed to make growth less transport intensive through better planning, remote and home-working and modal shift to public transport, these elements were strengthened in the CAP 2021 to include a further target of a 10% reduction in ICE car kilometres (km) by 2030. More recent updates under CAP 2023 and CAP 2024 have highlighted that to achieve the levels of change necessary to deliver the modal shift and emissions abatement that is required to achieve a 50% reduction, the level of vehicle kilometre reduction (relative to a 2030 business-as-usual scenario) should be increased to 20% and apply to all kilometres travelled – private, commercial, ICE and EVs, rather than ICE vehicles only. 'Moving Together,' the Department of Transport's draft national demand management strategy which has been published for public consultation, is therefore intended to act as a key enabling and supporting framework for local and regional authorities to implement further actions to improve the efficiency of our transport systems. With respect to renewable transport fuels, CAP maintains previous commitments to increase the renewable biofuel content of motor fuels through an annual increase in the rate of the Renewable Transport Fuel Obligation, such that an E10:B20 equivalent is reached by 2030.

A new target for commercial vehicles was also introduced in line with the Government's National Road Haulage Strategy, such that 30% of new registrations of medium-and heavy-duty vehicles would be zero-emission by 2030, in line with Ireland becoming a signatory to the Global Memorandum of Understanding on Zero-Emission Medium- and Heavy-Duty Vehicles at COP27.

Electricity Generation

The CAP aims to increase reliance on renewables from 30% to 80% adding over 15 GW of RE capacity (with peat and coal plants phased out).

Public Sector

- A 50% energy efficiency target for the Public Sector by 2030;
- A 51% reduction in GHG emissions in the Public Sector by 2030.

In the public sector, the SEAI has been operating a Pathfinder programme for the last 6 years providing opportunities for public sector bodies to implement pilot retrofit projects. Through the Pathfinder projects, public bodies learn how to replicate retrofit successfully across their wider building estates.

Ireland has also established a network of energy performance officers across public sector bodies and developed a comprehensive public sector energy efficiency monitoring and reporting system used by public bodies to report energy consumption and savings to the SEAI.

In order to drive forward the level of change at scale that is required, the Minister for the Environment, Climate and Communications in Ireland set up a Heat and Built Environment Taskforce to accelerate and drive delivery in relation to retrofitting, renewable heat, district heat and decarbonisation of the building stock in industry and across the residential and non-residential sectors in Ireland. Six working groups have been set up under the Taskforce, including one on the commercial built environment and one on the public sector-built environment.

Energy Efficiency Obligation Scheme (EEOS)

36,424 GWh cumulative in end-use energy savings is to be delivered by 2030 under Ireland's Energy Efficiency Obligation Scheme (provided for under Statutory Instrument (SI) 522/2022.) (Although this amount is likely to increase as part of the transposition of the recast Energy Efficiency Directive).

Under EEOS, the largest energy suppliers and distributors in Ireland are required to achieve annual energy efficiency targets. For Ireland's EEOS this includes companies that sell more than 400 GWh of energy per year to final customers. These companies, known as obligated parties, are given specific annual targets based on their market share within the energy industry. Obligated parties are drawn from the liquid fuel market, the solid fuel market and the electricity and natural gas market. In the liquid fuel market, the liquid fuel importers are obligated. In the solid fuel market, all distributors and retail energy sales companies are obligated. In the electricity & natural gas markets, the retail energy sales companies are obligated. The obligated parties have sub targets to meet as part of their delivery of energy savings. Cross-sector makes up 85%, with Residential at 10% and Energy Poverty at 5% making up the balance. Obligated parties can achieve their annual targets by financially supporting homeowners, businesses, and communities to carry out energy efficiency upgrades. For every unit of energy saved, obligated parties earn energy credits towards their annual goal.

The 2014-2020 EEOS supported energy efficiency actions in more than 300,000 homes and 3,000 businesses. The most recent 2021-2030 EEOS obligation period continues to obligate

large energy suppliers and distributors in the electricity, natural gas, liquid fuel, and solid fuel markets.

Work is underway to decide on the split between the EEOS and alternative measures as part of the transposition of Article 8 of the recast EED.

2.3 Dimension Energy Security

2.3.1 The elements set out in point (c) of Article 4 Gas & Electricity

Ireland has a small population base and, consequently, a high cost per capita to fund infrastructure. Its peripheral location at the end of the European electricity and gas grids means that our energy security profile is different to most other Member States. Ireland has a relatively high dependence on imported gas from the UK which has a key role in Ireland's energy system, providing almost 30% of our energy needs. Since the exit of the UK from the EU, we are no longer physically connected to the EU IEM. It is expected that peat and coal will no longer be part of Ireland's electricity generation mix post-2025. While this will have a positive impact on GHG and other harmful emissions, it will lead to an increased reliance on natural gas, thus reducing the diversification of our fuel mix and impacting on security of supply. Given this profile, a review was carried out of Ireland's electricity, natural gas, and oil systems. The Energy Security in Ireland to 2030 report outlines a new strategy to ensure energy security in Ireland for this decade, while ensuring a sustainable transition to a carbon neutral energy system by 2050. This report was published in November 2023 by the Government as part of an energy security package, which included a Technical Analysis of the Security of Energy Supply of Ireland's Electricity and Natural Gas Systems, which considered projections of natural gas demand to 2030 in the context of net zero by 2050. In addition, CRU conducted a public consultation, closing on 3rd May 2024, on GNI's proposed network development plan which will cover the period to 2031/32.

The report emphasised:

- That Ireland's future energy supply will be more secure by moving to an electricity-led system;
- The importance of delivering on the plans already in place: Ireland's existing plans to grow renewable generation, demand-side flexibility, new gas-fired generation as back-up, interconnection, and storage, are the right ones to secure electricity supplies;

- The importance of balancing sustainable gas demand and supply: While gas supplies and infrastructure are adequate to meet our demand projections, there are risks in the event of disruption to infrastructure. To reduce reliance on gas imports, we will reduce natural gas demand and develop renewable, indigenous gas supply and renewable gas-compatible storage. Appendix 1 of Energy Security in Ireland to 2030 report contains an annex of related actions. One of these actions, as a transitional measure, is that we will introduce a Strategic Gas Emergency Reserve to address security needs in the medium-term, to be used only if a disruption to gas supplies occurs. Based on the preliminary analysis by DECC it is anticipated that a floating reserve (FSRU) will best meet the criteria set by the Government today, a solution preferred by a range of EU states; This will be examined by Gas Networks Ireland (GNI) and a detailed proposal will return to Government.
- The need for back-up reserves and distribution plans in case of an oil emergency to be sufficient. Into the future, we will need to ensure that commercial oil supplies into the State are robust, along with the infrastructure for distribution, and over time, oil demand will be reduced;
- The maintenance of a strong focus on anticipating risks and good governance to ensure delivery, robust risk management and adequate resources.

Given that the Irish oil market is characterised by a lack of indigenous crude oil production, with no commercially viable finds having been discovered, there is limited scope for reducing petroleum import dependency in the short- to medium-term, and Ireland will remain reliant on imports to meet oil demands. Ireland's domestic downstream oil industry is fully privatised and largely de-regulated with the origin of imports being determined by cost and logistical factors. A Policy Statement on Petroleum Exploration and Production in Ireland was published in August 2022, replacing the 2019 Policy Statement, to reflect the current policy and legislative position of the Government on petroleum exploration and production. This policy statement outlines that the Department stopped accepting new applications for exploration licences for oil from September 2019 and for natural gas from June 2020. In line with the implementation of the 2019 and 2022 policy statements, holders of all existing applications and authorisations in place before the respective dates can continue to apply to progress their authorisations through the licensing stages towards a natural conclusion, which may include expiry, relinquishment, production, or rejection. Any such applications will

remain subject to Ministerial consent, and will continue to be required to meet environmental, technical, and financial standards.

As no new petroleum authorisations are being issued, and there being currently no commercially viable fields, it is not anticipated that crude production will be undertaken in the foreseeable future. Therefore, there is limited scope for reducing petroleum import dependency, with Ireland remaining reliant on imports to meet oil demands.

Our objectives regarding oil are to:

- Provide a policy and regulatory framework to facilitate commercial oil companies in their supplying of product to the domestic market;
- Facilitate the continued operation of sufficient infrastructure to import and supply oil to the marketplace;
- Support renewable and sustainable alternatives to petroleum products, including EVs, biofuels and CNG in transports;
- Continue to engage in oil emergency planning, including the measures specified below.

Cybersecurity

The Commission Recommendation (EU) 2019/553 provides non-exhaustive guidance to Member States and relevant stakeholders, in particular network operators and technology suppliers, for achieving a higher level of cybersecurity in view of the specific real-time requirements identified for the energy sector, cascading effects, and the combination of legacy and state-of-the-art technologies. The guidance aims at helping stakeholders keep in mind the specific requirements of the energy sector when implementing internationally recognised cybersecurity standards.

The recommendation calls on Member States to ensure the relevant stakeholders take the necessary measures and encourage them to build up knowledge and skills related to cyber security in energy. While dialogue on cyber security in the energy sector is mainly through the NIS Co-operation Group (Network and Information Systems Directive) the Commission provides regular updates to DECC and the Regulator through meetings of the Gas Coordination Group and Electricity Coordination Group. Co-operation on crisis management is fundamental to cyber security. Operators of Essential Services in the energy sector are advised to follow the recommendation and consider cybersecurity in regional/national risk

assessments under EU Regulation 2017/1938 for security of gas supply and under EU Regulation 2019/942 for security of electricity supply.

The National Cyber Security Centre (NCSC), having due regard to the recommendation, is working with providers of critical national infrastructure to improve the overall level of cybersecurity in the energy sector. The NCSC have developed cyber security guidance which provides a framework in alignment with international standards for cybersecurity, from which critical infrastructure providers can adopt a risk management culture to safeguard the protection and resilience of critical services. The NCSC is actively engaging with providers to develop communication and collaboration and has established an Energy-CORE collaboration and response network to enhance the cyber resilience of the energy sector. Incident guidance levels have been published to assist providers in the reporting of incidents, which can aid the sector in the prevention, detection, and management of incidents. In its ongoing engagement with stakeholders, the NCSC will proactively seek to improve the cyber security maturity level within the sector.

The current National Cyber Security Strategy was published in December 2019 and follows on from the country's first Strategy which was published in 2015. It is a broader and more comprehensive document than the last one and takes advantage of the operational experience gained by the NCSC from 2015 to 2019, and from ongoing national and international engagements in the area. The vision behind the 2019 Strategy is to allow Ireland to continue to safely enjoy the benefits of the digital revolution and to play a full part in shaping the future of the Internet. Some of the key objectives of the strategy are to continue to improve the ability of the State and to identify and protect critical national infrastructure by increasing its resilience to cyber- attack and by ensuring that operators of essential services have appropriate incident response plans in place to reduce and manage any disruption to services. The NCSC will work with energy operators and the wider ecosystem to prepare for the secure adaptation of novel and emerging technologies such as artificial intelligence, smart grids, energy storage, Internet of Things and, increasingly, distributed renewable energy resources.

A mid-term review of the 2019 strategy was recently carried out, including an extensive public consultation, stakeholder engagement and further consideration by all relevant Government departments and agencies. Based on this, 18 new strategic actions have been added to the NCSS, which will be delivered across Government by the end of 2024. Responding to the cyber security skills gap in Ireland and globally, the Mid-Term Review

includes new measures to continue the development of relevant cyber skills to fill skills gaps and support the potential growth of the cyber security industry in Ireland. In addition, a priority action will see the development of a whole-of-Government cyber security industrial strategy to support Ireland's cyber security industry to achieve its potential.

The Government will continue investment in the capacity of the National Cyber Security Centre (NCSC), particularly in its ability to monitor and respond to cyber security incidents and developing threats in the State such as ransomware. The Government has agreed to expand the range of entities supported by the NCSC, including a number of new measures to support small and medium enterprises (SMEs) and other stakeholders. The Mid-Term Review will also ensure Ireland plays a full and active part in cyber security discussions in the EU and internationally and is fully prepared to implement the revised EU Network and Information Systems Directive (NIS2) from next year, which will widen the cybersecurity regulatory orbit to include many more increasingly distributed renewable energy operators. The delivery of these measures will continue to be overseen by the existing high-level Inter-departmental Committee, and annual reports will be published to provide greater transparency on the implementation of the Strategy.

2.3.2 National objectives with regard to increasing: the diversification of energy sources and supply from third countries for the purpose of increasing the resilience of regional and national energy systems

In relation to natural gas, Ireland has a number of challenges including a high import dependency, a lack of import route diversity, and a declining indigenous natural gas supply. In addition, Ireland has a small synchronous island electricity system and the envisaged increasing integration of RE sources for heat, transport, and power generation, including variable renewable sources. A continuing secure supply of gas is crucial to support a highly renewable electricity system given the variability of wind and solar energy. Given the above, our objectives are to:

- Ensure that there is sufficient flexibility in the energy system to maintain energy security of supply and facilitate the integration and transition to clean energy sources in the most cost-effective way;
- Support further electricity interconnection to improve the functioning and flexibility of the national energy system;

- Support projects which are needed for energy security and consistent with national and EU climate policy objectives, including but not limited to the EU Projects of Common Interest process and EU funding mechanisms and projects agreed by Government of strategic importance to provide greater resilience and security to Ireland's energy system.

In relation to oil, although domestic production of biofuels and other alternative fuels has increased, the majority of feedstocks are imported. The sourcing of oil products is largely determined by pricing and logistics considerations. Crude oil is sourced mainly from the United States with some crude imports also coming from other countries including Canada, Denmark, and Norway. Refined product is currently imported primarily from UK refineries, with refined product imports, including diesel, also coming from other countries including Belgium, France, and the Netherlands. The UK's withdrawal from the EU did not impact significantly on the volume of product imported from UK refineries. Ireland will continue to ensure that commercial supplies into the State are robust along with the infrastructure for distribution of refined products at local and national level. As things stand, some diesel is imported from elsewhere, including the Netherlands and France. Ireland will continue to ensure the oil industry has the flexibility to obtain sufficient oil supplies of the necessary quality and will:

- Continue to utilise European and international standards for petroleum products, through its membership of the European Committee for Standardisation (CEN);
- Continue to enforce fuel quality standards by confirming quality compliance and specifying instances of non-compliance periodically to the Commission under Article 8 of the Fuel Quality Directive.

2.3.3 Where applicable, national objectives with regard to reducing energy import dependency from third countries, for the purpose of increasing the resilience of regional and national energy systems

Given Ireland's high and increasing reliance on natural gas for electricity, our low import route diversity, relatively high dependence on imported natural gas, which is likely to increase as the Corrib gas field progressively depletes, and the potential increasing role of gas in the energy mix for heat, transport and power generation including as a back-up for variable power generation, our objectives are to:

- Ensure the resilience of the gas network to a long-duration supply disruption, in the context of EU and national climate objectives;
- Reduce natural gas demand and develop renewable, indigenous gas supply and renewable gas-compatible storage solutions;
- Appendix 1 of Energy Security in Ireland to 2030 report contains an annex of related actions. One of these actions is to introduce, as a transitional measure, a state-led Strategic Gas Emergency Reserve to address security needs in the medium-term;
- Actively participate in EU and regional initiatives to maintain and enhance security of supply including national, regional and EU co-operation on emergency planning and response for gas and electricity networks, including risk assessments, preventative plans, and emergency plans;
- Following the withdrawal of the UK from the EU, engage with our EU partners to put in place an EU/UK framework for continued necessary regional co-operation between Ireland and the UK on matters related to gas and electricity security of supply, including emergency preparedness and response. DECC, in conjunction with key stakeholders including EirGrid, the National Oil Reserve Agency (NORA) and Fuels for Ireland, have further advanced the production of a plan to supply gas power plants with secondary fuel in the event of a gas emergency. The plan will provide for NORA strategic reserves to be deployed to priority power generation sites in the event of a gas emergency. The use of NORA Reserves would allow industry's commercial stocks to remain the same and serve to limit the impact on domestic oil markets.

2.3.4 National objectives with regard to increasing the flexibility of the national energy system, in particular by means of deploying domestic energy sources, demand response and energy storage

Given that Ireland has a small synchronous Island electricity system, and the envisaged increasing integration of RE sources for heat, transport and as a back-up for variable renewable power generation, our objectives are to:

- Ensure, in the most cost-effective and sustainable way, that there is sufficient flexibility in the energy system to maintain energy security of supply and facilitate the integration and transition to clean energy soconsuurces;
- Support further electricity interconnection to improve the functioning and flexibility of the national energy system;
- Improve demand flexibility and response to price, carbon and security signals;
- Support energy storage measures to better balance our variable RE supply and provide mitigation to fossil fuel import disruptions.

CAP 2023 tasked the CRU with the delivery of a Demand Side Strategy, now known as the National Energy Demand Strategy (NEDS), with the aim of 20%-to-30% of electricity demand to be flexible by 2030, with a target of 15%-to-20% flexibility by 2025. The NEDS aims to achieve these targets through facilitating active participation by citizens and businesses in the energy market. Large Energy Users will be expected to make a higher proportional contribution to this target. The NEDS and its accompanying Review of Large Energy Users Connection Policy have completed public consultation periods and decision papers are to be published in summer 2024.

Ireland currently has no indigenous oil supplies and currently has limited domestic production of sustainable fuels. Given that the Irish oil market is characterised by a lack of indigenous crude oil production, with no commercially viable finds having been discovered, there is limited scope for reducing petroleum import dependency in the short to medium term, and Ireland will remain reliant on imports to meet oil demands. All oil imports are transported by sea and placed on the market through an oil terminal. Taking this vulnerability into account, the Oil Emergency Contingency and Transfer of Renewable Transport Fuel Functions Act 2023 was enacted in February 2023. The main purpose of the Act is to strengthen the Government's ability to manage oil stocks in the unlikely event of a significant oil emergency. It is an important Act which puts all aspects of oil emergency planning on a statutory footing. It strengthens the statutory provisions available to Government to respond

to a severe or prolonged oil emergency, thereby ensuring adequate supplies for the emergency and critical services, and for the use of oil to generate electricity, if necessary, in the event of a major gas shortage. Ireland will continue to maintain existing policy measures and develop additional capacity to deal with an oil supply emergency, including:

- The ongoing maintenance of Ireland's strategic oil reserve of 90 days of net imports, stored in Ireland or within the EU, as required by EU legislation and IEA rules;
- Continued regional co-operation with Northern Ireland to ensure sufficient import capacity in the event of prolonged infrastructure disruption;
- Continued development of demand restraint measures aimed at reducing oil usage during a prolonged emergency, particularly in the transport sector;
- Further development of policy around Government intervention to ensure the supply of oil to critical infrastructure and for societal need, if required

A study of the Strategic Case for Oil Refining requirements in Ireland was completed in 2024. The Study builds upon a previous Study undertaken in 2012. It considers several important developments since that Study, including in oil markets; security of supply considerations; and decarbonisation legislation and policy. The results of the study should allow the Government to better asses the strategic role of the domestic refinery, in light of targets to reduce oil consumption towards 2030 and 2050.

Geothermal Energy

The Government's 'Policy Statement on Geothermal Energy for a Circular Economy,' published in July 2023, sets out the scope of a strategy to promote the sustainable development of Ireland's geothermal resources to decarbonise the heating and cooling of buildings and for industrial uses and power generation. The optimal deployment of geothermal energy will increase the flexibility of the national energy system through the moderation of demand for electricity, particularly in winter, and through energy stored naturally as heat in geological strata. In the longer term, geothermal energy could potentially generate electricity to provide baseload supply that is constant, further reducing dependence on fossil fuels for electricity generation.

Long Duration Energy Storage

CAP 2023 tasked EirGrid, along with CRU and ESBN, with identifying the investments needed to facilitate 80% renewable electricity annual share. In July 2023, EirGrid published an updated version of its Shaping Our Electricity Future Roadmap (SOEF Version 1.1), which sets out its plans and targets for enabling the grid to carry 80% of electricity from renewable sources by 2030, as well as reducing greenhouse gas emissions by 51%. Analysis conducted as part of the development of the roadmap identified the requirement for accelerated long-duration energy storage (LDES) as a key component to enable the achievement of these targets. The roadmap sets out an increase of 1.7 GW of energy storage across four-, six-, and eight-hour durations, to be delivered by 2030, which will provide a number of benefits including the contribution to achieving carbon reduction targets, facilitating additional renewable energy on the grid, and allowing for improved grid constraint management.

2.4 Dimension Internal Energy Market

2.4.1 Electricity Connectivity

Ireland's long-term electricity interconnectivity ambition aims to reach and then surpass the EU's electricity interconnection target of 15% generation capacity. This is supported with a strategy that the level from 2021 onwards is defined in close co-operation with affected Member States, taking into account the 2020 interconnection target of 10% and the following indicators of the urgency of action:

1. Price differential in the wholesale market exceeding an indicative threshold of EUR 2/MWh between Member States, regions, or bidding zones;
2. Nominal transmission capacity of interconnectors below 30% of peak load;
3. Nominal transmission capacity of interconnectors below 30% of installed renewable generation.

Each new interconnector shall be subject to a socioeconomic and environmental cost-benefit analysis and implemented only if the potential benefits outweigh the costs. As set out in the 2023 National Policy Statement on Electricity Interconnection, Ireland's Interconnection policy objectives are:

- Creating the necessary export opportunities to match the State's growing renewable energy generation capacity;

- Ensuring electricity security and resilience through diversified energy supply and market access;
- Lowering energy prices by gaining access to other electricity markets;
- Facilitating the achievement of a Net Zero power system;
- Supporting the carbon budget programme.

We will take a structured and integrated forward planning approach to deliver the necessary infrastructure to both meet Ireland's need and make Ireland central to Europe's energy future. Ireland's Single Energy Market (SEM) interconnection capacity currently stands at 500 MW in a single connection to the UK. Capacity is set to more than treble by 2027 to 1,700 MW including a return of direct interconnection between Ireland and the EU via the Celtic Interconnector. Envisaged connection to the IEM by 2030 is 700 MW.

Ireland's updated National Policy on Electricity Interconnection envisages a further connection with the UK by 2030 bringing the total anticipated interconnection capacity of 2,450 MW. Additionally existing and planned interconnection from GB to Northern Ireland will mean a total of 3,650 MW SEM interconnector capacity by 2030.

Had the UK not departed from the European Union, Ireland would have achieved its 15% target. The completion of the Celtic Interconnector in 2027 will see the return of direct connectivity to the EU via France. Development momentum on projects with the UK continues and Ireland will be well-served for interconnection by 2030. Further connection to the IEM is being explored with partner Member States for delivery in the next decade in the context of Ireland's RE ambitions and energy security needs.

Additionally, the existing 300 MW North-South Interconnector linking Ireland to Northern Ireland, while internal to the SEM, provides further interconnection to the UK. A further 1,500 MW Norther-South Interconnector is in development.

2.4.2 Energy Transmission Infrastructure

2.4.2.1 Key electricity and gas transmission infrastructure projects, and, where relevant, modernisation projects, that are necessary for the achievement of objectives and targets under the five dimensions of the Energy Union Strategy

On 28th November 2023, the European Commission published the updated list of Projects of Common Interest (PCIs), the sixth such list, which is published on the EC website. PCIs are

intended to help the EU achieve its energy policy and climate objectives: affordable, secure, and sustainable energy for all citizens.

Silvermines Hydroelectric Power Station ("Silvermines Hydro or Silvermines PCI"), located on a former open-cast mining site in Co. Tipperary and developed by Siga-Hydro Limited, is a designated Projects of Common Interest (PCI) project under the Trans-European Networks for Energy (TEN-E) Regulation 2022/869. Silvermines Hydroelectric Power Station entered the 4th PCI list in 2019 and has retained its designation as a PCI through to the 6th list, April 2024 PCI ref. 1.13 Hydroelectric Power Station Silvermines (IE).

Pumped-Hydro Storage (PHS) is a mature form of hydroelectric energy infrastructure that involves storing energy by using electricity to pump water from a lower reservoir to an upper reservoir. This energy is released by allowing the water to flow back down to the lower reservoir where it spins a turbine connected to a generator to create electricity.

Silvermines Hydroelectric Power Station as a PCI designated project is subject to the TEN-E regulations which were revised in June 2022. This revision introduced new guidelines and regulation which amongst other matters, addressed the development of energy storage facilities more effectively. The revised TEN-E rules, include the allocation of priority status to a PCI project of sufficient maturity, which ensures a streamlined administrative and permit granting process. As a designated PCI project, the Silvermines Hydroelectric Power Station project also benefits from the EU Connecting Europe Facility (CEF) funding.

Details on the other Irish project on the sixth PCI list, the Celtic Interconnector, can be found in section 3.4.1.3.

Table 20: Irish projects included on the sixth PCI list

PCI Number	Project Promoter	Project Title
1.3	Eirgrid & Réseau de Transport d'Electricité (RTE)	France-Ireland Interconnection (known as Celtic Interconnector)
1.13	Siga Hydro Limited	Hydroelectric Power Station Silvermines

The European Network of Transmission System Operators for Electricity (ENTSO-E) publishes a Ten-Year Network Development Plan (TYNDP) every two years. The most recent TYNDP is TYNDP 2024. The TYNDP includes projects of pan-European significance:

Table 21: Irish projects included in TYNDP 2024

TYNDP Number	Project Promoter	Project Title
81	Eirgrid, SONI	North South Interconnector
107	Eirgrid/RTE	Celtic Interconnector
349	Mares Interconnector Holdings Limited	MaresConnect
1040	Transmission Investment	LirLC
1185	Eirgrid	South Coast Offshore Transmission Project
ST 1025	Siga Hydro Limited	Silvermines Hydroelectric Power Station

2.4.2.2 Where applicable, main infrastructure projects envisaged other than Projects of Common Interest (PCIs)

To help plan and develop energy networks for the future, both EirGrid and GNI produce ten-year network development plans. EirGrid also produces a ten-year Generation Capacity Statement and a ten-year All-Island Transmission Forecast Statement. These network development plans and statements are future-oriented documents that allow both EirGrid and GNI to assess the demand for and development of energy networks and related infrastructure in Ireland.

In addition to the PCI projects set out above and the projects developed by EirGrid and GNI, the Energy Security in Ireland to 2030 Report provides that Ireland will introduce a state-led Strategic Gas Emergency Reserve to address security needs in the medium-term. This will be examined by GNI, and a detailed proposal will return to Government for final approval in 2024. In addition, as Ireland transitions itself to a low carbon economy, the gas and electricity networks must be planned and developed to make the transition as smooth as possible. As we make this transition the energy networks in Ireland will face many challenges. For example, as the penetration of electricity generated from wind increases the electricity network must be flexible enough to handle the unpredictability of wind while still operating in a secure manner. The increased penetration of wind energy also places an increased reliance on Ireland's gas network.

Following on from EU support to twin the final 50km of the gas interconnector system from Scotland to Ireland, further work has commenced by GNI to fully separate the two gas

interconnectors and they will be able to operate independently from each other from 2024/25 which will further increase the resilience, flexibility, and capacity of the gas system. Every year the Commission for the Regulation of Utilities (CRU) holds a public consultation on GNI's Network Development Plan and on EirGrid's Transmission Development Plan. The CRU's public consultation gives stakeholders the opportunity to express their views on the plans. The Development Plans present GNI and EirGrid's views of the future needs of the gas and electricity networks in Ireland. It also presents plans to meet the needs of the network over a ten-year period. The Development Plans include, among other things, investment needs, planned network investment, and supply and demand forecasts.

Two merchant project interconnectors are anticipated to be developed by 2030: The Greenlink Interconnector, between Wexford and Wales, which is expected to be commissioned by the end of 2024. Greenlink is a subsea and underground electricity interconnector cable (with two associated converter stations) linking the existing electricity grids in Ireland and GB and has a nominal capacity of 500 MW with flow in both directions. It has the potential to power 380,000 homes; it will increase energy security and will have strategic importance by doubling the interconnection capacity between Ireland and GB. It will deliver greater market integration and competition to benefit consumers in Ireland, GB, and continental Europe. The MaresConnect project, a point-to-point interconnector project from Ireland to GB is currently in development phase. It has just recently progressed under the new round of the TYNDP 2024 application process. This 750 MW electricity interconnector linking the Irish and GB electricity transmission networks could enable bi-directional flow of power, responding to the varying supply and demand dynamics between the two nations. To support Ireland's progress towards a renewables-led energy system, the Energy Security in Ireland to 2030 report commits to undertake a Network Transition Plan for Ireland's natural gas network to determine and support its long-term planning, usage, and investment requirements of our energy system in line with our sectoral emissions ceilings.

2.4.3 Market Integration

Reform of the Wholesale Electricity Market and Decarbonising the Electricity System

Ireland's wholesale electricity market redesign which took place in 2018, together with other related initiatives, forms an interlinked policy-aligned system of measures which underpin and facilitate greater renewable electricity penetration in Ireland and progressive decarbonisation of its wholesale electricity sector, while also ensuring efficiency and security

of electricity supply. The system comprises both policy and regulatory measures which can be grouped under three headings as follows:

- A Single Electricity Market (SEM);
- A competitive auction-based capacity mechanism in the wholesale market compliant with state aid measures and the CEP;
- Regulated TSO payments for system services known as DS3 Systems Services, soon to be supplemented and then replaced by the System Services Future Arrangements.

These elements correspond to payment categories, or revenue streams, that the electricity industry can expect from the market, for energy, capacity, and system services, respectively. The implementation of reforms in these revenue streams provides industry with the certainty needed for investment and encourages this through means that also contribute to secure and efficient decarbonisation. These interlocking measures are designed to work together and to reinforce each other and thereby facilitate delivery of energy policy goals over a sustained period, in line with typical electricity market investment time frames over decades rather than years. It is important when considering Ireland's approach to decarbonising its electricity market to take these elements together as a coherent whole, rather than evaluate any one aspect of the whole market separately, be it energy, capacity, or system services measures.

Ireland's Wholesale Electricity Market – SEM

Ireland operates as part of a Single Electricity Market (SEM), which is the wholesale electricity market on the island. It is jointly administered and regulated with the Irish and Northern Irish authorities via their regulators (Commission for Regulation of Utilities (CRU) in Ireland and the Utility Regulator (UR) in Northern Ireland) and the TSOs – EirGrid in Ireland and SONI in Northern Ireland.

By combining what were two separate jurisdictional electricity markets (for Ireland and Northern Ireland), the SEM became one of the first of its kind in Europe when it went live on 1st November 2007. The SEM, including its Market Design, is overseen, and administered by a statutory SEM Committee (SEM C) comprising the two energy regulators and independent members. The SEM promotes the interests of consumers by enabling greater competition through cost reflective prices, while also working to secure a diverse, viable and environmentally sustainable long-term energy supply.

Following Brexit, the continued operation of the SEM is explicitly provided for in the Withdrawal Agreement, including the Protocol on Ireland/Northern Ireland which entered into force on 1st February 2020 which was negotiated between the European Commission and UK Government.

Ireland is interconnected to Northern Ireland through three transmission connections. Only one of these has significant capacity, the Louth – Tandragee 275 kilovolt (kV) line is the primary means for power to flow between Ireland & Northern Ireland today. The two other connections are 110 kV lines from Corraclassy to Enniskillen and from Letterkenny to Strabane. They only provide local support to the network and because of this, they do not have sufficient capacity to carry surplus power. There are plans in progress for the development of a second North-South interconnector. There are currently two interconnectors connecting the SEM to other markets, the 500 MW East West Interconnector (EWIC) which connects Ireland and GB and the 500 MW Moyle Interconnector between Northern Ireland and Scotland.

Trade in electricity across the interconnectors between GB and the SEM has continued without tariffs since 1st January 2021. However, this trade is less efficient, as day ahead trading can no longer be used on these interconnectors. Scheduling of flows on each of the interconnectors is determined by the price spread between the SEM and GB in the IDA 1 and IDA 2 auctions. The Trade & Cooperation Agreement (TCA) provides a mechanism to ensure that the current system is made more efficient and should be based on the concept of multi-regional loose volume coupling (MRLVC).

A new market design for the SEM, substantially different to the original 2007 design took place under the Integrated Single Electricity Market (I-SEM) Project over six years going live in 2018. This included the establishment of new Day-Ahead, Intra-Day and Balancing Markets, with an ex-ante clearing price compared to the previous ex-post gross mandatory pool system, and a new obligation on participants to take responsibility for imbalances. This market redesign had the objectives of facilitating greater market integration through the application of IEM rules and enhancing competitive outcomes to benefit consumers. It also had the objective of ensuring compliance with the network codes and guidelines developed under Regulation (EC) 714/2009 within the EU's Third Energy Package and with the principles of wholesale market design laid out in the CEP, and particularly the recast electricity market regulation.

The SEM Capacity Mechanism

Ireland like several European countries is strongly supportive of the capacity mechanism provided for in the European framework and has learned the strategic importance of this policy lever in achieving a secure transition and successfully operating a majority renewable power system. The SEM includes a competitive capacity remuneration mechanism (CRM) as an integral feature of the market, which was State Aid approved by the European Commission in November 2017. Consistent with EU law, including Article 22 of the CEP recast Electricity Market Regulation and the terms of the state aid approval, the SEM's CRM is established to address existing resource adequacy issues. Considering the level of projected demand growth in Ireland, the transition to ever higher levels of variable renewables, and the need to manage the transition from an aging fleet of conventional fossil fuel units, the SEM CRM will continue to play a central role in securing the level of investment required in the coming years. Given the importance of the CRM as a measure, any policy changes or amendments must remain sufficiently flexible both to ensure generation adequacy and security of supply and to facilitate the achievement of the ambitious decarbonisation objectives on the island of Ireland in a cost effective and efficient manner. Given the extent and ambitious nature of Ireland's 2030 80% renewable electricity generation target, the SEM's CRM, in conjunction with the energy and ancillary services markets, provides a necessary revenue stream to ensure adequate levels of future investment including in flexible generation, such as demand response and battery storage.

During the recent electricity market design (EMD) negotiations, Ireland along with several other Member States successfully argued for a more flexible and simplified process for assessing capacity mechanisms from a state aid perspective. It was agreed that the Commission will come forward with proposals with a view to streamlining and simplifying the process for assessing capacity mechanisms shortly after entry into force of the EMD Regulation. This commitment is very welcome and will be monitored closely as EMD progresses.

The state aid decision on Ireland's capacity mechanism is due to expire in 2028. The SEM will be required to apply for a new decision from the European Commission. In preparation for this application, the Department will engage with key stakeholders across the SEM to develop a shared vision for how to ensure optimum operation of the CRM in the period to 2038 against the backdrop of the energy transition. Unlike the pre-ISEM project administratively determined capacity payment mechanism, the value of capacity in the

market under the CRM is determined through competitive auction. The CRM includes penalties for generators that receive reliability option payments after a successful bid but are then not available to produce at times of system stress. Despite these changes, the CRM has not performed to the level required to keep up with increasing tightness between supply and demand in the electricity market in Ireland. The CRU is implementing a program of actions to address electricity security supply risks over the coming years.

The Implementation Plan for Ireland was prepared in fulfilment of the requirement set out in Article 20 of the Regulation 2019/943 on the internal market for electricity (recast), part of the Clean Energy Package (CEP). The requirement is for Member States with capacity mechanisms to prepare and submit an Implementation Plan containing information about its measures under certain pre-defined headings relating to principles and objectives for market operation. The submission of the Implementation Plan is followed by a review by the Commission, both being legal conditions for the approval of any national capacity mechanism. This was detailed in the Guidance for Member States on implementation plans pursuant to Art. 20 (3)-(5) of Regulation (EU) 2019/943 ("Market Reform Plans"). Ireland's Implementation Plan recognises that markets, if well designed, free of regulatory distortions and sufficiently connected to the EU electricity grid, can provide the right amount and type of capacity to meet demand. Capacity mechanisms should only be introduced to address residual concerns, i.e., problems or circumstances which cannot be solely resolved by market reforms. Once the residual concerns have been eliminated and market reforms have started to work, adequacy problems are expected to decrease and ultimately disappear. To enable this, regulatory measures to eliminate distortions and to reform markets need to be effective and credible for investors and other market participants. In December 2019, Ireland's draft Implementation Plan was submitted to the Commission, which published it as part of their consultation process in early 2020. The Commission sent its opinion to DECC in April 2020 and subsequently published the opinion on 28th May 2020. The Implementation Plan was updated to reflect the Commission's suggestions on priority action in the wholesale market. The Commission emphasised the requirement for thorough implementation of CEP rules in the Irish wholesale market. The updated Implementation Plan was published on the Department's website on 9th October 2020. Article 20 (6)-(8) of Regulation (EU) 2019/943 (Electricity Regulation) and requires all Member States with identified adequacy concerns to monitor the application of their implementation plans and to publish the results of the monitoring in an annual report ("Monitoring Report") that shall be submitted to the Commission. This report contains updates on the progress to date achieved towards measures detailed in the Implementation Plan relating to market reform, resource adequacy,

and ongoing or future market reform measures. This report also details and explains any previous delays or possible future delays, whilst also setting out upcoming issues and planned mitigation measures. The first monitoring report was prepared in fulfilment of this requirement for Commission opinion under Article 20 (7) and submitted in February 2022. The second report was submitted in early 2023 and sets out the additional progress on those measures made since the first monitoring report was submitted. Ireland is currently drafting the third monitoring report which will be submitted imminently.

Electricity Market Design and REMIT

In March 2023, the European Commission (EC) published a suite of legislative proposals looking to reform the Electricity Market Design (EMD). These legislative proposals followed a public consultation that was initiated to better protect consumers from excessive price volatility, support their access to secure energy from clean sources, and make the market more resilient. Council agreed a general approach on EMD at the Energy Council meeting on 17th October after extensive negotiations by Member States. On 14th December, the European Council and the European Parliament reached a provisional agreement which was formally adopted at Coreper on 22nd December.

Alongside the EMD proposals, the Commission also published proposals for the Regulation on wholesale energy market integrity and transparency (REMIT). These proposals will provide stronger protection against market manipulation in energy trading, enhancing confidence and integrity in relation to REMIT. The Council and the Parliament reached a provisional political agreement on the regulation on 16th November. The provisional agreement now needs to be endorsed and formally adopted by both institutions. Broadly, Ireland welcomed the EMD and REMIT proposals and supported the objective to optimise the market to ensure best value for consumers who have been materially impacted by recent price shocks. Ireland advocated during the process that delivering the benefit of renewable electricity to consumers should be a guiding principle in all measures considered by the European Commission and Member States in the electricity market design process.

Ireland is pioneering the integration of large volumes of variable renewables into the power system, which is proving to be instructive for de-carbonising economies all over the world. It shows the great potential that Europe has to lead this agenda. However, it also highlights the importance of market signals and incentives that enable investment in modern, low-emitting, renewable-gas ready conventional generation and other low carbon technologies.

Transposition of EMD and implementation of REMIT will be a major undertaking and will be progressed rapidly. This is expected to commence in early 2024.

DS3 System Services

Due to Ireland's isolated island status and the dramatic increase in wind penetration levels in recent years, the level of non-synchronous power on the SEM system has risen at a faster rate than in any other region in Europe over this timeframe. In order to address some of the potential problems resulting from these unprecedented levels of intermittent renewables, the DS3 Programme was established by the Single Electricity Market Committee (SEMC) to provide for the introduction of a number of new system services by the TSOs, EirGrid and SONI, to ensure a safe and secure energy system, while also facilitating increased levels of non-synchronous generation (primarily renewables). To date, the DS3 Programme has enabled EirGrid and SONI to increase levels of instantaneous system non-synchronous penetration (SNSP) of up to 75%. Work has now begun on increasing the figure to 95% by 2030 in order to achieve RE targets. The DS3 programme has therefore been overwhelmingly successful in facilitating the integration of renewables into the SEM system, which in terms of SNSP is unprecedented.

2.4.3.1 National objectives related to other aspects of the internal energy market such as increasing system flexibility, in particular related to the promotion of competitively determined electricity prices in line with relevant sectoral law, market integration and coupling, aimed at increasing the tradeable capacity of existing interconnectors, smart grids, aggregation, demand response, storage, distributed generation, mechanisms for dispatching, re-dispatching and curtailment, and real-time price signals, including a timeframe for when the objectives shall be met

Ireland's national objective relating to the EU is, and has been over the long term, to continue to deepen the integration of Ireland's wholesale electricity market, and its regulation, with the EU IEM, building on ongoing plans, programmes, and actions in this regard. As has been the position for many years, it is the objective of Ireland to participate in and contribute to the continued development of the EU IEM and remain coupled with other EU electricity markets to as great an extent as possible.

In July 2022, Ireland notified the Commission of the full legal transposition of the Internal Market Electricity Directive 2019/944 into Irish law. These measures as outlined below have further strengthened consumer protection measures and the flexibility and transparency of

the retail market. These measures will be given further opportunity to embed, and their impact will be reviewed.

From the market regulation perspective, the main objectives over the next few years consist of:

- Maintaining and developing the successful all-island wholesale SEM, ensuring that all aspects of the I-SEM market, the capacity mechanism and other planned or signalled reforms are fully implemented;
- Ensuring the continued focus on the development of an open and competitive Irish retail energy market and maintain extensive market monitoring to ensure this competition is of benefit to final customers;
- Ensuring that new market actors including newly established categories of electricity undertakings and smaller market participants are operating within an appropriate regulatory framework.
- Implementing the requirements of EU rules and legislation under the CEP and EU Electricity Network Codes, along with upcoming legislative proposals such as EMD and REMIT, in the Irish electricity market;
- Ensuring continued compliance of Ireland's SEM capacity mechanism with the obligations in the CEP and in the European Commission's November 2017 State Aid approval. Ireland is currently in the process of updating our Reliability Standard in this regard;
- Designing and implementing the next phase of the DS3 System Services programme to provide enhanced system flexibility to accommodate increased renewables on the electricity system. (DS3 System Services is soon to be supplemented and then replaced by the System Services Future Arrangements);
- Developing a new demand strategy project to support the energy system by reducing load at times of peak demand, thereby also improving security of supply, or increasing demand at time of high RE availability, led by the CRU.

2.4.3.2 Where applicable, national objectives related to the non-discriminatory participation of renewable energy, demand response and storage, including via aggregation, in all energy markets, including a timeframe for when the objectives are to be met

Initial auctions that have taken place under the CRM in the SEM successfully procured future investment in flexible generation, including DSU and battery storage that will be required to complement Ireland's high and rising volume of intermittent renewables. In particular, the early auction results suggested that the advent of the CRM in the SEM had further spurred development of demand side response. The introduction of a firm Day Ahead Market schedule and price, resulting in more efficient short-term price signals, has also played a role in stimulating more DSU investment. Looking ahead to future reforms related to demand side participation; in order to comply with the European Commission's State Aid ruling of November 2017, it is intended to modify the participation of DSU in the CRM. when establishing the CRM, the SEM C determined that DSUs, although able to participate in the CRM auctions, would be exempt from reliability option (RO) payments where the contracted demand is delivered. RO difference payments would be applied to DSUs only when the demand reduction was not delivered, and the Strike Price was exceeded by the Market Reference Price (MRP). This decision recognised the fact that DSUs do not have offsetting energy payments, unlike other auction participants.

The Commission's November 2017 State Aid approval facilitated this different treatment of DSUs, but only as a temporary measure, with the Regulatory Authorities obliged to end the exemption from payback obligations for DSUs from the delivery period starting October 2020. To this end in March 2019 the SEMC published "DSU Compliance with State aid Consultation Paper" to provide stakeholders with an opportunity to comment on the proposals for achieving compliance with State aid, following which a formal decision paper was published in July 2019.

Due to the timescales involved in making system changes and developing the profiles and code changes required to determine the actual delivered quantity of an Individual Demand Site (IDS) and therefore a DSU and to avoid double-counting of energy, the SEM Committee have proposed an interim solution, with an enduring solution to follow. It includes the following key features:

- The assumption that dispatched quantity was a suitable proxy for metered quantity for DSUs;

- Use of the Socialisation Fund to socialise the costs of DSU energy payments across Suppliers; and
- Option for DSUs energy payments to be always made, or only at times of scarcity.

Regarding the enduring permanent solution, the SEMC determined that the choice of mechanism should be determined in line with the following principles:

- The socialisation mechanism must be robust to the lumpy nature of DSU energy payments and must ensure that all DSU energy payments are made;
- The recovery mechanism should allocate the costs between Suppliers in a fair and reasonable way, in line with the equity assessment criteria applied in the design of the I-SEM, i.e. “that the market design should allocate the costs and benefits associated with the production, transportation and consumption of electricity in a fair and reasonable manner;” and
- The mechanism must be capable of implementation for 1st October 2020.

The enduring solution is in the process of being implemented.

The DS3 Programme (Delivering A Secure, Sustainable Power System), was established in 2011 and has been operated by the transmission system operator, EirGrid, and is a crucial pillar of Ireland’s decarbonisation effort. The work begun by the DS3 Programme is now being continued under Shaping Our Electricity Future (SOEF) programme. Under the programme, EirGrid, via the DS3 System Services regulated arrangements, pays for highly technical ancillary/system services from electricity market participants, including battery storage, that are essential in facilitating the deployment of renewable generation on the electricity grid in a safe and secure manner. As of Q2 2024 over 700 MW of battery storage has been funded through this Programme. System services are products, other than energy, that are required for the continuous, secure operation of the power system.

The original aim of DS3 was to enable the increase of the System Non-Synchronous Penetration (SNSP) to 75%, a goal it reached in March 2022, with a target of 95% SNSP by 2030 now in place. The SNSP limit is a TSO operational constraint which limits the amount of variable generation that can provide energy to the system at any one time.

In December 2023, the SEM announced its decision to extend the DS3 System Services Regulated Arrangements, which were originally due to end in April 2024, to April 2026. In

2020, work commenced on the successor to DS3, System Services Future Arrangements (SSFA). The aim of SSFA is to introduce competitive procurement for system services while continuing to remove operational constraints, including continuing to facilitate increases to the SNSP limit and reductions to the number of minimum units. The outcome of this work is to support the introduction of daily auctions for system services by 2030. This is a requirement of European legislation and has been the overall ambition of the SEM Committee since the introduction of the DS3 Regulated Arrangements. A Phased Implementation Roadmap (PIR) for SSFA was approved by the SEMC and subsequently published by the transmission system operator in March 2024. It provides a pathway for the delivery of a suite of actions under SSFA, including the implementation of a Day Ahead System Services Auction (daily auction/DASSA), a layered procurement framework and fixed term contracts.

The DS3 Programme has been and will remain a vital ingredient in power generation decarbonisation and procurement of flexible generation on the island of Ireland and the integration of record levels of intermittent RES, primarily wind, onto the SEM system. The CAP commits to strengthening the policy framework to incentivise electricity storage and interconnection. Increased levels of storage and interconnection will be critical to absorbing high levels of renewable generation on to the system, as renewables require back-up which will have to be provided by quick response plant, storage, or interconnection.

2.4.3.3 Where applicable, national objectives with regard to ensuring that consumers participate in the energy system and benefit from self-generation and new technologies, including smart meters

Ireland is committed to supporting customers' participation in the energy system and enabling them to sell excess electricity they have produced back to the grid. In this regard, we have established the following key objectives: in February 2022 Ireland signed into law the Renewable Energy Regulations 2022 establishing among other things, an obligation on energy suppliers to offer the Clean Export Guarantee (CEG) tariff to new and existing renewables self-consumers, who are engaging in the generation of renewable electricity, primarily for their own self-consumption. This tariff offers these active energy consumers an opportunity to receive payment for excess renewable electricity they export to the grid, reflective of the market value. The CEG tariff represents a key aspect of a comprehensive enabling framework for active energy customers in Ireland, which is supported by other key enablers including the national smart meter roll-out programme, support schemes for smart

consumer assets (including micro-generation) and the ongoing development of the necessary regulatory frameworks to allow citizens and energy communities to participate in energy markets.

Smart Meters

Smart meters enable consumers to participate in the energy transition to a decarbonised system as outlined in the CAP. Smart meters support the migration to a carbon free electricity network and support smart grids, e-driving, e-heat, and micro- and small-scale generation. The current status of smart meter rollout in Ireland is as follows;

- Ireland's National Smart Metering Programme (NSMP) will roll out and install over 2.1m meters by 2025 and in the process will make available new products and services to energy consumers. It is being co-ordinated by the CRU with ESB Networks (ESBN) delivering the electricity meter rollout;
- As of April 2024, over 1.65m smart meters have been installed nationwide.
- ESBN are working with customers, electricity supply companies and other industry stakeholders to upgrade meters for customers who have informed them that they have installed micro-generation, which can be done by submitting an NC6 form to ESBN.

In a changing energy landscape, Solar PV and associated smart energy and communications technology, is increasingly acknowledged as vital infrastructure that will enable Ireland and EU member states to meet our challenging demand flexibility targets.

We know that the integration of new distributed renewable energy sources such as wind and solar, requires more grid decisions to be taken closer to the edge of the network, with more grid flexibility. Crucially it is recognised this can be provided by active consumers and energy communities that flexibly manage their energy assets; and in doing so, they can also lower their energy bills and reduce their carbon footprint.

It is further recognised that Ireland can start this journey by leveraging the success of our national smart metering programme; incorporating more smart energy technology infrastructure within our homes and businesses, including Solar PV, EV charging points, battery storage systems, smart home appliances and energy management systems, as well as ensuring the interoperability of those assets.

Micro-Generation

In regard to micro-generation, the aim had been to deliver a pilot solar photovoltaic (PV) micro-generation scheme, with a view to the commencement of an enduring support scheme by 2021 to ensure that people can sell excess electricity they produce back to the grid. It was also aimed to develop an enabling framework for micro-generation which tackles existing barriers and establishes suitable supports within relevant market segments. In December 2021, the Government approved the design of the Micro-Generation Support Scheme (MSS), as a means of supporting 380 MW of new micro-generation capacity by 2030. This would generate over 300 GWh of renewable electricity per annum, with the potential to abate 1.4 Mt CO_2eq over the lifetime of the installations. The MSS provides support to domestic and non-domestic applicants for renewable installations up to 50 kW, in the form of grants provided through the SEAI. These applicants are also eligible to avail of the Clean Export Guarantee (CEG) tariff, allowing them to receive payment from their electricity supplier for excess renewable electricity they export to the grid, reflective of the market value of the electricity.

Very strong growth in the domestic and non-domestic solar PV sectors has resulted in an expectation that existing micro-generation targets from CAP 2021 will be achieved ahead of plan. However, with the challenges posed to local electricity grids by the electrification of heat and transport in homes and businesses, it is recognised that 1.6 GW of installed micro-generation capacity (≤ 50 kW) is required by 2030, as identified by Eirgrid and noted in CAP 2024. This will provide significant support to the achievement of Ireland's objective of 8 GW total solar generation capacity by 2030.

Route to Market for Renewable Energy Generation

The Renewable Electricity Support Scheme (RESS) is the primary Government policy to help deliver the onshore renewable electricity capacity required to ensure Ireland meet's the 80% target by 2030. The RESS is an auction-based support scheme which invites grid-scale renewable electricity generation projects to compete to receive a guaranteed price for the electricity they generate under a two-way floating feed-in premium. These auctions provide pathways for renewable developers to plan and develop their projects. The Renewable Electricity Corporate Power Purchase Agreement Roadmap was published in March 2022 and sets out Ireland's policy on CPPAs.

Regulatory Streamlining of Renewables and Grid Development

- Ensure that the network operators (Electricity Supply Board (ESB) Networks and EirGrid) plan network and deliver on connecting renewable energy sources to meet the 2030 80% RES-E target;
- Ensure that renewable electricity grid connection policy is fit for purpose to deliver on renewable energy targets and community projects and aligns with EU legislation;
- Facilitate additional hybrid connections (e.g. solar/wind/batteries) operating in the electricity market to increase RES-E penetration;
- Implement energy actions under the Government Statement on the Role of Data Centres in Ireland's Enterprise Strategy to ensure that large demand connections are regionally balanced to minimise grid reinforcements;
- Publish a Private Wires Policy Framework
- Ensure that the network operators (Electricity Supply Board (ESB) Networks and EirGrid) Assess the network development required to integrate 80% RES-E and develop a high-level network development plan to (and beyond) 2030;
- Facilitate very high penetration of variable renewable electricity by 2030 (both SNSP and average) through system services and market arrangements.

2.4.3.4 National objectives with regard to ensuring electricity system adequacy, as well as for the flexibility of the energy system with regard to renewable energy production, including a timeframe for when the objectives are to be met

A core objective of changes to market trading rules introduced in recent years has been to facilitate a more flexible energy system, with increased efficiency of cross border trade across interconnectors and the additional volumes of renewables, DSU and storage required to facilitate power generation decarbonisation. In addition, a more flexible energy system, which can integrate higher volumes of renewables onto the grid is of paramount importance to meeting the ambitious goals outlined in the CAP.

2.4.3.5 Where applicable, national objectives to protect energy consumers and improve the competitiveness of the retail energy sector

Consistent with European energy regulation policy, the electricity and gas markets in Ireland are commercial, liberalised, and competitive. The CRU ended its regulation of retail market prices for electricity in 2011 and for gas in 2014. The position of successive Governments has been that competitive energy markets result in greater choice for consumers and businesses, in terms of suppliers, products and prices. Government policy on energy costs is focused on supporting the competitive market to drive down prices. While electricity and gas retail market prices are no longer regulated, the CRU has a statutory obligation to closely monitor electricity and gas retail markets to ensure that competition continues to develop. DECC took a phased approach to the legal transposition of the CEP Directive regarding the common rules for the internal market in electricity. For future national objectives, the CRU will continue to monitor the retail market to ensure that final customers are benefiting from competition in the supply of electricity and gas, as per its statutory functions set out in SI 630/2011. This S.I. sets out CRU's oversight of the development of competition, wider market monitoring, dispute resolution and enforcement functions. The CRU also has a statutory responsibility for customer protection under S.I. 463 2011. This S.I. sets out national consumer protection objectives to protect energy customers specifically addressing matters relating to vulnerable customers, customer charters, codes of practice for consumer protection, dispute resolution, single points of contact for information, and enforcement powers for CRU.

The CRU, as regulator has the key role in ensuring customer protection and the rights of customers in the market. A condition of a supplier's Electricity Supply Licence is that they fulfil their obligations as set out within the CRU Supplier Handbook. Suppliers must prepare and submit to the CRU for its approval terms and conditions of supply, Codes of Practice and Customer Charters in line with CRU guidelines. The Supplier Handbook is the guideline from which Codes of Practice and Customer Charters should be developed. The transposition of article 10, 'Basic Contractual Rights' within Directive 2019/944 was provided for within the above tools.

The transposition also provided for categories of licences to be created for new market activities including aggregation, demand response and energy storage. Provision was also made for the creation of a non-licence-based registration framework for "relevant market participants" who engage in activities for which they have obligations under the Directive but

for whom the standard licensing regime would prove unnecessarily onerous. These market participants are essential to allow for citizen participation in the clean energy transition, which is necessary to meeting our ambitious climate targets. This will allow a greater variety of actors to engage in the production of renewable electricity, and other associated activities such as aggregation and demand response, which are essential to the resilience of the electricity market in meeting Ireland's ambitious climate targets. The CRU has established a new licensing team, who, under the policy oversight of the DECC, will bring full effect to this legislation. To further support these measures the rollout of the smart metering programme and the availability of dynamic price contracts and time of use tariffs have also been prioritised within transposition.

The Department, in consultation with relevant stakeholders, provided regular input to the trialogue discussions which took place at the end of last year for the proposed reform of the Electricity Market Design and looks forward to working with these stakeholders to ensure implementation of these measures designed to shield consumers from price spikes, accelerate the deployment of renewable energy, improve consumer protection and implement the necessary steps to stress test supplier hedging strategies.

2.4.3.6 Where applicable, national objectives to enable and develop demand response, including those addressing tariffs to support dynamic pricing

As set out in CAP, smart electricity meters will be installed in 2 million homes by the end of 2024. The delivery plan has been phasing in smart services since 2021, giving consumers more choice and information and enabling them to be more proactive in their use of electricity and save money.

Demand Strategy

A key element in managing energy demand and supporting high RE on the system is effective demand flexibility. Demand flexibility can support the energy system by reducing load at times of peak demand, thereby also improving security of supply, or increasing demand at time of high RE availability. For Ireland to meet its carbon emissions targets, it is necessary for electricity demand to become more flexible, to optimise the use of renewable generation and to minimise demand during times of high carbon intensity on the electricity grid. This will require new demand connections, especially large energy users, to invest in flexibility capability from the outset, and for all customers to increasingly shift their consumption away from peak-times and times of high-carbon intensity on the grid and

towards times of high-renewable output. The CRU has been designated as the lead organization to bring this project to fruition through the publication of a National Energy Demand Strategy (NEDS) which will be finalised, following recent consultation, in summer 2024. The NEDS aims to achieve 20-to-30% of electricity demand to be flexible by 2030, with a target of 15-to-20% by 2025, through facilitating active participation by citizens and businesses in the energy market. Large Energy Users will be expected to make a higher proportional contribution to this target. In addition, The System Services Future Arrangements, along with the DS3 Programme which it is intended to replace, will be key to achieving a more flexible, dynamic Irish energy system.

2.4.4 Energy Poverty, where applicable, national objectives to protect energy poverty, including a timeframe for when the objectives are to be met

Ireland's strategy to combat energy poverty is laid out in the Energy Poverty Action Plan, published in December 2022. People at risk of energy poverty need to access different combinations of available measures to meet their individual needs and circumstances. Table 22 and Table 23, below, show the change cost of an estimated annual bill during the month of December between 2020 and 2023, as well as the percentage increase in estimated annual bill between December 2023 and 2022 relative to December 2021.[23] welcome price reductions apparent in Table 22, estimated annual bills were 54% higher for electricity and 77% higher for gas than they were in December 2021. For these reasons, Ireland has developed a whole-of-Government strategy laid out in the Action Plan.

[23] December 2023 figures are based on November 2023 figures reported by the CRU and assume no further change, as indicated by energy suppliers.

Table 22: Estimated Annual Bills for major energy suppliers Dec-20 – Dec-23

STANDARD ELECTRICITY EAB	Dec-20	Dec-21	Dec-22	Dec-23
Energia	€1,194	€1,643	€ 2,271	€1,966
Electric Ireland	€1,098	€1,237	€ 2,120	€1,917
Bord Gais	€1,102	€1,190	€2,305	€1,948
PrePay Power	€1,261	€1,381	€2,245	€ 2,023
SSE Airtricity	€ 1,137	€1,406	€2,267	€ 2,024
Flogas	€1,214	€1,987	€ 2,983	€ 2,088
Pinergy	€ 1,280	€ 2,029	€ 2,193	€2,185
Weighted Average	€1,106	€1,247	€2,170	€1,926
STANDARD GAS EAB	**Dec-20**	**Dec-21**	**Dec-22**	**Dec-23**
Energia	€ 856	€1,199	€1,860	€ 1,550
Bord Gais	€774	€897	€1,865	€1,607
PrePay Power	€ 836	€968	€ 1,886	€1,691
SSE Airtricity	€811	€1,032	€1,821	€1,679
Electric Ireland	€755	€880	€1,893	€ 1,693
Flogas	€ 876	€1,485	€2,682	€ 1,920
Weighted Average	€ 794	€934	€ 1,887	€ 1,651

Table 23: Percentage Change in EABs Dec '22 and Dec '23 vs. Dec '21 for Electricity and Gas

ELECTRICITY EAB	Dec 21 - Dec 22 Increase %	Dec 21 - Dec 23 Increase %
Bord Gais	94	64
PrePay Power	63	46
Electric Ireland	71	55
Energia	38	20
Flogas	50	5
Pinergy	7	8
SSE Airtricity	61	44
Weighted Average	74	54
GAS EAB		
Bord Gais	108	79
Electric Ireland	115	92
Energia	55	29
Flogas	81	29
SSE Airtricity	76	63
PrePay Power	95	75
Weighted Average	102	77

This Plan sets out the range of measures implemented across Government during winter 2022/23 to support people with energy costs, as well as the longer-term actions taken to ensure those most at risk of energy poverty can adequately heat and power their homes. A cross-departmental and inter-agency Steering Group was established to develop, implement, and oversee the policies and measures detailed in the Action Plan.

The plan sets out actions in four areas:

- Meeting the Cost of Energy;
- Energy Efficiency;
- Research;
- Governance and Communications.

Progress on measures set out in the Action Plan are monitored by the Energy Poverty Steering Group. An Annual Report outlining progress under the various actions in the Action Plan during 2023 will be published in Q2 2024. The Action Plan aims to alleviate the burden of energy poverty on the most vulnerable in society through actions focused on improving the efficiency of homes, supporting lower income households with their energy costs, and minimising the costs to consumers associated with action on climate change and with ensuring security of supply. This strategy is underpinned by empirical research undertaken within the department and by the Economic and Social Research Institute of Ireland (ESRI). In Ireland energy poverty has been measured as a household having to spend more than 10% of its income on energy. The ESRI has estimated, on this basis and with unprecedented energy inflation, 29% of households in Ireland are in energy poverty and that this will rise with increases in energy costs. However, this methodology is limited as it provides no indication as to the intensity of the energy poverty being experienced or correlation to the energy efficiency levels of these homes. As energy costs are a huge driver for the overall rise in the cost of living, with impacts on levels of energy poverty, it is essential that this methodology is improved and optimised for Ireland's situation. As such funding has been provided to the ESRI to develop new methods of quantifying and understanding energy poverty in Ireland, thus ensuring that better targeted measures may be used by Government to support households.

DECC recently ran a public consultation to engage with relevant stakeholders and consult with the public in the coming months in the context of the development of a revised Action Plan. Following completion of the consultation, the revised Action Plan was presented to

stakeholders at the Annual Energy Poverty Stakeholder Forum in May 2024 and subsequently brought to government for approval.

2.5 Dimension Research, Innovation and Competitiveness

2.5.1 National objectives and funding targets for public and, where available, private research and innovation relating to the Energy Union, including, where appropriate, a timeframe for when the objectives are to be met.

Given the level of Ireland's ambition regarding the reduction of GHG emissions, new technologies must be developed and deployed in the coming years. This is acknowledged in the Research & Innovation Chapter in CAP 2024 which states that addressing the climate challenge will require the deployment of existing innovative technologies and solutions at scale, plus the development and deployment of new technologies and solutions.

Ireland's overall level of public investment in R&D as measured by R&D intensity is low relative to the Europe 2020 target set by the European Commission, estimated at 1.34% (€4,874bn) of GNP for 2022. This is an estimated decrease from 1.49% (€4,821bn) of GNP in 2021. Impact 2030, the national strategy for research and innovation to 2030, sets a research intensity rate target of 2.5% of GNI* by 2030, rising from a baseline of 2.21% in 2020. Overall expenditure on RDI (GERD) increased from €3.1bn in 2015 to an estimated €4.8bn in 2022, an increase of €1.7bn. GERD has increased year on year since committing to the Europe 2020 target, with an overall estimated increase of €2,116bn since 2012. However, reaching the 2.5% research intensity rate target presents a significant challenge.

Of the overall public investment in R&D in 2022, 1.7% supported energy research, and 3.7% supported research in environmental policy, climate change and natural hazards. The Sustainable Energy Authority of Ireland (SEAI) is the designated national agency to promote and support energy R&I initiatives. National energy research provision is achieved through a domain specific funding programme: the SEAI National Energy Research Development & Demonstration (RD&D) Funding Programme, and with further provision from a component of funding from domain-agnostic funding agencies Science foundation Ireland (SFI), the Irish Research Council (IRC), and Enterprise Ireland (EI). Further energy related research funding has been awarded by the Department of Agriculture (DAFM), Department of Transport (DoT), Geological Science Ireland (GSI), Marine Institute (MI), the Environmental Protection Agency (EPA) and Met Eireann.

To address reaching the research intensity challenge, DECC has increased in a stepwise fashion public funding for the SEAI National Energy RD&D Programme (see 3.5.3). This funding has allowed the SEAI to instigate new initiatives, expand current activities, develop strategic collaborative partnerships with national & international organisations and further strengthen the capacity of the energy RD&D system in Ireland. Increased investment in energy RD&D has also assisted Ireland in meeting its medium- and long-term low-carbon transition targets and obligations and will unlock enterprise opportunities for Irish businesses. Since the commitment to increase funding was made, SEAI's annual RD&D budget has increased from €4.5 million in 2020 to €13.8 million in 2024, with annual awarding of multi-annual energy research projects increasing to €19.8m over the period. It is projected that annual budget allocations will increase to reflect the multi-annual awarding envelope as the scheme matures. Additional energy funding allocations will be determined following the outcome of the SEAI's Energy Research Strategy (Q1 2025) and SEAI's Offshore Renewable Energy Technology roadmap (CAP21 Action 123B and 123C; due Q2 2024) and other publications.

The EPA Research Programme includes a specific strand on climate change evidence needs, recognising the need for research to inform a practical response to, and strategic engagement on, climate change. EPA Research has a strong focus on informing policy and knowledge transfer. The EPA has a statutory role in coordinating environmental research in Ireland and convenes a coordination group comprising relevant public bodies across the research and policy domains. EPA spend on research and innovation increased from €9.6M in 2020 to a projected spend of €11.4M in 2023.

2.5.2 Where available, national 2050 objectives related to the promotion of clean energy technologies and, where appropriate, national objectives, including long-term targets (2050) for deployment of low-carbon technologies, including for decarbonising energy and carbon-intensive industrial sectors and, where applicable, for related carbon transport and storage infrastructure

The Climate Action and Low Carbon Development (Amendment) Act 2021 sets Ireland on a legally binding path to net-zero emissions no later than 2050, and to a 51% reduction in emissions by the end of 2030. The annual CAPs provide a roadmap for taking decisive action to deliver on these targets, putting in place a decarbonisation pathway consistent with

the adoption of a net zero target in Ireland by 2050. The 2023 CAP was the first CAP update following the introduction of economy-wide carbon budgets and sectoral emission ceilings, which were approved and adopted in May and July 2022, respectively.

To deliver on 'an evidence-based decarbonisation pathway for the electricity system to net zero,' CAP 2023 tasks SEAI with delivering a Decarbonised Electricity System Study that will produce the evidence basis for effective decision-making and build the necessary consensus to deliver on change. The scope of work, commencing Q2 2024, will support SEAI's input to the development of future iterations of the CAP on measures concerning the electricity sector. It will inform the formation and implementation of policy to meet future carbon budgets and initiate a dialogue that may contribute to building a wider societal consensus on Ireland's pathway to a fully decarbonised electricity system. Through gathering stakeholder input, from diverse perspectives, on the viability of potential future technologies, infrastructure, deployments, and timelines, robust, evidence-based, input scenarios may be developed for detailed analysis in the Techno-Economic Study.

Irelands CAP 2024 continues to drive additional actions related to energy innovation and low carbon technologies. It identifies abatement technologies that will need to be implemented across key sectors including renewables, the built environment, transport, agriculture, enterprise, and land use. CAP 2024 provides multiple national targets across various renewable energy sources such as geothermal energy, hydrogen, solar, offshore, and onshore wind, biomethane, and carbon capture utilisation and storage (CCUS). These CAP 2024 actions are set out in the table below:

Table 24: National Objectives for Low-Carbon Technologies

Geothermal	Hydrogen	Solar	Offshore/On Wind	Biomethane
DECC will develop legislation and regulation to support the geothermal energy sector. DECC intends to publish a General Scheme of a Bill to provide the necessary legislative basis for the regulatory framework by Q4, 2024.	The National Hydrogen Strategy sets out a list of 21 high level actions, which are to be undertaken over the period up to 2030 to further support the sector's development. DECC's focus for 2024 will be on ensuring a detailed implementation plan and appropriate governance arrangements are in place.	Ireland has a 2030 target of 8 GW solar PV capacity, including 2.5 GW of new non-utility solar to abate electricity emissions.	Ireland has a target of 9 GW onshore wind capacity and at least 5 GW offshore wind capacity by 2030.	Ireland has a target to deliver 5.7 TWh of indigenously produced biomethane by 2030. Within that overall target, Ireland also has a biomethane heating target of up to 1.1 TWh by 2030.

2.5.3 Where applicable, national objectives with regard to competitiveness

Ireland's National Competitiveness Council (NCC) reports to the Irish Government on key competitiveness issues facing the Irish economy and provides recommendations on policy actions required to enhance Ireland's competitiveness position. Details in this section are drawn from Ireland's Competitiveness Challenge 2023 Report, published in September 2023. The report identifies four broad medium and long-term strategic challenges and outlines 19 tangible, actionable policy recommendations to the Government aimed at enhancing Ireland's competitiveness and productivity performance.

The four key challenges identified in the report are as follows:

- Reduce the cost of doing business in Ireland;
- Significantly improve the planning, development, and delivery of infrastructure;
- Accelerate progress on the usage and generation of energy in line with our climate targets;
- Enable stronger productivity growth through research, development, and innovation.

Competitiveness is a multidimensional concept incorporating many interlinked and interdependent factors. Reflecting this complexity, Ireland's Competitiveness Scorecard analyses over 170 measures, each of which articulates an aspect of Ireland's competitiveness performance. Competitiveness performance reflects the interaction of a wide range of factors that, combined, determine the ability of firms to compete successfully in international markets. Ireland's performance across several international competitiveness indices has improved in recent years.

3 Policies and Measures

3.1 Dimension Decarbonisation

3.1.1 GHG Emissions and Removals

3.1.1.1 Policies and measures to achieve the target set under Regulation (EU) 2018/842 as referred in point 2.1.1 and policies and measures to comply with Regulation (EU) 2018/841, covering all key emitting sectors and sectors for the enhancement of removals, with an outlook to the long-term vision and goal to become a low emission economy and achieving a balance between emissions and removals in accordance with the Paris Agreement

Building on the policy framework of the National Mitigation Plan and Project Ireland 2040, the Government published its first CAP in June 2019. The Plan identifies how Ireland will achieve its 2030 targets for GHG emissions which is also consistent with a trajectory to achieve net zero emissions by 2050. The Plan sets out over 180 actions, together with hundreds of sub-actions, that need to be taken, and encompasses every relevant sector: electricity, enterprise, housing, heating, transport, agriculture, waste, and the public sector. The Plan, which is updated annually and reported on quarterly, also includes actions to ensure that citizens become engaged and mobilised to take climate action, while ensuring that the necessary societal and economic transition that we must make is fair, both in Ireland and globally.

Irelands national Long-term Strategy on Greenhouse Gas Emissions Reductions provides the link between the State's climate agenda for 2030 and Ireland's long-term commitment to achieve climate neutrality by 2050, as established by Ireland's "National Climate Objective" and at the EU level by the European Climate Law. The Strategy sets out indicative pathways, beyond 2030, towards achieving carbon neutrality for Ireland by 2050. It builds on the decarbonisation pathways set by the carbon budgets, sectoral ceilings, and latest CAP, and identifies additional measures and policies that will drive deeper decarbonisation post-2030. The Strategy covers, total GHG emission reductions and enhancements of removals by sinks; emission reductions and removals in individual sectors; expected progress on transition to a low GHG emission economy, and; expected socio-economic effects of the Transition, including aspects related to macro-economic and social development, health risks and benefits and environmental protection. The strategy has been prepared in line with

requirements set out in both domestic and EU legislation and has been submitted to the European Commission and UNFCCC.

A National Dialogue on Climate Action had already been established to provide an opportunity to create awareness, engagement, and motivation to act (locally, regionally, and nationally) in relation to the challenges presented by climate change. It also created structures and information flows to facilitate people gathering to discuss, deliberate and achieve consensus on appropriate responses to these challenges as well as enable and empower appropriate action. The Plan takes into account the outcomes from the examination of the issue of climate action by the "Citizens' Assembly" as well as the work of the All-Party Committee on Climate Action. A Climate Action Delivery Board was established to ensure coordination and accountability across Government on the various actions identified and to focus effectively on timely implementation.

Reflecting the central priority of climate change in our political and administrative systems into the future, the Plan sets out the development of new governance arrangements including carbon-proofing of our policies, establishment of carbon budgets, a strengthened CCAC and greater accountability to the Parliament. A new legal framework will drive the definition of targets and the governance process. In early 2020, the Government published the general scheme of a new that will provide an unprecedented national legal basis for the setting of mitigation targets and the governance of climate policy. Under the proposed legislation, Ireland will adopt five-year carbon budgets at a national level following recommendations by a strengthened, statutorily independent Climate Change Advisory Council. Three five-year budgets (i.e. up to 2035 in the first instance) were approved by the Government and by the Dáil. In addition, the Government set target ranges and trajectories for each sector within the overall carbon budget. The governance of the plan will follow the approach successfully applied in the Action Plan for Jobs. A very detailed list of actions and measures are assigned at Department level and implementation will be monitored and reported on a quarterly basis under the supervision of the Department of the Taoiseach.

Some of the key measures set out in the Plan include:

- Committing to a trajectory of carbon pricing, to create behavioural change and avoid locking in carbon intensive technologies;
- Establishing a system of 5-year carbon budgets and sectoral targets;
- Carbon proofing all Government decisions and major investments;

- The establishment of a Just Transition Commission;
- A mandate on all public bodies to adopt a Climate Action Mandate;
- A new Climate Action Act, to include 2050 targets;
- The establishment of a parliamentary Standing Committee on climate action;
- The elimination of non-recyclable plastic, including: the imposition of higher fees on the production of materials which are difficult to recycle, and the implementation of measures to ban products such as single-use plastic plates, cutlery, straws, balloon sticks and cotton buds;
- Increasing the penetration of renewable electricity;
- Phasing out coal and peat fired generation;
- The provision of a regulatory framework and development of a strategy for the optimal deployment of geothermal energy, to support the decarbonisation of heating and cooling in buildings, industry, and power generation;
- Putting in place a coherent support scheme for micro-generation, facilitating the sale of excess power to the grid;
- Setting stricter energy & climate requirements for new buildings and substantial refurbishments;
- The adoption of new Local Authority Climate Action Plans (LACAPs) within each of Ireland's 31 Local Authorities, setting out mitigation and adaptation measures to be adopted locally;
- Working toward the upgrade the equivalent of 500,000 homes to a BER B2 or cost optimal level;
- Building a supply chain for home retrofits;
- Increased delivery of renewable heat through district heating and, to a lesser extent, biomethane;
- Accelerating the penetration of EVs into sales of cars and vans and deliver a nationwide charging network;
- Expanding the network of cycle paths and of "Park and Ride" facilities;
- Making growth less transport intensive through better planning, the promotion of

remote or hybrid working where overall journeys and kilometres travelled are reduced, and modal shift;

- Increasing the proportion of renewable transport fuel (biofuel) in transport through ongoing implementation of the Renewable Transport Fuel Policy, including annual increases in the rate of the Renewable Transport Fuel Obligation (RTFO);
- Deliver substantial, verifiable GHG abatement through the adoption of a specified range of improvements in farming practice in line with recommendations from Teagasc;
- Promoting the increased use of domestic harvested wood in longer lived products, which will enhance the storage of carbon in these products and act as a substitute for materials with a higher carbon intensity;
- Delivering an expansion of forestry planting and soil management to ensure that carbon abatement from land-use is delivered in 2021-30 and in the years beyond; and
- Supporting diversification within Agriculture and land use to develop sustainable and circular value chains and business models for lower carbon intensity farming.

The following sections provide an overview of the various actions covering all key emitting sectors.

Electricity Generation

Energy is indispensable to contemporary social and economic functioning. Energy policy seeks to balance the occasionally competing aspects of sustainability, competitiveness, and security of supply. Given the scale, scope, and extent of energy use, it inevitably has significant environmental impact: including GHG emissions arising from power generation, heating, and transport. Harnessing Ireland's RE resources will play a key role in the transition towards a sustainable, secure, and competitive energy system. A key sector in this transition is electricity generation: which, since 2005, has been subject to the EU's ETS. Representing just under a third of emissions from the energy sector, electricity has been an area of considerable decarbonisation success and a target area for future progress[24].

[24] https://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:2009:140:0016:0062:EN:PDF

Some of the key actions for the decarbonisation of the electricity sector include:

- Increase electricity generated from renewable sources to 80% by 2030, underpinned by the Renewable Electricity Support Scheme (RESS);
- Streamline consenting and connection arrangements;
- Phase-out of coal and peat-fired electricity generation;
- Introduce a support scheme for micro-generation;
- Facilitate community participation in renewable generation;
- Provide funding supports for new technologies onshore and offshore;
- Deliver Smart Metering Programme in line with current timelines;
- Support the ocean energy research, development and demonstration pathway for emerging marine technologies and associated test infrastructure.

Built Environment

Improving energy efficiency is central to the transition to a low carbon economy. Using less energy, and using it in a more flexible way, is the most cost-effective and accessible way to tackle climate change. This is why conserving energy and shrinking our energy use is the first step to take in the process of decarbonising the built environment. The more that energy use is reduced through energy efficiency measures, the fewer the emissions produced, and the easier the effort required to achieve RE targets. Ireland recognises that, in terms of energy efficiency, attaining the objective of a low carbon future will involve radically changing behaviour as citizens, industry and Government and becoming significantly more energy efficient. Energy efficiency upgrades to the fabric of buildings by, for example, carrying out works such as insulation and airtightness, reduces the amount of energy needed for heating and cooling and reduces the CO_2 emissions connected with our energy use in those homes and workplaces. However, this is just the first step. To decarbonise the built environment, the switch from using fossil fuel as the source of energy in buildings to alternative energy sources will be vital. The National Heat Study considered a number of potential decarbonisation options for a wide range of dwelling and business types - the recommendation of the Heat Study is that heat pumps are the optimal decarbonisation path for heating systems, with district heating also being an option that can be widely deployed. A further heat source under certain circumstances is direct use of geothermal heat collected

via deep boreholes. In some circumstances, fuels such as biomass may be suitable in Combined Heat and Power systems.

However, it is critical that the fabric of a building is upgraded first so that the desired levels of comfort and function are maintained in homes and workplaces when a less energy intensive RE system is used. The principle of 'fabric first' is now embedded in existing support for energy efficiency upgrades and will continue to define the ongoing development of measures to combine energy efficiency improvements with the fuel switching necessary to make real progress on decarbonising Ireland's built environment. Ireland is facing significant challenges as we move to decarbonise the built environment across residential, public, and commercial sectors.

Through Ireland's energy agency, the SEAI, Ireland offers a range of supports to business, encompassing grants for audits, energy efficient design, renewable heat and solar. SEAI also supports a large industry energy network (LIEN), which brings large energy users together to exchange best practice and experience and provides training for the non-domestic sector through its online energy academy. In order to drive forward the level of change at scale that is required, the Minister for the Environment, Climate and Communications in Ireland, set up a Heat and Built Environment Taskforce to accelerate and drive delivery in relation to retrofitting, renewable heat, district heat and decarbonisation of the building stock in industry and across the residential and non-residential sectors in Ireland. Six working groups have been set up under the Taskforce, including one on the commercial built environment and one on the public sector-built environment. The public sector working group reviewed SEAI guidance which was issued to public sector bodies on building stock plans. Public sector bodies building stock plans are a key opportunity to collect data to enable a strategic overview of the national portfolio of buildings occupied by public bodies, including clarifying whether the public body is occupying a State-owned or leased building, the number of buildings on a campus and the floor area of the buildings. The information on public sector building stock is intended to contribute to the development of a prioritisation exercise in delivering building retrofit across the public sector. The commercial-built environment roadmap, under development by the commercial-built environment working group, will provide clarity for the commercial-built environment sector in terms of the decarbonisation pathway to 2050, at a rate that is consistent with the carbon budget programme, sectoral emissions ceilings, CAP and taking into account the findings of the National Heat Study.

The Heat and Built Environment Taskforce has already overseen the development of the District Heating Steering Group Report in 2023, the development of the National Biomethane Strategy, monitors progress on residential retrofit programmes and will consider the forthcoming industrial decarbonisation roadmap, National Heat Policy Statement, and the Roadmap for the Phase Out of Fossil Fuel Heating Systems.

Some of the key actions for the Built Environment sector include:

- Stricter requirements for new buildings and substantial refurbishments;
- Design policy to upgrade 500,000 homes to B2 Building Energy Rating (BER);
- Install 600,000 renewable energy heating sources;
- Develop a plan to ensure that the grant schemes, new finance models and the delivery system are effectively integrated;
- Skill-up current contractors/other industry players in deep retrofit, NZEB and new technology installations;
- Implement a coordinated approach to the development of district heating through establishing a District Heating Centre of Excellence;
- Develop a legislative and regulatory framework to support the expansion of district heating;
- Provide a regulatory framework and develop a strategy for the optimal deployment of geothermal energy to support the decarbonisation of the heating and cooling of buildings;
- Increase the number of Sustainable Energy Communities to 1,500;
- The public sector is tasked with reducing GHG emissions by 51% by 2030).

Under Directive 2023/1791 on Energy Efficiency, there is a specific obligation for the public sector to achieve an annual energy consumption reduction of 1.9%. In addition, Member States are required each year to renovate at least 3% of the total floor area of buildings owned by public bodies. The Directive came into force on 10th October 2023, and Ireland has two years from this date to transpose the requirements of the Directive into Irish law.

There are further obligations for public bodies in the Energy Performance of Buildings Directive (EPBD) which came into force on 12th April 2024. Ireland has two years from this date to transpose the requirements of this Directive into Irish law. These include, inter alia,

minimum energy performance standards for buildings in the non-residential sector, with 16% worst-performing buildings to be upgraded by 2030 and 33% by 2033.

Transport

Moving to a low carbon society represents a significant challenge for Ireland's expanding transport sector where the use of fossil fuels is firmly embedded in driving culture and travel demand is increasing in response to population and economic growth. To address the challenge of transitioning from conventionally fuelled vehicles to alternative fuels and technologies, an ambitious national target was established in the Programme for Government whereby a commitment was made for all new cars sold in Ireland to be zero carbon emission or zero emission-capable by 2030, via a proposed ban on the sale of ICE vehicles, as well as for the electrification of our public transport buses and rail lines. However, we now understand that as the EU has legislated under the Regulation on CO_2 emission standards for cars and vans to set a phase out date for the sale of new fossil-fuelled cars and vans of 2035, that Member States are obligated to allow goods that are legally produced and marketed in other Member States to circulate and to be placed on the Irish market. As such, Ireland expects that we will need to achieve 100% of new registrations to be zero emission in advance of this date to meet our national emissions targets. The Zero Emission Vehicles Ireland (ZEVI) office was established in July 2022 to help us achieve this ambition. Ireland's long-term ambition is to decarbonise the national passenger car fleet by 2050 and increase the use of alternative fuels in the freight sector. A mix of further measures, developments and initiatives will be needed to continue to respond to the climate challenge into the future. New technology deployment and behavioural change initiatives need to be advanced across the transport sector, stimulating changes to the way people travel and the type and amount of fuels that are used. Further measures being progressed are:

- The implementation and revision of the National Planning Framework, which aims to ensure better integration of land use and transport planning policy in order to reduce travel demand and support more efficient patterns of development and travel;
- The development of a national demand management strategy to secure a systematic shift, where feasible alternatives exist, away from private car use and from inefficient freight journeys (a draft Strategy with 35 new recommendations for all sectors was launched for public consultation – for a period of three months - on 16th April 2024);

- Enhancing public transport and walking/cycling, with major public transport infrastructure schemes in Ireland's cities, and the NTA's Connecting Ireland Rural Mobility Programme in towns and villages;
- The development of the National EV Charging Infrastructure strategy and consequent National EV Charging Network Plan detailing the path to deliver circa 705 MW of charging infrastructure by 2030, coupled with a package of proposals on investment, regulation, and policy instruments over the coming years;
- The development of the National Sustainable Mobility Policy and its associated Action Plan 2022-2025, alongside a programme of 'pathfinder projects' to demonstrate the benefits of sustainable mobility and accessibility;
- Encouraging the take-up of alternative fuels to petrol and diesel in road transport, maritime transport, and aviation, under consideration by an Alternative Fuel for Transport Working Group established in 2023; and
- Substituting high-emitting fossil fuels with renewable energy through a policy of increase of the national mandated minimum renewable transport fuel in transport energy consumption, i.e., the RTFO. This includes sub-targets for advanced biofuels and renewable fuels of non-biological origin, adherence to the limits set out in the EU RED and GHG reduction and sustainability requirements, while fulfilling domestic decarbonisation biofuel targets under the CAP;
- In addition, the leveraging potential role of taxation, the impact of eco-driving, and driving behaviours are also being examined and advanced.

Some of the key actions to be progressed for the Transport sector include:

- Accelerate the penetration of EVs so that 945,000 will be on the road by 2030, underpinned by policy tools such as vehicle and fuel taxation measures, and a strong carbon tax trajectory;
- Make growth less transport intensive through better planning and transport orientated development, encourage remote working (where feasible) and greater modal shift through the delivery of major projects such as BusConnects, DART+, MetroLink, Cork Commuter Rail and an expanded network of an additional 1,000 km in walking and cycling infrastructure;
- Increase the proportion of renewable transport fuel in transport underpinned by the annual rate of increase of the renewable transport fuel obligation (RTFO);

- Set targets for the conversion of public fleets underpinned by a Green Public Procurement Framework and a public sector mandate;
- The expansion of the EV charging network to support the growth of EVs will be progressed in line with the mandatory targets now set out in the EU Alternative Fuels Infrastructure Regulation and National EV Charging Infrastructure Strategy, with high-power fast-charging infrastructure on the TEN-T network and Destination and Residential Charging for those without the facility to charge at home.

Local Authority Climate Action Plans and Capacity Building

The Climate Action and Local Carbon Development (Amendment) Act 2021 provides for an additional Section 14B (1) of the Climate Action and Low Carbon Development Act 2015 in relation to the role of Local Authorities. This sets out that each Local Authority shall prepare plan (referred to as a LACAP) specifying the mitigation and adaptation measures to be adopted for a period of five years. The plans were adopted in early 2024, having gone out to public consultation and following adoption by the elected members in each Local Authority. The Climate (Amendment) Act amends the Planning and Development Act 2000 by stating that Local Authority Development Plans must take account of the LACAPs. As stated in the Planning Act, Local Authority Development Plans shall include objectives for the promotion of sustainable settlement and transport strategies including the promotion of measures to reduce emissions and address climate adaption, taking account of any LACAP, in particular relating to the location, layout, and design of new development.

The City and County Development Plans are the key statutory documents in delivering policy change at Local Authority level. The policy making and implementation role of local government in support of national and international climate action has been expanded through climate legislation. There is a greater emphasis on Local Authorities and regional assemblies as leaders in creating more sustainable, cleaner, biodiversity rich administrative areas. Delivering on national climate obligations and remaining within the statutory carbon budgets will require strengthened activity by Local Authorities. In recognition of this, Government has invested significantly in funding climate-related programmes and roles in each Local Authority to increase their capacity to respond. These new specialist resources form the nucleus of the Local Authority climate action teams. As climate change is a cross-cutting challenge, it requires involvement from across the entire range of Local Authority functions and cross-departmental working. Local Authority staff from across functional areas

will support climate action policy development and will be responsible for the delivery of climate actions. Organisational support and governance are integral to the success of the actions put forward in the LACAPs.

Each Local Authority will take a multi-disciplinary approach to climate action by putting in place a defined governance structure. DECC is supporting the LACAP process and broader climate delivery by funding Climate Action Coordinators and Officers in each Local Authority. Strand 1 of the Community Climate Action Programme from DECC provides funding for Community Climate Action Officers in each Local Authority. Government has been supporting capacity building in the local Government sector. DECC funds the Local Authority Climate Action Training Programme, which is delivered by the Eastern and Midlands CARO through the Local Authority Services National Training Group. Building climate action capacity in the Local Authorities is essential to support their leadership role in the fight against climate change and to build resilience. The programme comprises a suite of training pillars designed for specific target groups, covering areas such as climate science, the adaptation of national policy to local requirements, leadership, and local innovation. Strategic training priorities are identified, and learning objectives are developed to suit the target learning groups, which include Local Authority front line staff, senior management, climate action teams, and elected members. The programme commenced in January 2021 and by December 2023 circa 27,000 training places had been provided to approximately 22,500 people. An analysis of training needs for the programme was carried out in early 2024 to determine its future direction, training target numbers, and specific target groups to help strengthen the implementation of climate action.

In addition, having identified capacity in local authorities as a risk to delivery of actions under the Sustainable Mobility Policy, the Department of Transport is funding a capacity building programme on sustainable mobility for Local Authorities. Designed by the Regional Assemblies, Phase 1 of the Smart and Sustainable Mobility Accelerator ‘Pathfinder’ Project was completed in 2023 and Phase 2 is being rolled out in Q4 2024. Further to this, Zero Emissions Ireland has been working with the Local Authorities in the development of the Regional and Local EV Charging Network Plan, resourcing will be provided to Local Authorities to develop this plan through the development and implementation of their Local Authority EV Charging Strategies. The Department of Transport has committed to working closely with DECC and the CAROs to facilitate delivery of transport measures by Local Authorities.

Agriculture

Agriculture accounted for 38.5% of Ireland's greenhouse gas (GHG) emissions in 2022. Between 2012 and 2022, emissions grew by 14%, to a provisional 23.34 Mt CO_2eq. in 2022. The 2022 figure represents a 1.2% decrease on the peak of 23.6 Mt CO_2eq. in 2021. This decrease was predominantly driven by reductions in fertiliser use. Under the process set out in the Climate and Low Carbon Development (Amendment) Act 2021, a target has been set for reducing overall emissions from Agriculture by 25% from the 2018 baseline year by 2030, down to 17.25 Mt CO_2eq. per annum by 2030.The agriculture sector is undergoing a significant transformation to deliver the reduction in GHG emissions required which will impact across Ireland's agriculture and food production systems. Guided by the Food Vision 2030 Strategy, Irish farmers and food producers will further prioritise delivery of environmental, social, and economic sustainability. We are doing this through actions in the following areas: per annum by 2030.The agriculture sector is undergoing a significant transformation to deliver the reduction in GHG emissions required which will impact across Ireland's agriculture and food production systems. Guided by the Food Vision 2030 Strategy, Irish farmers and food producers will further prioritise delivery of environmental, social, and economic sustainability. We are doing this through actions in the following areas:

- Reducing nitrous oxide emissions;
- Reducing methane emissions;
- Increasing carbon capture;
- Enhancing biodiversity;
- Providing diversification options for livestock farmers;
- Enhancing adaptation.

The agriculture sector is the largest contributor to Ireland's greenhouse gas (GHG) emissions. While challenging from an Irish perspective, and unusual in an international context, this fact reflects the economic and historical importance of agriculture, relative to other industries in the Irish economy. Reducing emissions in agriculture is not a uniquely Irish challenge – throughout Europe, reducing GHG emissions in agriculture has proven difficult. What sets Ireland apart from its EU counterparts is the scale of our beef and dairy primary production industries relative to our population and land size, and the lack of heavy industry in Ireland's economic make-up.

Agriculture was a sector that reduced emissions in 2022 compared to 2021. Economy-wide, 25% of the 1.9% year-on-year reduction in total emissions can be attributed to the agriculture sector. There is a significant overlap between agriculture and the land use, land use change and forestry (LULUCF) sector; as the vast majority of land in the state is agricultural land, land use emissions and removals are strongly influenced by actions undertaken by farmers. Actions to reduce emissions from agriculture can have significant positive co-benefits such as the development of our domestic bioeconomy, enhancing ecosystem services such as water and air quality, biodiversity, and providing nature-based solutions for climate change adaptation.

The table below sets out the mitigation measures for the agricultural sector under Ireland's statutory Climate Action Plan, and the total annual emissions reduction targeted by the end of each period that is attributed to each measure.

Table 25: Key mitigation measures and targets for the Agricultural sector for 2025 and 2030

Targets	2021 – 2025 $MtCO_2eq.$	2026 – 2030 $MtCO_2eq.$	Total $MtCO_2eq.$ (2021-2030)
Reducing chemical N use to a maximum of 300,000 tonnes	0.4 – 0.45	0.1 – 0.2	0.5 – 0.65
Increased adoption of Inhibited urea	0.35 – 0.45	0.08 – 0.12	0.43 – 0.57
Earlier finishing of beef cattle (3 – 3.5 months reduced finishing age)	0.25	0.48	0.73
Reduce age at first calving of suckler beef cows	0.03	0.07	0.1
Improved animal breeding by focusing on low methane traits	0.0	0.3 – 0.5	0.3 – 0.5
Low emission animal feeding	0.2	0.4	0.6
Miscellaneous measures, including extended grazing and acidification, amendments, aeration of manures and slurries.	0.2	0.3	0.5
Total Core Mitigation Measures	**1.43– 1.58**	**1.73 – 2.07**	**3.16 – 3.65**
Further Mitigation Measures			
Addition of a slow-release pasture-based feed additive/methane inhibitor	0	0.6	0.6
Support land use diversification options for livestock farmers, such as anaerobic digestion, forestry, and tillage	1.3	0.2	1.5
Increase Organic farmed Area (75k ha to 450k ha)	0.1	0.2	0.3

Total Further Measures	**1.4**	**1.0**	**2.4**
All Mitigation Measures	**2.83 – 2.98**	**2.73 - 3.07**	**5.56 - 6.05**

Regarding agriculture's pathway forward, the sector has made substantial progress on some mitigation measures. For example, the purchase of chemical nitrogen (N) by Irish farmers fell to 343,000 tonnes in 2022 from the 2018 baseline of 408,000 tonnes, which represents a 14% decrease in chemical N purchases on the previous year. This figure has dropped by a further 18% in 2023, which will likely contribute to an expected overall reduction in emissions from agriculture again in 2023. There is a risk of a rebound in chemical N use if prices fall, which is being managed through a continued focus at farm level on replacing chemical nitrogen with organic sources and improving nitrogen use efficiency, supported by knowledge transfer programmes.

New policies and programmes will help the agricultural sector reduce its emissions. The new Forestry Programme for 2023-27 offers substantial support for farmers to diversify their farming enterprise and reduce overall agricultural emissions. The Fifth Nitrates Action Programme 2022-2025 also helps reduce nitrate pollution of Ireland's soils and water while reducing the emissions of N_2O, a potent GHG. The National Biomethane Strategy will also provide opportunities for farmers to diversify into production of feedstocks, create a new value stream for slurry and forage, as well as highlighting their valued contribution to decarbonising the energy system. A key consideration in the development of the Strategy was the need to ensure the development of a biomethane sector in an ecologically sustainable manner and that biomethane is produced in an environmentally sustainable manner having regard to established goals for the protection and restoration of water, soil, biodiversity, and ecosystems.

Emissions reduction in the agriculture sector is particularly challenging because it is a biological system; as long as we produce food, fuel or fibre, there will always be residual emissions. In particular, there is a lack of mature technologies to directly mitigate methane emissions from livestock in pasture-based systems. Policies must continue to support the rapid development of these technologies whilst driving the rollout of existing solutions. This is particularly the case where mitigation measures, such as more efficient nutrient application and the use of inhibited urea fertilisers or different fertilizer compounds, can also mitigate agriculture's other environmental impacts – such as on biodiversity and water quality – as well as delivering economic benefits to farmers.

Livestock grazing out of doors dominates Irish agriculture and Ireland's agriculture sector has a reputation for high quality and sustainably produced food. Maintaining and verifying that reputation is an imperative for our domestic agri-food industries as 90% of its products are exported. Emissions can also be reduced through diversification from conventional livestock farming into farming enterprises such as organics, tillage, high-value bioeconomy products and forestry that have a lower carbon footprint. These actions have significant economic and environmental co-benefits. Food Vision 2030 is Ireland's shared stakeholder-led strategy for the agri-food sector. Food Vision aims for Ireland to be *"a world leader in sustainable food systems."* Ireland aims to deliver food security and nutrition for all in such a way that the economic, environmental, and social bases to generate food and nutrition for future generations are not compromised. Food Vision 2030 sets out 22 goals under the following four high-level missions that the sector must achieve if it is to fulfil this ambition:

- A Climate-Smart, Environmentally Sustainable Agri-food Sector;
- Viable and Resilient Primary Producers, with Enhanced Wellbeing;
- Food that is Safe, Nutritious and Appealing, Trusted and Valued at Home and Abroad;
- An Innovative, Competitive and Resilient Sector, Driven by Technology and Talent.

The strategy has the objective of achieving a climate-neutral food system by 2050, with verifiable progress achieved by 2030, encompassing emissions, biodiversity, and water quality, as well as a range of other targets for forestry, fisheries, organic farming, and food waste. Under Food Vision 2030, a number of working groups were established whose remit includes work to further develop options for emissions reduction in the sector.

Teagasc Marginal Abatement Cost Curve (MACC)

In 2023 Ireland's Agricultural and Food Development Authority Teagasc released their third iteration of the GHG MACC, and it outlines pathways for significant step changes. The 2023 MACC identifies, in the form of a single visual representation, the most cost-effective pathway to reduce GHG emissions and enhance carbon sequestration in the agricultural, land-Use, land-use change and forestry sectors plus (bio) energy. Each potential measure for emissions reduction is assessed in terms of cost and total potential mitigation.

Building on the last MACC (published in 2019), the 2023 document reflects new developments in technology, research, and global market conditions. It will serve as a key tool for policymakers in identifying further options to reduce emissions in the agriculture sector. There are a number of key differences to the previous MACC. These include:

- Updated animal number projections based on the latest modelling;
- A separation of measures that increase GHG efficiency of production (and therefore may not deliver a reduction in total emissions in the case of rising activity levels) against those that reduce emissions in absolute terms;
- New measures have been added, including age at finishing, feed additives, and diversification etc. The potential contribution of some existing measures has been adjusted based on the latest science;
- Two adoption pathway rates for GHG mitigation measures have been established along with three possible scenarios for how animal numbers might evolve.

The 33 measures set out in the 2023 MACC following engagement with all stakeholders now need to be considered for integration into an updated roadmap for the sector through 2024/2025 and in turn for them to be turned into actions in the CAP.

An Innovation Focused Partnership with EIT Climate-KIC

Achieving our climate ambition in the agri-food sector in Ireland requires new and innovative approaches by everyone in the industry and beyond. Ireland needs to embed new thinking and approaches across the sector to deliver climate goals whilst retaining a thriving sector.

Funded by the European Commission through the European Institute of Technology (EIT), EIT Climate-KIC is Europe's leading innovation community working to support the delivery of a climate resilient economy and society.

Ireland's Department of Agriculture Food and the Marine has partnered with EIT Climate-KIC to work with public and private stakeholders in the Irish agri-food sector and help the sector deliver an accelerated pathway of climate action.

Climate-KIC are applying their "Deep Demonstration" model of innovation to the entire agri-food and biobased value chain. This involves working with stakeholders from public, private, finance, civic and education sectors to develop and deploy coordinated actions. A key step

will see the partnership identify, mobilise, and deploy both grant funding and private investment (venture, corporate and institutional) capital to support the innovation actions.

Critical measures for the achievement of emission reduction targets for the Agricultural Sector in Ireland;

Significant Reduction in Nitrous Oxide Emissions by Changing Farm Management Practices in relation to Nutrient Use

Nitrogen is a key nutrient which, when applied to land, promotes plant and crop growth. However, this application generates emissions of nitrous oxide and can result in air and water pollution. This sector has the opportunity to reduce chemical fertiliser use by the end of the decade, with a maximum usage target of 300,000 tonnes set for the sector. Over the last number of years, sales of chemical nitrogen fertiliser have been increasing to a peak, in the Act's base year of 2018, of 408,000 tonnes The increase in prices in 2022 related to the wider geopolitical and energy price shock together with action on reduced usage by the sector led to a decrease in sales of chemical nitrogen in Ireland of 14%. Provisional data for 2023 suggests that declining use has continued, despite a decrease in prices. Nitrogen application is also heavily influenced by nitrates legislation that governs water quality.

The Irish government is supporting a shift to more efficient and lower-emission nitrogen use by:

- Supporting the establishment of multi-species swards and clovers in pastures, which reduce chemical nitrogen requirements through fixing atmospheric nitrogen in our soils;
- Funding adoption of low emissions slurry spreading systems; and
- Supporting transition to organic farming.

Increase Focus on Low Methane Traits within Animal Breeding Programmes

A new carbon sub-index was added to the Economic Breeding Index, the Irish dairy breeding index in November 2022 which will help the sector move towards genetically selecting for lower emission animals.

In May 2023, the Minister for Agriculture, Food, and the Marine announced a world-first scientific breakthrough that can enable the reduction of methane from the Irish cattle herd through animal genetics. This will be possible because of the publication of methane

evaluations which will enable breeding programs to reduce daily methane emissions in beef cattle. The research to underpin this is a result of a €3 million project 'GREENBREED', funded by the Irish Department of Agriculture, Food, and the Marine. The project has led to the publication of the world's first national genomic evaluations for methane emissions in Irish beef cattle. The work indicates that breeding programs to reduce methane emissions will be effective for selecting low-emitting livestock, especially when undertaken in tandem with the national genomic evaluations, such as the age at slaughter evaluations released in 2022.

The implementation of a low methane emitting breeding programme has significant potential to harness the genetic variation for methane emissions that exists within the national herd. This, in turn, will bring about permanent and cumulative reductions in the methane output of future generations of livestock.

Low Emission Feed and Fertiliser

Key to delivery of Ireland's climate targets in the Agri-sector will be the provision of low emission animal feeds and low emission fertilisers. Significant resources are currently employed to advance these technologies to the point that they can be deployed on Irish farms. Low emission animal feed that includes ingredients such as lipids, methane inhibitors, halides (oxidising methane inhibitors) and a lower protein content offer real promise as a sustainability measure. Food and feed safety will always come first with all feed ingredients needing to meet regulatory, safety and necessary research requirements. Incorporation of these technologies and in particular advancement towards a methane inhibitor that can reduce emissions significantly while animals are grazing outdoors will be key to the delivery of absolute emissions.

Nevertheless, it is important to recognise that whilst these technologies offer promise, and their implementation is currently built into the sector's emissions reductions plans from 2025 onwards, they are still at early stages of research. Policy measures to incentivise their use will also need careful consideration.

Also key to reducing emissions will be the use on Irish farms of low emission fertilisers, with more options and products being currently researched and developed. Replacement of calcium ammonium nitrate fertiliser with inhibited urea and the use of low emission compound fertilisers with high ammonium content rather than a high nitrate content. There is also increasing potential for the use of bio-fertilisers and digestate coming from a developing

biomethane industry to replace chemical nitrogen combined with more efficient use of existing animal slurries through achieving our targets for low-emission slurry spreading.

Support Transition to Alternative Land Uses through Diversification Options

Livestock farmers will be provided with diversification options, in the following key areas:

- Organics.
- Cultivation of biomethane feedstocks.
- Tillage.
- Afforestation.
- Reduced management intensity of grasslands and water table management on drained organic soils.

Increase Organic Farming

Ireland's current level of organic farming, at 3.6%, is low when compared to the rest of Europe, which is at an average of 9.9%. Roughly 176,000 hectares of land is currently used for organic farming, in an agricultural landbank of 4,883,600 hectares. Under the EU Farm to Fork Strategy, the EU has committed to an overall target of reaching at least 25% organic farming by 2030. Ireland's target of 450,000 ha (10%) by 2030 is considerably larger than our current rate of organic farming, requiring an almost 150% increase by 2030. This will help to further reduce fertiliser and pesticide use, resulting in associated environmental benefits.

Ireland's Common Agricultural Policy Strategic Plan incentivises a dramatic increase in organic farming. There has been an increase in budget allocation for the Organic Farming scheme from €13 million in 2022 to €36 million in 2023 and now €57 million for 2024 which shows the Irish government's commitment to organic farming. In addition, substantial advisory supports have been introduced for organic farming. The Irish Agricultural Consultants Association have received Government funding in 2022 and 2023 to upskill advisors and hold organic farm walks. Teagasc and the Irish Department of Agriculture jointly fund the new Growing Organics monitor farm programme which was launched in Spring of 2023 and will run for 5 years promoting best practice at farm level.

Tillage

The tillage and horticulture sectors are the most carbon-efficient sectors of Irish agriculture, and it is important that the area under cultivation in these sectors is increased. In 2022, there were approximately 348,500 hectares of tillage crops (cereals, legumes, beet, maize, oilseed rape, and potatoes) produced.

In 2023, there was a slight reduction (approximately 1%) in the overall area of tillage crops. 2023 was a challenging year for tillage farmers as a result of high input costs, significant reduction in grain price and adverse weather conditions that impacted on the sowing of both winter and spring crops. The adverse weather conditions continued into the harvest resulting in disruption to harvest operations. There is scope to increase the area under tillage, despite increasing land competition from the dairy sector. There is also an opportunity for industry to exploit opportunities for high-value crops, based on changing consumer preferences, creating opportunities for the primary producer both in new food markets and bioeconomy efforts. There is a very clear opportunity to increase the volume of Irish grain being used in the high-value drinks industry, and as a source of protein for the livestock industry. For example, cereals are a key raw material for the Irish whiskey sector, a growing national industry. Tillage and horticulture by-products (for example stalks, stems, husks, wash water, and peelings) also hold value as part of the EU-supported circular bioeconomy for further chemical, packaging, medical, and construction material, and energy uses.

The Minister for Agriculture, Food and the Marine established the Food Vision 2030 Tillage Group in May 2023 in order to address a wide range of challenges facing the sector. The remit of the Tillage Group is to advance the actions for the tillage sector identified in the Food Vision 2030 strategy, while also taking account of the targets set out in the Farm to Fork Strategy and the CAP 2024 including the target to sustainably grow the tillage area to 400,000 hectares by 2030.

Over the next decade, there is the potential to produce 40,000 hectares of beans which would provide a native source of proteins. Policy mechanisms to achieve this target include the increased Protein Aid budget from €3m to €7m under the CAP Strategic Plan 2023 – 2027. An increase in overall tillage area will also naturally result in an increase in break crops such as beans. Protein crops are very good break crops and offer opportunities to reduce the use of plant protection products which will be important in the context of the Sustainable Use of Pesticides Regulation.

Land Use, Land Use Change and Forestry

The latest CAP was approved by Government in December 2023. It sets out the key actions and measures to support the delivery of Ireland's emissions reduction targets and overall climate objectives. CAP 2024 contains a series of measures for the LULUCF sector to deliver the necessary emissions reductions. The measures shall;

- Establish ambitious and feasible activity levels,
- Take steps towards meeting Ireland's commitments as part of wider EU goals for the LULUCF sector under the Fit for 55 package,
- Substantially contribute to the longer-term national forest cover target of 18% of land area.

The emissions in the LULUCF sector remain in flux as our understanding of emissions and activity for this sector advances. The 2018 baseline for this sector (as reported in the EPA's 2021 National Inventory Report (NIR)) increased by 31% in the 2023 NIR. Multiple inventory refinements are scheduled for the coming decade, resulting in further fluctuations to the baseline, in parallel with current and projected emissions trends for the sector out to 2030 and beyond.

As part of the actions to reduce emissions within the LULUCF sector, there are a number of measures in CAP 2024 that will deliver sectoral abatement. These include:

- Delivering the Forest Strategy 2023-2030 and Forestry Programme 2023-2027, which includes a wide range of forest creation measures, including native woodland expansion and planting of small native tree areas;
- Continued funding to the Bord na Móna's Enhanced Decommissioning, Rehabilitation and Restoration Scheme (EDRRS) for 33,000 ha of post-production peatlands;
- The continuation of state-led restoration of Ireland's national raised bog and blanket bog Special Areas of Conservation (SACs) and Natural Heritage Areas (NHAs) network. These works are also funded by European programmes such as LIFE, INTTEREG and others;
- Developing carbon farming to deliver key sequestration, emission reductions in drained organic soils, and other land use measures;

- Reviewing the CAP Strategic Plan following the amended EU LULUCF Regulation and Effort Sharing Regulation.

The LULUCF sector will work in tandem with a series of measures that are being delivered across various Departments (DECC, DAFM and DHLGH) to aid the reduction of emissions and increase in carbon sequestration. In relation to mineral and organic soils, these measures include the Common Agricultural Policy Strategic Plan 2023-2027, the Agri-Environment and Climate Measure and the Straw Incorporation Measure. The restoration of peatlands will be delivered through Bord na Móna's EDRRS, the LIFE People and Peatlands project and other funding schemes; to date, 15,000 ha of peatlands have been rehabilitated under the EDRRS. Peatland mapping will be improved through continued funding of the RePEAT Mapping project.

In relation to forestry, the implementation of the recently adopted Forestry Programme 2023-2027 – which focuses on the importance of climate-smart forestry – will provide for significantly increased premiums and grants for planting trees and extend the premium period from 15-to-20 years depending on the forest type. The programme will also provide for a broad range of planting options, including agroforestry. The LULUCF sector will develop, assess, and adopt as appropriate Coillte's Strategic Vision, which aims to capture additional CO_2 in its forests, soils, and wood products by 2050. Additionally, it will continue to manage the public forest estate to increase carbon storage and support sustainable forest management interventions across the entire forestry sector.

The key performance indicators for LULUCF presented in the CAP 2024 include;

- Increasing afforestation rates to 8,000 ha per annum;
- Increase the incorporation of straw to at least 85,000 ha of tillage area;
- Increasing the inclusion of cover crops in tillage to at least 50,000 ha;
- Improving the management of at least 450,000 ha of grasslands on mineral soils;
- Reducing the management intensity of at least 80,000 ha of grasslands on drained organic soils;
- Rehabilitating 33,000 ha of exploited peatlands; and
- Planting 2,000 km of new hedgerows.

The 2023 Teagasc MACC for LULUCF identified additional land use levers to establish a LULUCF pathway to achieve the EU target in the sector. Many of these additional levers are untested (e.g. extension of the rotation cycle of 31% of forests on suitable sites) and will require further evaluation and feasibility analysis. Emissions and mitigation levers for the LULUCF sector are predominately biological and, therefore, have bio-physical and temporal limits. Any pathway for this sector must take into account the bio-physical limitation of many of the levers and the legacy issues that are driving up future emissions. The socio-economic impacts and feasibility of proposed measures must be assessed to determine which actions are possible to deliver.

As part of the actions to reduce emissions within the LULUCF sector, the following are set in the CAP 2024 Annex of Actions:

- Implement the new Forest Strategy and Implementation Plan, including the Forestry Programme 2023-2027;
- Review the proposed measures detailed in the Teagasc MACC 2023 to determine which actions are possible to deliver sustainably across all land use types.

Other measures which have been introduced to help achieve EU LULUCF targets include:

- Interdepartmental and Industry Working Group on Timber in Construction was established in late 2023. This is a cross sectoral action to create the conditions to increase the use of timber in construction. It also aims to ensure the highest degree of building safety and property protection, examine regulatory standards and challenges; and maximise the use of home-grown timber in construction. The use of sustainable wood products from Irish forests, as alternatives to carbon-intensive products, will reduce the embodied carbon in our built environment.

- In line with the EU carbon removals certification framework (CRCF), a Carbon Farming Working Group was established comprising relevant Government Departments and Agencies to drive the process of developing a national framework and designing pilots/demonstration to test the framework.

- A Land use review working group is ongoing to ensure optimal land use options inform all government decisions. Phase II is now underway which will consider the policies, measures and actions that need to be taken on land in the context of

wider economic, social and climate objectives. A publication of the results of Phase II is expected by the end of Q1 2025. This review is a cross-departmental initiative from DECC, DAFM and DHLGH which will lean on the expertise of relevant experts through a Technical Working Group and a Citizen Engagement Group to take an overarching view of the land use of the State. This work will be broad in scope and the outcomes from this process will filter into the development of future environmental government policy. It is essential that key demands on both public and private land inform the future policies for land use across key government objectives, improving socio-economic, climate, biodiversity, water, and air quality outcomes to achieve our environmental targets.

- Support for climate related research in LULUCF: A government funded research call was launched in 2023. This included a thematic research area to improve the understanding of carbon stock changes of forest in drained organic soils and investigate different management options.

- Providing policy support and data input into Forest Navigator Horizon Europe Project and Pathfinder Horizon Europe Project. Both projects forecast forest management effects, which will inform Forest climate policy decisions.

Forestry

Forests and forest products will play an important role in mitigating emissions in the land use sector. Sustainably managed forests are a net absorber of carbon. Afforestation is one of the largest land-based, long-term climate change mitigation measures available to Ireland. Management of our existing forests also provides opportunities to increase carbon stores.

In 2023 a new Forest Strategy to 2030 was published in parallel with the Forest Strategy Implementation Plan, including the Forestry Programme 2023-2027. The Forest Strategy Implementation Plan contains a detailed action plan, which includes actions for each of the Enablers and Value Area Goals of the Forest Strategy.

The new Forestry Programme (2023-2027) was approved by the Government in September 2023, and the overall funding of €1.3 billion represents the largest ever investment by an Irish Government in forestry. The comprehensive package of measures included in the Programme includes details on proposed measures, which represent a step forward in climate change mitigation and adaptation, towards diverse, multifunctional forests that

strengthen the economic viability of rural communities, protect our environment, and make forests resilient in the face of climate change.

The 2023 MACC for LULUCF identified forestry levers to establish a LULUCF pathway to achieve the EU target in the sector, which by 2030 includes:

- Preventing deforestation on 495 ha of land per year;
- Delivering 2,000 ha of agroforestry;
- Through changes to forestry management practices, encourage the extension of the rotation cycle on up to of 31% of forests on suitable sites, while having regard to the social, economic, and environmental implications;
- Through changes to forestry management, allow for the replanting of former afforested peats with birch woodland up to 18,000 ha.

As stated earlier, many of these additional levers are untested and will require further evaluation and feasibility analysis to consider the socio-economic and environmental impacts. In the intermediate to short term, the Forestry Programme (2023 -2027) is the primary means by which forestry LULUCF targets will be delivered.

Other Sectors

The Plan also includes actions in relation to other sectors of the economy which have an important role to play such as enterprise and the waste sector. Key actions in these sectors include:

- Develop coherent reduction strategies for plastics, food waste and resource use;
- Increase the level and the quality of recycling with less contamination and greater replacement of virgin materials by recycling;
- Reduce the reliance on landfill with sharp reductions in plastics and compatibles entering landfill;
- Embed energy efficiency, replacement of fossil fuels, careful management of materials and waste and carbon abatement across all enterprises and public service bodies;
- Mobilise clusters regionally and sectorally to become centres of excellence for the adoption of low carbon technologies;

- Develop networks in key industry sectors and a roadmap of actions to support decarbonisation of large industry;
- Expand the EXEED (Excellence in Energy Efficient Design) programme to influence and deliver new best practices in energy efficient design;
- Implement the provisions of the National Waste Management Plan for a Circular Economy 2024-2030, which was published this year to help to guide the transition to a circular economy;[25]
- Develop new and expanded environmental levies, such as the Waste Recovery Levy, to encourage reduced resource consumption and incentivise higher levels of re-use and recycling;
- Publication of a Whole-of-Government Circular Economy Strategy and promotion of the Circular Economy, including Green Public Procurement. Ireland's first Whole of Government Circular Economy Strategy 2022-2023 was published in 2021 and the next iteration will be published in 2024, including Circular Economy Roadmap for the Construction Sector and a proposal for an aggregates levy to lower construction costs and increase the use of secondary raw materials. A new Green Public Procurement Strategy and Action Plan, Buying Greener: Green Public Procurement Strategy and Action Plan 2024-2027, was published in April 2024.
- Funding has recently been approved for the Rediscovery Centre to develop and build a Circular Economy Communications Platform and complementary actions to support excellence in communications for a circular economy.

3.1.1.2 Where relevant, regional co-operation in the area

Details of regional co-operation under the five energy dimensions, including detail on the North Seas Energy Co-operation, the Clean Energy for EU Islands Initiative, the British-Irish Council, and interconnection co-operation are set out under the relevant sections. Co-operation in these forums contributes to our long-term vision and goal to become a low emission economy.

[25] Available here

3.1.1.3 Without prejudice to the applicability of State aid rules, financing measures, including Union support and the use of Union funds, in this area at national level, where applicable

The Climate Action Fund provides an allocation of €300m to fund the Support Scheme for Renewable Heat and €200m to support the uptake of EVs. The Climate Action Fund was approved by Government in May 2018 and will, over the course of the NDP, invest a total of €500m. The objective of the Climate Action Fund is to support initiatives that contribute to the achievement of Ireland's climate and energy targets in a cost-effective manner or offer the potential for innovative interventions in these sectors that, in the absence of support from the Fund, would not otherwise be developed.

Financing the domestic transition envisaged under the CAP as well as the agenda under Article 2 of the Paris Agreement on making finance flows consistent with a pathway towards low GHG emissions and climate-resilient development is an important issue for Ireland. On the private sector side, green and sustainable finance is an emerging high-growth international financial services (IFS) sub-sector. Importantly from a financial markets perspective the significant funding requirement to achieve this transition to a sustainable climate resilient world is well recognised. Over the next 15 years, the G20 estimates that the world will need to invest around US$90 trillion in sustainable infrastructure assets.

Turning to state-funded green finance, Ireland has a strong record of supporting international climate action, making significant advances in the delivery of climate finance in recent years. A consistent approach to programming climate support, based on policy prioritisation on addressing climate finance, is improving the predictability of Irish climate finance. The majority of Ireland's financial support of €175m to be provided over the period 2016 to 2020 is provided through Irish Aid.

3.1.2 Renewable Energy

3.1.2.1 Policies and measures to achieve the national contribution to the binding 2030 Union target for renewable energy and trajectories as referred to in point (a)(2) Article 4, and where applicable or available, the elements referred to in point 2.1.2 of this Annex, including sector-and technology-specific measures

Harnessing Renewable Energy Through Support Schemes

Onshore

Ireland has, since the 1990s, had in place support schemes to encourage the development of onshore RE. While the first two of these are now closed for new applicants, Ireland will continue to operate these support schemes until the contracted support period ends, these schemes are:

- The Alternative Energy Requirement (AER) scheme;
- The Renewable Energy Feed-In Tariff scheme (REFIT); and
- The Renewable Electricity Support Scheme (RESS).

The AER scheme was launched by the then Department of Transport, Energy and Communications in 1996 and was the first step towards a market support for wind energy as part of the Department's programme to promote generation of electricity from renewable resources (when planning these measures, Member States shall take into account the end-of-life timeframes of existing installations and the potential for repowering). The programme involved the tendering for contracts of certain fixed amounts of capacity, by potential RE generators. The last AER project stopped receiving support in 2021. REFIT 1, was open for applications until 31st December 2009. The technologies covered in REFIT 1 are small wind (< 5 MW), large wind (>5 MW), hydroelectricity and biomass/landfill gas. The support is provided for a period of 15 years. Due to delays in grid rollout for REFIT 1 projects, and with State Aid approval in August 2013, the backstop date for REFIT 1 was extended by two years to 2027.

REFIT 2, which succeeded REFIT 1, came into operation in March 2012. It provides for up to 4,000 MW of renewable generation. The technologies covered are small wind (< 5 MW), large wind (>5 MW), hydroelectricity and biomass/landfill gas. The backstop date for REFIT 2 is 2032 and the scheme closed to new applications in 2015.

REFIT 3 aimed to support the addition of 310 MW of biomass technologies including AD and Combined Heat and Power (CHP). CHP is the simultaneous generation of useable heat and electricity in a single process and is regarded as a highly efficient energy production process. It makes use of the heat produced in electricity generation instead of releasing it into the atmosphere. The heat generated in a CHP plant can be used for many purposes including district heating and displacing industrial heat demand. The backstop date for REFIT 3 is 2030 and the scheme closed to new applications in 2015.

The RESS is the primary Government policy to help deliver the onshore renewable electricity generation capacity required to ensure Ireland meets our ambitious climate and energy targets, as set out in the CAP. The RESS is an auction-based support scheme which invites grid-scale renewable electricity generation projects to compete to receive a guaranteed price for the electricity they generate under a two-way floating feed-in premium. These auctions provide pathways for renewable developers to plan and develop their projects.

The primary policy objective of the RESS is the delivery of renewable electricity in a sustainable, cost-effective, and secure framework, in the context of Ireland's 80% renewable electricity target by 2030. Supported technologies include onshore wind, solar, and hybrids (co-located wind, solar, storage), as well as offshore wind projects through dedicated offshore auctions. It will also allow Ireland to take advantage of new technologies as they emerge.

The RESS design includes high in-built consumer protection where bidders will provide a strike price for use in two-way settlement arrangements, i.e. when the market price is lower than the strike price, support is provided by the Public Service Obligation (PSO) levy, paid for by the electricity customers but when the market price is higher than the strike price, then a refund will be made by the bidder to electricity customers through the PSO. State Aid for the RESS was granted on 20th July 2020 and was notified for a period of five years. The RESS was designed to support projects which would be unviable without support. The scheme was re-notified under the EU Temporary Framework to account for changes required for ORESS 1 (Offshore RESS), ORESS 2, and RESS 3 and was approved in June 2022.

The first RESS auction (RESS 1) successfully concluded in September 2020 with over 1 GW of new capacity procured – amounting to an increase of over 15% to Ireland's RE generation capacity. RESS 1 projects had a final deadline of 31st December 2023 to achieve

commercial operation. The energisation of RESS 1 projects led to 2022 being a record-breaking year for renewable connections to the grid in Ireland.

The second RESS auction (RESS 2) was held in 2022, with the final results published in June 2022. The total capacity procured represented a potential increase of nearly 20% in Ireland's RE generation capacity. RESS 2 projects are contracted to deliver by year-end 2025 at the latest.

The third RESS auction (RESS 3) was held in September 2023. The volume procured represents a potential increase of 12% in Ireland's RE generation. RESS 3 projects are contracted to be delivered by 30th April 2027, at the latest. This ensures a steady pipeline of projects connecting annually (RESS 1 – 2023, RESS 2 – 2024 & 2025, RESS 3 – 2026 & 2027) to assist in meeting Ireland's 2027 interim target.

The fourth RESS auction (RESS 4) is planned to follow in 2024 and is expected to be a much larger auction. There are also plans for a fifth RESS auction (RESS 5) to be held before the end of 2025, as per the published RESS Auction Calendar.

Alternative Routes to Market

In addition to the RESS, subsidy-free RE through corporate power purchase agreements (CPPAs) provide a route to market for renewable project developers in the shorter term, providing them with a real opportunity to boost Ireland's RE capacity. In March 2022, DECC published the Renewable Electricity Corporate Power Purchase Agreement Roadmap, which sets out Ireland's policy on CPPAs.

The roadmap sets out that CPPAs have an important role to play in helping Ireland to reach our ambitious renewable electricity targets and includes the Principles of Good Practice for Renewable Electricity CPPAs, which state that such agreements should:

- Clearly deliver additional GHG emissions reductions and contribute to Ireland's 2030 renewable electricity and climate targets;
- Lower the net costs of the energy transition to Irish consumers and the State;
- Be measured and reported in a way that accurately reflects actual emissions reductions from final energy use in space and time and avoids 'greenwashing';
- Align with Government and EU policy regarding delivering on the energy transition for communities, including the Just Transition.

By providing another route to market for RE generation projects, CPPAs not only ensure that there is a greater amount of RE on the grid but can contribute significantly to our national security of energy supply. It is absolutely essential that RE generation projects funded under CPPAs include community benefit funds of equivalent value to those required under the RESS (currently €2/MWh).

Wind Energy Development Guidelines (WEDG)

A review of the 2006 Wind Energy Development Guidelines (WEDG) is currently underway, led by the Department of Housing, Local Government and Heritage and supported by the DECC in the context of its environmental noise and climate and renewable energy policy remits. The review is addressing a number of key aspects including noise, setback distance, shadow flicker, community obligations, community dividend, and grid connections.
Both Departments are engaging on this review to ensure that the revised guidelines, when published, are robust and fit for purpose to provide guidance in line with renewable energy and climate targets, including the revised 2030 target to generation 80% of our electricity from renewable sources, whilst having appropriate regard to the impacts of wind energy development. The revised WEDG will be published in 2025.

Renewable Electricity Spatial Policy Framework (RESPF)

Ireland is currently developing a Renewable Electricity Spatial Policy Framework (RESPF) White Paper which will set out Government's intentions with respect to the delivery of its onshore renewable energy targets. Aligned with the ongoing revision of the National Planning Framework, the RESPF will promote a plan-led and evidence-based approach to the allocation of renewable electricity generation capacities across the three Regional Assemblies, to facilitate the achievement of the national target of 80% renewable electricity by 2030. In developing their Regional Renewable Electricity Strategies, the Regional Assemblies will consider how the regional renewable electricity generation targets can be distributed and allocated between their constituent local authorities, in a way that integrates with wider planning policies for the region. They will develop a preferred approach to where and how the wind and solar generation capacity can be best delivered by considering the particular social, economic, and environmental characteristics of the region. Allocating the regional target across the Local Authorities will involve exploring opportunities – for example for employment creation, Just Transition, new infrastructure as well as identifying environmental constraints. The development of LARES was influenced by International, European and National Legislation and policy.

Small-Scale Renewable Electricity Support Scheme (SRESS)

The Small-Scale Renewable Electricity Support Scheme (SRESS) offers support for renewable electricity installations, primarily solar PV, which are not suited to the RESS (above) or the Micro-Generation Support Scheme (below). The SRESS aims to provide increased levels of new small-scale generation and assist with providing at least 500 MW of local community-based renewable energy projects by 2030. The first phase of SRESS has been providing assistance since July 2023, in the form of grants to renewable self-consumers, for installations between 50 kW to up to 1 MW in size, alongside similar grants for non-domestic installations in the 6 kW up to 50 kW range. The second phase of SRESS, including tariff rates, is due to launch in the first half of 2024.

Micro-generation Scheme

In December 2021, the Government approved the design of the Micro-Generation Support Scheme (MSS), as a means of supporting 380 MW of new micro-generation capacity by 2030. This would amount to 60,000 homes and 9,000 non-domestic installations, such as small farms and businesses, schools, and community groups, etc. and would generate over 300 GWh of renewable electricity per annum, with the potential to abate 1.4 Mt CO_2eq over the lifetime of the installations. The MSS provides support to domestic and non-domestic applicants for renewable installations up to 50 kW, in the form of grants provided through the SEAI. These applicants are also eligible to avail of the Clean Export Guarantee (CEG) tariff, allowing them to receive payment from their electricity supplier for excess renewable electricity they export to the grid, reflective of the market value of the electricity. The first phase of the MSS brought the introduction of the Domestic Solar PV grant scheme in February 2022.The Domestic Solar PV grant scheme has gone from strength to strength since its launch, with over 10,000 applicants supported by the end of 2022 and a total installed capacity of 46.5 MW. 2023 saw record levels of solar PV grant support provided, with more than 22,000 households supported to install an additional 115 MW of PV generation capacity. The second phase of the MSS commenced in September 2022, when the SEAI extended the solar PV grant scheme to the non-domestic sector, including schools, businesses, small farms, and community enterprises, for installations up to 6 kW. This scheme is also proving very successful, with installations amounting to over 60 MW of capacity to date. In July 2023, an extended funding range was introduced to support non-domestic installation sizes between 7-kilowatt peak (kWp) and 1,000 kWp (1 MW) capacity, on a pilot basis until the end of the year.

The uptake of grants under the MSS has supported rapid growth in Ireland's domestic and non-domestic solar PV sectors, and there are now more than 85,000 registered micro-generators nationwide, providing 330 MW of electricity generation capacity. This growth has enabled an increase in the micro-generation target to 1.6 GW of installed capacity (≤ 50 kW) by 2030, under CAP 2024.

Accelerating Renewable Electricity Taskforce

The establishment of an Accelerating Renewable Electricity Taskforce, to focus on the development of onshore renewable electricity generation, was a key action under the CAP 2023. This Taskforce was established in March 2023, with the membership made up of senior officials from relevant Departments and State Bodies, namely:

- Department of the Environment, Climate and Communications
- Department of Housing, Local Government and Heritage
- Department of Public Enterprise, NDP Development and Reform
- Department of Enterprise, Trade and Employment
- Sustainable Energy Authority of Ireland
- Commission for Regulation of Utilities
- EirGrid
- ESB Networks
- National Treasury Management Agency.

The Taskforce was established to identify, coordinate, and prioritise the required policies needed to achieve the onshore renewable electricity, and related, targets and to ensure that barriers to the implementation of such policies are removed or minimised to the greatest extent possible.

Offshore Wind

Ireland has significant ambitions with respect to offshore wind development and is targeting at least 5 GW of installed capacity by 2030, with a further 2 GW earmarked for the production of green hydrogen and other non-grid uses to be in development by 2030. To achieve this, Ireland has adopted a phased approach to a plan-led regime for Offshore Renewable Energy (ORE) development. Phase One is intended the deliver the maximum

competitively procured offshore wind capacity at the earliest feasible deployment stage, from the most advanced offshore wind projects, with developers leading on site selection. Phase Two will procure the remainder of the 5 GW capacity target for 2030 at the ORESS2 auction for specific maritime areas dedicated to offshore wind development referred to as Designated Marine Area Plans (DMAPs). The final phase in the transition to a plan-led regime is referred to as the Future Framework which will establish the pathway for centralised ORE development from 2030 to 2050 and beyond.

Offshore Wind Delivery Taskforce and Offshore Wind Energy Programme

Realising Ireland's potential in offshore wind requires concerted action across many Government Departments and Agencies. This is to ensure that all aspects of the regulatory framework related to the construction and operation of offshore wind farms are in place, that the grid projects required to support the deployment of additional offshore capacity are operational and that the potential economic and societal benefits from the industry are maximised. Central to this is the Offshore Wind Delivery Taskforce, and the Offshore Wind Energy Programme.

The Offshore Wind Delivery Taskforce was established in April 2022 and its membership includes the State organisations with key actions to deliver to enable the offshore wind industry in Ireland. The current membership is set out below.

Table 26: Membership of Offshore Wind Delivery Taskforce

Department/Agency	Area of remit
Department of the Environment, Climate and Communications	Energy Policy, Routes to Market, Future Framework Policy, ORE Communications, Marine Planning Policy
Department of Housing, Local Government and Heritage	Marine Environment
Department of Transport	Commercial Ports Policy
Department of Enterprise, Trade and Employment	Supply Chain and Industrial Strategy
Department of Further and Higher Education, Research, Innovation and Science	Skills

Department of Public Expenditure and Reform	Finance, NDP
Department of Rural and Community Development	Communities
Department of Defence	Defence and Critical Entities Resilience
Enterprise Ireland	Supply Chain and Industrial Strategy
IDA Ireland	Supply Chain and Industrial Strategy
Commission for Regulation of Utilities	Markets, Networks Regulation & Licensing
EirGrid	Grid connection and development
Maritime Area Regulatory Authority	Maritime Areas Consents and Licensing
Sustainable Energy Authority of Ireland	Energy research
Marine Institute	Marine data

The Taskforce has developed the Offshore Wind Energy Programme to coordinate ongoing activities across Government in relation to offshore wind and has established a Programme Management Office to drive its implementation.

Offshore Wind Maritime Area Planning and Consenting

Ireland's ambitions for the offshore renewable energy (ORE) sector are contingent on delivering and implementing a licensing and regulatory regime for offshore renewable energy. The Maritime Area Planning Act 2021 (MAP Act) and the National Marine Planning Framework (NMPF), Ireland's first marine spatial plan, provide for long-term forward planning for Ireland's maritime area and will enhance the effective management of marine activities and more sustainable use of our marine resources. The NMPF provides a holistic, overarching policy framework for how Ireland will utilise and protect it maritime area, while incorporating ecological, economic, and social priorities. The NMPF applies to all decision-makers and State actors in the maritime area and places ocean health, protection of our marine ecosystem and co-existence between multiple marine activities, at the heart of all decision-making, plans, and policies.

The MAP Act has created a new State consent, the Maritime Area Consent (MAC), as a first step in a new and streamlined planning process. This replaces the existing regime of foreshore leases and licences. The MAC regime assesses the viability of proposed ORE developers in a number of key areas, including in respect of their financial and technical competency, in advance of developers proceeding to environmental studies. The robust assessment of potential offshore developers who apply for a MAC will ensure that only the most viable offshore projects will have the opportunity to apply for development permission from An Bord Pleanála. Developers who have been assessed for, and are subsequently awarded, a MAC can then proceed to apply for development permission, where they will undergo environmental assessment.

The MAP Act also provided for the establishment of the Maritime Area Regulatory Authority (MARA), which occurred on 17th July 2023. This agency has responsibility for assessing applications for MACs, as well as the management of the existing Phase One MACs. MARA is also responsible for granting licences for certain activities in the maritime area. The establishment of the MARA marks the transition to the new maritime consenting regime, and it is a key enabler in respect of Ireland's ambitions for the ORE sector.

The Minister for the Environment, Climate and Communications issued MACs to the first phase of ORE projects, known as the Phase One projects on 23rd December 2022. These projects were then eligible to compete in Ireland's first offshore wind auction, known as ORESS1. The MAP Act also provides the legislative framework for forward planning for the maritime area, which includes the creation of a comprehensive sub-national planning process referred to as Designated Maritime Area Plans (DMAPs).

Under the new plan-led regime for ORE, all future post Phase One ORE developments in Ireland must be located in marine areas identified for this purpose by Government through the establishment of DMAPs. As approved by Government and the Oireachtas, Ireland's first DMAP for ORE will be located off the South Coast of Ireland and will identify a number of marine areas for future development of fixed offshore wind technology.

On 13th July 2023, an initial South Coast DMAP Proposal for ORE was published by the Department of the Environment, Climate and Communications, which comprised an initial 'study area', within which future ORE development areas are to be identified. The identification of ORE development areas is taking place through a process of public engagement and consultation, expert strategic environmental assessment and appropriate assessment, and other expert analysis. Following a period of public engagement, a 'Draft DMAP' will be published, which will identify the proposed areas within which future ORE

developments will locate. Publication of the draft south coast DMAP will be followed by a period of statutory public consultation, followed by possible amendments to the draft Plan prior to seeking the approval of both Houses of the Oireachtas, Ireland's parliament.

(Offshore) Renewable Electricity Support Scheme (ORESS)

Similar to the onshore RESS auctions detailed earlier, there are specific ORESS auctions tailored to supporting the delivery of offshore renewable electricity generation capacity required to meet the specific offshore wind energy targets set out in the CAP. The first auction under ORESS (known as ORESS1) was held in 2023. The auction results, which were finalised in June 2023, surpassed expectations, both in terms of the total volume of RE procured and the low price at which it was secured. The competitive price secured — at an average of €86.05/MWh — was one of the lowest prices paid by an emerging offshore wind market in the world. Over 3 GW of capacity was procured from four offshore wind projects, which will deliver over 12 TWh of renewable electricity per year. This is the largest volume of RE Ireland has ever procured at auction — equivalent to over a third of Ireland's entire electricity consumption this year and over a quarter of projected 2030 electricity demand. The next offshore wind auction (ORESS 2.1) is expected to commence before the end of 2024 and will align with Ireland's ORE Phase Two. This auction will seek bidders for a 900 MW site off the south coast of Ireland, geographically aligned with available onshore grid capacity. This auction, and all subsequent Phase Two auctions, will result in the development of offshore wind capacity within DMAPs. This plan-led approach will ensure that development is managed in a planned, strategic, and sustainable way. Importantly, it will provide greater certainty for all maritime users as to where development will be situated.

Further ORESS auctions will follow in order to deliver Ireland's 2030 offshore wind targets and subsequently to contribute towards Ireland's longer-range ORE targets.

Future Framework for Offshore Renewable Energy

The final phase in the transition to a plan-led regime is referred to as the Future Framework, which establishes the pathway for centralised ORE development to deliver 20 GW of ORE by 2040 and 37 GW by 2050. The Future Framework aligns essential policy for ORE including marine spatial planning, Ireland's domestic industrial strategy, electricity interconnection, renewable hydrogen development, energy storage, demand side management, and technology innovation. This policy alignment will provide clarity for stakeholders on their role and opportunities for engagement and participation in the plan-led

regime. Several government priorities have been identified as critical to ensuring the environmental, social, and economic sustainable delivery of ORE targets for the benefit of all, including a focus on protection of marine biodiversity and ecosystems-based management. Central to the Future Framework is a description and sequencing of the plan-led aspects including DMAPs, MACs, route to market opportunities, grid connection, and development permission. Consideration is also given to prominent and innovative ORE technologies – including both fixed and floating wind –, domestic demand opportunities, grid infrastructure, port facilities, security of supply, co-existence with other maritime activities, and defence and security. It explores and analyses economic opportunities both domestically and internationally, including an analysis of the export potential for surplus electricity, energy, and green products and services, from Ireland, specifically through increased interconnection and renewable hydrogen. The purpose is to provide evidence-based ORE policy based on an analysis of financial mechanisms for the return to the State and local communities and job creation opportunities, and in due consideration of environmental and social impacts. In September 2023, DECC procured expert consultancy services to provide future Irish and European energy system demand forecast scenarios, analysis, and modelling, as a robust evidence base to inform Future Framework policy decisions including the expansion of domestic demand opportunities and the establishment of a leading ORE export market via interconnection and a growing renewable hydrogen industry. After undergoing public consultation and Strategic Environmental Assessment/ AA screening, the Future Framework policy statement is expected to be published in Q2 2024. Under the Future Framework, the State will ensure that the environmental, societal, and economic benefits of ORE are realised for everyone. The Future Framework acknowledges the dynamic and diverse landscape of ORE policy and the energy sector more widely. It is therefore intended to be an iterative document and identifies a number of medium-term actions required to deliver Ireland's ORE ambitions, for which progress will be reported on annually.

Supply chain

The development of an offshore wind industry of scale in Ireland will generate significant regional employment opportunities across Ireland, particularly in coastal communities which have a long maritime tradition and capability; it will also stimulate inward investment and help to decarbonise our economy. The Department of Enterprise, Trade and Employment (DETE) has published Powering Prosperity – Ireland's Offshore Wind Industrial Strategy. This first strategy of its kind for Ireland aims to build a successful, vibrant, and impactful

offshore wind energy industry in Ireland, ensuring that the sector creates as much value as possible throughout the country and maximises the economic benefits associated with Government ambitions to deliver on its offshore wind targets.

Powering Prosperity includes 40 actions that will be implemented in 2024 and 2025 and was developed as part of close ongoing collaboration between the DETE and other government departments and agencies within the Offshore Wind Delivery Taskforce (OWDT).

These actions aim to build a strong and resilient offshore wind supply chain in Ireland, as well as exploring opportunities for Irish companies to play a major role in the development of offshore wind projects in Ireland and abroad. It also explores opportunities to leverage Ireland's existing strengths in RD&I, finding ways to support the sector to reach the cutting edge of future developments in offshore wind. In the longer term, the strategy will consider routes to market for Ireland’s abundant clean renewable energy, as well as assessing regional development opportunities in areas central to the production of offshore wind energy.

Ports

A policy statement on the facilitation of ORE by ports was published in December 2021 by the Department of Transport. This sets out that Ireland will potentially need to build, on a phased basis, a number of port facilities that will act as construction, deployment, and maintenance ports for ORE infrastructure.

A multiport approach to the provision of port infrastructure to facilitate the development of ORE in Ireland will help maximise the economic benefits at regional as well as national level in terms of the creation of jobs and new SMEs that can support the development of the ORE industry. This includes maximising the value that can be created from supply chain activities and by developing supply chain clusters in and around our ports. The Policy Statement also makes it clear to the offshore industry that the Government recognises the important role for Ports in Ireland for the facilitation of ORE developments In line with the Policy Statement, a Ports Co-ordination Group has been established to co-ordinate and monitor the progress of the ports with their ORE projects.

Increased Electricity Interconnection

Electricity interconnection will play a central role in Ireland’s journey to Net Zero transition. Increased interconnectivity is needed to enable our RE ambitions and improve collective

security of supply. Increased interconnection helps balance electricity supply and demand between countries and provides a valuable backup power supply for when the Irish electricity system has reduced capacity. It allows for increased imports in the case of an adverse shock such as extreme weather or the failure of a major power plant. The role of interconnection will increase in importance as variable renewables become a larger proportion of supply in the Irish and European electricity system both in relation to import and export of electricity. Under Ireland's previous policy framework set out in 2018 capacity is set to more than treble by 2026 to 1,700 MW including a return of direct interconnection between Ireland and the EU via the Celtic Interconnector and an additional 500 MW connection to GB in the Greenlink interconnector. Envisaged connection to the IEM by 2030 is 700 MW. Ireland's updated 2023 National Policy on Electricity Interconnection envisages a further connection with the UK by 2030, bringing the total anticipated interconnection capacity to 2,450 MW. This includes a further Connection to GB, MaresConnect, that has been supported for inclusion in ENTSO-E's 2024 TYNDP. Additionally, existing, and planned interconnection from GB to Northern Ireland will mean a total of 3,650 MW SEM interconnector capacity by 2030. The 2023 policy reflects the radically changed circumstances including the departure of the UK from the European Union, net zero targets and geopolitical energy challenges.

Ireland's Interconnection policy takes into account the broader context of interconnection and energy policy. The landscape of policy is currently fast-moving with policies in the process of coming into being i.e., emergent. Ireland has high ambitions in terms of becoming a net renewables energy exporter, but the current policies need to work, and projects need to be consented and delivered, meaning interconnection policy will be contingent on these factors coming together. The manner of how we create, consume, and transmit renewables is on a fast-evolving trajectory. New technologies are emerging, breakthroughs are coming all the time, and our policy needs to be flexible enough to allow for and harness these advances. We will take a structured and integrated forward planning approach to deliver the necessary infrastructure to both meet Ireland's needs and make Ireland central to Europe's energy future that will be expressed in an Offshore Transmission Strategy. This Strategy will be aligned with our forthcoming offshore Future Framework policy and the recently published Powering Prosperity – Ireland's Offshore Wind Industrial Strategy. Industry has expressed significant interest in progressing Multipurpose Interconnector (Hybrid) projects under the transmission strategy both to GB and the continent. Ireland will establish our anticipated interconnection needs to be tested for technical feasibility, financial viability and benefits to the State and people. Further detail in Section 4 below. Within the SEM there is an existing

North South interconnector usually operating at 300 MW capacity. A second 1500 MW North South interconnector is planned and has PCI status.

Renewable Transport Fuel Policy

The Renewable Transport Fuel Policy Statement 2023-2025 supports the achievement of CAP transport decarbonisation targets and European renewable energy targets through increasing the supply of renewable transport fuel by means of annual increases in the Renewable Transport Fuel Obligation (RTFO) rate to 2030, as well as ensuring European sustainability and GHG reduction criteria are adhered to.

The Policy, and its previous iteration (covering the period 2021-2023), sets out an indicative trajectory of annual increase to the Renewable Transport Fuel Obligation (RTFO) rate and, within the RTFO, establishes sub-rates for the supply of advanced biofuels and limits on the supply of renewable fuel produced from food and feed crops and biofuels/biogas produced from high indirect land-use change-risk. As well as the annual increase in the RTFO rate, implementation measures within the policy include the incentivisation of specified renewable transport fuels through the award of additional RTFO certificates by the National Oil Reserves Agency (NORA) for their supply and the mandating of E10 petrol supply in 2023.

A suite of legislative amendments is being developed to support the ongoing implementation of the policy, including the transposition of the transport provisions of the 2023 EU RED amendment.

Modelling of projected renewable transport fuel consumption demand across transport modes and supply-side assessment relevant to market conditions for Ireland will input to the continued development of policy and trajectories to 2030 targets and beyond. State-level, cross sectoral working groups were established in 2023 on the topics of achievement of the RES-T and biofuel sustainability which will also input to future policy development.

The Renewable Transport Fuel Policy continues to provide a framework for ongoing consultation, analysis and review towards meeting targets set out in the CAP and European obligations for renewable energy supply for use in transport. An expert panel of industry stakeholders including fuel suppliers, renewable transport fuel producers and representative bodies has also been established to support policy implementation, providing industry knowledge and insight. The renewable transport fuel policy will continue to be reviewed every two years. Annual increases in the RTFO rates aligned to the planned trajectory to target are reviewed every year.

Renewable Transport Fuel Obligation (RTFO)

National and European targets for renewable transport fuel are mandated through the Renewable Transport Fuel Obligation (RTFO) under the National Oil Reserves Agency (NORA) Act 2007. The RTFO places a statutory obligation on suppliers of road transport (fossil) fuels to ensure that a proportion of the fuels they place on the market in Ireland are produced from renewable sources. The RTFO rate is currently set at 21% by energy for the 2024 obligation period and is to be increased to an indicative rate of 25% in 2025, with increases planned each year to reach an indicative RTFO rate of 49% by 2030.

The obligation is administered by the National Oil Reserves Agency (NORA) which grants RTFO certificates to RTFO account holders for renewable transport fuel supplied to the market, subject to independent verification of proof of sustainability and GHG reduction criteria from an EU approved voluntary scheme. Obligated parties have a variety of renewable fuel pathways to meet the national mandate, e.g., ethanol in petrol, biodiesel or HVO in diesel, biomethane, etc. incentivising a competitive market action to deliver increased renewables in transport. Renewable transport fuel produced or supplied with an end-use in transport (including aviation and maritime transport) can also be awarded RTFO certificates that can be traded with obligated parties to meet their obligation. This occurs in contractual arrangements between the parties rather than a managed credit exchange mechanism.

In the 2022 Renewable Transport Fuel Annual Report the NORA set out that approximately 307m litres (9.6 PJ) of liquid biofuel and 1,105k Nm^3 (0.04 PJ) of gaseous biofuel were placed on the market, with additional tailpipe emission GHG savings of 0.2 Mt CO_2eq over the 2018 baseline.

On 1 January 2023, Ireland introduced an advanced biofuel obligation rate for supply of a proportion of biofuel to be produced from advanced feedstocks as defined in Annex IX Part A of EU RED. The advanced biofuel obligation rate is established at 0.1% by energy (as a % of fossil fuel supply) for the 2024 obligation period and will increase to an indicative 1.5% for the 2025 obligation period. It is intended to be increased annually, aligning to the sub-targets for supply of advanced biofuels specified in EU RED. The annual trajectory of increases in the advanced biofuel obligation rate is set out indicatively in the Renewable Transport Fuel Policy 2023-2025.

The trajectories to target set out in the Policy will be reviewed in 2024 within the context of the next iteration of the Policy covering the period 2025-2027, to ensure alignment with the

EU RED targets as amended in 2023 well as domestic CAP targets concerning biofuels or other alternative fuels, taking into account a future review concerning national corrective actions to address CAP carbon budget gap-to-target.

Additionally, the RTFO also includes limits in the supply of renewable transport fuel produced from food and feed crops ('the crop cap'), established at 2.3% for the 2024 obligation period (corresponding to a 2% limit under the EU RED).

Further, aligned with the EU RED phase-out of biofuel and biogas produced from high indirect land-use change-risk feedstock ('high ILUC-risk') by 2030, high ILUC-risk biofuel/biogas supply in transport in Ireland is limited to 90% of 2019 supply, and restricted to economic operators who placed such biofuel/biogas on the market in that year, with plans under the Policy to phase-out this amount of supply to 0% by 2030.

Phasing Out Fossil Fuels

Phasing out fossil fuels from the grid in a secure way will be necessary to meet Ireland's sectoral emissions ceilings for electricity. Ireland has committed to end the burning of coal in ESB's Moneypoint generation plant by 2025, and to replace coal-fired generation with low-carbon and renewable technologies. The ESB is engaging with DECC regarding the future of Moneypoint as it will be retained as a backup unit operating on HFO for several years until sufficient alternative plant is developed. Peat-fired generation ceased at the end of 2023, when the last remaining plant that used peat as a fuel source switched to 100% biomass fired generation. Mitigating measures to ensure that impacts on regional employment in the affected regions, where peat and coal fired electricity generation are to be phased out, will be critical to ensuring a just transition. Initiatives such as including the Midlands Region in the EU Coal Regions in Transition Platform and implementing a wider cross-Government policy framework supporting employment in the region will ensure a just transition.

Renewable Heat Obligation

Government has agreed to the introduction of an obligation in the heat sector by 2024. The Renewable Heat Obligation (RHO) will incentivise suppliers of fossil fuel used for heat to ensure a certain portion of the energy they supply is from a renewable source. The RHO will support an increased use of renewable energy in the heat sector and contribute to a reduction in emissions in line with Ireland's climate ambitions. As Ireland imports most of its fossil fuels, the heating sector is a significant contributor to Ireland's high energy import

dependency. The RHO will also help reduce our reliance on imported fossil fuels and strengthen our energy security due to greater diversification of our energy streams.

CAP 2024 commits to the publication of a high-level Scheme by Q3 2024.

District Heating

A comprehensive assessment was carried out by the Sustainable Energy Authority of Ireland (SEAI) in 2022. Alongside the comprehensive assessment, the SEAI conducted a National Heat Study. The National Heat Study produced several reports detailing options for decarbonising the heating and cooling sectors in Ireland to 2050. Analysis undertaken as part of the National Heat Study suggested that district heating could, in time, supply upwards of 50% of building heating demand in Ireland.

The National Planning Framework also highlights the role of district heating in contributing to the sustainable management of water and other environmental resources and in particular as a key future growth enabler for the cities of Dublin, Cork, Limerick, Galway, and Waterford.

CAP contains a range of actions designed to support the expansion of district heating, including the setting up of a District Heating Steering Group to advise Government in the context of strategic targets for the sector and the strategic aim of decarbonising the built environment. The District Heating Steering Group Report was approved by Government in July 2023 and contains recommendations that set the future policy direction for district heating in Ireland. CAP also contains targets to deliver up to 0.8TWh of district heating by 2025 and 2.7 TWh of district heating by 2030. These targets are based on district heating using renewable energy sources and/or waste heat as the main fuel source. To help deliver on those targets, the key priorities for the Department are:

- The establishment of a National District Heating Centre of Excellence to, inter alia, co-ordinate support and drive delivery of existing and planned district heating projects by public, private and utility developers going forward.
- Ensuring that a legislative and regulatory framework for district heating is implemented as soon as possible and legislation is being drafted to establish the legal basis and regulatory model for district heating that ensures consumer protection and the delivery of a vibrant district heating industry and mandate all Public Sector

buildings and facilities to connect to district heating where available and technically and economically feasible.

CAP 2024 restates the commitment to implementing the recommendations of the District Heating Steering Group as approved by Government in July 2023. It also specifically commits to providing a national level assessment of the size and location of potential candidate areas for district heating.

The skills gaps for district heating in Ireland are expected to be similar to those in other countries where district heating currently has a lower market penetration like the UK. Codema, Dublin's Energy Agency, along with representatives from a number of other European cities contributed to the recent Decarb City Pipes 2050 Project. The Project resulted in the production of a Transition Map for Dublin city, which identifies the steps needed to drive the transition towards decarbonising the heat sector. The Transition Map contains a suite of Actions designed to support capacity building in the context of district heating.1 In addition, DECC has also recently created a District Heating Delivery Unit.

The Climate Action Fund (CAF) provided support of approximately €5m to the Tallaght District Heating Scheme (a suburb of Dublin), which commenced operation in 2023 and which recently won the 'Emerging District Energy Market' award at the Global District Energy Climate Awards in Brussels. The CAF also allocated funding to the Dublin District Heating Project, which when completed will be the largest district heating project in the State. Furthermore, DECC is giving active consideration to the future funding requirements of the sector.

SI 350/2022, which transposed inter alia Article 24(1) of Renewable Energy Directive 2018/2001/EU, assigns regulatory roles to the CRU in a District Heat context. The National Heat Study recognised geothermal energy as a potential source of heat for district heating networks, while also highlighting that further work is required to better understand the suitability of geothermal resources (either alone, or as part of a mix of RE resources) for district heating at various locations across Ireland. DECC is pursuing a number of research projects to identify available geothermal heat gradients and subsurface properties in urban areas, building on the Department's 2020 report 'An Assessment of Geothermal Energy for District Heating in Ireland', which reviewed Ireland's geothermal energy resources and in particular, the potential for deep geothermal energy to contribute to decarbonised district heating in Ireland.

Geothermal Energy

The Government's 'Policy Statement on Geothermal Energy for a Circular Economy', published July 2023, sets out the broad approach to be adopted in regulating the exploration for, and the utilisation of, geothermal energy as a natural resource and the scope of a strategy to promote the sustainable development of Ireland's geothermal resources to decarbonise the heating and cooling of buildings, for industrial uses, and power generation. The regulatory framework, underpinned by legislation, will licence the exploration for and utilisation of geothermal energy, including in integrated energy networks and will integrate with policy and legislation for district heating. The strategy will build on existing data gathering and research, which is being drawn together in a National Geothermal Database to de-risk investment in geothermal exploration. The strategy will also identify appropriate metrics to measure and set targets for geothermal energy's contribution to the decarbonisation of the heating and cooling of buildings, industrial processes, and power generation. The strategy will also include targets for established technologies using ground-source energy to contribute to meeting the RES-H modal target for heating and cooling for residential, commercial, and industrial applications, and any other binding EU targets as they are adopted. The NECP 2021-2030 contains a target of installing 600,000 heat pumps during the period to decarbonise the built environment. A target for ground source heat pumps will consider the potential differential demand for electricity of ground and air source heat pumps and the levelised cost of energy. Additionally, the strategy will examine the case for financial incentives to promote deployment, the knowledge, skills, and capacity needed in industry and regulatory bodies, including planning functions, and information resources and engagement with the public. The Government's "Policy Statement on Geothermal Energy for a Circular Economy", published July 2023, sets out the broad approach to be adopted in regulating the exploration for, and the utilisation of, geothermal energy as a natural resource and the scope of a strategy to promote the sustainable development of Ireland's geothermal resources to decarbonise the heating and cooling of buildings, for industrial uses, and power generation. The regulatory framework, underpinned by legislation, will licence the exploration for and utilisation of geothermal energy, including in integrated energy networks and will integrate with policy and legislation for district heating. The strategy will build on existing data gathering and research, which is being drawn together by Geological Survey Ireland in a National Geothermal Database to de-risk investment in geothermal exploration.

Critical Raw Materials

The Government's 'Policy Statement on Mineral Exploration and Mining – Critical Raw Materials for a Circular Economy', published December 2022, is aligned with the Critical Raw Materials Act, and aims to maximise the contribution that sustainable exploration and mining can make to the transition to climate neutrality through the secure and sustainable supply of critical raw materials necessary for achieving the Union's targets for renewable energy.

3.1.2.2 Where relevant, specific measures for regional co-operation, as well as, as an option, the estimated excess production of energy from renewable sources which could be transferred to other Member States in order to achieve the national contribution and trajectories referred to in point 2.1.2

North Seas Energy Co-Operation (NSEC)

The North Seas Energy Co-operation works to increase electricity transmission capacity among the countries involved in the group, as well as to the rest of Europe. The NSEC aims to ensure a sustainable, secure, and affordable energy supply in the North Seas region through further integration of wholesale electricity markets. A key element in this integration is to increase the interconnection between countries in the region that could be promoted through the NSEC. Ireland is committed to exploring further opportunities for hybrid interconnection/offshore assets as part of the NSEC and to implement regulatory arrangements to support new interconnection, including hybrid assets as set out in Action 23 of the CAP.

Cross-Border Participation in Support Schemes

As part of the design of the RESS, Ireland is committed to opening the scheme to participants from other European Member States with whom Ireland has a direct electricity connection, provided a co-operation agreement has been signed by both parties. It is expected that Producers located in other European Member States (or in a neighbouring State with which a free trade agreement exists) will be allowed to bid for a certain percentage of the capacity allocated within the tenders. The support quota for each participating member state will be based on the volume of imported electricity, the RES-E share in total final electricity consumption of that country and the total final electricity consumption in Ireland. The participation of producers from other States in the RESS is subject to the following conditions:

- A co-operation agreement with the relevant State is in place; the co-operation agreement describes the rules to prove physical delivery of the green electricity;
- The projects in the relevant State fulfil the same requirements as the projects located in Irish territory.

3.1.2.3 Specific measures on financial support, where applicable, including Union support and the use of Union funds, for the promotion of the production and use of energy from renewable sources in electricity, heating and cooling, and transport

Many of the measures and schemes set out in the preceding sections are considered financial supports, including the Climate Action Fund, the Support Scheme for Renewable Heat and the supports provided to incentivise the uptake of EVs and other low emission vehicles (LEVs). There are no European funds involved in these measures to date. The costs of the AER, REFIT, and RESS schemes are recovered directly from electricity consumers or electricity suppliers through an annual public service obligation (PSO) levy, payable by all final electricity consumers or suppliers with power purchase agreements with RESS projects (depending on the cost of wholesale electricity versus the RESS strike prices).

3.1.2.4 Where applicable, the assessment of the support for electricity from renewable sources that Member States are to carry out pursuant to Article 6(4) of Directive (EU) 2018/2001

An ex-post evaluation of the RESS is currently being undertaken as part of the RESS State Aid Decision and is due to be submitted to the EU Commission Directorate General for Competition in early 2025.

3.1.2.5 Specific measures to introduce one or more contact points, streamline administrative procedures, provide information and training, and facilitate the uptake of PPAs

These measures will be developed as part of the implementation of Articles 15 and 16 of the recast Renewable Energy Directive. As stated above, DECC published the Renewable Electricity Corporate Power Purchase Agreement Roadmap, which sets out Ireland's policy on CPPAs. The Roadmap sets out that CPPAs have an important role to play in helping Ireland to reach our ambitious renewable electricity targets and includes the Principles of Good Practice for Renewable Electricity CPPAs. The Maritime Area Planning Act 2021 (as

amended) has created a new State consent, the Maritime Area Consent (MAC), as a first step in a new and streamlined planning process. The MAC regime assesses the viability of proposed ORE developers in a number of key areas, including in respect of their financial and technical competency, in advance of developers proceeding to environmental studies. The MAP Act also provided for the establishment of the Maritime Area Regulatory Authority (MARA), which occurred on 17th July 2023. This agency has responsibility for assessing applications for MACs, as well as the management of the existing Phase One MACs. This provides for one state consent MAC to enable occupation of the Maritime Area and one development consent (planning permission), with a single environmental assessment.

3.1.2.6 Summary of the policies and measures under the enabling framework Member States have to put in place pursuant to Article 21(6) and Article 22(5) of Directive (EU) 2018/2001 to promote and facilitate the development of self-consumption and renewable energy communities.

Micro-generation, small-scale generation, and community-based projects play a key role in enabling a further reach for deployment of RE projects throughout the economy, whilst in turn offering financial return, security, and ownership over energy supply for residences, communities, small businesses, and farming. The CAP identifies the Micro-generation Support Scheme (MSS) and the Small-Scale Renewable Electricity Support Scheme (SRESS) as key tools to incentivise investment in micro- and small-scale generation technology.

The MSS received Government approval in December 2021 and the final scheme design was approved in December 2022. The MSS offers capital grant support for new domestic and non-domestic solar PV installations. It works in tandem with the Clean Export Guarantee (CEG) tariff, for which an interim enabling framework was published by the CRU in 2021. The CEG is an export payment for residual renewable electricity exported to the grid by renewables self-consumers and renewable energy communities. The CRU are currently conducting a review of the interim CEG and will publish a decision to put in place an enduring CEG framework following the completion of this review.

The SRESS aims to provide increased levels of new small-scale generation and assist with providing at least 500 MW of local community-based renewable energy projects by 2030. The first phase of SRESS has been providing assistance since June 2023, in the form of grants to renewable self-consumers, for installations between 50 kW up to 1 MW in size,

alongside similar grants for non-domestic installations in the 6 kW up to 50 kW range. The second phase of SRESS, including tariff rates, is due to launch in the first half of 2024.

3.1.2.7 Assessment of the necessity to build new infrastructure for district heating and cooling produced from renewable sources.

As set out above, a District Heating Centre of Excellence is being established within the SEAI and an appropriate legislative and regulatory framework is being developed to support the expansion of district heating in Ireland.

While the National Heat Study, produced by the SEAI in 2022, highlights the potential for up to 54% of heat in buildings in Ireland to be supplied by district heating, district heating and cooling in Ireland is currently provides less than 1% of heat consumption. To assist progress in this sector, CAP 2024 commits to providing a national level assessment of the size and location of potential candidate areas for district heating.

However, in order to realise the potential of district heating in Ireland, it will be necessary to develop the sector from the early development stage it currently occupies. To do so, once the legislative and regulatory frameworks are embedded and can give certainty to developers, suppliers and future consumers, it will be necessary to leverage the learnings of existing, early mover schemes and construct the pipe networks required to transport the heat from source to consumer. The construction of renewable heat sources and utilisation of available waste heat will also be required. Ireland is looking at the development of a fund to support the development of this infrastructure, to align with the policy measures being implemented.

3.1.2.8 Where applicable, specific measures on the promotion of the use of energy from biomass, especially for new biomass mobilisation taking into account:

- Biomass availability, including sustainable biomass: both domestic potential and imports from third countries,

- Other biomass uses by other sectors (agriculture and forest-based sectors); as well as measures for the sustainability of biomass production and use.

The Support Scheme for Renewable Heat incentivises the installation and use of biomass and AD heating systems by providing financial support to help businesses move to renewable heating. The SSRH is open to commercial, industrial, agricultural, district heating,

public sector and other non-domestic heat users and there are currently two different financial supports available when a business switches to renewable heat. The financial supports include:

- Operational support for a biomass and biogas heating systems
- An installation grant for a commercial heat pump.

The scheme includes detailed sustainability criteria in line with the Renewable Energy Directive.

Government will continue financial supports for the continued mobilisation of biomass from forests by supporting measures such as forest road construction, knowledge transfer groups and decision support tools. Wood fibre used for energy generation will continue to be used in the forest products sector to dry sawn timber reducing the dependency on fossil fuels. Use of biomass for heat and electricity generation will continue to use small diameter material which facilitates the sustainable management of forests where harvesting is regulated by the Forestry Act 2014. Forests felled are replanted ensuring that biomass is harvested from sustainable resources. The potential wood fibre available from the Irish forest estate for energy and other uses is forecasted to increase from 0.89 million m3 in 2021 to over 2 million m3 between 2031 and 2035. Volume in excess of these figures will be used by the sawmilling sector. Where demand exceeds available domestic supply biomass will be imported from third countries from sustainable sources which also must satisfy the requirements of the EU timber regulation. Planned increases in afforestation as set out in Ireland's CAP will take place while protecting and increasing the levels of biodiversity. All land converted to forestry is regulated by the requirements of the Forestry Act 2014 and adherence to a suite of environmental requirements which aims inter alia to protect existing water courses, biodiversity, and archaeology. All land use change to forestry requires a detailed assessment by the competent authority to ensure that there are no significant impacts on statutory designations as regulated by the Habitats Directive.

3.1.3 Other Elements of the Dimension

3.1.3.1 Where applicable, national policies and measures affecting the EU ETS sector and assessment of the complementarity and impacts on the EU ETS

The EU ETS includes some 11,000 stationary installations (over 100 currently in operation in Ireland of which approximately 70 are industrial installations) with an installed power-

generation capacity of more than 20 MW; Irish-based ETS plants are mainly in power-generation and large-scale industrial production. The system covers emissions of carbon dioxide (CO_2) from power and heat generation and a wide range of energy-intensive industry sectors including oil refineries, steel works and production of iron, aluminium, metals, cement, lime, glass, ceramics, pulp, paper, cardboard, acids, and bulk organic chemicals. Nitrous oxide emissions from the production of certain acids and emissions of perfluoro-carbons from aluminium production are also included.

A separate but adjacent system has been introduced for the Buildings, Road Transport and Additional (mainly small industry) Sectors (ETS II). Chapter IVa of Directive 2023/959 sets out the specific legislative provisions in respect of ETS II which is based on the auctioning of emissions allowances, with no free allocation. ETS II has a separate emissions abatement target of 42% by 2030 – compared to 2005.The regulated entities will be the 'upstream' suppliers, such as fuel importers and distributors. The ETS II regulated entities will be required to surrender emissions allowances in respect of each year (from 2027), equivalent to the CO_2 emissions associated with the fossil fuels used. The triggering of the compliance obligation is the release on the market of the eligible fuels for consumption in the relevant sectors.

An option for Member States to apply a derogation from the obligation on regulated entities to surrender emissions allowances for the years 2027-2030 has been incorporated in ETS II. In the context that ETS II extends emissions trading to sectors of the economy that are encompassed by Ireland's domestic carbon tax, Ireland has notified for this derogation and a decision is expected from the Commission in respect of this notification.

Since 2012, CO_2 emissions from aviation have been included in the Emission Trading System (EU ETS). The Directive requires all airlines operating within the European Economic Area (EEA), to record, report and verify emissions and surrender allowances against those emissions. The ETS legislation applies to EU and non-EU airlines alike. During 2023 an agreement was reached to revise ETS for Aviation to increase its environmental ambition. Entering force by way of Directive 2023/958, the revision phases out provision of free allowances to aircraft operators by 2026, thereby encouraging aircraft operators to make further emissions reductions. It also reserves a total of 20m allowances to incentivise the uptake of sustainable aviation fuels (SAF), for the period 2024 to end 2030. Aircraft operators who uplift SAF will be able to request free allocation of these allowances. A key part of the revision of EU ETS for Aviation was to bring the Carbon Offsetting and Reduction Scheme in International Aviation (CORSIA) under EU law both legally and administratively.

CORSIA was established by the International Civil Aviation Organisation (ICAO) and all EU Member States including Ireland have participated in the scheme since its inception. The EU ETS, now in its third phase, covers about 45% of total EU emissions, but just 24% of total emissions in Ireland (excl. LULUCF), based on the latest inventories published by the Irish EPA in May 2024. The relatively small share of total GHG emissions which the ETS sector in Ireland accounts for is owing to the relatively light industrial base in Ireland and the disproportionately large agricultural sector for which emissions are captured in the non-ETS inventory. Since 2005, emissions in the ETS sector have decreased by 31.7% or 7.12 Mt CO_2eq. Within the ETS sector, the electricity generation and the cement sectors are responsible for most of the decrease.

3.1.3.2 Policies and measures to achieve other national targets, where applicable

Climate Adaptation

In outlining a whole of Government approach to climate adaptation, Ireland's 2024 NAF sets out a wide range of policies and measures. The Plan identifies 13 key sectors, including Electricity and Gas Networks, under the remit of 7 Government Ministers where sectoral adaptation plans will be prepared. This includes a new tourism adaptation sector. In addition, a scoping exercise for a potential Built Environment and Planning Adaptation Sector will be undertaken. Key policies and measures provided for under the NAF include:

- Preparation of sectoral adaptation plans by 7 Government departments for the key sectors;
- Revising sectoral guidance on the development of Sectoral Adaptation Plans
- Revised governance and reporting arrangements;
- Increasing awareness around climate adaptation and resilience;
- Improving the availability of standardised information on climate change
- Developing Ireland's first National Climate Change Risk Assessment
- Mainstreaming climate adaptation into key national plans and policies.

The new NAF also emphasises the need to avoid maladaptation, encourages greater use of nature-based solutions and promotes greater consideration of socioeconomic vulnerability and just resilience considerations. The current cycle of Sectoral Adaptation Plans was approved by Government in 2019. Plans were developed in line with the national guidelines 'Sectoral Planning Guidelines for Climate Change,' which were published in May 2018 to

ensure that a coherent and consistent approach to the development of plans was taken across government. A revised version of these Guidelines is being finalised that will set out the requirements for the second set of sectoral plans developed under the recently approved new NAF. Table 27, below, sets out the sectors and lead Government departments that are preparing plans under the NAF.

Table 27: Sectoral adaptation plans under the 2024 National Adaptation Framework

Theme	Sector Level	Lead Department for Sectoral Adaptation Plans	Cross-cutting Policy Issues
Natural Environment	Biodiversity	Department of Housing, Local Government and Heritage	Coastal, Built Environment, Urban Environment, Health impacts, Disaster Risk Reduction
	Water Quality	Department of Housing, Local Government and Heritage	
Built Environment and Infrastructure	Communication Networks	Department of the Environment, Climate and Communications	
	Electricity and Gas Networks		
	Flood Risk Management	Office of Public Works	
	Built Environment and Planning	Department of Housing, Local Government and Heritage[1]	
	Transport Infrastructure	Department of Transport	
	Water Services Infrastructure	Department of Housing, Local Government and Heritage	
Human	Built and Archaeological Heritage	Department of Housing, Local Government and Heritage	
	Health	Department of Health	
Economy	Agriculture	Department of Agriculture, Food, and the Marine	
	Forestry		
	Seafood		
	Tourism	Department of Tourism, Culture, Arts, Gaeltacht, Sport, and Media	

Chapter 22 of the Climate Action Plan 2024 focuses on climate adaptation, primarily in the context of the ongoing implementation of the NAF and sectoral adaptation plans. For 2024, the actions in the Plan relate to the development of early warning systems, mainstreaming climate adaptation into flood policies, nature-based solutions as well as improving adaptation data availability. Institutional governance and monitoring. Since 2015 sectoral coordination of national adaptation policy has taken place under the auspices of the National Adaptation Steering Committee. The need for appropriate cross sectoral coordination and consultation is identified as crucial in the NAF and the Climate Act and the Steering Committee has a key

role to play in promoting and encouraging work in this regard. Members of the Steering Committee include Departments preparing sectoral adaptation plans under the NAF; Department of Foreign Affairs and Trade; Irish Water; the EPA; Department of Finance; Department of Public Expenditure, NDP Delivery and Reform; regional and local Government; the National Standards Authority of Ireland; and Met Éireann.

Monitoring Reporting and Evaluation (MRE)

The CCAC annually assesses progress of both SAPs, NAF implementation and progress at local level through its annual Adaptation Scorecard process. The CCAC scorecard evaluates progress made by sectors in their climate change adaptation efforts in the past year and is published annually. The scorecard for 2023 shows clearly that good progress has been made across sectors including Transport, Flood Risk, Water, and Built and Archaeological Heritage, with mixed and inconsistent progress evident in other areas. The figure below sets out the governance structure for climate adaptation in Ireland.

The NAF outlines Ireland's reporting obligations at International, EU and National levels. Ireland will continue to meet its EU and international obligations on adaptation, including forthcoming requirements on adaptation under Articles 17 and 19 of the EU Governance of the Energy Union and Climate Action Regulation.

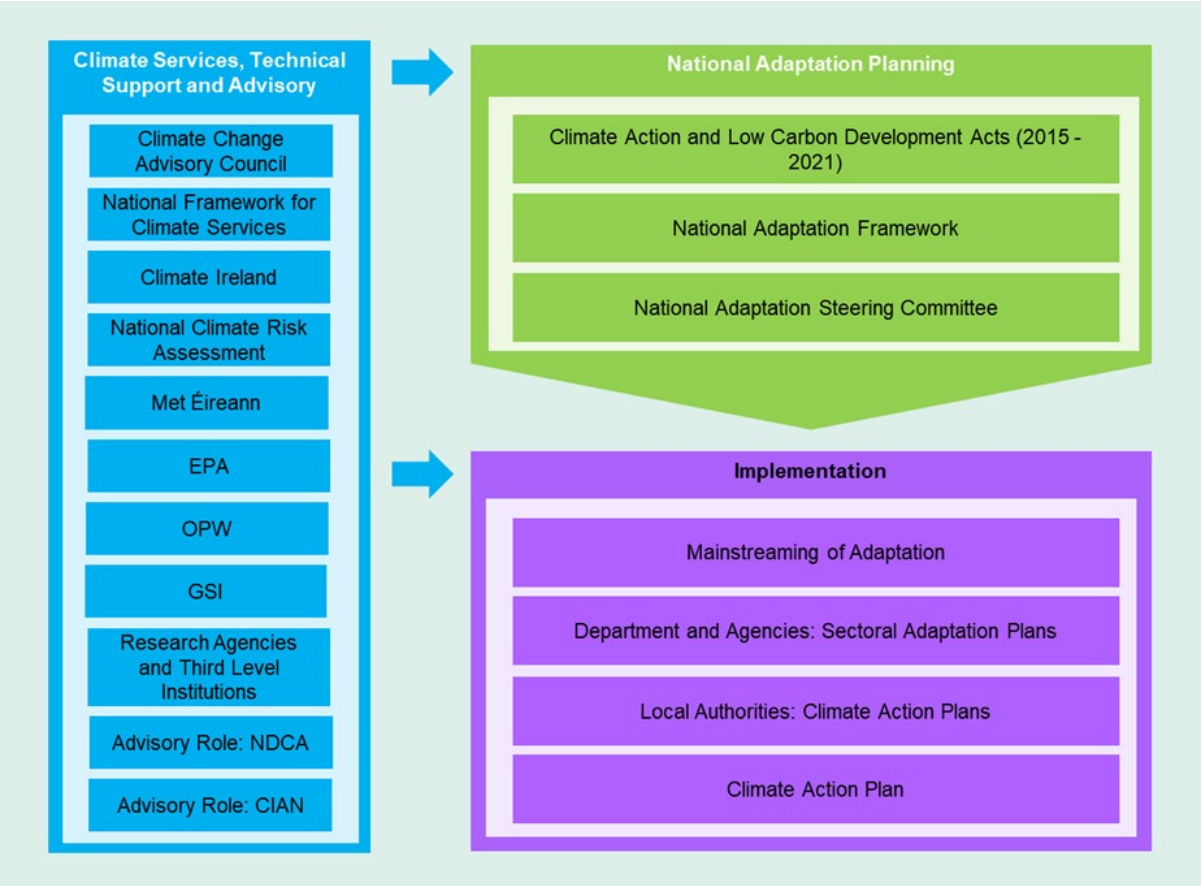

Figure 1: Governance structure for climate adaptation in Ireland

Adaptation Governance Structure

At the national level, oversight and reporting will be undertaken through a number of statutory mechanisms including:

- Statutory review of a Government approved National Adaptation Framework not less than once in every five-year period;
- Submission of an annual report by the CCAC to the Minister for the Environment, Climate and Communications containing findings and recommendations in furthering the transition to a low carbon, climate resilient and environmentally sustainable economy;
- Submission of a periodic review report by the CCAC (at its own instigation or that of the Minister) to the Minister for the Environment, Climate and Communications
- Annual CAP reviews focused on sectoral level actions as part of the national effort to progress adaptation;

- Adaptation elements/actions for CAP quarterly reporting; and,
- Individual sectors reporting progress through Department structures and annual reports required under sectoral guidelines.

The governance framework outlined above describes an open, accountable, and transparent process requiring a whole-of-government approach in order to engage successfully in a planned adaptation process involving Sectoral, Local Authority and CCAC participation in developing adaptation policies.

To support adaptation indicator development, Transport Infrastructure Ireland (TII) is currently completing a project on the development of adaptation indicators. It is planned that the methodology developed through this project will be included in the national sectoral adaptation planning guidelines and applied in the development process for the next iteration of sectoral adaptation plans required by Q3 2025.

Regional and Local Level Adaptation

National climate action policy in Ireland recognises the potential which exists within the local Government sector to contribute to the transition to a low carbon and climate resilient future. The NAF identifies the critical role to be played by Local Authorities in addressing climate change adaptation. The Minister for Communications, Climate Action, and Environment funds the Local Authority sector to run four CAROs and also funds specific climate focused roles within each local authority. This commitment recognises the significant obligation which has been placed on local Government to develop and implement its own climate action measures, as well as the need to build capacity within the sector to engage effectively with climate change, both in terms of mitigation and adaptation. The CAROs are being operated by a lead Local Authority in four different regions grouped according to shared climate change risks. These offices have been enabling a more coordinated engagement across the whole of Government and build on the experience and expertise which exists across the sector. The CAROs are a core component of climate delivery within the local Government sector. A further €12 million in funding was provided for 2023 – 2029 for the CAROs to continue their work in supporting local government to coordinate and deliver climate actions and to develop their Local Authority Climate Action Plans.

The CAROs play an important role in ensuring that cross-sectoral climate issues impacting on the sector are identified and addressed in a coordinated manner. They provide a shared service function and are guided by the CCMA to ensure a consistent, sector-wide approach.

The CAROs coordinate between DECC, other departments and agencies, and the local level, including Local Authorities and energy agencies. They have led and been involved in a number of climate projects by providing technical expertise, acting as a conduit of information from the top down and bottom up and taking on an enabling role. They also work on ensuring community engagement and doing community outreach and awareness raising. Under the NAF the 31 Local Authorities in Ireland have developed their own adaptation strategies in line with guidance to be developed for the sector. Local Authorities adopted their local adaptation strategies in 2019. The requirement to prepare LASs has been superseded with a new statutory requirement for all Local Authorities to prepare LACAPs every five years These plans were adopted in each Local Authority in early 2024. Work on the development of LACAPs was undertaken by individual Local Authorities with support from the CARO in their region.

Monitoring at local level

CAROs are monitored by a CARO Management Group structure, comprising Local Authority representatives and DECC. The function is overseen by a Strategic Implementation Group (SIG) which has membership from the local Government representative body (the CCMA) and DECC. A wider Stakeholder Advisory Group (SAG) brings together sectoral inputs. The CAROs and the Local Authority sector are also integrated into national oversight bodies for climate action, with representatives on the National Adaptation Steering Committee and the Adaptation Committee of the Climate Change Advisory Council (CCAC).

National Climate Change Risk Assessment

To support the planning and implementation of targeted, relevant adaptation actions, Ireland's first National Climate Change Risk Assessment (NCCRA) is under development by the EPA with a deadline for completion by March 2025. The NCCRA is building on and advancing existing understanding of climate change risks for Ireland through the establishment of a structured, semi-quantitative risk assessment procedure to identify, evaluate, and prioritise climate change risks. On this basis, the NCCRA will set out the priority impacts of climate change for Ireland. This process will lay the groundwork for informed adaptation planning and action implementation, facilitating the development of tailored solutions to enhance Ireland's resilience against anticipated climate-related challenges. The NCCRA will also set out national and sectoral risk assessment criteria to ensure consistency in the estimation of risk within and across sectors. The EPA is taking

account of the findings of the recently published European Climate Risk Assessment[26] (EUCRA).

Climate Adaptation Platform

Climate Ireland is the official National Adaptation Platform, serving as a key resource for adaptation-related information in Ireland. It aims to support climate adaptation planning by providing tailored climate and adaptation information, guidance, and tools for risk assessment. Managed by the Environmental Protection Agency (EPA) and initially developed by researchers at University College Cork and the National University of Ireland, Galway, Climate Ireland offers scientific advice, decision-making frameworks, and tools to aid adaptation efforts.

The platform regularly updates its resources to serve a broad audience, including decision-makers at local, regional, and sectoral levels, enhancing awareness and capacity in adaptation planning through workshops and seminars. The Climate Ireland Adaptation Network (CIAN) established by the EPA is aimed at sharing expertise and creating learning opportunities around adaptation in Ireland as well as improving the consistency of adaptation implementation. CIAN has in excess of 250 members and is growing. The first newsletter was issued in January 2024, and it will continue to be issued quarterly. The network held its inaugural seminar in October 2023 and a second annual seminar focused on the themes of uncertainty, risk management and risk assessment is currently being planned. The network encourages additional adaptation practitioners to join on an ongoing basis. These developments emphasise Climate Ireland's role as a central hub for up-to-date climate information and tools, integral to Ireland's ongoing climate adaptation strategies.

National Projections Data

At a national level, the TRANSLATE project, led by Met Éireann, in partnership with ICHEC, University of Galway, and University College Cork – SFI Research Centre for Energy, Climate and Marine (MaREI) has produced the first standardised and bias corrected national climate projections for Ireland.[27] The projections are the most up to date, and highest resolution available to the Irish community. The TRANSLATE project's results and climate services are designed to be accessible and useful for stakeholders, including platforms like

[26] EEA Report No 1/2024. Available at: https://www.eea.europa.eu/publications/european-climate-risk-assessment

[27] Met Éireann (2023)

Climate Ireland, by providing standardised and bias-corrected national climate projections. This facilitates the incorporation of the latest climate science into practical, real-world solutions for climate adaptation, mitigation, and planning decisions across Ireland.

Progress under EU Strategy on Adaptation to Climate Change

Ireland is committed to ensuring comprehensive and transparent reporting on adaptation in line with the requirements of the Governance of the Energy Union and Climate Action Regulation and facilitating the EU's commitments on adaptation under the UNFCCC and the Paris Agreement. The latest reporting under Article 19 was submitted to the Commission on 15 March 2023. In February 2021, the EU published a new EU Climate Change Adaptation Strategy[28], Forging a Climate-resilient Europe. The new strategy was developed in recognition of adaptation as a crucial component of the long-term global response to climate change. The strategy aims to increase and accelerate the EU's efforts to protect nature, people, and livelihoods against the unavoidable impacts of climate change. It outlines a long-term vision of creating a climate resilient EU by 2050 by making adaptation smarter, more systemic and swifter, and by stepping up international action. Implementation of the strategy is ongoing. The EU's first Climate Change Risk Assessment was completed in 2024. A Risk Data Hub is in place, and the EU Mission on Adaptation under the Horizon Europe Programme, which aims to support at least 150 European regions and communities to move towards climate resilience by 2030 has, to date, welcomed the signatures of 308 regions and Local Authorities who have signed up to the mission charter under the EU Mission for Adaptation to Climate Change. This includes seven Local Authorities in Ireland. Louth, Mayo, Offaly, and Sligo County Councils, as well as Cork, Dublin, and Galway City Councils, have signed the mission charter and pledged to develop adaptation and mitigation strategies. This entitles them to expert advice and guidance through the identified and appropriate resilience solutions implemented.

Alignment of Climate Adaptation and Disaster Risk Reduction

The NAF acknowledges the requirement to enhance coherence and complementarity between the Paris Agreement, the Sendai Framework for Disaster Risk Reduction as well as the UN SDGs. The NAF acknowledges that Emergency management and climate change adaptation are currently two discrete systems for governance, management and coordination at the national level and there is a need to better integrate emergency response

[28] EUR-Lex - 52021DC0082 - EN - EUR-Lex (europa.eu)

planning with longer-term disaster risk management whilst considering the known and projected risks arising from changing levels of climate change influenced hazards, and community exposure and vulnerability, with their existing and future capacities for service provision and operational responsibilities. Identifying ways to promote coordination and align incentives, priorities and planning processes will facilitate a more holistic and comprehensive approach to disaster risk management at all levels of government.

The National Risk Assessment for Ireland 2023 (NRA) [29]provides the basis on which key risks for the country are identified, prioritised and managed. The objective is to establish a coordinated approach to national risk management. This assessment focuses on 22 key risks, which have been identified as having the potential to trigger a national level emergency. Each of the 22 key risks were analysed by expert focus groups. These expert groups considered the potential impact of climate change for each key risk. The climate change trajectory, which is displayed on the National Risk Matrix, indicates if the risk rating for each risk is likely to increase, decrease or stay the same as a consequence of Climate Change. The systems approach to emergency management in Ireland involves a continuous cycle of activity. The principal elements of the systems approach are; Risk Assessment, Risk Management, Planning and Preparedness, Response, and Recovery.

The Department of Housing, Planning and Local Government is designated as the Lead Government Department for coordinating the response to severe weather emergencies. "Strategic Emergency Management National Structures and Framework" sets out the national arrangements for the delivery of effective emergency management. It outlines the structures for coordinating a "whole of Government" approach and the framework for achieving a systems approach to emergency management. This Framework is complemented by a series of 'Strategic Emergency Management (SEM) Guidelines' dealing with specific aspects of strategic emergency management. This includes a Guideline on climate change.

Local Authorities are designated as the lead agency for coordinating and delivering the response on the ground to severe weather emergencies and lead the local response in collaboration with the other Principal Response Agencies – An Garda Síochána (Ireland's National Police Service) and the HSE (Health Services Executive).

[29] NRA Available here: www.gov.ie/pdf/?file=https://assets.gov.ie/266493/8fef16b4-ea2c-4830-a6fc-4f6d2a393453.pdf#page=null

Biodiversity

As set out under section 2.1.1(i), the conservation and sustainable use of biodiversity needs to be escalated. Actions within the Biodiversity Sectoral Climate Change Adaptation Plan build on the foundations of the National Biodiversity Action Plan (2017- 2021) and are aimed at improving sustainable agriculture and fisheries, better soil, and land management and, most urgently, the restoration of natural systems. Ireland's National Biodiversity Action Plan is underpinned by seven strategic objectives together with 119 targeted actions. The Plan lays out a clear framework for Ireland's national approach to biodiversity, ensuring that efforts and achievements of the past are built upon, while looking ahead to what can be achieved over the next five years and beyond. The key policies under that Plan include:

- Mainstreaming biodiversity across the decision-making process in the State;
- Strengthening the knowledge base underpinning work on biodiversity issues;
- Increasing public awareness and participation;
- Ensuring conservation of biodiversity in the wider countryside;
- Ensuring conservation of biodiversity in the marine environment;
- Expanding and improving on the management of protected areas and protected species;
- Enhancing the contribution to international biodiversity issues.

The Biodiversity Climate Change Sectoral Adaptation Plan was published in September 2019 and sets out the key goal of protecting biodiversity from the impacts of climate change and to conserve and manage ecosystems so that they deliver services that increase the adaptive capacity of people and biodiversity, while also contributing to climate change mitigation. A wide range of policies and measures are set out under the Adaptation Plan including 6 strategic objectives linked with the aims of the action Plan. Some of the key measures under the Adaptation Plan include:

- Restore and enhance natural systems through management to increase resilience;
- Establish and implement an all-island invasive species programme;
- Develop and implement a National Soil Strategy to increase the resilience of soils;

- Develop an integrated coastal management strategy which includes ecosystem-based adaptation actions;
- Promote ecosystem restoration and conservation through Payment for Ecosystem Services and investment in actions that increase carbon sinks while promoting biodiversity;
- Carry out a comprehensive vulnerability assessment of biodiversity in Ireland;
- Develop an impact assessment tool to screen for potential maladaptation impacts;
- Design corridors and buffer zones to enhance the resilience of protected areas and designated sites by increasing opportunities for dispersal across the landscape;
- Implement measures to reduce the barrier effects of roads, railways and technical, objects in rivers and streams to facilitate species spatial responses to climate change;
- Undertake natural capital accounting in all sectors to ensure natural capital is being valued and Ecosystem Based Adaptation and green infrastructure options are being employed.

A new and updated fourth Biodiversity Action Plan 2023-2030 was published in January 2024.

Circular Economy

The transition to a circular economy is a key strategic goal for Government. In line with the evolution of EU and UN environmental policy, Ireland's Waste Action Plan for a Circular Economy 2020-2025 (WAPCE) was published in September 2020 and provides a robust policy framework for transitioning from a focus on managing waste to a much greater focus on adapting patterns of production and consumption; preventing waste generation; and extending the productive life of all goods and products in our society and economy. In line with the objectives set out in the WAPCE, a Circular Economy Unit was established within DECC in 2020 with a mandate to ensure a whole of Government approach to Ireland's transition to a circular economy.

Implementation of the WAPCE is ongoing. Ireland's first Circular Economy Strategy was published in December 2021 and sets out an overall approach to circular economy policy

and a vision for Ireland's transition to a Circular Economy. The Circular Economy and Miscellaneous Provisions Act 2022 was enacted in July 2022 and provides a statutory framework for the transition. Ireland is committed to leading the transformation from waste management to circular economy practice through the National Waste Action Plan 2020-2025, and subsequent National Waste Management Plan for a Circular Economy 2024-2030. Key objectives already committed to and underway under the CAP and national Waste Policy include:

- Incentivising the use of reusable and recyclable alternatives to a range of wasteful single-use disposable packaging and other items through the phased introduction of new environmental levies;
- Re-designating the existing Environment Fund as a Circular Economy Fund, which will remain ring-fenced to provide support for environmental and circular economy projects;
- The establishment of the Circular Economy Innovation Grant Scheme in 2021, to support innovation and demonstration of circular economy projects by small to medium enterprises and social enterprises, with funding allocated to date of €1.25m;
- The publication of Ireland's National Food Waste Prevention Roadmap 2023-2025, setting out 38 priority actions to reduce food waste by 50% by 2030, a UN SDG;
- The hosting in Dublin of Circular Economy Hotspot, a flagship international event, over 4 days in May 2023, highlighting Irish circular economy innovation;
- The introduction of an obligation on waste collectors, from 1st July 2023, to provide all commercial customers with a mixed dry recycling, biowaste and residual waste bin, and to charge fees which incentivise waste segregation;
- The introduction of a new Waste Recovery Levy of €10 per tonne on 1st September 2023 with the existing Landfill Levy increased by €10 per tonne from the same date;
- The launch of a first national Communications Campaign to raise public awareness of Circular Economy concepts;
- The introduction of a Deposit Return Scheme for plastic bottles and cans to deliver on our ambitious EU targets for the recycling of these products;

- Maintain Government leadership in taking responsibility for our own resource consumption, particularly single use plastics, energy, waste, and water;
- Identify opportunities to strengthen the regulatory and enforcement frameworks and structures for the waste collection and management system, to maximise the collection of clean, segregated materials for reuse and/or recycling from all households and businesses;
- Incentivise consumers to reduce, reuse and recycle;
- Regulate and incentivise producers of waste, particularly packaging, to ensure the prevention of waste and the use of recycled materials in packaging products;
- Scope a number of possible environmental levies, including a possible levy on single use plastics, as part of the review of the Environment Fund. Further detailed research would be required prior to the introduction of any new levy;
- Identify and commence delivery of measures to address the key regulatory barriers to the development of the bio economy, including exploring opportunities to establish “End of Waste” criteria for certain bio-wastes.

Bioeconomy

In seeking to expand our bioeconomy, Ireland will undertake a number of policies and measures as set out under the national Plan including:

- Ensure that there is coherence between all sectoral strategies which impact on the bioeconomy in Ireland;
- Establish a network comprising representatives of commercial entities operating within the bioeconomy and relevant public bodies to inform the future development of the bioeconomy - this network may make additional recommendations to be followed up; (This could also include the sharing of best practice regarding applications for BBIJU, SC-2 and H2020 funding);
- Encourage the translation of research into real world applications through promoting collaboration between research institutions (academia) and industry - through the use of pilots/demonstrations at the model demonstrator facilities (Lisheen site, the Marine Research Cluster in Connemara);

- Assess the current legislative definition of waste and recommend whether a redesignation is necessary for residual waste flows to be successfully managed for use in the bioeconomy;
- Ensure greater sectoral coherence within the bioeconomy through the development of risk assessment and management protocols regarding the use of by-products which encourage the piloting of opportunities;
- Progress the leading value chain propositions identified in the Bio-Eire project by establishing the conditions required for their commercial viability and how these might be fulfilled;
- Examine how greater primary producer, public and consumer awareness of the bioeconomy and its products could be built up - through knowledge transfer, advisory, sustainable business models, public procurement, consumer awareness campaigns and product labelling initiatives etc.

Ireland's first national Bioeconomy Action Plan was published in 2023. The Bioeconomy Action Plan 2023-2025 includes 33 actions to accelerate support for the development of the bioeconomy. The plan has a high focus on bringing sustainable scientific practices, technologies and biobased innovation and solutions into use on farms and by biobased industries in Ireland.[30]

Air Quality

Ireland's emissions inventory reports show that significant progress has been made since 1990, benefiting air quality and human health. The projections to 2030 also outline that implementation of the policies and measures set out under this Plan and the CAP will have significant benefits in relation to air quality. In particular, actions to reduce the use of fossil fuels and kilometres travelled, increase electrification of the national transportation fleet and further increase penetration of renewables in electricity generation will have knock on effects on the level of emissions of key pollutants across the state. It is also proposed in the national demand management strategy, which is currently out to public consultation, that legislation be developed to provide the legal basis for enabling authorities to introduce, if and as appropriate, Low Emissions or Clean Air Zones.

[30] Ireland's Bioeconomy Action Plan 2023-2024 is available here

Biomethane

Ireland is recognised as having a large potential for Biomethane production due to its substantial agriculture sector. The development of an agri-centric indigenous Biomethane industry will directly contribute to meeting Ireland's decarbonisation targets and will deliver multiple cross sectoral benefits including a diversification opportunity for farmers and gas security and diversification of supply.

While a well-proven technology, the development of the anaerobic digestion industry and biomethane production is at a very early stage in Ireland. There are currently only 2 operational biomethane facilities producing 75 GWh of biomethane per annum, which is equivalent to 0.001% of Ireland's current gas demand.

The National Heat Study completed extensive analysis of bioenergy resources available in Ireland and identified biomethane as a competitive, cost-efficient, path to decarbonising sectors with a high thermal heat demand. The Study estimated a production capacity of 5.1 TWh through the use of food waste resources and pig slurry, and with farmers supplying agricultural feedstocks such as grass silage and animal slurries, therefore also acting as a farm diversification opportunity.

Government has committed to deliver up to 5.7 TWh of indigenously produced biomethane by 2030, with an interim CAP24 target of 1 TWh by 2025. The Government target of 5.7 TWh represents approximately 10% of Ireland's current overall gas demand. Target delivery would represent a significant curtailment of emissions for both the energy and agriculture sectors, with a carbon abatement potential of 2.1 Mt CO_2eq.

As a first key step, Ireland has published a National Biomethane Strategy. The objective of this strategy is to develop a sustainable, agri-centric model of biomethane production that will provide diversification opportunities for farmers through the supply of a variety of agricultural feedstocks.

The implementation of the Strategy consists of delivery of key actions and policy enablers to develop a sustainable, successful biomethane sector in Ireland. This is being overseen by a Biomethane Implementation Group, as set out in CAP24. This Group is supporting support delivery, monitoring progress, and reports to the Heat & Built Environment Taskforce on implementation progress.

The Renewable Transport Fuel Policy Statement 2023-2025 sets out the policy framework for renewable transport fuels, including biomethane. In April 2023, legal provision was made for the award of additional renewable transport fuel obligation (RTFO) certificates for supply of biomethane for use in transport, to incentivise its supply. RTFO certificates for biomethane supply in the transport sector can be traded with obligated parties within the RTFO.

Hydrogen

Irish policy on the role of hydrogen, and the actions needed for its development, are set out in the National Hydrogen Strategy, published in July 2023. The National Hydrogen Strategy is our first major policy statement on renewable hydrogen and marks an important first step in developing an indigenous hydrogen sector in Ireland. The Strategy sets out our strategic vision for the role that hydrogen will play in Ireland's energy system and as a key component of our zero-carbon economy. The Strategy considers the needs of the entire hydrogen value chain, including production, end uses, transportation and storage, safety, regulation, markets, innovation, and skills. Ireland will focus its efforts on the scale up and production of renewable "green" hydrogen as it supports both our decarbonisation and energy security needs. Prior to 2030, we will explore the potential to produce green hydrogen from grid-connected electrolysis using surplus renewables, which arise as we move towards an 80% RES-E system. It is also proposed to develop an innovation fund to support the demonstration of green hydrogen technologies in Ireland during this time.

A 2 GW target offshore wind to produce renewable hydrogen is also set to be in development by 2030, which will help to provide greater certainty for investors and create the scales needed to enable greater infrastructure deployment.

The deployment of renewable hydrogen in Ireland will focus on hard-to-decarbonise sectors where energy efficiency and direct electrification are not feasible or cost-effective solutions. In the coming years, renewable hydrogen is envisioned to play an important role as a zero-emission source of dispatchable, flexible electricity, as a long-duration store of RE, in decarbonising industrial processes, and as a transport fuel in sectors such as heavy goods transport, maritime and aviation. Ireland has the potential to become a net exporter of RE including green hydrogen in the long-term, due to our abundance of offshore renewables potential, with some of the best natural wind resources in all of Europe.

There are 21 short-term actions identified within the National Hydrogen Strategy to enable the development of the hydrogen sector in Ireland. These actions aim to remove any barriers

which could inhibit early hydrogen projects from progressing today, and to enhance our knowledge through targeted research and innovation across the hydrogen value chain, laying the groundwork to deliver on our long-term strategic vision for hydrogen in Ireland. International cooperation is also an objective of the Strategy. Ireland has signed a Declaration of Intent with the German Government on future joint research and pilot projects in the field of Hydrogen and cross border trade in Hydrogen.

Carbon Capture & Storage

Carbon capture, utilisation, and storage (CCUS) tackles emissions from existing energy assets, providing solutions in some of the sectors where emissions are hardest to reduce like cement, supporting the rapid scaling up of low-emissions hydrogen production, and enabling some CO2 to be removed from the atmosphere. Carbon dioxide removal from the atmosphere is likely to be needed to keep the global temperature rise ‘well below’ 2°C, and to be necessary in achieving the more difficult 1.5°C target

In the 2020 Programme for Government, it was recognised that “in setting the second carbon budget for 2026-2030, we will not yet be in a position to identify all the emerging technologies, changing scientific consensus or policies to meet our full ambition.

The sectoral emissions ceilings, agreed by the Government in July 2022, include 26 Mt CO_2eq. of unallocated savings in the second carbon budget period from 2026-2030 (5.25 Mt CO_2eq. in 2030). CAP 2024 identifies potential measures to address unallocated savings using multiple approaches: Evidence of improved technology readiness and/or commercial deployment: For example, the International Energy Agency (IEA) through its Clean Energy Technology Guide, and the UK Climate Change Committee (CCC), indicate potential for technologies not included in CAP 2024 such as Carbon Capture, Utilisation and Storage (CCUS), carbon removal technologies such as biochar, and sustainable aviation fuels. Potential abatement techniques were also identified from the wider scientific community, such as IPCC reports and regulations such as EU’s Fit For 55.

Assessments were conducted on the feasibility of additional decarbonisation measures for Ireland: These include the 2023 Teagasc MACC which presents the latest perspective on decarbonisation in agriculture and the National Hydrogen Strategy, which sets a vision for hydrogen production and usage in electricity and industry.

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Global reports, including those by the IEA and the UK CCC, along with domestic research such as SEAI’s Carbon Capture Utilisation and Storage: Suitability, Costs and Deployment Options in Ireland and Coillte's strategic vision, underscore the considerable potential of carbon removals in Ireland. Notably, within the second carbon budget, two distinct carbon removal methods emerge as potentially promising avenues capable of addressing part of the gap in residual unallocated emissions:

- Biochar: Utilising biogenic woody residue to produce biochar (e.g., for use as soil enhancement);
- Bioenergy with Carbon Capture and Storage: Removing biogenic carbon dioxide from renewable biomass power plants.

Carbon Tax

The Irish Government's Finance Act, 2010 introduced a carbon tax which is applied to mineral oils, natural gas and solid fuels supplied for combustion in Ireland. The Finance Act 2020 legislated for carbon tax increases to be applied successively, with an increase of €7.50 per tonne of CO_2 emitted, from €48.50 to €56.00, announced in Budget 2024. Ireland has committed to a long-term trajectory of annual increases in the carbon tax rate leading to a rate of €100 per tonne in 2030. A large portion of Ireland’s carbon tax revenues are ringfenced to fund measures which contribute to a just transition, with €412m allocated in 2022 to the following programmes:

- €174m on targeted social welfare and other initiatives to prevent fuel poverty and ensure a just transition;
- €202m to partly fund a national retrofitting programme targeting all homes, but with a particular emphasis on households in or at risk of energy poverty;
- €36m to other sectors to support programmes such as peatlands rehabilitation and the Midlands Just Transition Fund.

Aviation

The International Civil Aviation Organisation (ICAO) Carbon Offsetting and Reduction Scheme for International Aviation (CORSIA) requires airlines in participating States to report emissions and offset these emissions above a baseline level, within a 3-year compliance cycle. The scheme allows Aircraft operators to reduce their offsetting requirements by claiming emissions reductions from the use of CORSIA Eligible Fuels (CEF), i.e. sustainable aviation fuels recognised by the scheme. The scheme aims to address CO_2 emissions from international civil aviation above a baseline level, which for its pilot phase (2021-2023), was above 2019 levels.

The 2022 ICAO Assembly agreed that the baseline will be 85% of 2019 levels from 2024 onwards. The scheme is currently voluntary for its pilot phase and first phase (2024-2026) but will become compulsory from the beginning of its second phase in 2027. Ireland has voluntarily participated in the scheme since its inception along with all other EU Member States.

In 2023, the EU ETS was revised to incorporate CORSIA in EU law both legally and administratively. The EU ETS continues to apply to intra-EEA aircraft operations while CORSIA applies to extra-EEA aircraft operations. In October 2022, the 41st ICAO Assembly adopted an ambitious long-term aspirational goal (LTAG) for emissions reductions, including a collective global goal of achieving Net Zero carbon emissions from aviation by 2050.

In recognition of this, ICAO convened the Third Conference on Aviation and Alternative Fuels (CAAF/3) which took place in November 2023. The outcome of CAAF/3 was the agreement of an interim, non-binding target to reduce CO_2 emissions from global aviation by 5% by 2030 through the use of Sustainable Aviation Fuel (SAF), Low Carbon Aviation Fuel (LCAF) and other aviation cleaner energies (compared to zero cleaner energy use).
At EU level, the ReFuelEU Aviation Regulation was adopted on 18th October 2023. It mandates the increasing deployment of sustainable aviation fuel (SAF) at Union airports out to 2050 sending a clear signal to the fuel industry of future demand for SAF. The Regulation generally applies since 1st January 2024; however, some key provisions shall apply from 1st January 2025. The Regulation sets legally binding obligations upon aircraft operators, aviation fuel suppliers and Union airport managing bodies.

Aviation Fuel Suppliers are mandated to supply a minimum share of 2% SAF from 1st January 2025 and this shall increase over time to a minimum share of 70% SAF in 2050.

Additionally, a sub-mandate for synthetic aviation fuels shall mandate their supply from 1st January 2030 at a minimum share of 0.7% which increases over time to 35% in 2050. Union airport management bodies are required to take all necessary measures to facilitate the access of aircraft operators to such fuels. The Regulation also introduces refuelling obligations for aircraft operators to uplift 90% of their yearly aviation fuel requirements for journeys departing from Union airports within scope. This will limit the practice of fuel tankering which can unnecessarily negatively impact the environment.

An environmental labelling scheme for aviation is also introduced which allows transparency for consumers in determining the environmental credentials of participating aircraft operators and their services.

In Q4 of 2023, the Department of Transport established the Sustainable Aviation Fuel Task Force, to bring together stakeholders with responsibility for and interest in policy development and implementation in relation to SAF. One of its main tasks is to assist the department with the development of a national SAF Policy Roadmap, which will help inform policy formation. To date, the Task Force has met three times, and the next meeting is anticipated for Q3 2024.

Work is ongoing to develop the SAF policy roadmap. Officials are engaging in bilateral meetings with stakeholders, identifying the interlinkages that exist across different policy remits and engaging across Government Departments and agencies to ensure the development of effective cohesive policy.

Amendments to the EU RED in 2023 bringing aviation within the scope of Article 25.1 must have regard to the interplay with the Refuel EU Regulation mandates. The potential for measures to incentivise increased SAF in aviation transport will continue to be reviewed within the consideration of the Alternative Fuel for Transport Working Group and in the context of policy development and update of the Renewable Transport Fuel Policy.

Maritime

The adoption of the EU Fit for 55 Maritime Package, in particular the Fuel EU Regulation, revised Alternative Fuels Infrastructure Regulation and the application of the EU Emissions Trading System to the maritime sector will significantly impact on the regulatory framework shaping pathways towards the decarbonisation of the sector. Research is currently underway across a number of areas to identify how the sector can best be supported to meet its obligations under the enhanced framework.

A government funded project, ShipFuel-IE, is examining the development of pathways for a sustainable shipping and maritime fuel value chain in Ireland. The project will assess a range of potential energy carriers (hydrogen, ammonia, methane, methanol, renewable diesels) produced either from biomass or renewable electricity as fuels for the shipping sector. It will also examine the infrastructural requirements of Irish ports needed to deliver such low-carbon fuels and vessel technologies. ShipFuel-IE involves stakeholder engagement from across the Irish maritime sector. Its work is arranged into three technical work packages assessing the socio-techno-economic and environmental impact of: fuel production routes; refuelling infrastructure required at Irish ports and vessel technology, including the option of retrofitting existing vessels.

In relational to the development of port infrastructure, the Irish Maritime Development Organisation (IMDO) is a partner in the EALING - European Flagship Action for Cold Ironing in Ports – Project. The IMDO is undertaking technical studies aimed at identifying the locations and requirements for OPS in Irish ports and developing high level designs and costings for the systems that could be deployed. The IMDO is also updating a 2019 feasibility study it conducted on The Development of Alternative Fuel Infrastructure in Irish Ports and this will also inform the development of the maritime aspects of the National Policy Framework required under the Alternative Fuels Infrastructure Regulation.

At international level, Ireland is working with our EU colleagues to progress the development of the 2023 Revised IMO GHG Strategy on Reduction of Greenhouse Gas Emissions from Shipping. In addition, Ireland is collaborating with littoral states in the North-East Atlantic to examine the potential for a future Emissions Control Area in the North-East Atlantic Ocean. This is line with the Irish Maritime Directorate Strategy 2021-2025 which commits to exploring policy options in relation to the Introduction of an Emission Control Area in Irish waters.

National Digital Strategy

Our national digital strategy, Harnessing Digital – The Digital Ireland Framework, was published in February 2022 and sets out a roadmap to drive the digital transition across the Irish economy and society. Ireland is committed to continuing to be a digital leader at the heart of European and global digital developments; and Harnessing Digital places a strong emphasis on inclusiveness, security, and safety, underpinned by strong governance and a well-resourced digital regulatory framework.

The Government will ensure its benefits are achieved via targets such as:

- Making connectivity available to everyone, including through the National Broadband Plan, Remote Working Hubs, and Broadband Connection Points, with a target of having all Irish households and businesses covered by Gigabit network no later than 2028 and all populated areas covered by 5G no later than 2030;
- Providing digital skills for all – from school to further and higher education, to life-long learning, with a target of increasing the share of adults with at least basic digital skills to 80% by 2030;
- Ensuring widespread access and use of inclusive digital public services, with a target of 90% of services to be consumed online by 2030;
- Helping small businesses benefit from digital opportunities by providing grants and assistance, with a target of 90% of small-medium enterprise (SME) at basic digital intensity by 2030 and 75% enterprise take-up in cloud, AI, and big data;
- Investing in cyber-security to protect Irish citizens and businesses, including increased resources for the NCSC;
- Ensuring a modern and well-resourced digital regulatory framework and;
- Playing a leading role in Europe right across the digital agenda.

Harnessing Digital aligns with EU priorities, under the Digital Decade 2030 programme. It also complements our work towards achieving Ireland's climate targets, with our green and digital ambitions re-enforcing each other.

Annual Progress Reports set out progress achieved, with the most recent report for 2023 reflecting:

- A newly refreshed Enterprise Digital Advisory Forum, with industry and expert representatives; more than 320 projects have been approved for funding of €30 million under the €58 million Digital Transition Fund, part of an €85 million fund supporting enterprise and our four European Digital Innovation Hubs; and a new Digital Portal will shortly be launched to advise companies;
- A continuing focus on digital skills provision, as well as work on the identification of potential digital skills gaps and future skills needs, and progressing the Digital Strategy for Schools, and Adult Literacy for Life Strategy;

- Our Digital Connectivity Strategy sets out our ambition for digital connectivity to 2030; a Mid-Term Review of the National Cyber Security Strategy 2019-2024 was published, including 18 new strategic actions (further detail below); this includes the continued development of the National Cyber Security Centre (NCSC), through facilities with state-of-the-art connectivity and security, additional staff and enhanced capabilities, and strengthening the NCSC's legislative footing. An annual update on the implementation of the Strategy is due to be published at the end of June 2024;
- The digitalisation of public services is progressing, including through the development of a Key Life Events Service, and 'Digital for Care: A Digital Health Framework for Ireland 2024-2030' was recently published; and
- Digital for Good: Ireland's Digital Inclusion Roadmap sets out the range of initiatives contributing to improving digital inclusion through better skills, access, and infrastructure.

The national digital strategy places a particular emphasis on cyber security, which led to a review of the National Cyber Security Strategy, published in May 2023, to recognise progress made and to respond effectively to an evolving landscape. The National Cyber Security Strategy focuses on the protection of the State, its people and businesses, and its critical national infrastructure. As the strategy is implemented , measures to enhance and strengthen Ireland's approach were considered as part of the review. The revised National Cyber Security Strategy emphasised the following three Pillars as fundamental to meeting the challenges of cyber security moving forward:

- Protect the State, its people, critical national infrastructure, and strategically important industry sectors, from threats in the cyber security realm in a dynamic and flexible manner, and in a way that fully respects the rights of individuals and proportionately balances risks and costs;
- Develop the capacity of the State, education and research institutions, businesses including small and medium-sized enterprises, the public sector, the community and voluntary sector, and of the people to both better understand the manage the nature of the challenges faced in this space and to ensure that organisations and individuals can continue to benefit from economic and employment opportunities in information technology, and in particular in cyber security;

- Engage nationally and internationally in a strategic manner, supporting a free, open, peaceful, and secure cyber space, including playing an active role in the development and implementation of EU policy on cyber security, and ensuring that cyber security is a key component of our diplomatic posture across the full range of engagement.

All groups will be enabled to benefit from digital opportunities under Harnessing Digital. The Government is ensuring effective delivery, through strong political leadership and oversight on digital issues, and strengthened governance structures; as well as regular consultation with stakeholders, including the Digital Regulators Group.

3.1.3.3 Policies and measures to achieve low emission mobility (including electrification of transport)

As regards to the private vehicle fleet, in line with Ireland's CAP, Ireland plans to progressively electrify our mobility systems, moving away from polluting and carbon-intensive propulsion systems to new technologies, such as EVs and introduction of electric and hybrid traction systems for public transport fleets, so that by 2040 Ireland's cities and towns will enjoy a cleaner, quieter environment free of combustion engine-driven transport systems.

Ireland's CAP contains a commitment to maintain and build on existing tax and financial incentives for low emissions vehicles, and in line with the requirements of the recently adopted EU Alternative Fuels Infrastructure Regulation, Ireland will also update its National Policy Framework: Alternative Fuels Infrastructure for Transport in Ireland: 2017-2030 to reflect new targets and ensure that charging and refuelling infrastructure supports the vehicle transition.

In public transport, a key goal is to decarbonise the bus and rail fleet by transitioning to zero-emission vehicles. This policy is already being implemented, for example, no new diesel-only buses have been purchased for urban public service obligation bus fleets since July 2019, and the CAP sets a target to accelerate the decarbonisation of the public bus fleet with the objective to only have low-emitting buses in the urban PSO bus fleet by 2035, with an expected 1,500 low-emission buses serving PSO routes by 2030. The transition to a zero-emission urban bus fleet is currently programmed to take up until 2035, based on replacement of non-zero-emission buses as they reach the end of their efficient service lives. Further electrification of urban rail services is also planned with projects including DART+,

Metrolink and the expansion of the Luas tram network. The draft All-Island Strategic Rail Review, which will inform investment in the rail sector in Ireland and Northern Ireland to 2050, recommends the decarbonisation of the rail network, including an electrified intercity network.

Low Emission Vehicles

Zero Emission Vehicles Ireland (ZEVI) has been established as a dedicated Office within the Department of Transport, charged with supporting consumers, the public sector, and businesses to continue to make the switch to zero emission vehicles. The Office leads on the delivery of the Ireland's ambitious targets under the CAP 2024 to have an expected 30% of our private car fleet switched to electric by 2030. Zero Emission Vehicles Ireland launched on 21st July 2022.

The Irish Government has committed significant funding to support low emitting vehicles through the National Development Plan, which currently includes an allocation of almost €500 million for the period 2021-2025 and additional support from the Climate Action Fund. ZEVI uses this funding to provide capital grants to support the purchase of EVs and capital funding for the delivery of EV charging infrastructure. Almost €116m has been allocated in 2024 to ensure the continued transition to electric vehicles which includes funding for EV grants and EV charging infrastructure. This underpins the Irish Government's commitment to making electric vehicles accessible to all. While the bulk of this funding has been focused on vehicle incentives to date, Government investment strategy for electric vehicles will begin to rebalance towards supporting EV charging infrastructure. In January 2023, ZEVI published the National EV Infrastructure Strategy, covering the crucial period out to 2025, alongside an Implementation Plan. The strategy sets out the Government's ambition regarding the delivery of a public EV charging infrastructure up to 2025, including a commitment of €100m towards its delivery. The strategy focuses on the provision of publicly accessible charging infrastructure for electric cars and light-duty vehicles to meet the needs of 195,000 electric cars and vans by the middle of the decade. The strategy also addresses the needs of heavy-duty vehicles as required by the AFIR regulation.

Building on the EV Infrastructure Strategy, ZEVI has worked with Transport Infrastructure Ireland (TII), the Local Authorities, Regional Assembly's and ESB Networks in developing a National EV Charging Infrastructure Plan.

- The first part of this plan – the National Road Network EV Charging Network Plan (NRNECP) was published as the Draft National En-Route EV Charging Network Plan in September 2023 and the final plan will be published in May 2024.
- The second element is the Regional and Local EV Charging Network Plan, which focuses on destination and neighbourhood charging, is planned to be published for consultation in May 2024.

While at a national level the ambitions of these plans are defined mainly by the CAP and the National Electric Vehicle Charging Infrastructure Strategy, at a European level, the Alternative Fuels Infrastructure Regulation (AFIR) sets specific requirements and standards for the provision of accessible and efficient charging infrastructure. These plans and the initiatives therein will drive the delivery of charging infrastructure to be ahead of demand and deliver AFIR requirements for both LDVs and HDVs resulting in a nearly 250% increase in power available on its public charging system for cars by 2025 with a further trebling by 2030 as follows:

Table 28: Total Charging Power for EV Chargers

Target Year	EV Chargers	Total Charging Power
Feb 2024	2,400	85,000 kW
2025	3,200 – 6,210	214,000 kW
2030	•	705,000 kW

While the National Road Network EV Charging plan will be delivered through Transport Infrastructure Ireland, under the Regional and Local Infrastructure Plan, the accelerated expansion of public destination and neighbourhood charging infrastructure will be led by local authorities. To deliver this, a regional approach amongst local authorities will be taken to strategy development and implementation with a view to sharing resources and ensuring a consistent approach to the delivery of EV Infrastructure. The Local Authority EV Strategies will be developed with support and in partnership with public sector bodies, private sector groups and other stakeholders.

While the pathway to funding supports for infrastructure up to 2025 is reasonably clear, the level of exchequer funding that will be required to deliver 2030 targets and particularly HDV charging infrastructure targets is currently being considered. ZEVI have engaged with the European Investment Bank (EIB) Advisory service under the EU Invest Programme to get expertise on funding and business models.

The CAP also committed to considering an operating model for eMobility Hubs, helping to support a shift away from private car ownership/use in favour of more sustainable modes. In line with the CAP 2023 and CAP 2024 actions, a pilot project is being developed to help inform the development of an operating model for mobility hubs, which will support the potential roll-out of hubs nationally, particularly in the five cities. Modular, in format, to adapt to the characteristics of specific locations, it is anticipated that hubs to be developed as part of the pilot would be branded and would include bikes, ebikes (and other micromobility options), car share club EVs and charging locations for private EVs. Many hubs are expected to be located adjacent to public transport nodes and will include AC charging and, where appropriate, with options for faster DC. As well as a 'base' charging option for those unable to charge at home, the 'shared' and 'network' elements of the hubs have the potential to encourage a transition away from car ownership and the development of local EV infrastructure, to include shared car clubs, strategically aligns with these CAP actions. A public consultation on the development of mobility hubs – to inform the pilot - was launched in March 2024, with submissions to be reviewed during summer 2024. It is intended to finalise a new Policy Statement on Mobility Hubs by end 2024.

Draft Universal Design Guidelines for EV Charging Infrastructure was published for public consultation on 30th June 2023 and the final version will be published in Q2 2024. The document summarises key considerations when designing, installing, and operating EV charging stations. The guidance includes best practice on the design of a charging station, the accessibility of a charging site and the information and communications expected to inform users before, during, and after a charging session.

Vehicle funding supports

The following vehicle supports are currently being offered in Ireland:

- Vehicle Registration Tax (VRT) relief of €5,000 on the purchase of newly registered battery EVs up to a value of €40,000. A tapered relief is available for cars value less than €50,000;
- A purchase grant of up to €3,500 for battery EVs up to a value of €60,000;
- Accelerated Capital Allowances (ACAs) for EVs;
- A grant of up to €10,000 to support the purchase of a battery EV in the taxi/hackney/limousine sector with an additional €2,500 available for those choosing to make their vehicle wheelchair accessible. Those scrapping older, more polluting, or high mileage vehicles are now eligible for double the normal

grant if they make the switch to electric with up to €20,000 available for a new BEV, €25,000 for a new wheelchair accessible BEV and €15,000 for a new wheelchair accessible PHEV; In addition to these grants, SPSV owners who switch to an EV can also avail of VRT relief (up to €5,000) and a Domestic Charger Scheme (up to €600);

- Benefit-in-Kind tax relief for battery EVs;
- Low motor tax for EVs;
- A Public awareness campaign on the benefits of electric vehicles, Government investment in charging infrastructure and the supports available;
- A Zero Emission Heavy-Duty Vehicle grant scheme for HDVs to bridge the gap between a zero-emission vehicle and a fossil fuel vehicle;

The level of support for vehicles is regularly reviewed in order to ensure the right balance across all of ZEVI's incentive measures across both its vehicles and infrastructure remits.

Charging Infrastructure supports

In addition, to support the development of charging infrastructure, the following supports are in place:

- A grant of up to €300 towards the cost of the installation of a domestic charge point in private dwellings with off-street parking and in multi-unit developments;
- Accelerated Capital Allowances for businesses to support investment in charging infrastructure;
- Support of €10m from the Climate Action Fund to support ESB e-cars in renewing the existing public charging network and rolling out 50 fast chargers (50 kW) and 90 superfast chargers (150 kW) across the country (approximately 50% funding);
- The first scheme under the National Road Network EV Charging Plan, was launched by TII in February 2024. This ZEVI funded scheme will provide €21m to accelerate the development of high-powered EV charging infrastructure and ensure 1,200 kW of charging every 60km across Ireland's motorway network by 2025. Funding will be secured through a competitive grant process and up to 50% of eligible costs will be funded. It is expected that a second scheme will be rolled out before the end of the year to target the remaining national road

network. Combined these schemes will be designed to deliver 21% of the National Target of 214,000 kW of charging capacity;

- A Shared Island funded Sports Club scheme, which will install up to 200 fast chargers across the Island. €15m has been secured for the provision of charge points under this scheme;
- An EU Just Transition Fund supported scheme for Community Facilities, which plans to install 60-80 chargers in the Just Transition areas. €15m has been secured for the provision of charge points under this scheme;
- In 2022 and 2023, ZEVI provided funding to a number of Local Authorities and public sector organisations to undertake pilot projects for EV charging. This not only provides for early installations but also provides learning and evaluation of various EV charging models and activities;
- Under the Regional and Local EV Charging Plan and the Local Authority strategies, new funding schemes will be delivered from 2024 to 2030 to support the roll out of EV Infrastructure for public charging at Destination and Residential Neighbourhood locations;
- The delivery of the AFIR targets for dedicated HDV charging will be a significant challenge as with CAP targets to transition 5,000 HDVs (3,500 HGVs and 1,500 busses) by 2030, it will attract minimal private investment. TII are working on a State Aid Notification to enable funding for this infrastructure.

Land Use Planning

Ireland has a relatively low population density with 70 persons per square kilometre compared to 117.7 for the EU-28. Such settlement patterns give rise to dispersed journeys for which public transport provision is not always feasible. The net result is a higher dependence on private car use and longer journeys compared with more densely populated urban settlements. In addition, Ireland is experiencing population growth with an increasing tendency towards dispersed, low-density developments. The largest increases in population over the past twenty years have been in Fingal, Cork (outside Cork City Council area), Kildare, Meath, Laois, and Galway County (outside Galway City Council area) accounting for approximately 45% of the additional population growth since 1996.

These extensive catchments and dispersed land-use development patterns have resulted in greater car dependency, longer commutes, a high demand for road infrastructure and

difficulties in supplying adequate public transport provision. Transport policies aimed at reducing travel demand and travel distances can only be delivered if there are effective spatial policies in place. The location of schools, jobs, shops, local services, and other land uses relative to the location of residential developments are critical determinants of the need to travel, the distances to be travelled and the modes of transport chosen.

Additionally, the provision of sustainable transport alternatives can only be effective if matched with complementary development patterns which support and facilitate their use. Future investment in new public facilities must take account of the need for access without reliance on the car. Better integrated land use and transport planning and transport-orientated development is a key objective in national policies to help counteract dispersed settlements and facilitate more sustainable travel by active travel and public transport. The new draft demand management strategy 'Moving Together: A Strategic Approach to Improving Efficiency in the Transport System in Ireland', which was launched for public consultation in April 2024, includes recommendations to strengthen policy alignment and implementation mechanisms to deliver NPF National Strategic Objective 1 'Compact Growth' and NSO 4 'Sustainable Mobility' given the critical role of compact growth in reducing travel demand and in enhancing transport system efficiencies.

One of the ten goals of the National Sustainable Mobility Policy is to better integrate land use and transport planning at all levels to support the National Strategic Outcomes of the National Planning Framework relating to compact growth, sustainable mobility and transition to a low carbon and climate resilient society. This is supported at a metropolitan level through the metropolitan area transport strategies which are in place in the five cities (Cork, Dublin, Galway, Limerick, and Waterford) and which set out programmes of proposed transport investment in active travel, bus, and rail for each city over a 20-year period. The Cork Metropolitan Area Transport Strategy was published by the National Transport Authority (NTA) in 2020 while the Limerick-Shannon Metropolitan Area Transport Strategy and Waterford Metropolitan Area Transport Strategy were published in 2022. A revised Transport Strategy for the Greater Dublin Area (GDA) 2022-2042 was published by the NTA in 2023 and work is underway to develop a new Galway Metropolitan Area Transport Strategy to replace the 2016 Galway Transport Strategy. These metropolitan area transport strategies are consistent with the spatial planning objectives in the National Planning Framework and the relevant Regional Spatial and Economic Strategy. The statutory basis on which these strategies are developed differs currently with an explicit statutory basis to the transport strategy in the GDA and a specific statutory role for the NTA. Outside the GDA, the metropolitan area transport strategies are currently non-statutory plans which are developed

by the NTA in co-operation with the relevant Local Authorities and other agencies. The National Planning Framework: Ireland 2040, the National Sustainable Mobility Policy and the CAP include a commitment to extend the NTA's statutory remit for transport planning in the GDA to the other cities.

The CAP highlights the importance of embedding transport orientated development (TOD) at all stages of planning and development, particularly the siting of services and multi-use development at transport nodes. TOD is a well-established plan-led approach that seeks to provide higher density mixed-use development in close proximity to high quality transport services. The Department of Housing, Local Government and Heritage and the Department of Transport jointly established a working group in December 2021 under the Government's Housing for All plan to consider opportunities for TOD in major urban centres. The working group has completed a review of TOD opportunities in Dublin and is now focusing on TOD opportunities in the wider eastern region and in Cork, Galway, Limerick, and Waterford.

In line with the energy efficiency first principle, public transport use and modal shift should be encouraged through efficient planning. The first revision to the National Planning Framework in addition to its ongoing implementation is central in setting the context for future national planning objectives and will ensure that all future land use and transport planning are fully aligned to successfully influence how people travel. Land use policy is a key determinant in transport investment decisions at both the strategic and local level. The Framework has set National Strategic Outcomes for Sustainable Mobility and the Transition to a Low Carbon Climate and Climate Resilient Society. The Government has identified the transition to EVs and other LEVs as a critical factor in delivering these outcomes, through:

- The provision of adequate charging infrastructure: The Government's vision is that, where feasible, EVs are charged primarily where they are parked overnight and that supplementary charging opportunities are made available at suitable locations and destinations where vehicle parking is provided and along key travel routes;
- Local Authority Development Plans: The cost of retrofitting charging infrastructure to existing homes, businesses, car parks and other locations can be a barrier to its installation and therefore to the transition to EVs. Consequently, it is vital that Local Authorities should ensure that provision is made for EV charging within their Development Plans, particularly at the point of development and construction. The regional approach of ZEVI's Regional and Local EV Charging

Network Plan and particularly the plan for its delivery through the Local Authorities will facilitate this going forward;

- The provision of adequate charging LEV infrastructure: The provision of adequate fuelling infrastructure nationally for other LEVs (such as CNG, liquefied natural gas and hydrogen) should be facilitated, where appropriate, to support the uptake of these vehicles and their rollout nationally.

A Working Group set up under the LEV Taskforce considered the role that planning policy and legislation, building regulations and state leadership may play in facilitating charging and refuelling infrastructure deployment. Planning Authorities play an important role in future proofing the need for LEV recharging/refuelling infrastructure through the planning process. Currently, in Ireland all Planning Authorities are required to have a Development Plan for their functional area which must support the promotion of measures to reduce greenhouse gases and address the necessity of climate change adaptation.

To integrate LEVs further into Development Plans the LEV Taskforce recommended that the Guidelines be updated to include references to evolving Government LEV policies to support the roll out of LEV infrastructure through Planning Authority functional areas; making sure certain adequate numbers of EV charging points are installed and provision is made (e.g. through the installation of ducting) for future installation of EV charging points at all appropriate locations where parking is provided for passenger vehicles (including homes, businesses, on street and car parks); safeguards that ensure adequate numbers of public EV charging points are 'accessible for all'; and ensure locations that cater for traditional fuelling of vehicles (i.e. filling stations) provide charging for EVs and, where applicable, and in line with Government policy, fuelling for other LEVs. The Taskforce also recommended that guidance be issued to planning authorities to ensure a consistent and future-proofed approach to the rollout of EV charging infrastructure through planning decisions. These recommendations have been taken on board in the development of ZEVI's the Regional and Local EV charging Plan and the Universal Design Guidelines.

Improving the Efficiency of Public Transport

The Public Sector Energy Efficiency Strategy highlights the role that the public sector fleet can play in piloting, facilitating and accelerating market uptake of new, energy efficient technologies and alternative fuels. The efficiency of the public transport fleet is incrementally

being improved through the replacement of older vehicles with newer models and accelerating the roll-out of battery powered and more energy efficient vehicles.

Public transport infrastructure investment

The DART (Dublin Area Rapid Transit) system is an electrified commuter rail network serving the east coast of Dublin, including its city centre. Passenger demand grew by more than one-third on DART and commuter rail services from 2013 to 2019, with 35.6m passenger journeys. The DART+ Programme will create a full metropolitan area DART network for the GDA and will transition current diesel commuter lines to electricity from the city centre to Drogheda, Co. Louth, and to Celbridge/Hazelhatch and Maynooth, Co. Kildare. This will also involve a new interchange station with bus, LUAS (light rail) and planned MetroLink networks. This part of the national rail network carries over 75% of total rail passengers each year. This will triple the amount of electrified track in the GDA from 50km to 150 km by 2030.

Delivery also commenced in 2022 of Ireland's first diesel-electric trains, which will enable the enlargement of the rail fleet by approximately some 300 new rail carriages. Under the NDP 2021-2030, BusConnects programmes will be substantially delivered in all of Ireland's five cities by the end of the decade. BusConnects programmes comprise a number of different elements including the network redesign of bus services and the development of core bus corridors infrastructure, including segregated cycling facilities on the busiest routes to make journeys faster, more predictable, and reliable. BusConnects will enhance the capacity and potential of the public transport system by increasing and replacing the bus fleets with LEVs and introducing a new system of Next Generation Ticketing and cashless payments.

MetroLink, which is another key project under the NDP, will be a fully segregated and mostly underground new rail line from the Swords area in north Dublin to Charlemont in the south of Dublin City Centre. This new link will form a key spine of the overall public transport system for Dublin, alongside BusConnects and DART+, and facilitate compact transport-orientated development at key locations. The Cork Area Commuter Rail Programme represents the largest investment in the rail network in Cork undertaken by the State. The programme comprises several separate but interrelated projects. These include the integration of the three existing railway corridors in the Cork area; full electrification, or alternative fuelling of the suburban rail network; other infrastructure improvements to accommodate a transformative 10-minute frequency for the suburban rail network in Cork; additional rolling stock; and a muti-modal integrated transport hub for the city. This could potentially be

implemented across the wider fleet. These major rail projects will help supplement the range of viable low carbon alternatives to private passenger car travel and positively impact on our sectoral emissions and energy profile.

Cessation of Diesel Urban Bus Purchasing

In the urban bus fleet, a clear trajectory towards low emissions has firmly been established. The NDP committed Ireland to no longer purchase diesel-only buses for the urban public bus fleet from July 2019, which is supported by the NTA, which is responsible for procurement of vehicles in the public service obligation (PSO) fleets. The CAP sets a target to accelerate the decarbonisation of the public bus fleet with the objective to only have low-emitting buses in the urban PSO bus fleet by 2035, with an expected 1,500 low-emission buses serving PSO routes by 2030.

In order to inform such future purchasing decisions, the Department of Transport launched a low-emission bus trial in December 2018. The trial assessed full electric, diesel-electric hybrids, CNG, and hydrogen buses, with a final report on these trials published on the Government website in 2022, and which will continue to inform subsequent procurement decisions. In March 2022, a major framework contract for the provision of up to 800 double deck electric buses was signed, supplementing a similar framework agreement for up to 200 single deck electric buses signed in 2021. First deliveries of new electric buses have commenced, with buses going into service in 2023 following testing and commissioning, and completion of depot charging. The recast Clean Vehicles Directive also contains new stringent sub-targets for zero- emissions buses to promote cleaner and energy-efficient public transport vehicles. It is expected that this Directive will result, in the longer term, in acceleration and wider deployment of clean and energy efficient buses. Supporting these goals, Ireland also became a signatory to the Global Memorandum of Understanding on Zero-Emission Medium and Heavy-Duty Vehicles at COP27, which sets a non-binding target which seeks to ensure that by 2030, a minimum of 30% of new sales of MHDVs (trucks and buses) would be zero-emission.

Electrification of New Public Transport Projects

Ireland also launched its first all-electric town bus service in Athlone in January 2023, as part of a €10m investment by the NTA. This was the first project to launch under the Government's Sustainable Mobility Policy Pathfinder Programme – a package of exemplar transport projects to be delivered by state agencies and Local Authorities around the country by 2025, in order to demonstrate the benefits of sustainable mobility.

This town service roll-out has recently been followed by the roll-out of the first electric regional city bus fleet in Limerick. In total, 55 new double-decker battery-electric buses are expected to service more than 2.1 million emission-free kilometres in Limerick city annually, as part of a €54m investment in the city's bus service.

Demand Management

In the design of a decarbonisation pathway capable of meeting a 50% emissions abatement target, it is clear that demand management and the enhanced provision of sustainable transport alternatives will be required. The CAP sets out a number of actions and targets including some which should encourage a reduction in vehicle km driven on Irish roads with an enhanced focus on the Avoid-Shift-Improve framework for greater transport sustainability and increased wellbeing.

Reduced car usage would be beneficial in several ways, including improved air quality, less congestion, and lower levels of CO_2 emissions. In order to encourage the transition away from fossil fuels into more sustainable forms of transport, the Plan commits to the development of a national demand management strategy. Good progress has been made in this respect. The Department of Transport has developed a draft Strategy 'Moving Together – A Strategic Approach to Improving the Efficiency of the Transport System in Ireland' along with an Implementation Plan. This Strategy, which was launched for a 3-month period of public consultation on 16th April 2024, represents a call for collective action across Government and society to affect the systems change required (as per OECD 2022) in support of transport decarbonisation targets. It identifies the wide range of policy areas and activities that impact on transport demand and makes recommendations that are intended to incrementally bring about changes in the transport system. The draft Strategy sets out a wide range of options that can be deployed at national, regional, and local level. It also provides for supporting, guiding, and enabling the appropriate authorities and entities, both in the public and private domain, to take ownership and shape their own actions in a coherent, evidence-based manner. Following the public consultation, it is proposed to seek approval to publish the final Strategy and Implementation Plan by end 2024.

EV Deployment Roadmap

Passenger cars account for over half of all land transport emissions in Ireland; therefore, a transition to low and zero emission cars is one of the necessary changes required if Ireland is to substantially reduce its transport emissions and energy use. Accordingly, EVs are a prominent mitigation in the CAP, which sets targets of 195,000 EVs on Irish roads by 2025,

and 30% of the EV fleet to be electric by 2030. With over 118,000 EVs on the road at the end of February 2024, almost 67,000 of these BEVs, these targets are broadly in line with the profiled trajectory to achieve but will remain very challenging and are indicative of the scale of the transformation that is needed across all sectors if Ireland is to reduce national emissions and reach its legally binding emission ceiling in future years.

It is widely expected that, over the coming years, the combination of; improvements in technology; reductions in EV purchase prices; increasing driving ranges and model availabilities; Government incentives and new investment in the recharging network, will maintain the current positive policy environment under which EV sales rise steeply over the past year, albeit from a low base.

To date, the Irish Government, supported by the LEVs Taskforce and more recently, ZEVI, has worked to ensure that conditions and policies are in place to support citizens in making greener vehicle choices. Several Government Departments have responsibility for incentives to encourage a move towards EVs; this concerted work across several Departments will continue in order to accelerate the current trajectory of EV sales. The CAP commits the recently established Zero Emissions Vehicles Ireland office (established July 2022) to continue with and review the development of a roadmap on the optimum mix of regulatory, taxation and subsidy policies to drive significant ramp-up in passenger EVs and electric van sales from very early in the next decade.

Modal Shift/Share

Alongside technological developments, behavioural change amongst motorists will be critical in reducing emissions in the transport sector. Modelling undertaken for CAP 2023 on the level of change necessary to deliver a 50% abatement of transport emissions by 2030 has highlighted that at least 2 Mt CO_2eq of annual abatement will be required through a basket of ‘Avoid’ and ‘Shift’ measures and to counteract emissions associated from projected growth in population and economic activity.

Many mitigation measures are dependent on modal shift or a change in the fuel and/or technology currently employed to meet travel demands. It is critical to develop a better understanding of the important role that behavioural economics and psychology play in decision making to facilitate a greater uptake of energy efficient or sustainable travel options. Normalising new technologies and addressing consumer concerns will be required to accelerate the mitigating impact that alternative fuels and technologies can potentially have.

Timely delivery of the actions set out in the National Sustainable Mobility Policy (SMP) and its associated SMP Action Plan 2022-2025 will be critical in achieving the modal shift necessary to meet the targets set out in CAP 2023 and reiterated in CAP 2024. The SMP Action Plan sets out 91 actions to achieve these targets via a wide range of interventions including public transport infrastructure and services, active travel promotion and supports, road safety initiatives, legislative measures, research, public engagement, and others. Implementation of the SMP and its Action Plan is overseen by a Leadership Group made up of representatives of Government Departments, relevant agencies, and regional and local authority representatives, and an annual Progress Report is published with an update on the delivery status of each of the actions set out in the Action Plan.

In addition, the SMP Pathfinder Programme, which was launched in October 2022, comprises a series of sustainable mobility projects to be implemented around the country by the end of 2025. The Programme aims to bring increased momentum to the delivery of projects at a local level, providing templates that can be replicated elsewhere, and with a strong emphasis on experimental and innovative approaches. Alongside the SMP itself, the Pathfinder Programme will help to identify effective approaches to generating modal shift, as well as providing a mechanism to capture and share learnings which will inform future sustainable mobility projects.

Figures released from the Central Statistics Office (CSO) in the Census 2022 indicated that 750,000 people, a third of workers, now worked from home for at least some part of their week, while the number of people who drove to work increased by 4% to 1.2m between 2016 and 2022. However, more positive behavioural change signals were recorded with respect to education-related journeys, with 88% more primary school children commuting by bicycle than in 2016, and the number of students aged 13 to 18 cycling to school up by 79%. This has occurred against a background of strong economic recovery, growth in the numbers of people at work, and consequent increases in travel demand and the number of people commuting as the country has emerged from COVID-19 public health restrictions.

In the GDA, there has been a much greater and a more significant modal shift. The Canal Cordon Report 2022 recently published by Dublin City Council and the NTA - which provides data on trends in mode share of vehicles and people crossing the Canal Cordon in Dublin between 7am and 10am - indicates that a strong modal shift has been occurring in the Dublin City Centre area. It shows that over 70% of all inbound trips crossing the canal cordon were made by a sustainable mode which includes cycling, walking, taxi and other public transport, with the total number of trips recorded crossing the cordon in 2022

(177,243) at c.80% of pre-pandemic levels, capturing some of the impact of working-from-home policies that have now become embedded.

In order to continue to build on this momentum and to encourage further modal shift nationally, over €110m in capital funding is being directly allocated to develop cycling and walking infrastructure in the GDA, Galway, Limerick, Cork, and Waterford over the period 2018-2021. A further €135m capital funding is allocated over this same period for investment in Sustainable Urban Transport projects, and these will include projects that will provide either direct or indirect improvements for urban cycling. €2.5m per annum is also spent on behavioural change programmes including Green Schools, Cycle Right and Smarter Travel Workplace and Campus programmes aimed at encouraging a modal shift.

3.1.3.4 Where applicable, national policies, timelines and measures planned to phase out energy subsidies, in particular for fossil fuels

Fossil Fuel Subsidies

The recent Global Stocktake decision, reached at COP28, was a landmark moment in global efforts to address the climate crisis. The broad ranging decision, which called for the phasing out of inefficient fossil fuel subsidies that do not address energy poverty or just transitions, as soon as possible, also called for the doubling of energy efficiency, the tripling of renewables and, for the first time in a COP decision text, called for Parties to transition away from fossil fuels. In the IPCC's Sixth Assessment Report,[31] they found that removing fossil fuel subsidies would reduce emissions, improve public revenue and macroeconomic performance, and yield other environmental and sustainable development benefits. At COP28, Minister Ryan was pleased to join an international coalition to phase out fossil fuel subsidies, spearheaded by the Dutch Government. Ireland looks forward to continuing to engage with the other members of the coalition, as they work to progress the phase out of fossil fuel subsidies.

Ireland's CAP highlights the need to decouple economic growth from fossil fuel dependency and is reflective of the environmental goals of the 2015 Paris agreement and the European Green Deal. CAP commits to developing a roadmap for the review and transition away from fossil fuel tax subsidies. The first step in this action is a review of existing fossil fuel tax

[31] Available here: "https://www.ipcc.ch/report/ar6/syr/downloads/report/IPCC_AR6_SYR_LongerReport.pdf"IPCC_AR6_SYR_LongerReport.pdf pg.111

subsidies. As part of the whole-of-Government approach to address the actions outlined in the Government's CAP 2024, Government Departments are working in a co-ordinated manner to achieve the targeted reductions in overall greenhouse gas emissions by 2030 and reach net-zero by 2050. The Department of Finance is assessing the impact of climate change on the public finances, as part of the budgetary process, by conducting and publishing green budgeting analysis.

Green Budgeting — Department of Finance:

Green budgeting is a process that seeks to consider the impacts of the budgetary process and wider fiscal policy on the transition to a more sustainable, environmental and climate friendly economy. Ultimately, green budgeting has the potential to induce policy changes that will result in improved environmental outcomes. The Department of Finance's focus is on undertaking green budgeting analysis of the tax system. This includes analysis of both climate positive and climate negative tax revenues and tax expenditures (that include for example fossil fuel subsidies) in the tax system.

In Budget 2022 (October 2021), the Department of Finance first published a review of green budgeting from a tax perspective. This publication represented a first-stage analysis of tax related green budgeting, a process which can be expected to develop over time and help inform other areas of the Department's climate analysis. At a European level, the Commission has acknowledged that Ireland is considered to be at the forefront of green budgeting tax analysis among Member States. At an international level, the Department of Finance and Department of Public Expenditure and Reform (DPENDR) work closely with colleagues in the OECD and the European Union. At an OECD level, the Department is actively engaged in the Paris Collaborative, which aims 'to design new, innovative tools to assess and drive improvements in the alignment of national expenditure and revenue processes with climate and other environmental goals'. At an EU level, the Departments participate in the Green Budgeting Expert Group with other EU Member States.

The Department of Finance and DPENDR also provide input into the annual surveys and to ad-hoc research undertaken by the EU and the OECD. At present, both Department are participating in Civil Service Exchange programmes with colleagues across the EU to learn from their practices and provide feedback on the Irish experience.

Green Budgeting – Budget 2024:

Green Budgeting analysis undertaken as part of Budget 2024 examined the tax system as a whole, over the period 2012 to 2021. It also examined the estimated climate impact, in monetary terms, of recent previous budgets, from Budget 2019 to Budget 2024. The analysis of the tax system over the period 2012 to 2021 concluded that the tax system as a whole is climate positive, from a monetary perspective. This climate positive monetary balance has grown significantly over time, from around €1.7 billion in 2012 to €3 billion in 2021.

Budgetary policy between Budget 2019 to Budget 2022 is also shown to be strongly climate positive. The Government is cognisant that while recent tax-related budgetary policy appears, on the face of it, to be climate negative, it is important to recall the context within which climate-negative tax measures have been introduced. In particular, in Budget 2024 there are a number of time-bound excise and VAT cost-of-living measures that have been introduced to offset significant short-term inflationary pressures, in particular energy price increases. Given the temporary nature of these measures, it is important to note that the overall climate negative related impact in Budget 2024 from these cost-of-living measures is not expected to have long-term implications for future climate-positive taxation policy

The Department of Finance, in its 2023 ‘Climate Action and Tax’ paper’ (Tax Strategy Group), carried out a review of the main existing fossil fuel tax subsidies within its remit, in particular the diesel excise gap, and the diesel rebate scheme. It outlined options for phasing out these fossil fuel subsidies.

It should be noted that the Tax Strategy Group is not a decision-making body and the papers produced by the Department are a list of options and issues to be considered in the budgetary process. The existing Directive provides for a wide range of exemptions and reductions in the form of fossil fuel incentives which are not in line with the European Green Deal. Getting agreement on this proposal to amend this is challenging in the absence of the widespread availability of alternative fuels for the aviation, maritime and transport sectors.

The Irish Government is engaged proactively with other Member States at EU level on this matter. Decisions in relation to excise matters and tax matters are considered as part of the annual budgetary process taking account of relevant EU directives. The Department of Public Expenditure, NDP Delivery and Reform has published assessments of programmes that are considered likely to have negative climate and environmental impacts, including fossil fuel subsidies and other potentially harmful supports, both through a detailed Spending

Review[32] and through inclusion in budgetary documentation alongside the Revised Estimates Volume for Public Services.[33] The staff paper and the accompanying budgetary documentation assess expenditures on the basis of their potential negative impact on climate and environmental outcomes. Hence, this is a broader assessment than just an assessment of fossil fuel subsidies.

In particular, the analysis notes that the identification of a subhead as a potentially climate harmful support is not a suggestion that a programme is not valid. Rather, it merely acknowledges the likely practical impacts a programme may have. The stated policy rationale for each expenditure item considered to be potentially harmful is detailed in both papers and, in many cases the programmes in question may lead to very important wider social benefits. Careful consideration is required to determine if there are potentially less distortionary means of achieving the outcomes the expenditure supports or, where feasible, the Departments and Agencies responsible for the programmes identified should put in place controls or complimentary measures that can offset or negate any potentially harmful impacts that have been identified. In some cases, programme reforms have already likely reduced negative externalities in items considered as fossil fuel subsidies.

For example, the Fuel Allowance is now a means-tested, direct income support provided for a certain period of the year. While it is provided over a time of the year when energy costs are higher, as a cash payment, decisions on its specific use are at a household's discretion. As such, there is no incentive to over-consume energy, which may have been the case were the supports linked to a certain quantity of energy use or provided as on-bill support only. Hence, while the fuel allowance may potentially have a negative impact on emissions (versus its absence), that impact has been minimised and must be considered against the wider societal benefits delivered by the programme, in particular a reduction in fuel poverty, also identified in the Commission's National Energy and Climate Plan recommendations as a priority. Highlighting items as potentially unfavourable or harmful, as defined in this work, suggests increased focus is required on ensuring that any negative climate and

[32] A Review of Fossil Fuel Subsidies and other Potentially Climate Harmful Supports (DPENDR, February 2023)

[33] Green Budgeting in REV 2024: Climate and Environmental Expenditure in the Revised Estimates for Public Services (DPENDR, December 2023)

environmental impact of this investment is minimised insofar as is possible by the holders of those policy areas.

The CSO estimated total fossil fuel subsidies in Ireland amounted to €2.2bn in 2020, with indirect subsidies arising from revenue foregone due to tax abatements accounting for 87%of this figure. As mentioned above, as part of the Budget Quality of Life Assessment, the Department of Finance publishes green budgeting tax analysis. In 2022, this analysis concluded that the tax system as a whole is climate positive from a monetary perspective and has grown significantly over time from a €1.4bn climate positive monetary balance in 2011 to a balance of €2.5bn in 2020. This means that the tax system collects more revenue from fossil fuel use than it provides in relevant tax expenditures. It does not account, however, for fossil fuel subsidies provided through state spending generally.

3.1.3.5 Just Transition

Just Transition Legislation and Policy

The Climate Action and Low Carbon Development Act 2015, as amended, established a National Climate Objective to “pursue and achieve, by no later than the end of the year 2050, the transition to a climate resilient, biodiversity rich, environmentally sustainable and climate neutral economy”. As referenced in previous sections, the Act sets Ireland on the path to a 51% reduction in emissions by the end of this decade and to net-zero emissions no later than 2050.

Delivering a just transition is based on recognising the transformational level of change required to meet these targets and having a shared understanding that the transition is fair, and just, and that the costs are shared equitably. Our climate policies should, therefore, seek to protect the most vulnerable. The 2021 Act provides that, in the transition towards the National Climate Objective, Ministers and the Government as a whole, in preparing both the Long-Term Climate Action Strategy and the annual CAP , must have regard to the requirement for a just transition to a climate neutral economy, which endeavours, in so far as practicable, to maximise employment opportunities and support people and communities that may be negatively affected by transitions. Building on this provision, the Government, initially through CAP 2021 adopted an overarching framework for policy development, which takes a principles-based approach to define just transition in Ireland. The just transition framework is made up of four principles:

1. An integrated, structured, and evidence-based approach to identify and plan our response to just transition requirements.
2. People are equipped with the right skills to be able to participate in and benefit from the future net zero economy.
3. The costs are shared so that the impact is equitable and existing inequalities are not exacerbated.
4. Social dialogue to ensure impacted citizens and communities are empowered and are core to the transition process.

Each Minister must consider their climate policy development and implementation against the four principles for a just transition set out above and the recommendations of the CCAC. Each relevant Minister will also report to the Oireachtas on how our principles for a just transition are being addressed under the most recently approved CAP, including the policies, mitigation measures and adaptation measures for each sector.

1. An integrated, structured, and evidence-based approach to identify and plan our response to just transition requirements

Based on our current understanding, it is likely that the future impacts of our transition to a climate neutral economy will be both incremental and broadly-based, affecting occupations most closely linked to consumption of fossil fuels, arising from increases in heating, energy, and transport costs, or resulting from changes in agricultural practices. This does not exclude the possibility of concentrated impacts in different parts of the country or income groups (e.g., with higher reliance on private cars for mobility, on solid fuels for domestic heating, or on particular types of agricultural production). Our long-term agenda for a just transition to a climate-neutral economy and society will be supported through the establishment of a Just Transition Commission. Approval to establish a Just Transition Commission was received with a Government Decision on 30th April 2024 and the Commission is expected to be formally constituted and commence its work towards the end of 2024 following a recruitment process for Members and Chair. The Commission will advise and support the Government in long-term just transition planning, developing a shared understanding, and identifying the challenges, solutions, and opportunities for Ireland's transition to a carbon neutral future. The Commission will advise and support the Government in long-term just transition planning, developing a shared understanding, and identifying the challenges, solutions, and opportunities for Ireland's transition to a carbon neutral future. the Commission's Terms of Reference with its mandate and proposed work programme are available at gov.ie

Irelandwill also embed just transition in our existing governance and engagement structures, and into the delivery of climate policy whereby each Minister will consider their climate policy development and implementation against the four principles for a just transition and the recommendations of the CCAC and the future Just Transition Commission. Each relevant Minister will also report to the Oireachtas on how our principles for a just transition are being addressed under the most recently approved CAP, including the policies, mitigation measures and adaptation measures for each sector. There is an aim to develop a robust evidence base in order to better anticipate and plan for a just transition. This includes commissioned research into Just Transition, including research into developing a Just Transition Indicators Framework, as well as further cooperation with stakeholders and advisory bodies.

2. People are equipped with the right skills to be able to participate in and benefit from the future net zero economy

A climate neutral Ireland will bring new, green employment opportunities. Our CAP sets out a number of key measures to drive the creation of new jobs with new skills requirements, in particular building retrofits; renewable energy generation; the move to sustainable mobility; and new farming practices. Meeting Ireland's renewable energy targets will increase demand for a range of engineering and technician roles including civil; electrical/electronic; mechanical; marine; production and process; quality control and planning; telecommunications; IT; and energy. There will also be demand for a range of built environment jobs, including construction and building trades; supervisors; construction occupations; health and safety officers; chartered surveyors; as well as other roles such as: environment professionals; finance and investment analysts; advisers; physical scientists; solicitors; accountants; and tax experts. According to the Expert Group on Future Skills Needs estimates, this could raise demand for roles in these activities from a 2020 estimate of 5,000 to potentially 22,000 to 27,000 by 2030. There is also scope for additional job creation as we seek to decarbonise and embed sustainability practices across all sectors of the economy. Further details on our skills strategy are available under Chapter 5.

Climate action presents opportunities for existing supply chains and new business formation. Finding the right balance between regulation and incentives to progress decarbonisation will be crucial to maintaining our national competitiveness and ability to create jobs. As progress is made in the transition to a carbon neutral economy, changes in regulatory requirements (nationally and internationally), a higher carbon price, supply chain patterns, and evolving consumer preferences will drive growth and innovation in our enterprise base. As

businesses take steps towards decarbonisation and reducing their climate impact, there is a need to ensure that the new employment opportunities are seized.

3. **The costs are shared so that the impact is equitable and existing inequalities are not exacerbated.**

To ensure a Just Transition to a climate neutral Ireland, the costs must be shared so that the impact is equitable and existing inequalities are not exacerbated. Progressive carbon tax increases and targeted social welfare and other initiatives to reduce energy poverty are part of the tools used. However, considerations around costs and equity are not limited to the carbon tax and will also apply to other fiscal measures, as well as to the provision of grants or other supports to assist the implementation of climate policy. The principles of a Just Transition, and addressing transport poverty, forced car ownership and fossil-fuel dependency have also formed key considerations in the design of the decarbonisation pathway for the transport sector.

4. **Social dialogue to ensure impacted citizens and communities are empowered and are core to the transition process.**

Ireland is committed to social dialogue and engagement to identify issues for impacted communities and sectors. The National Dialogue on Climate Action (NDCA) is Ireland's national programme to engage, enable and empower stakeholders and citizens across society to take climate action through the annual Climate Conversations, National Climate Stakeholder Forum events, and National Youth Assemblies on Climate. The NDCA employs insights from all these engagements to co-create the annual CAP, inform communications and strategies across Government, and lay the foundations for a future that is fair, equitable, and accessible to all. The NDCA has actively sought the views of vulnerable groups through the hosting of workshops as part of the Climate Conversations and inviting stakeholders from these groups to attend Forum events. In 2024, the NDCA is radically expanding its programme to support communities and groups across Ireland to scale the work they are doing and support those who are not yet engaged.

In addition, the CCAC, and the National Economic and Social Council (NESC) statutory advisory bodies also provide strategic advice, research, and analytical support for a climate action and a just transition, among others.

Just Transition and Decarbonisation in the Electricity Sector

As mentioned under subheading 3.1.1 of this Chapter, the Climate Action, and Low Carbon Development (Amendment) Act 2021 sets Ireland on the path to a 51% reduction in emissions by the end of this decade and to net-zero emissions no later than 2050. Delivering a just transition is based on recognising the transformational level of change required to meet these targets and having a shared understanding that the transition is fair, and just, and that the costs are shared equitably.

It will be essential to maintain the high level of political and civic consensus which has been built through the work of the Citizens' Assembly and the All-Party Committee on Climate Action. To foster public engagement, Ireland established a number of advisory bodies as outlined in Chapter 2, including the National Dialogue on Climate Action, the Climate Change Advisory Council, and is currently working on setting up a new Just Transition Commission to advise the Government on matters related to the green transition.

The Government is committed to delivering a Just Transition to those who are negatively impacted by climate action. The Government has sought to ensure that revenue from increases in the carbon tax will be ring-fenced to protect those who are most exposed to higher fuel and energy costs and has committed one third of all additional carbon tax revenues over the next decade to targeted measures such as a socially progressive national retrofitting scheme. An estimated €9.5 billion in additional revenue will be raised by 2030 by the planned increases in carbon tax. This funding will be used on targeted initiatives to prevent fuel poverty and ensure a just transition, to fund a socially progressive national retrofitting programme, and to incentivise green and sustainable farming, among others. Further information on this is available under subsection 3.2.8. Additional funding is being provided to support lower income households to participate in retrofitting schemes, with the Warmer Homes Scheme delivering a range of energy efficiency measures free of charge to lower income households vulnerable to energy poverty.

In response to rising energy prices in 2022, DECC also released the Energy Poverty Action Plan, which set out a range of measures, in the near and medium term, to tackle energy poverty. This Action Plan was developed in participation with Departments including Social Protection (DSP), Housing, Local Government & Heritage, Health, Community & Rural Development, the CRU, Sustainable Energy Authority Ireland (SEAI) and the HSE. Measures combatting energy poverty are outlined in more detail in section 3.4.4 of this document.

National Just Transition Fund and Decarbonisation in the Electricity Sector

Bord na Móna has been harvesting peat for electricity generation in the Midlands of Ireland for over 70 years. The final peat-burning plant was converted to run exclusively on biomass in December 2023. There were three electricity generating plants in the Midlands that used peat as the primary fuel, totalling 350 MW of electricity. While two of these plants closed down in 2020, the remaining plant at Edenderry announced earlier in 2024 that their transition to 100% biomass has been completed with the vast majority of biomass coming from Irish suppliers. The Edenderry plant is also undergoing works to connect it to the gas network, enabling gas to be used in future fuel mixes. Bord na Móna has been an integral part of the commercial and social development of the Midlands since 1947, creating significant employment in the region. Several supports are being put in place in the context of the Government's response to the cessation of peat harvesting by Bord na Móna.

The National Just Transition Fund was made available in 2020 and continues to support communities transitioning to a low carbon economy up to the end of 2024, facilitating innovative projects that contribute to the economic, social, and environmental sustainability of the Wider Midlands region and have significant employment and enterprise potential. The Government has provided €22.1m in grant funding to 56 projects, and the Fund focuses on retraining workers and generating sustainable employment in green enterprise across the region.

EU Just Transition Fund

To support the preparation of Ireland's EU Just Transition Fund Programme, development of Ireland's first Territorial Just Transition Plan sets out the impacts on the Territory as a result of the ending of peat extraction for energy production and identifies the development needs and priorities for the territory in order to address these impacts.Following the cessation of commercial peat extraction an estimated 1,000 employees and contractors were directly impacted in Bord na Móna between January 2019 and May 2021. Public consultees expressed clear concern about the wider socio-economic impacts and the resulting impacts on rural depopulation.

Utilising an objective, evidence-based assessment, and analysis, it was proposed that the Territory should include Counties Offaly, Laois, Longford, Westmeath, and Roscommon, as well as five additional Municipal Districts (MDs) Ballinasloe (Co. Galway), Athy and Clane-Maynooth (Co. Kildare), Carrick on-Suir and Thurles (Co. Tipperary). The analysis examined

demography, society, well-being, economy, and ecology in areas associated with historical dependence on peat. Ireland's EU Just Transition Fund was launched on the 28th April 2023, which secured €169m of funding (of which €84.5 million is financed by the EU) to address the development needs identified in the Territorial Plan.

The EU JTF promotes economic, social, and territorial cohesion in line with key EU priorities. The Programme is be managed by the Eastern and Midland Regional Assembly (EMRA), focusing on three priorities:

- Generating employment by investing in the diversification of the local economy;
- Supporting the restoration and rehabilitation of degraded peatlands and the regeneration and repurposing of industrial heritage assets;
- Providing former peat communities with smart and sustainable mobility options to enable them to benefit directly from the green transition.

As of the 21st March 2024, nine implementation plans for different schemes under the Programme have been approved and six open calls have been launched, inviting applicants to apply for a combined total of €71 million.

Underscoring the role of the Midlands Region in working with central Government in addressing the ongoing transition, the region is also represented, through the Midland Regional Transition Team, in the EU Just Transition Platform, National and EU Just Transition Funds within the impacted territory.

3.2 Dimension Energy Efficiency

The Climate Action Plan sets out the policies, measures, and programmes that Ireland is already undertaking, developing, and considering in order to achieve energy efficiency and climate objectives. Following the entry into force of the Energy Efficiency Directive (2023/1791), which substantially increases ambition in relation to energy efficiency, Ireland will do its utmost to fulfil the obligations set out in this Directive. In line with the requirements of Article 3 of the Recast EED, Ireland is committed to implementing the Energy Efficiency First Principle (EEFP), as defined in the Governance Regulation of the Energy Union: "Member States should use the energy efficiency first principle, which means to consider, before taking energy planning, policy, and investment decisions, whether cost-efficient, technically, economically, and environmentally sound alternative energy efficiency measures could replace in whole or in part the envisaged planning, policy, and investment measures, whilst still achieving the objectives of the respective decisions. This includes, in particular, the treatment of energy efficiency as a crucial element and a key consideration in future investment decisions on energy infrastructure in the Union. Such cost-efficient alternatives include measures to make energy demand and energy supply more efficient, in particular by means of cost-effective end-use energy savings, demand response initiatives and more efficient conversion, transmission, and distribution of energy. Member States should also encourage the spread of that principle in regional and local government, as well as in the private sector."

Ireland recognises the significant benefits arising from energy efficiency and embracing the Energy Efficiency First Principle. The EEFP is a significant stepping stone towards Ireland becoming a sustainable, resource efficient economy and society, with all the associated economic, environmental, and social benefits.

Under Article 3 of the Recast EED, Ireland must implement the Energy Efficiency First Principle across planning, policy, and major investment decision processes, as required. We are currently considering how to most effectively achieve this, in the context of specific governance and legal structures. Pending receipt of additional guidance from the European Commission, consideration is currently being given as to whether adaptations need to be made to the following processes to embed the Energy Efficiency First Principle across all major planning, policy, and investment decisions in Ireland:

- Consideration of whether any elements of the Energy Efficiency First Principle need to be reflected in Ireland's planning or building control processes, at the appropriate level.
- Consideration of how the Energy Efficiency First Principle can be accounted for within the public spending appraisal processes.
- Consideration of how the Energy Efficiency First Principle can be incorporated within the policies governing the energy infrastructure system.

While the transposition deadline for Article 3, along with the majority of the EED, is October 2025, work has commenced with various government bodies to prepare for the implementation of the EEFP across different policy areas. It will be difficult to quantify the exact energy savings that can be gained from the implementation of the EEFP, given the nature of the requirements involved.

The target for energy efficiency savings to be pursued in Ireland is based on the continuation of measures already in place, upscaling and adding to those measures based on the approach and level of investment set out in the National Development Plan together with the actions and intensifications outlined in the CAP. In addition, Government announced the establishment of a new Infrastructure, Climate and Nature Fund (ICNF) in Budget 2024 with funding of €3.15bn to be made available to 2030. The fund will be used, among other things, to support designated environmental projects including projects which contribute to a reduction in greenhouse gas emissions.

Achievement of Ireland's energy efficient targets will be a significant challenge. The key measures in each sector are set out in the CAP and summarised in the box in Chapter 1 of this document.

Built Environment

In relation to the built environment, the scale of retrofit ambition is a significant challenge for Ireland. While significant progress has been made on improvements in energy efficiency for new dwellings, existing dwellings, commercial premises, and buildings occupied by the public sector require significant retrofit to meet our energy and climate targets. In the public sector, critical barriers to retrofit include limited internal capacity, funding shortfalls and very few completed projects to learn and benchmark from. Public policy has been geared towards trying to overcome those barriers to advance retrofit of public buildings, via the SEAI Public Sector partnership programme and the SEAI Pathfinder programme. The first programme,

the public sector partnership, is based around engagement with public bodies. This includes training and advice on operational actions public bodies can take to reduce day-to-day energy consumption and the administration of a system for monitoring and reporting of energy data in the public sector.

The SEAI Pathfinder has been the key policy lever and driving force behind public sector capital retrofit in the last 6 years. The programme involves SEAI collaborating with national estate portfolio leads and providing match-funding as a means of leveraging their willingness and commitment to engaging in retrofit projects, building from shallow to deep retrofit projects. SEAI has entered into individual agreements under Pathfinder with the Health Service Executive (HSE), Department of Education, Department of Further and Higher Education (DFHERIS in relation to buildings under the Higher Education Authority and Education and Training Boards), the OPW and individual Local Authorities/ CAROs.

Co-funding has served as the policy lever to engage portfolio leads and enable them to find the pathway to deliver, or plan to deliver, deep retrofit projects. The national portfolio leads are at various stages of advancement, with some having now completed several deep retrofits (Education, DFHERIS) and others having done shallow retrofit measures only and being at the early stages of the deep retrofit process (HSE, OPW, Local Authorities.) Under the Pathfinder programme SEAI provides technical support and capital support. Projects are complex and require management under a detailed project management approach.

On the commercial built environment, support is provided through the LIEN operated by SEAI and the energy academy training platform. In addition, the Excellence in Energy Efficiency Design (EXEED) scheme supports organisations with the costs of embedding energy efficient design in their assets, to reduce lifecycle impact through lower energy use and reduced carbon emissions. This scheme is targeted towards organisations, both public and private, that are planning a major investment in an energy efficient design project, regardless of project scale. The primary objective of Support Scheme for Energy Audits (SSEA) is to support small and medium-sized enterprises (SMEs) in carrying out energy audits. The scheme offers €2,000 towards the cost of a professional high quality energy audit which is carried out by a SEAI Registered Energy Auditor selected by the SME.

Planned policies, measures, and programmes to achieve the indicative national energy efficiency contributions for 2030 as well as other objectives referred to in point 2.2, including planned measures and instruments (also of a financial nature) to promote the energy performance of buildings, in particular with regard to the following:

3.2.1 Energy efficiency obligation schemes and alternative policy measures under Articles 7a and 7b and Article 20(6) of Directive 2012/27/EU and to be prepared in accordance with Annex III to this Regulation

Ireland currently intends to deliver the energy savings required by Article 8 of Directive 2023/1791 through a combination of an energy efficiency obligation scheme (EEOS) to achieve energy savings targets on certain energy companies (the "obligated parties") and a range of alternative measures. SI 522/2022 (European Union EEOS) Regulations 2022 set a total EEOS target for the obligation period 2021-2030 of 36,424 GWh cumulative end-use energy savings on parties obligated under the EEOS.

The Recast Energy Efficiency Directive (2023/1791) means that Ireland's cumulative energy savings target under Article 8 is significantly larger, and considerations are underway as to how best to ensure that a significantly higher target can be achieved between EEOS and alternative measures. No decision has yet been taken as to the split between EEOS and alternative measures pending that analysis – under SI 522 of 2022 60% of the target is delivered via EEOS with the rest via alternative measures. Under SI 522 of 2022, there is provision for obligated parties under the Scheme to buyout a certain portion of their target at prescribed rates or to pay a financial penalty in cases where they fall short of their annual target. The funds from the buyouts are transferred into the Energy Efficiency National Fund and any funds from buyouts or penalties are ringfenced under SI 522 of 2022 to be used on alternative measures that contribute to Ireland's Article 8 target. The current alternative measures Ireland counts are the various SEAI programmes (residential, public sector, industry, transport, commercial, services etc) where EEOS obligated parties are not involved in delivering the measures.

In order to assist with deliberations on the implications of the new Directive, SEAI recently appointed consultants who will work with SEAI and DECC, as policy lead, to carry out further analysis on the implications for Ireland's EEOS of the increased Article 8 target in Directive 2023/1791 and to carry out analysis on alternative measures. It is envisaged that the

analysis of alternative measures will include a review of measures counted as alternative measures in other EU Member States with the aim of determining whether they might be suitable in an Irish context.

It is envisaged that when the analysis is available, it will inform revisions required to the EEOS to bring it in compliance with Directive 2023/1791 and to ensure Ireland's Article 8 target achievement between EEOS and alternative measures. The ministry would envisage undertaking a public consultation on any proposed updates to Ireland's EEOS later in 2024 with a view to having amended legislation in place by mid-2025, in advance of the Directive transposition deadline.

3.2.2 Long-term renovation strategy to support the renovation of the national stock of residential and non-residential buildings, both public and private, including policies, measures, and actions to stimulate cost-effective deep renovation and policies and actions to target the worst performing segments of the national building stock, in accordance with Article 2a of Directive 2010/31/EU

The Energy Performance of Buildings Directive (recast) was formally adopted on 12th April 2024. Article 3 and Annex II of the new Directive include a requirement to implement National Building Renovation Plans, which will replace the Long-Term Renovation Strategy (LTRS). The latest version of the LTRS was prepared by DECC in 2020. Under the 2020 LTRS Ireland already has a number of supports in place to encourage retrofitting of homes, businesses and public sector buildings as set out below.

Existing Measures:

Residential

- The National Residential Retrofit Plan sets out the Government's approach to achieving the CAP targets of upgrading the equivalent of 500,000 homes to a Building Energy Rating (BER) of B2 or cost optimal equivalent standard and installing 400,000 heat pumps to replace older, less efficient heating systems by 2030. The Plan is designed to address barriers to retrofit across four key pillars: driving demand and activity; financing and funding; supply chain, skills, and standards; and governance. Actions under the Plan are updated on an annual basis;

- Local authorities in their administration of the social housing retrofit programme select homes for inclusion and measures to be implemented in order to contribute to the overall target of 36,500 dwellings retrofit to B2/Cost Optimal levels.
- Government funds several energy efficiency supports for the residential sector. These are administered by SEAI and include:
- Free Upgrades for households at risk of energy poverty are provided under the Warmer Homes scheme. This scheme prioritises the worst performing homes;
- Grants for households taking a step-by-step approach to upgrading the energy performance of their home and moving away from fossil fuel heating are provided under the Better Energy Homes Scheme;
- A One Stop Shop service for households undertaking a whole-house upgrade project including switching to a heat pump. This scheme requires homes to achieve a minimum uplift in energy performance, thereby incentivising poorer performing homes to avail of the supports;
- A Community Energy Grants scheme is available for homeowners seeking to carry out their deep retrofit as part of a community project;
- Social Housing Retrofit Programme – this programme is administered by the Department of Housing and Local Government – under this programme the social housing stock is undergoing a programme of energy efficiency renovation.

Industry & Commercial Services

There are a wide range of supports and measures funded by DECC and administered by the SEAI. The supports are intended to enable all businesses to improve their energy efficiency, reduce carbon emissions, reduce energy consumption and costs and, in the process, enable them to become more competitive. The EXEED scheme supports organisations with the costs of embedding energy efficient design in their assets, to reduce lifecycle impact through lower energy use and reduced carbon emissions. This scheme is targeted towards organisations, both public and private, that are planning a major investment in an energy efficient design project, regardless of project scale. The primary objective of Support Scheme for Energy Audits (SSEA) is to support SMEs in carrying out energy audits. The scheme offers €2,000 towards the cost of a professional high quality energy audit which is carried out by a SEAI Registered Energy Auditor selected by the SME.

The SEAI's Energy Academy is an online resource that provides businesses with free access to high quality energy training, providing energy training to 4,150 existing users. Development of this resource continues, with new training modules added on an ongoing basis. There are currently 28 Modules available, with more being added on an ongoing basis. The Large Industry Energy Network (LIEN) is a network of large organisations who, with the support of the SEAI, work together to improve their energy performance and share experiences amongst members. The members of the network are comprised of organisations that account for circa 20% of Ireland's energy use. The SEAI provides a wide range of advice, information, and mentoring services to businesses. These include briefings, workshops, workplace resources, access to energy auditing services and case studies of best practice. ACA - The Accelerated Capital Allowance (ACA) is tax incentive operated by Revenue which encourages businesses to upgrade to the most energy-efficient equipment.

Public Sector

The SEAI Public Sector partnership programme is based around engagement with public bodies. This includes training; advice on operational actions public bodies can take to reduce day-to-day energy consumption and the administration of a system for monitoring and reporting of energy data in the public sector.

The SEAI's Public Sector Pathfinder programme has been the driving force in recent years behind retrofit and energy efficiency projects in public buildings. The programme is operated via individual agreements between the SEAI and the 'National Estate Portfolio Leads' i.e. the Department of Education, the Department of Further and Higher Education, Research, Innovation and Science, the Office of Public Works, the Health Service Executive, and the Local Authorities. The Pathfinder programme involves SEAI collaborating with national estate portfolio leads in the public sector and providing match-funding as a means of leveraging their willingness and commitment to engaging in retrofit projects, building from shallow to deep retrofit projects.

As funding for Pathfinder is 50/50 with the national estate portfolio leads, the investment made by SEAI will have been matched, meaning in total, double the amount was invested. An operational review of Pathfinder was carried out in 2022 with a view to informing future development of the programme. Amongst the findings were that moving to deeper retrofit and renewable heat resulted in a significant increase in costs. This is highly dependent on the design path chosen and level of retrofit and renovation. A key finding was that projects must consider additional co-occurring costs. These may arise with repair and maintenance

issues, condition of buildings, regulatory requirements, and other accommodation needs. Moving to 90% renewable heat has a significant impact on the costs. Biomass heating is more cost effective than heat pumps in terms of cost per square metre (€/m^2) and cost per tonne of carbon emissions saved (€/tCO_2). Inflation in the construction industry has a significant impact on increasing costs. Cost per tonne of CO_2 is based on current electricity grid carbon figures and will be reduced based on future electricity grid carbon figures. Direct carbon emissions from schools retrofitted under the 2021 and 2022 SEAI Pathfinder Programme were reduced by 95-to-100%. Carbon savings for University College Dublin were associated with connecting into a pre-existing district heating scheme with inclusion of heat pump. Where economically and practically feasible, district heating in small areas, campuses, or where integrated within larger municipal opportunities, will provide best value and impact. The Maximum Import Charge (MIC) electrical connection will be impacted with electrification of heat.
Currently, varied approaches are employed for project identification and selection. This is dependent on whether it lies within a centralised building estate management (schools, HSE, OPW), coordinated (DFHERIS, HEA, SOLAS), or buildings under direct ownership of local authorities. The competitive call process used by the Higher Education Authority as a multi-stage process adds to overall project timeframes.

Major upgrades to older buildings must include design assessment of additional provision of fire and safety measures. Issues have been identified at later project stage by onsite design teams or during construction. Where a regulatory issue needs to be addressed, this incurs knock-on costs and potential delays. Delays and unforeseen cost variations are also incurred as onsite design teams identify fire and safety issues. An assessment for asbestos and lead paint is necessary to determine presence and risk. As a specialist service, this assessment and treatment adds to project costs. Planning permission may be necessary with external wall insulation, heat pump compounds and biomass containers; this can vary on location and will impact on the programme delivery. In certain school buildings with restrictions around outside building façades, internal wall insulation may not be viable for classroom sizes.

Contractors may need longer lead-in times to provide additional training and quality-related issues in deep retrofit of buildings and renewable heat systems. There is a need for upskilling within the non-domestic retrofit supply chain. To facilitate supply chain development, a Continuing Professional Development (CPD) programme to upskill and train consultants and contractors in non-domestic retrofit would be beneficial.

Centralised procurement frameworks for consultancy and contracting services for all Pathfinder projects would shorten project timeframes considerably. The ability to bundle specialist services across a number of projects would streamline delivery. In future, the development of renovation passports should help to streamline and structure a phased approached to building upgrade. The CAP defines a role for the public sector in which it leads the driving of the climate agenda and of raising awareness in citizens, communities, and businesses. Additionally, the role of public services will support critical success factors in areas such as supply chain skills, research, and green public procurement.

The Terms of Reference of the Public Sector Working Group (under the Heat and Built Environment Taskforce) includes a financial workstream that will develop the financial model to build a more thorough analysis for the costs of retrofitting the public sector building stock. More detailed work by all public bodies in the development of their own climate action roadmaps will enable better analysis on a national basis - public bodies will use their own data and apply a gap-to-target tool (developed by SEAI) to identify investment priorities. It is likely that Ireland will avail of the exemptions (Defence Forces /Transport) provided for in the calculation of the public sector target, however further analysis is underway which will inform a final decision on this matter. SEAI has engaged consultants that are working on the definition of public bodies and determining the scope of public bodies encompassed under the 1.9% and 3% targets. There is also a wider discussion amongst Member States in the concerted action on the Directive to try to understand these matters.

Ireland expects to avail of the alternative approach in relation to the 3% renovation rate. This was signalled in a letter to the Commission in December 2023. The floor area concerned is not yet available in order to notify the Commission of the projected energy savings to achieve at least the equivalent amount of energy savings under Article 6(6). However, extensive work is underway with a view to providing the Commission with this data in 2024. SEAI has requested data on floor area from public bodies as part of provision by public bodies to SEAI of ‘building stock plans’ and there will be a need to review and assess the data in 2024 and carry out analysis prior to determining the relevant figures.

EPBD IV, the latest revision to the Energy Performance of Buildings Directive (EPBD), was formally adopted on 12th April 2024. The revised EPBD will increase the rate of renovation, particularly for the worst-performing buildings. The Directive sets out a range of measures to reduce the average primary energy use of residential buildings by 16% by 2030. The measures will have to ensure that at least 55% of the decrease is achieved through the renovation of the worst-performing buildings. For the non-residential building stock, the

revised rules require renovating the 16% worst-performing buildings by 2030. Member States will have the possibility to exempt certain categories of residential and non-residential buildings from these obligations, including historical buildings or holiday homes. An EPBD implementation group has been established by the Department of Housing and Local Government (DHLG), DECC and SEAI which is meeting to progress transposition and implementation of the latest EPBD.

Improved Energy Performance Certificates (EPCs) called Building Energy Ratings or BERs in Ireland will be based on A to G scale to replace the existing A1 to G scale with the intention of better informing citizens and making financing decisions across the EU easier. SEAI and DHLGH have worked together for many years on Ireland's BER system and will take forward this action.

To fight energy poverty and bring down energy bills, financing measures will have to incentivise and accompany renovations and be targeted at vulnerable customers and worst-performing buildings, in which a higher share of energy-poor households live. Member States will also have to ensure that there are safeguards for tenants, to help tackle the risk of eviction of vulnerable households caused by disproportionate rent increases following a renovation. As set out above, Ireland has a number of schemes targeted at energy poor households. These include the free upgrade scheme administered by SEAI, which is for applicants meeting specified criteria, and involves the upgrading and retrofitting of homes free of charge. In addition, the social housing upgrade scheme administered by local authorities (which are under the remit of DHLGH) also involves upgrades to housing owned by the local authority at no cost to the tenant. It is intended that these schemes will continue.

Under the revised EPBD, Member States have to:

- Establish national Building Renovation Plans to set out the national strategy to decarbonise the building stock and how to address remaining barriers, such as financing, training, and attracting more skilled workers;
- Set up national building renovation passport schemes to guide building owners in their staged renovations towards zero-emission buildings;
- Establish one-stop-shops for homeowners, SMEs, and all actors in the renovation value chain, to receive dedicated and independent support and guidance.

Boilers powered by fossil fuels will be phased out.

There are provisions on pre-cabling, recharging points for electric vehicles and bicycle parking spaces. The revised EPBD will make zero-emission buildings the new standard for

new buildings. This will be implemented as a requirement under the building regulations. All new residential and non-residential buildings must have zero on-site emissions from fossil fuels, as of 1st January 2028 for publicly owned buildings and as of 1st January 2030 for all other new buildings, with a possibility for specific exemptions.

Member States will also have to ensure that new buildings are solar-ready, meaning that they have to be fit to host rooftop photovoltaic or solar thermal installations. For existing public and non-residential buildings solar will need to be gradually installed, starting from 2027, where this is technically, economically, and functionally feasible. Such provisions will come into force at different points in time depending on the building type and size. These requirements will be transposed as part of the EPBD transposition. SEAI will be responsible for implementing the significant changes to the BER scheme arising from the revised EPBD.

Article 3 and Annex II of the new Directive include a requirement to implement National Building Renovation Plans, which will replace the Long-Term Renovation Strategy (LTRS). The first draft National Building Renovation Plan is due to be submitted to the Commission in December 2025.

Cross Sectoral

Energy Efficiency Obligation Scheme (2021-2030) – Ireland has established an obligation scheme under Article 7 of the EED. SI 522/2022 European Union (Energy Efficiency Obligation Scheme) (EEOS) Regulations 2022 sets a total EEOS target for the obligation period 2021-2030 of 36,424 GWh cumulative end-use energy savings on parties obligated under the EEOS. Under the SI, there are two binding sub-targets (5% energy poverty and 10% residential.) Beyond that, obliged energy companies may deliver energy savings in any sector.

The revised EED has significantly increased Ireland's cumulative energy savings target under Article 8 and considerations are underway as to how best that significantly higher target can be achieved between EEOS and alternative measures. No decision has been taken yet as to the split between EEOS and alternative measures pending that analysis. See section 3.2.1 for further information.

The Community Energy Grant scheme offering supports for groups of buildings to carry out retrofitting as part of a community project. The projects can involve residential, commercial, public and community buildings. This scheme also requires a minimum energy performance uplift for any residential retrofits.

Financing

Ireland has an Energy Efficiency National Fund in place since 2014 established under Regulation10 of SI 131 of 2014.
The provisions of Regulation 10 are as follows:

1. The Minister may, with the consent of the Minister for Public Expenditure and Reform
    a. establish a fund to be known as the Energy Efficiency National Fund ("Fund"), and
    - pay into the Fund monies from central government sources or any other source.
2. The Fund shall be managed and controlled by the Minister or a person acting on behalf of the Minister.
3. The Minister shall pay into the Fund the amount of any contribution from an energy supplier under an Energy Efficiency Notice or as a result of a direction issued under Regulation 7(1).
4. A statement of moneys paid into and out of the Fund shall be shown in a special note to the Appropriation Account under the Communications, Energy and Natural Resources Vote.
5. The objectives of the Fund are —
    a. to support the delivery of energy efficiency improvement programmes and other energy efficiency improvement measures, and
    b. to promote the development of a market for energy efficiency improvement measures.
    - Without prejudice to the Fund's objectives, the Fund may be used for the alleviation of energy poverty (within the meaning of a document entitled "Warmer Homes — A Strategy for Affordable Energy in Ireland" published by the Department of Communications, Energy and Natural Resources).
    - The Fund may, directly or through such other person as the Minster may specify, issue or provide grants, loans, financial guarantees and such other types of financial support as may be determined by the Minister, in order to further its objectives, as outlined in paragraph (5) or for the alleviation of energy poverty or both.

- Grants, loans, financial guarantees, and other types of financial support issued or provided under paragraph (7), may be so issued, or provided through an energy efficiency improvement programme and subject to the terms and conditions of that programme.

6. The Minister, or such other person as the Minister may nominate, may publicly invite proposals to avail of moneys or other financial supports from the Fund. This invitation shall outline the criteria, consistent with the objectives of the Fund, to be used to assess proposals.

    - Without prejudice to any contractual arrangements entered into by the Fund, the Minister, with the consent of the Minister for Public Expenditure and Reform, may wind up the Fund at any time.

    - Any money in the Fund upon its winding-up shall be disposed of by the Minister, with the consent of the Minister for Public Expenditure and Reform, in such manner as the Minister considers appropriate in the circumstances having regard to the amount of money in the Fund and the purpose for which the Fund was established.

The fund has been used since 2014 and will continue to exist and be used in the period to 2030. The fund was first used to fund an investment in Ireland Energy Efficiency Investment (IEEI) which is due to be closed in 2024 under which the Minister invested €14m and received a dividend of over €17m. The fund has been used for the national ‘Reduce Your Use’ campaign run since 2022 to encourage the public to reduce their energy consumption. It has also been used to finance the new Home Energy Upgrade Loan Scheme for the residential sector. In addition, buyout funding from the EEOS will be used to fund alternative measures that meet the requirements of Article 8 of Directive 2023/1791. Please see Section 3.2.8 for details of the Home Energy Upgrade Loan Scheme.

Planned Measures

Building Standards, Retrofitting and Energy Efficiency

The National Retrofit Plan sets out the Government's approach to achieving the Climate Action Plan targets of upgrading the equivalent of 500,000 homes to a Building Energy Rating (BER) of B2 or cost optimal equivalent standard and installing 400,000 heat pumps to replace older, less efficient heating systems by 2030. The Plan is designed to address barriers to retrofit across four key pillars: driving demand and activity; financing and funding;

supply chain, skills, and standards; and governance. Actions under the Plan are updated on an annual basis;

- Local authorities in their administration of the social housing retrofit programme select homes for inclusion and measures to be implemented in order to contribute to the overall target of 36,500 dwelling retrofit to B2/Cost Optimal levels;
- The Public Sector Energy Efficiency Strategy and its associated support programme are designed to assist public bodies in achieving the national energy efficiency targets of 33% by 2020, and 50% by 2030;
- The EXEED programme will help commercial buildings and businesses embed energy efficiency measures in the design of their projects, processes, and assets;
- Develop the necessary supply chain, including working with Regional Skills Fora to train skilled workers.

As part of its integrated national energy and climate plan and its updates pursuant to Regulation (EU) 2018/1999, Ireland completed and issued to the Commission a comprehensive heating and cooling assessment in 2021. Ireland is currently preparing an updated comprehensive heating and cooling assessment which will be submitted to the Commission in 2025.

3.2.3 Description of policy and measures to promote energy services in the public sector and measures to remove regulatory and non-regulatory barriers that impede the uptake of energy performance contracting and other energy efficiency service models

The Energy Contracting Support Scheme administered by SEAI is a pilot programme that provides supports and expertise across the business and public sectors to deliver energy efficiency through Energy Performance Contracts, Local Energy Supply Contracts and Energy Performance Guarantees. SEAI is currently supporting a small number of projects in the public sector under this scheme.

The Department of Education has used the ESCO model in replacing the heating system in a number of schools where fossil fuel boilers have been replaced with biomass boilers. The ESCO operates the boiler on behalf of the school over a fixed number of years. Ireland, in conjunction with the European Commission, under the Sustainable Energy Investment Forums (SEIF) initiative hosted a national roundtable on 9th November 2023 to promote

dialogue between the public sector and key stakeholders in the field of sustainable energy financing with regard to leveraging private finance for public sector retrofit.

Ireland expects to take forward this theme through the national hubs being established under the European Energy Efficiency Financing Coalition (EEEFC) which energy ministers signed up to at the December 2023 Energy Council, see section 3.2.8. The Commission envisages that Member States would chair national hubs and define priorities in line with EEEFC objectives. The overall objective is to facilitate the mobilisation of private financing for energy efficiency at scale, including a more favourable environment for an energy efficiency market. The EEEFC should make national and local financial institutions and stakeholders more aware of market opportunities on energy efficiency. It is intended that a subgroup in the national hub will examine policy and measures to promote energy services in the public sector and measures to remove regulatory and non-regulatory barriers that impede the uptake of energy performance contracting and other energy efficiency service models. The Department of Public Expenditure, NDP Delivery and Reform committed to undertake a review of energy performance contracting, which it commenced in Q4 2023.

3.2.4 Other planned policies, measures, and programmes to achieve the indicative national energy efficiency contributions for 2030 as well as other objectives referred to in point 2.2 (for example measures to promote the exemplary role of public buildings and energy-efficient public procurement, measures to promote energy audits and energy management systems, consumer information and training measures, and other measures to promote energy efficiency

The following tables provide an estimate of the cumulative final energy savings under both the WEM and WAM scenarios.

Table 29: Estimated final energy cumulative savings impact 2021-2030 by category (WEM)

Estimated cumulative final energy savings 2021-30 (WEM - GWh)	
Category	**2021-2030**
Public Sector	1,589
Services Sector	3,607
Residential Retrofit	1,960
New Dwellings	582
New Buildings other than Dwellings	1,777

Industry	965
Transport	4,083
Cross-sectoral	2,238
Total	**16,799**

Table 30: Estimated final energy cumulative savings impact 2021-2030 by category (WAM)

Estimated cumulative final energy savings 2021-30 (WAM - GWh)	
Category	**2021-2030**
Public Sector	2,031
Services Sector	6,111
Residential Retrofit	4,935
New Dwellings	574
New Buildings other than Dwellings	1,779
Industry	2,484
Transport	4,770
Cross-sectoral	2,245
Total	**24,929**

Note: Work is currently underway to determine the most suitable approach for Ireland to meet its EED Article 8 energy savings obligations specifically the split between the EEOS and alternative measures. As a result, the above tables cannot consider all energy savings measures that will be put in place in this time.

SEAI have established a Behavioural Economics Unit which is focused on encouraging measurable changes to homeowners' and businesses' energy behaviour, using the latest evidence from Behavioural Science and Economics; their work also helps inform policies through SEAI.

SEAI engages frequently with consumers and business and carries out regular surveys of attitudes towards and perspectives on energy efficiency. SEAI's website also provides useful information on taking action on energy efficiency for consumers and businesses; A national 'Reduce Your Use' campaign for the public was run in Winter 2022/2023 and Winter 2023/24. This covered all media formats.

For businesses, SEAI provide a range of guidance and supports. These include;

- Online guidance and information including guidance on energy audits for identifying energy efficiency opportunities;
- Classroom based energy management training for companies;
- Audits – For larger enterprises SEAI operate an Energy Audit Scheme which helps larger enterprises comply with their obligations under Article 11 of the Energy Efficiency Directive (recast October 2023);
- The Support Scheme for Energy Audits (SSEA) is to support SMEs in carrying out energy audits. The scheme offers €2,000 towards the cost of a professional high quality energy audit which is carried out by a SEAI Registered Energy Auditor selected by the SME. Public bodies may also avail of this scheme;
- Ireland's Building Energy Rating system provides homeowners with information on the efficiency of their home as well as guidance on the steps they can take to reduce their energy usage and their costs;
- Government has also funded the rollout of Home Energy Savings Kits across libraries, where individuals can borrow a kit of practical tools that will help them to understand their energy usage and take steps to become more efficient. SEAI, through the public sector energy efficiency partnership provides energy management and advisory supports to circa 350 public bodies and 4,000 schools to help them achieve energy efficiency savings. The programme offers comprehensive support and engagement to guide public bodies in reaching their energy saving targets focusing on capacity-building and energy management principles, which are low cost means of delivering energy efficiency improvements;
- The OPW run a state-wide staff energy conservation campaign, entitled 'Optimising Power @ Work' which operates in Central Government buildings. The core principle of the campaign is to intensively work and engage with staff to encourage behavioural change on energy use and to identify and eliminate energy waste. Participating buildings can achieve average annual energy savings of 20%;
- All public bodies lead by example by signing up to the Sustainable Energy Authority of Ireland (SEAI) and the OPW "Reduce Your Use" winter campaign in proactively lowering energy consumption and carbon. This campaign was first run

with public bodies in Winter 2022/23 and was run again in Winter 2023/24. Case studies on the campaign can be found on the SEAI's website;[34]

- A carbon price of at least €80 per tonne by 2030 has been announced by Government (current price is €56 per tonne since 11th October 2023). This will improve the payback period for investments and increase the uptake of energy efficiency measures by factoring the cost of carbon into decision-making;

- More stringent building regulations are in force since November 2019, with all new buildings to be Nearly Zero Energy Buildings (NZEB) and existing dwellings undergoing major renovations (more than 25% of the building envelope) to meet cost optimal performance equivalent to a BER of B2.

Planned Measures:

Market Signals

The National Smart Metering Programme (NSMP) was launched in 2020 and is set to complete the installation of over 2.1m meters in early 2025. This will facilitate consumers in improving energy efficiency. Work is underway to develop a non-domestic retrofit support scheme for high impact measures on a staged basis. In Budget 2023, €50m funding from the Climate Action Fund (CAF) was announced to support the Scheme initially. The scheme is intended to assist SMEs in progressing retrofit including through targeted capital support and technical support.

Regulation of New Buildings and Renovations:

Building regulations will be progressively strengthened to order to further improve energy efficiency performance, including to phase out the installation of oil boilers. At least 40% of all new homes nationally will be delivered within the built-up footprint of existing settlements under our commitment to promote compact and sustainable growth of our cities, towns, and villages. Better spatial planning will reduce the carbon emissions of new developments, and deliver a better quality of life, including shorter commute times, better connections between our places of work and homes, and more vibrant, people-focused environments. Concrete

[34] https://www.seai.ie/reduceyouruse/public-bodies/energy-efficiency-campaig/A

actions being taken to make this a reality include the Land Development Agency aggregating sites, pre-planning of transport, and ensuring that our education and health needs are met.

Examine ways in which audits for commercial buildings can be further progressed through the use of existing policy levers.

SEAI provide:

- Online guidance and information including guidance on energy audits for identifying energy efficiency opportunities;
- Classroom based energy management training for companies;
- Audits – For larger enterprises SEAI operate an Energy Audit Scheme which helps larger enterprises comply with their obligations under Article 11 of the Energy Efficiency Directive (recast October 2023);
- The Support Scheme for Energy Audits (SSEA) is to support SMEs in carrying out energy audits. The scheme offers €2,000 towards the cost of a professional high quality energy audit which is carried out by a SEAI Registered Energy Auditor selected by the SME. Public bodies may also avail of this scheme.

District Heating

A National District Heating Centre of Excellence has been established within the SEAI to co-ordinate, support and drive delivery of existing and planned district heating projects by public, private and utility developers going forward.

Legislation is being developed to provide for a suitable regulatory and legal environment for the district heating sector, including the facilitation of appropriate customer protection mechanisms.

Geothermal Energy

A strategy is being developed and implemented for the optimal deployment of geothermal energy, including investigating the introduction of a requirement that geothermal energy be assessed for deployment in publicly funded buildings that are new builds or where there is a material change in the heating or cooling systems. Assessments will consider the long-run cost and gross FEC of alternative renewable heating/cooling systems.

3.2.5 Where applicable, a description of policies and measures to promote the role of local renewable energy communities in contributing to the implementation of policies and measures in sections 3.2.1 to 3.2.4

CAP 2024 sets out a number of steps to support communities to take local action by linking to existing and new networks and clustering initiatives. The CAROs will lead a step-up in climate action within Local Authorities. Several measures in CAP focus on building awareness in local communities of their energy use and how to reduce it. CAP aims to expand the SEC Network to 1,500 communities all over Ireland receiving support to plan for a sustainable energy future.

3.2.6 Description of measures to develop measures to utilise energy efficiency potentials of gas and electricity infrastructure

The generation of electricity using coal is being phased out, and peat-fired generation has already been phased out. This generation will be replaced by a combination of RE, interconnection imports and, in the short to medium term, by generation from natural gas. Electricity is produced from natural gas at an efficiency of circa 50% on average in Ireland compared to 30-35% coal, and previously, peat. The move from high-carbon solid fossil fuels to natural gas, utilising the available capacity in the gas network, will lead to a significant increase in efficiency.

3.2.7 Regional co-operation in this area, where applicable

The policies listed in this section and section 3.4.4 apply nationally. The mainstream grant schemes, programmes and other supports are administered centrally and are available nationwide.

3.2.8 Financing measures, including Union support and the use of Union funds, in the area at national level

Carbon Tax

The Programme for Government commits to increasing the carbon tax progressively over the period to 2030, and using the estimated additional revenue raised for additional spending over the period. In 2020, €9.5 billion in additional revenue was estimated to be raised by the planned increases in carbon tax. This funding will be used to:

- Ensure that the increases in the carbon tax are progressive by spending €3 billion on targeted social welfare and other initiatives to prevent fuel poverty and ensure a just transition;
- Provide €5 billion to part fund a socially progressive national residential retrofitting programme;
- Allocate €1.5bn of additional funding to encourage and incentivise farmers to farm in a greener and more sustainable way.

Ireland is using European Regional Development funding to co-fund the energy efficiency retrofit programme for low-income households under Ireland's Regional Operational Programme 2021-2027.

Home Energy Upgrade Loan Scheme

Ireland and the European Investment Bank (EIB) have reached an agreement that paves the way for Government-backed, low-interest home energy upgrade loans under the recently launched Home Energy Upgrade Loan Scheme. This €500 million Scheme is the first of its kind for Ireland and the European Investment Bank (EIB) Group and will play a crucial role in helping homeowners to invest in energy efficiency, making their homes warmer, healthier, and cheaper to run. The interest rates will be significantly lower than those currently available on the market as a result of the combination of the EIB Group loan guarantee and a government-funded interest rate subsidy, both of which are funded through the Energy Efficiency National Fund. PTSB is the first financial institution to offer loans under the Scheme, with rates from 3.55%. AIB, Bank of Ireland, Avant Money and seven credit unions from the Irish League of Credit Unions are expected to commence offering loans shortly.

The loans have been designed with the needs of homeowners in mind and will help lower the financial barriers encountered by homeowners, making home energy upgrades easier, more accessible, and affordable. Also, it will signal to the banking sector, new sustainable business opportunities associated with retrofit and the transition to a low carbon economy.

National Development Plan

The NDP 2021-30 sets out ambitious plans backed by funding of €35 bn to enhance public transport, active travel options and the connectivity of communities throughout Ireland. Of that:

- €11.6bn will be allocated to new public transport infrastructure;

- €1bn will be allocated to specific carbon reduction measures, including the continued delivery of improved vehicle efficiencies, incentives to encourage the switch to EVs, EV infrastructure, alternative fuels, and demand management measures.

BusConnects will be substantially delivered in all five cities across the country, massively expanding access to public transport and radically improving cycling infrastructure. On rural and regional bus services, around €350m will be invested in renewing and expanding fleets across the country. The new LIFE Regulation 2021-2027 Regulation (EU) 2021/783 entered into force on 17th May 2021 and applies retroactively from 1st January 2021. The financial envelope for the programme under the new regulation is €5.432bn, which represents a significant increase compared to the €3.46bn available to the programme under the previous regulation. Government announced a new infrastructure, climate, and nature fund (ICNF) in Budget 2024. €3.15bn will be made available in the period 2026-2030 and the fund will be used to support designated environmental projects, including projects which contribute to a reduction in greenhouse gas emissions. The Report on the Implementation of a Comprehensive Building Upgrade Programme for the Public Sector in Ireland (2020), funded by the European Commission, examined the scale of the retrofit and investment required in public sector buildings in Ireland. The required level of investment was estimated to cost €9.4 billion. This excluded operational and other costs, including decanting. Given inflation levels, including construction and wage inflation, and given the costs being seen of recent deep retrofits under the SEAI Pathfinder, that figure is currently considered to be a significant underestimate.

Given the scale of what is required, private funding will also have to be leveraged. In November 2023, DECC together with the European Commission hosted a national roundtable on seeking to leverage private funding for the public sector as part of the Sustainable Energy Investment Forum. The national roundtable included energy companies, public sector bodies, private financing companies and Government Departments and agencies. Amongst the topics discussed were energy performance contracting via ESCOs and the Energy Efficiency Obligation Scheme (EEOS).

The European Commission is due to launch an Energy Efficiency Financing Coalition (EEFC) as part of assisting Member States in leveraging private funding and developing new financing instruments. Ireland along with other Member States signed up to participation in the EEFC at the December 2023 Energy Council. At a national level, a national hub under the EEFC will have to be established to include various stakeholders including private sector

financial institutions. The national hub will also have to include Ireland's ministries for Finance and Public Expenditure, the Treasury, public sector national estate portfolio leads etc. The national hub will need to examine what private financing instruments (loans, funds, EEOS, energy performance contracts, energy services etc) could be established that could be availed of by public bodies for retrofit, where Exchequer funding is unavailable. Through the national hub, various private sector financing options will be explored with a view to removing barriers and leveraging these in appropriate cases.

Government is funding retrofit of the public sector capital programme (SEAI Pathfinder) in 2024 through funding of €63m from the Climate Action Fund (CAF) (and also plan to fund the programme from the CAF in 2025.) As the programme is based on 50/50 funding, it is also co-funded via the capital Exchequer-funded budgets of the national estate portfolio leads. See section 3.2.2 for further information. An SEAI/HSE Pathfinder project involving retrofit of 5 health sector sites is due to receive €48m in funding under RePowerEU. Ireland's RePowerEU submission was lodged with the Commission on 25th March 2024.

The Energy Efficiency National Fund (EENF) (see section 3.2.2) will continue to be used to fund energy efficiency measures, including buyout/penalties relating to the Energy Efficiency Obligation Scheme (EEOS) being used to fund delivery of alternative measures.

3.3 Dimension Energy Security

3.3.1 Policies and measures related to the elements set out in point 2.3

Ireland is committed to maintaining the security of our energy system in the most cost-effective manner and in line with our sustainability objectives. Ireland is cognisant of the risks posed by the impacts of climate change to our energy security. The policies and measures set out under this plan, both in terms of mitigation and adaptation, serve to offset those risks. In addition, the impact of the wide range of policies and measures aimed at increasing energy efficiency will contribute considerably to ensuring security of our energy system. Ireland has established quantifiable objectives regarding indigenous production of clean energy. These, together with the measures detailed in this plan on improving the flexibility of our system, will strengthen Ireland's capacity to deal with the consequences of the planned closure of coal and peat plants.

A review has been carried out on Ireland's electricity, natural gas, and oil systems. The Energy Security in Ireland report to 2030 sets out a strategy to ensure energy security in Ireland for this decade, while ensuring a sustainable transition to a carbon neutral energy system by 2050. In terms of gas and electricity the key policies and measures, in line with national policy set out in the Energy Security in Ireland to 2030 report and CAP, include:

- Ireland's future energy supply will be more secure by moving to an electricity-led system;
- Delivering on the plans already in place: Ireland's existing plans to grow renewable generation, demand-side flexibility, new gas-fired generation as back-up, ensuring interconnection and storage facilities are in place to secure electricity supplies;
- Balancing sustainable gas demand and supply: While gas supplies and infrastructure are adequate to meet our demand projections, there are risks in the event of disruption to infrastructure. To reduce reliance on gas imports, we will reduce natural gas demand and develop renewable, indigenous gas supply and renewable gas-compatible storage. Appendix 1 of Energy Security in Ireland to 2030 report contains an annex of related actions. One of these actions is, as a transitional measure, we will introduce a Strategic Gas Emergency Reserve to address security needs in the medium-term, to be used only if a disruption to gas

supplies occurs. This is being examined by GNI, and a detailed proposal will return to Government for final approval in 2024;

- Actions related to gas demand are also included in Appendix 1 of the Energy Security in Ireland to 2030 report. In addition, gas demand measures in relation to the current 15% voluntary gas demand reduction target, were included in the draft National Gas Supply Emergency Plan 2023-2027, which was notified to the European Commission, in October 2023 by CRU, Ireland's designated competent authority for EU regulation 2017/938;
- Robust oil supply: Back-up reserves and distribution plans in case of an oil emergency are sufficient. Into the future, we need to ensure commercial oil supplies into the State will be robust, along with the infrastructure for distribution. Over time, oil demand will be reduced;
- Anticipating Risks: Maintaining a strong focus on anticipating risks and good governance to ensure delivery, robust risk management and adequate resources.

The Energy Security Package has numerous actions to enhance electricity security of supply with a particular focus on resilience and on governance of the energy system. These include Action 7, which is to work within the updated European Electricity Market Design to continue to reduce emissions associated with Ireland's conventional capacity over the medium-term. Action 7 includes setting out how the Department will engage with key stakeholders across the SEM to develop a shared vision for how to ensure optimum operation of Ireland's capacity market in the period to 2038 against the backdrop of the energy transition. This is in advance of the new state aid decision due in 2028. Furthermore, DECC is leading work through 'Pillar X' examining how a secure transition can occur in the medium term to complement the work underway on action 8 below. Action 8 has a shorter focus. Pillar X will examine delivery scenarios for electricity security focused on the period 2030.

Action 8 of the ESP focuses on the delivery of the CRU-led Security of Supply programme for electricity. Following the declaration of a capacity crisis in the electricity sector in 2021, the CRU has led a programme of work to mitigate the risks of an identified shortfall in generation capacity in the electricity sector. This programme is supported by EirGrid and DECC and all three organisations have worked urgently to identify and pursue all available mitigations to ensure resilience in the electricity sector until winter of 2025/26 and until sufficient enduring capacity is anticipated to deliver. An update on this programme was published in the autumn of 2023 and is available on the CRU website.

The CRU-led Security of Supply programme actions include:

- The procurement of at least 2 GW of new, flexible, enduring, capacity through market mechanisms;
- Enhanced monitoring of projects successful at auction to ensure successful delivery of this capacity;
- The procurement of 650 MW of Temporary Emergency Generation capacity to ensure there are units of last resort available to the State in an emergency;
- The retention of older generating units on a temporary basis until new, enduring capacity is delivered;
- Measures to improve the performance and availability of existing generators and demand-side units, and the development of additional demand-side responses;
- Appropriate oversight and reporting arrangements to ensure the successful delivery of this programme.

Ireland is experiencing significantly higher electricity demand growth rates by comparison to other European jurisdictions. As a result, Ireland has identified that accommodating the rate of growth and demand scale of this as part of our industrial base is unique and presents risks to energy security. Action 5 of the Energy Security Package aims to identify and support new, innovative approaches to integrating large-scale demand sustainably into Ireland's energy systems that align with the overriding objective to decarbonise. Innovative partnerships that can deliver demand flexibility (e.g. time-shifting), system-level solutions (e.g. district heating initiatives) and/or the introduction of new technologies (e.g. long duration energy storage), all have potential to manage this risk more effectively. Accelerating the delivery of initiatives such as the co-location of generation and demand (for example Green Energy Parks) will also be important enablers of a more resilient and secure system.

The Energy Security Package also sets out a number of actions to enhance security of supply in our gas sector, including measures to support responsive demand and greater resilience.

Action 4 commits to amend gas connection policy and introduce gas demand flexibility measures. Demand-side management mechanisms are in place in the electricity sector whereby demand-side units reduce their demand in response to times of system stress and are compensated for their actions. Similar demand-side mechanisms will be developed in the gas sector, particularly for times of peak demand. This will not only reduce system stress

when needed, but it can also ensure Ireland is efficiently using its gas infrastructure – an important component of meeting our emissions ambitions.

Recognising the transitional role of natural gas as part of moving to an integrated net zero energy economy, permanent gas storage solutions compatible with renewable gases will be developed, as they offer a permanent and sustainable security of supply Ireland's energy system. Action 14 focuses on finalising studies to inform the development of long-term gas storage solutions, complementing a suite of actions set out in the National Hydrogen Strategy. Action 17 focuses on the creation of a Strategic Gas Emergency Reserve to address unmet demand should a significant disruption occur to Ireland's largest gas infrastructure in the medium term as Ireland transitions to renewable energy. The Minister for the Environment, Climate and Communications will bring a memorandum to Government for decision in 2024 following detailed examination and business case proposal by the gas transmission system operator, Gas Networks Ireland (GNI).

In addition to these actions, the British and Irish Governments signed a Memorandum of Understanding (MoU) in September 2023 to strengthen existing arrangements in the event of a gas supply shock. The MoU details how both States will cooperate on gas security of, supply and it supports the principle of natural gas supplies to Ireland and Northern Ireland being reduced equitably along with the four Distribution Network companies in Great Britain. The need for adaptation to address the current and future risks posed by a changing climate is both urgent and essential to successfully transition to a climate resilient economy and society by 2050. As referred to under the section on adaptation, tackling climate change will require the effort of our entire society and the electricity and gas networks sector is included in this. As these changes continue and if, as predicted, increase over the coming decades, the energy sector must prepare for, and adapt to, these new conditions. By identifying areas of vulnerability now, steps can be taken, and measures put in place to avoid or minimise future adverse impacts within the sector and to exploit opportunities.

The Government's 'Policy Statement on Geothermal Energy for a Circular Economy', published July 2023, sets out the scope of a strategy to promote the sustainable development of Ireland's geothermal resources to decarbonise the heating and cooling of buildings and for industrial uses and power generation. The optimal deployment of geothermal energy will increase the flexibility of the national energy system through the moderation of demand for electricity, particularly in winter, and through geological energy storage. In the longer term, geothermal energy could potentially generate electricity to

provide baseload supply that is constant, further reducing dependence on fossil fuels for electricity generation.

Ireland’s oil emergency management takes place within the framework of Ireland’s membership of the European Union and the IEA. Strategic stocks are the cornerstone of oil security of supply and provide a robust buffer against an oil emergency. In accordance with EU Council Directive 2009/119/EC and IEA rules, Ireland holds 90 days of a strategic oil reserve to be used in the event of a supply disruption. The EU Council Directive 2009/119/EC prescribes Ireland's stock holding obligations. Any future amendments to the Directive in respect of stock holding obligations in the context of the energy transition will be implemented as prescribed. The NORA is responsible for acquiring and managing Ireland’s strategic oil reserve. NORA is funded by a Government levy of 2 cents per litre on oil disposals. At the end of Q3 2023, NORA held approximately 75% of its stocks on the island of Ireland, with the remaining 25% of stocks held abroad.

In the event of an oil supply disruption, the Department will liaise with NORA and the oil industry on the evolving situation. Where a stock release is warranted, a recommendation is made to the Minister for Environment, Climate and Communications by Departmental officials. The Minister informs his cabinet colleagues of his decision and instructs NORA to release stocks, specifying the product categories, volumes, and location from which the stocks are to be released. NORA has a Stock Drawdown Plan in place to deal with such a situation. NORA updates its stock drawdown procedure regularly. NORA also has a Memorandum of Agreement with five shipping companies that considerably strengthens the Agency’s ability to ship products from storage locations at home and abroad to where it is needed in the event of a shortage of supply.

In the case of a domestic issue requiring stock drawdown, the Department would inform the EU/IEA of its actions and engage with NORA on the replenishment of stocks. In the case of collective EU or IEA action, stocks would be released in accordance with agreed procedures. The Oil Emergency Contingency and Transfer of Renewable Transport Fuel Functions Act 2023, which was enacted in February 2023, puts all aspects of oil emergency planning on a statutory footing. Ireland’s procedures for responding to an oil emergency are contained in the Oil Emergency Response Plan (OERP), as provided for in the Oil Emergency Contingency and Transfer of Renewable Transport Fuel Functions Act 2023. The OERP, which has been developed by DECC, sets out the framework for a national response to a petroleum fuel shortage in the domestic market, taking into account the fuels

that may potentially be in short supply and the severity and duration of any supply constraint. The OERP is updated frequently, influenced by learnings from recent market disruptions.

The OERP includes measures to deploy the State's strategic oil reserve of 90 days of supply, reduce fuel usage, and by way of the provisions of the associated Oil Emergency Allocation Schemes (OEAS), protect the operation of the emergency and critical services.

The OEAS provides for the measures to enable Government to intervene effectively in the petroleum product markets, where it is absolutely necessary for it to do so, to ensure product availability for critical functions. The OEAS enables the allocation of oil to ensure the continuation of societal functioning in a scenario where oil availability is limited or in the unlikely event of an Oil Emergency. The OEAS is modular in nature, consisting of a number of schemes, which, if required, may be enacted in their entirety, depending on the extent and duration of the emergency and the fuel type(s) in short supply. Quantities of fuel allocated to various fuel users may also be varied during the lifetime of the plan, based on the level of fuel stocks at the Minister's disposal.

The Department works closely with NORA and the Irish oil industry (through Fuels for Ireland (FFI), the industry body representing oil importers and distributors) on the development of oil emergency management policies and procedures. Several cross sectoral oil emergency exercises have been held, involving the other Government departments, NORA, and FFI, with the most recent being in September 2023. These are scenario based and explore the impacts of an oil emergency across all sectors, with an emphasis on a whole-of-Government response, taking into account the extent of the supply deficit in the market.

Crude oil is sourced mainly from the United States with some crude imports also coming from other countries including Canada, Denmark, and Norway. Refined product is currently imported primarily from UK refineries, with refined product imports, including diesel, also coming from other countries including Belgium, France, and the Netherlands. Ireland cooperates with other Member States through the EU's Oil Coordination Group and with other International Partners through the IEA. Given that the Irish oil market is characterised by a lack of indigenous crude oil production, with no commercially viable finds having been discovered, there is limited scope for reducing petroleum import dependency in the short to medium term, and Ireland will remain reliant on imports to meet oil demands. As Ireland has no indigenous oil reserves, all oil must be imported. The oil market is largely deregulated, with the oil companies sourcing product based on cost and logistical factors. While it is expected that the decarbonisation of transport and heating will decrease petroleum product usage over time, post Covid-19 the demand for some refined product within the Irish market

is increasing, driven largely by demand from the transport sector, particularly the aviation industry. Although the increased use of biofuels has begun to displace a small volume of petroleum product, there is no expectation that Ireland will be able to decrease its reliance on imported oil product in the short to medium term.

Although there are currently no plans to build new or to repurpose existing oil infrastructure, if the reliance on oil products for transport purposes diminishes significantly, there might be an opportunity to repurpose existing oil infrastructure for storage of carbon neutral energy sources, as Ireland will rely more on renewable biofuels. In line with the requirements of Article 3 of the Recast EED, Ireland is committed to implementing the Energy Efficiency First Principle (EEFP), as defined in the Governance Regulation of the Energy Union:

“Member States should use the energy efficiency first principle, which means to consider, before taking energy planning, policy, and investment decisions, whether cost-efficient, technically, economically, and environmentally sound alternative energy efficiency measures could replace in whole or in part the envisaged planning, policy, and investment measures, whilst still achieving the objectives of the respective decisions. This includes, in particular, the treatment of energy efficiency as a crucial element and a key consideration in future investment decisions on energy infrastructure in the Union. Such cost-efficient alternatives include measures to make energy demand and energy supply more efficient, in particular by means of cost-effective end-use energy savings, demand response initiatives and more efficient conversion, transmission, and distribution of energy. Member States should also encourage the spread of that principle in regional and local government, as well as in the private sector.”

Ireland recognises the significant benefits arising from energy efficiency and embracing the Energy Efficiency First Principle. The EEFP is a significant stepping stone towards Ireland becoming a sustainable, resource efficient economy and society, with all the associated economic, environmental, and social benefits.

Under Article 3 of the Recast EED, Ireland must implement the Energy Efficiency First Principle across planning, policy, and major investment decision processes, as required. We are currently considering how to most effectively achieve this, in the context of specific governance and legal structures. Pending receipt of additional guidance from the European Commission, consideration is currently being given as to whether adaptations need to be made to the following processes to embed the Energy Efficiency First Principle across all major planning, policy, and investment decisions in Ireland:

- Consideration of whether any elements of the Energy Efficiency First Principle need to be reflected in Ireland's planning or building control processes, at the appropriate level;
- Consideration of how the Energy Efficiency First Principle can be accounted for within the public spending appraisal processes;
- Consideration of how the Energy Efficiency First Principle can be incorporated within the policies governing the energy infrastructure system.

While the transposition deadline for Article 3, along with the majority of the EED, in October 2025, work has commenced with various government bodies to prepare for the implementation of the EEFP across different policy areas. It will be difficult to quantify the exact energy savings that can be gained from the implementation of the EEFP, given the nature of the requirements involved.

3.3.2 Regional co-operation in this area

To ensure continued and ongoing regional co-operation Ireland will:

- Continue to implement the requirements of EU regulation 2017/1938 (Measures to safeguard security of gas supply) including risk assessments, preventative action plans, and emergency plans. The CRU is the designated competent authority for this regulation;
- Implement the requirements of EU regulation 2019/941, which came into force on 4 July 2019, on Risk Preparedness in the Electricity Sector. This Regulation provides for Member State co-operation on common methods for assessing risks and to establish a framework for a more systematic monitoring of security of supply issues;
- Seek to maintain strong regional co-operation with the UK on emergency preparedness and response for gas and electricity;
- Participate in EU fora for gas, electricity, and oil security of supply;
- Cooperate with the Department of the Economy in Northern Ireland on the all-island dimensions of oil security, particularly around the utilisation of import infrastructure on an island-wide basis, in the event of a disruption to the capacity to move product through a major oil terminal.

Since the UK's departure from the EU, Ireland has continued to work with EU partners and the UK to identify and put in place any measures and arrangements necessary for continued regional co-operation on emergency preparedness and response, and security of supply for gas/electricity systems including working closely with the European Commission to support the Commission's engagement with the UK to progress energy security matters under the EU/UK Trade and cooperation agreement, including but not limited to any relevant provisions of EU regulation 2017/1938 as amended.

Memoranda of Understanding were signed between the Irish and UK Governments in September 2023 on Cooperation in the Energy Transition, Offshore Renewables and Electricity Interconnection and on Cooperation for Natural Gas Security of Supply, strengthening co-operation between both countries on a range of energy related matters including energy security.

International Energy Agency (IEA)

In February 2024, Minister Eamon Ryan co-chaired the 2024 IEA Ministerial Meeting in Paris, alongside his French equivalent. The IEA Ministerial was a two-day event that produced strong engagement to safeguard energy security while stepping up clean energy transitions to keep the goal of limiting global warming to 1.5°C within reach. The meeting of ministers representing close to 50 countries delivered a powerful consensus on the need for bolder action and greater global cooperation to swiftly transform the world's energy system, with geopolitical uncertainty on the rise and global temperatures continuing to break records.

Ministers from the IEA's 31 member countries laid out a series of mandates in a joint communique that will guide the Agency's mission going forward. These new mandates include:

- Directing the IEA to take a leading role in COP28's energy outcomes;
- Putting climate change and sustainable development at heart of IEA;
- Noting scale of financial investments necessary for energy transitions;
- Underlining key global targets, such as tripling renewables to 2030;
- Welcoming start of "discussions" with India about IEA membership;
- Reiterating condemnation of Russia and welcoming Ukraine to IEA family.

Ireland's co-chairing of the IEA Ministerial Bureau lasts until 2026 and it will play an active role in tracking and implementing progress of these mandates.

3.3.3. Where applicable, financing measures in this area at national level, including Union support and the use of Union funds

Maintaining the security of our energy system requires adequate infrastructure and diversity of supply. This must be achieved in the most cost-effective manner. Access to suitable financing measures is essential to realising this objective. This plan sets out several financing measures relevant and necessary to furthering our climate and energy goals, including support schemes for electricity and heat. These will impact positively on security of supply. One of the key financing measures regarding security of supply is the EU CEF funding. EU energy Projects of Common Interest (PCIs) are eligible to apply for CEF funding for works or studies, providing they satisfy certain criteria set out in both the PCI and CEF Regulations.

Most recently, two Irish Interconnection Projects Greenlink and the Celtic Interconnector qualified for CEF funding. Greenlink was also included in the third Project of Common Interest (PCI) list published in 2018 and in the fourth PCI list published in October 2019, pre withdrawal agreement. Further detail can be found in Section 4 below. While a PCI is eligible to apply for funding under CEF, it is not guaranteed. In general, projects that are commercially viable would not receive funding under CEF. CEF funding is only allowable for a maximum of 50% of the project costs, if recommended. It is vital that access to this funding would continue to be available to Irish projects now that the UK has becomes a third country. Project promoters may also avail of European Investment Bank (EIB) funding opportunities to support projects. The EIB offers financial support to projects through innovative financial instruments such as guarantees and project bonds.

These instruments create significant leverage in their use of EU budget and act as a catalyst to attract further funding from the private sector and other public sector actors. Regulated assets can also be funded by tariff-related expenditure, which is subject to the approval of the CRU, Ireland’s national energy regulator.

3.4 Dimension Internal Energy Market

Ireland's wholesale electricity market, together with other related initiatives, form an interlinked, policy-aligned system of measures which underpin and facilitate greater renewable electricity penetration in Ireland and progressive decarbonisation of its wholesale electricity sector, and ensure efficiency and security of electricity supply. Ireland's national objective relating to the EU IEM is, and has been over the long term, to continue to deepen the integration of Ireland's wholesale electricity market, and its regulation, with the EU IEM, building on well-known ongoing plans, programmes, and actions in this regard.

Brexit has added a level of complexity to this ambition. As of 1st January 2021, the Day Ahead Market (DAM) in the SEM is no longer coupled, with cross border trading taking place only in the intraday timeframe (IDA) with GB. Scheduling of flows on each of the interconnectors is determined by the price spread between the SEM and GB in the IDA 1 and IDA 2 auctions. The Trade & Cooperation Agreement (TCA) provides a mechanism to ensure that the current system is made more efficient and should be based on the concept of multi-regional loose volume coupling (MRLVC).

Ireland is committed to supporting customers' participation in the energy system and enabling them to sell excess electricity they have produced back to the grid. Ireland's peripheral location at the north-western edge of mainland Europe presents obvious challenges to interconnection, not least around costs, yet may also highlight the desirability of interconnection, particularly in the context of security and diversification of electricity supply. National and regulatory policy combined have now created a model environment for the proposal of additional interconnection, as appropriate, to assist in meeting our national targets. In line with the requirements of Article 3 of the Recast EED, Ireland is committed to implementing the Energy Efficiency First Principle (EEFP), as defined in the Governance Regulation of the Energy Union: "Member States should use the energy efficiency first principle, which means to consider, before taking energy planning, policy, and investment decisions, whether cost-efficient, technically, economically, and environmentally sound alternative energy efficiency measures could replace in whole or in part the envisaged planning, policy, and investment measures, whilst still achieving the objectives of the respective decisions. This includes, in particular, the treatment of energy efficiency as a crucial element and a key consideration in future investment decisions on energy infrastructure in the Union. Such cost-efficient alternatives include measures to make energy demand and energy supply more efficient, in particular by means of cost-effective end-use energy savings, demand response initiatives and more efficient conversion, transmission,

and distribution of energy. Member States should also encourage the spread of that principle in regional and local government, as well as in the private sector."

Ireland recognises the significant benefits arising from energy efficiency and embracing the Energy Efficiency First Principle. The EEFP is a significant stepping stone towards Ireland becoming a sustainable, resource efficient economy and society, with all of the associated economic, environmental, and social benefits.

Under Article 3 of the Recast EED, Ireland must implement the Energy Efficiency First Principle across planning, policy, and major investment decision processes, as required. We are currently considering how to most effectively achieve this, in the context of specific governance and legal structures. Pending receipt of additional guidance from the European Commission, consideration is currently being given as to whether adaptations need to be made to the following processes to embed the Energy Efficiency First Principle across all major planning, policy, and investment decisions in Ireland:

- Consideration of whether any elements of the Energy Efficiency First Principle need to be reflected in Ireland's planning or building control processes, at the appropriate level;
- Consideration of how the Energy Efficiency First Principle can be accounted for within the public spending appraisal processes;
- Consideration of how the Energy Efficiency First Principle can be incorporated within the policies governing the energy infrastructure system.

While the transposition deadline for Article 3, along with the majority of the EED, is October 2025, work has commenced with various government bodies to prepare for the implementation of the EEFP across different policy areas. It will be difficult to quantify the exact energy savings that can be gained from the implementation of the EEFP, given the nature of the requirements involved.

3.4.1 Electricity Infrastructure

3.4.1.1 Policies and measures to achieve the targeted level of interconnectivity as set out in point (d) of Article 4

Ireland's interconnection capacity currently stands at 500 MW in a single connection to the UK. Capacity is set to more than treble by 2027 to 1,700 MW including a return of direct interconnection between Ireland and the EU via the Celtic Interconnector. Envisaged

connection to the IEM by 2030 is 700 MW. The Celtic Interconnector between Ireland and France remains on target for integration into the IEM by 2027. Construction activities have advanced well in both France and Ireland. The completion of the Celtic Interconnector in 2027 will see the return of direct connectivity to the IEM following the departure of the UK from the European Union. Ireland's updated National Policy on Electricity Interconnection envisages a further connection with the UK by 2030 bringing the total anticipated interconnection capacity to 2,450 MW. Additionally, existing, and planned interconnection from GB to Northern Ireland will mean a total of 3,650 MW SEM interconnector capacity by 2030.

Ireland's updated National Policy Statement on Electricity Interconnection published in July 2023 sets out our interconnection ambitions. Targeting increased connection to the IEM and recognizing the key energy relationship with the UK, Ireland will explore the feasibility of the following at a minimum:

- A second connection to France. This will build upon the collaborative relationship between EirGrid and the French TSO in progressing the Celtic Interconnector;
- A connection to Spain, if feasible considering the practical geographical challenges;
- A connection to Belgium/Netherlands, potentially a hybrid or multi-purpose project;
- A further connection to GB, potentially a hybrid interconnector, beyond 2030 seeking to give effect to the April 2023 Ostend declaration of energy Ministers;
- Any further interconnection required to support export of renewable electricity in the context of other uses such as green hydrogen and new demand centres.

We will take a structured and integrated forward planning approach to deliver the necessary infrastructure to both meet Ireland's need and make Ireland central to Europe's energy future that will be expressed in an Offshore Transmission Strategy that will be aligned with our forthcoming offshore future framework policy and the recently published National Industrial Strategy for Offshore Wind. Industry has expressed significant interest in progressing Multipurpose interconnector (Hybrid) projects under Transmission strategy both to GB and the continent.

Ireland's next focus is the exploration of a further connection with France. To give effect to this Ireland and France made a Joint Declaration of Intent in November 2023 committing to

making progress on assessing a second Ireland-France Interconnector building on the ongoing work at EU level on the Offshore Network Development Plan, which was published in January 2024. Should that assessment indicate that a second interconnector could be considered, both member states would be positively disposed to the TSOs advancing towards a prefeasibility study to progress towards a second interconnector. Progress was further buttressed by the signing of a Memorandum of Understanding between the respective TSOs.

Further connection to the IEM will be explored with partner member states for delivery in the next decade in the context of Ireland's renewable energy ambitions and energy security needs. The 2023 policy also acknowledges the potential for commercial projects, augmenting those of Eirgrid, to maximise future interconnection.

Ireland's National Regulator CRU assesses electricity interconnection applications based on a set of technical, economic, and regulatory criteria. In particular, the impact of each project both in terms of its socio-economic benefits as well as in terms of costs under a range of different scenarios and sensitivities. In carrying out this evaluation, CRU has due regard for the long-term interest of final consumers, particularly in ensuring that the impact on national tariffs does not represent a disproportionate burden for the Irish consumer.

The CRU continues to support further interconnection, with statutory responsibility for:

- Deciding on appropriate regulatory support to underpin interconnection investment;
- Cooperating with other National Regulatory Authorities and the Agency for Cooperation of Energy Regulators in the PCI process;
- Cross border cost allocation decisions as part of the PCI process;
- Approving EirGrid's submissions on national grid infrastructure upgrades that may be associated with new interconnectors connecting to the transmission system;
- Granting licences to transport electricity and maintain an interconnector as per the Electricity Regulation Act 1999;
- Granting authorisation to construct an interconnector, along with the appropriate regulatory regime for the specific interconnector, considering the interests of final customers of electricity.

The CRU will continue to effectively deliver these functions in future. Additionally, CRU's considerable regulatory experience will inform the development and evolution of the Offshore Transmission Strategy.

EirGrid is the certified independent TSO in Ireland and will play a vital and central role in the expansion of Ireland's offshore grid. EirGrid's remit has been extended significantly to support our offshore energy and interconnection ambitions.

As per SI 445/2000 , EirGrid will operate and ensure the development and maintenance of a safe, secure, reliable, economical, and efficient electricity transmission system, and to explore and develop opportunities for interconnection of its system with other systems, always with a view to ensuring that all reasonable demands for electricity are met and having due regard for the environment.

The 2021 Policy Statement on the Framework for Ireland's Offshore Electricity Transmission System set out EirGrid's intended role relating to offshore grid development. In addition to its central role in design and construction EirGrid's technical expertise and experience will be fundamental in informing the Offshore Transmission Strategy.

3.4.1.2 Regional co-operation in this area

North Seas Energy Co-operation

NSEC Support Group 1 (SG1) is a project-based support group for hybrid assets (multipurpose interconnectors) and joint projects between member countries. The group also concentrates on regulatory aspects and methods to overcome barriers to hybrid projects. This is a new and emerging policy area with only one developed hybrid project in the EU, although there are various projects, initiatives, and models in progress or development across the Union.

Ireland's engagement with SG1 to date has been productive in leveraging the experience of other Member States that will be vital in furthering Ireland's energy transition. As additional Member States' specific projects, initiatives and models develop it is intended to intensify our engagement with this support group in relation to:

- The establishment of Offshore Bidding Zones;
- The alignment of development of offshore energy & routes to market including interconnection;

- Ensuring consistency of approach towards hybrid projects with the UK across member states.

In 2022, under Ireland's Presidency of the NSEC, a joint MOU of co-operation in the development of ORE was signed with the UK. The cooperation under the MoU implements Article 321 of the EU-UK Trade and Cooperation Agreement, which provides that the EU and the UK are to enable the creation of a specific forum for technical discussions on offshore renewable energy development, building on NSEC, in a number of areas. The MoU gives effect to this provision and establishes a new relationship between NSEC and the UK, building on the existing NSEC structures. Through the MoU, Britain does not become an NSEC member but benefits from a privileged framework for cooperation with the NSEC members.

A key challenge has emerged from hybrid projects in development with the UK. Effective operation of hybrid projects requires an efficient market design. The Advanced Hybrid Coupling (AHC) approach endorsed by the Commission is not applicable to the UK under the Trade and Cooperation agreement. Alternative approaches are in discussion through the Specialised Committee for Energy. A successful outcome to that process will be fundamental in progressing Hybrid projects with the UK.

General Co-operation

Ireland - France Joint Declaration of Intent on energy transition cooperation.

On 13th November 2023, Ireland and France signed a Joint Declaration of Intent (JDoI) on 'Energy Transition Cooperation'. The declaration provides a framework for the mutual willingness of both countries to accelerate the decarbonisation of energy systems and is part of a wider collective ambition for Europe to become the first climate neutral continent by 2050.

The Joint Declaration of Intent also builds upon existing commitments set out in the 'Ireland France Joint Plan of Action 2021-2025', adopted by both countries in August 2021. The joint action plan set out several priority projects in a number of areas, including efforts to support sustainability, with a focus on 'renewable energy.' It signals greater co-operation on onshore wind and solar development and a commitment to accelerating the deployment of offshore renewables and energy systems, including intensifying cooperation bilaterally and regionally in the North Sea.

In the near term, both countries will endeavour to make progress on the assessment of opportunities to increase electricity interconnection capacities, building on the ongoing work

at EU level on the Offshore Network Development Plan, which was published in January 2024. Should that assessment indicate that a second interconnector should be considered, the signatories would be positively disposed to the TSOs advancing towards a prefeasibility study to progress towards a second interconnector.

Ireland – United Kingdom

The UK remains a key energy partner for Ireland despite its departure from the European Union. In addition to geographical proximity, the existing IE-GB energy links, proximity, and growing array of interconnectors with other member states, the Single Energy Market includes Northern Ireland and crosses national jurisdictions requiring close cooperation.

There are several fora for cooperation stemming both from the Good Friday Agreement and the general need for collaboration including:

- The British–Irish Intergovernmental Conference;
- Energy MOUs;
- British Irish Council – Energy Work Sector.

The British–Irish Intergovernmental Conference (BIIGC) is an intergovernmental organisation established by the Governments of Ireland and the UK under the Good Friday Agreement in 1998. When the Northern Ireland Assembly is suspended, devolved matters revert to the BIIGC's remit. The BIIGC guarantees the Government of Ireland a say in areas of bilateral co-operation and on those matters not yet devolved to the Northern Ireland Assembly or the North/South Ministerial Council. The latest meeting took place at in Dublin on 28th November 2023 with Energy security as a key focus and is complemented by regular and ongoing official level workshops and discussion fora. It was agreed to explore increased cooperation on offshore renewable energy and security of supply, including in relation to offshore grids, electricity interconnection, and development of hybrid/multipurpose projects combining offshore wind generation with interconnection:

- Continue the policy dialogue between relevant Departments and agencies in the context of the forthcoming Memorandum of Understanding for cooperation on gas security of supply;
- Jointly examine the scope for further cross-border cooperation and coordination around low carbon hydrogen;

- In September 2023, Ireland signed two Memoranda of Understanding with the UK on increased cooperation for developing offshore renewable energy, exploring further electricity interconnection opportunities, and strengthening cooperation on security of gas supplies;
- The benefits of cooperation between the participants are to accelerate the delivery of offshore renewable generation, interconnection, and offshore hybrid assets, which includes hybrid interconnector projects that connect directly with offshore wind farms and energy islands, and the importance of wider regional co-operation to facilitate this;
- Under the Electricity MOU a Joint Working Group to explore increased interconnection, including hybrids, is being established.

Ireland – United Kingdom – Belgium

On 15th May 2024, a Joint Statement was signed in Bruges, Belgium by Minister Ryan and his Belgian and UK counterparts, Minister Tinne van der Straeten and Andrew Bowie, to pave the way for greater co-operation on renewables and interconnection opportunities between the three countries.

The Joint Statement built on the ambition declared at the North Sea Summit held in Ostend in April 2023 to accelerate the development of offshore wind in the North Seas, including the Irish Sea, Celtic Sea and Atlantic Ocean. The nine countries involved in that declaration have set the ambition to increase offshore wind capacity in the North Sea from less than 30GW to of about 120GW by 2030, and 300GW by 2050.

The co-operation includes the establishment of a working group which will produce a report on the shared challenges, opportunities and solutions to developing offshore renewable energy infrastructure. EirGrid will engage with its Belgian and UK counterparts and report back to their respective ministries with options for trilateral arrangements. This work is expected to be completed in 2025.

British – Irish Council – Energy Work Sector

The British-Irish Council is a practical forum where national and devolved administrations work together on issues of common interest to citizens across these islands. The Council allows Ministers to consult, share expertise and build strong partnerships.

Member Administrations meet regularly throughout the year, including when Heads of Administration and Ministers come together at biannual Summits. The Council remains responsive to evolving policy priorities and its current work programme prioritises eleven specific work sectors where it can deliver for citizens and stakeholders.

In these work sectors Ministers, civil servants and, when relevant, invited stakeholders, are collaborating across a diverse range of social, economic, and environmental topics. The energy work sector covers a range of energy topics of common interest including grid and interconnector development. Co-operation between the two countries will be imperative over the coming decade.

3.4.1.3 Where applicable, financing measures in this area at national level, including Union support and the use of Union funds

Celtic Interconnector

In December 2019 TSOs EirGrid and RTE entered into the current grant agreement under the CEF with the Climate Infrastructure and Environment Executive Agency (CINEA) to establish funding for the Celtic Interconnector project. The total CEF grant for this project is a maximum of €530.7m.

The regulators in Ireland and France reached a joint decision in 2019 on the “Cross Border Cost Allocation” for the project. Based on the benefits, the regulators have ultimately agreed that 65% of the project’s estimated construction costs will be allocated to Ireland and 35% to France, subject to a substantial grant from CEF.

In 2021 CRU granted EirGrid a fully regulated regulatory model consisting of two phases for the Celtic Interconnector in Ireland. Phase 1 – Pre-Operational (i.e. developments & construction), the remuneration of the project will be limited to qualifying debt costs, with any returns for equity risk during that period being deferred to Phase 2. CRU has decided to allow EirGrid to recover their efficient cost of debt service during construction. In operational Phase 2 a full Regulatory Asset Base (RAB) x Weighted Average Cost of Capital (WACC) model would apply with EirGrid permitted to recover their efficient cost of debt and a return on equity.

Greenlink Interconnector

In 2018, Greenlink Interconnector Limited (GIL) entered into a grant agreement with CINEA in respect of the Greenlink Interconnector Ireland-UK. Under two separate grant agreements, the total CEF funding for this project is approx. of €8.4m. In 2021, CRU

published in it is decision paper on the Cap and Floor regulatory framework for the Greenlink interconnector in Ireland. The Cap and Floor Regime will promote the development, financing, and construction of the Interconnector where it is demonstrably beneficial to consumers. The paper also includes the CRU's initial estimate of the Cap and Floor levels that would apply to a maximum of 50% of the project costs and revenues, reflecting the costs applicable to Ireland. An annual assessment period will be carried out over the 25-year regime from the commissioning date. This has established a regulatory model in Ireland that can be applied, if appropriate, to future commercial interconnectors to EU member states and the UK.

TSO and future developments

CRU published its Price Review 5L ('PR5') Determination Papers. The Final Determination sets out the CRU's decision on the network companies' revenues for the 2021 to 2025 period and examines the cost and performance over the previous five years (2016 to 2020). Price review 6 to 2030. The designation of EirGrid as the system operator and asset owner of Ireland's offshore electricity transmission system under the Policy Statement on the Framework for Ireland's Offshore Electricity Transmission System 2021, will ultimately provide Eirgrid with a much larger asset base, increase its standing as a central market operator and its borrowing potential. CRU recently published a call for evidence to gather stakeholder feedback on the revenue recovery model to be applied to EirGrid in its new role as offshore asset owner to match our offshore generation and grid ambitions. The CRU is of the view that EirGrid will require significant levels of equity to be injected into the business in order raise sufficient capital to fund the build out of the offshore transmission grid. Further financial measures to support EirGrid in its role as offshore TSO are in active development.

Other supports

DECC received funding from the European Union via the Technical Support Instrument in cooperation with the Directorate-General for Structural Reform Support of the European Commission (DG REFORM). Funding was set at €430K. This project seeks to underpin the plan-led regime for Offshore Renewable Energy (ORE) in Ireland and to inform future policy.

DG Reform approved all project reports in March 2024. Deliverable 3 of the project is an Analysis for Setting Up an Appropriate Policy Framework for Hybrid Interconnection and will inform the development of the Offshore Transmission Strategy and NSEC SG1 engagement.

3.4.2 Energy Transmission Infrastructure

3.4.2.1 Policies and measures related to the elements set out in point 2.4.2, including, where applicable, specific measures to enable the delivery of Projects of Common Interest (PCIs) and other key infrastructure projects.

Government policy statement on the strategic importance of transmission and other energy infrastructure: In July 2012, the Government produced a policy statement on the Strategic Importance of Transmission and other Energy Infrastructure. This statement reaffirmed the need for the development and renewal of energy networks to meet economic and social goals. It stated that the planning process provides the necessary framework for ensuring that all necessary standards are met, and that comprehensive statutory and non-statutory consultation is built into the process. It confirmed that Government "endorses, supports and promotes the strategic programmes of the energy infrastructure providers." The 2021 Policy Statement on the Framework for Ireland's Offshore Electricity Transmission System set out a number of measures and policies to support the development of Ireland's offshore transmission infrastructure including:

- A phased transition from the current decentralised offshore transmission system model to a centralised model ultimately resulting in Eirgrid being the exclusive developer of offshore transmission infrastructure;
- The designation of EirGrid as the system operator and asset owner of Ireland's offshore electricity transmission system;
- Transmission system assets developed by RE projects must comply with functional specifications provided by EirGrid.

Compliance with Trans-European Energy Infrastructure Regulation

Ireland is compliant with EU Regulation 347/2013 which promotes the development of trans-European energy infrastructure. Under Article 8 of the regulation, IE has designated Ireland's planning authority, An Bord Pleanála, as the competent authority responsible for facilitating and coordinating the permit granting process for projects of common interest.

An Bord Pleanála was designated Competent Authority for the purposes of Article 8.3(c) of Regulation 347/2013. An Bord Pleanála is carrying out this role in accordance with the requirements of Regulation 347/2013 for a streamlined permit granting procedure. The competent authority, in consultation with other consenting authorities, sets the time limits in

accordance with Article 10 of the Regulation on which individual decisions shall be issued for a PCI.

EU Regulation 347/2013 lays down rules for the timely development of trans-European energy projects in order to achieve the energy policy objectives of the EU. The Energy Infrastructure Regulation contains guidelines for the identification of projects known as Projects of Common Interest (PCI). The PCI designation carries certain conditions and entitlements, including more streamlined planning and regulatory processes at Member State level. The regulation facilitates the timely implementation of projects of common interest by streamlining, coordinating more closely, and accelerating permit granting processes and by enhancing public participation.

TSO Public Engagement

In the next decade, EirGrid will need to develop large amounts of new grid infrastructure - significantly more than in the last ten years. More than ever before, it is important that we gain the support of individual landowners, their neighbours, and their wider communities. Eirgrid acknowledges the challenges of what they ask from individuals and communities for the benefit of the entire population.

EirGrid has been making community engagement and participation part of their core competence. In early 2020 EirGrid established a programme delivery team to find ways to improve public engagement. This team then started a detailed process of investigation and recommendation. They outlined goals, assessed practices, gathered learnings, and defined a path to new standards. This process was informed by a comprehensive analysis of independent reviews on this topic. These included independent reports carried out by external consultants. The research also considered insights from workshops held with internal and external stakeholders. Finally, the team evaluated local case studies, and a range of international and European best practice reviews.

This process allowed them to consider specific lessons learnt from their own projects, and from similar work across the energy sector. In particular, they examined the detail of recent engagements with landowners, community, and industry. This allowed EirGrid to make informed and considered recommendations to create their strategy for effective public engagement. EirGrid published their strategy for effective public engagement in 2021 and have been pursuing the actions laid out in the strategy ever since. This strategy focuses on the three pillars of Social Acceptance, Capacity and Partnerships.

Goal 1: Social Acceptance

Social acceptance is the biggest challenge EirGrid faces when developing new electricity grid infrastructure. As a result, they have been placing greater emphasis on engaging with and listening to affected communities.

To help overcome the challenge of social acceptability, EirGrid have been:

- Considering the social acceptability of each solution;
- Improving Participation and engagement methods;
- Enhancing community benefits;
- Delivering ambitious education and information campaigns;
- Improving their approach to landowner engagement.

Goal 2: Greater public engagement capacity

For public engagement to become a core competence, EirGrid have been developing a dedicated in-house team with specialist skills in this area. This team focuses on developing programmes and protocols to ensure they deliver a consistent and appropriate approach to every project.

To build on their Public Engagement capacity, EirGrid have been:

- Reviewing and updating their processes and outputs;
- Restructuring their teams with a great focus on public engagement;
- Increasing their public engagement capacity by adding personnel;
- Carrying out independent evaluation and certification of their public engagement every year;
- Expanding their public engagement toolkit.

Goal 3: Partnerships

EirGrid has a deeply interconnected role in leading the changes necessary for a clean electricity system. This is reflected in the many partnerships they are renewing, building, and developing with stakeholders such as; Government, local Government, state bodies, NGOs and local community and voluntary groups.

To develop these partnerships, EirGrid has been

- Working with Government on a multi-partner campaign about climate action to support public policy;
- Supporting and encouraging the energy sector to work together more effectively;
- Strengthening relationships with community organisations;
- Renewing and developing new alliances with enabling organisations.

For more information, please refer to our Public Engagement Strategy here.

3.4.2.2 Regional co-operation in this area

EirGrid and GNI work very closely with all European Transmission System Operators (TSOs) through ENTSO-E and ENTSO-G. Significant areas of work include the TYNDP and Network Codes. A joint TYNDP is produced by ENTSO-E and ENTSO-G. Network Codes are a common set of rules being adopted by the European Union which will enable electricity and gas network operators, generators, suppliers, and consumers to operate more effectively in the pan-European electricity and gas market. The harmonisation of national rules will promote the efficient use of cross-border interconnection between countries and will provide more secure and reliable systems with an increased level of renewable generation.

3.4.2.3 Where applicable, financing measures in this area at national level, including Union support and the use of Union funds

The majority of projects are financed through customers that use the transmission systems in Ireland. Both the Celtic and Greenlink interconnector have received CEF funding for studies. Greenlink was granted funding of €3.6m in 2019, and Celtic has received three grant awards including two for approx. €3.75m and €4m. On 2 October 2019, the European Commission announced the allocation of a €530.7m grant from the CEF for the Celtic Interconnector between Ireland and France. This grant reflects the project's value in terms of solidarity and security of supply, as well as its contribution to achieving the EU's energy policy objectives.

3.4.3 Market Integration

3.4.3.1 Policies and measures related to the elements set out in point 2.4.3

Some of the regulatory policies and measures related to the national objective for market integration in section 2.4 are already provided for in existing plans and programmes,

comprising the I-SEM market design, the associated capacity mechanism and the DS3 System Services programme which is soon to be supplemented and then replaced by the System Services Future Arrangements. Further regulatory measures in the SEM over the coming years are set to be implemented to ensure compliance with relevant EU energy acquis requirements, and in accordance with regulatory and system operator work programmes and timelines.

The requirements flow from the EU relevant network codes and guidelines, the electricity market regulation in the CEP, reform the electricity market design (EMD) and regulation on wholesale energy market integrity and transparency (REMIT) that is currently being negotiated at EU level, and the requirements of the SEM capacity mechanism State Aid approval. Further details on the main elements of these policies and measures are contained in this following section.

Given that the I-SEM project was being developed as the CEP was being negotiated and the depth and broad scale of reforms implemented in the new market design, in many respects the SEM was already largely compliant with the principles for the design and operation of electricity markets outlined in the CEP recast electricity market regulation. That said, there were requirements that needed to be implemented relating to the electricity market regulation such as changes to emissions limits for participation in the CRM, implementation of non-priority dispatch renewables, and changes to the SEM's definitions of dispatch and redispatch. This CRM introduced in 2017 is State Aid approved and is also similarly aligned in many respects with the regulation.

The ISEM launched on 1st October 2018 and included the establishment of Day-Ahead, Intra-Day and Balancing Markets, with an ex-ante clearing price compared to the previous ex-post gross mandatory pool system, and a new obligation on participants to take responsibility for imbalances.

The Day-Ahead Market (DAM), Intra-Day Market (IDM) and Balancing Market (BM) are the exclusive routes for contracting and physical scheduling of generation in the SEM. Financial Transmission Rights (FTRs) were sold until 2021 when the Withdrawal Agreement entered into force. FTRs were the only forward, cross-border contracting available to market participants. FTRs will be sold again on the Celtic Interconnector once energisation is complete. Market participants are required to provide bids and offers to provide this energy to the TSOs in the Balancing Mechanism (BM), up to the technical capability of the market participant to respond to dispatch instructions. Through the ability to trade closer to real time, the revised arrangements are also facilitating the continued growth of renewable generation

and decarbonisation of Irish power generation. It is also important to note the non-discriminatory nature of participation in the new market and its capacity mechanism, which has led to a marked increase in demand side participation and battery storage in the SEM.

The Capacity Mechanism in the SEM

Ireland, like several European countries is strongly supportive of the capacity mechanism provided for in the European framework and has learned the strategic importance of this policy lever in achieving a secure transition and successfully operating a majority renewable power system. The SEM includes a competitive CRM as an integral feature of the market, which was State Aid approved by the European Commission in November 2017.

Consistent with the thrust of EU acquis, including Article 22 of the CEP recast Electricity Market Regulation and the terms of the state aid approval, the SEM's CRM is a measure (in energy sector terms) established to address existing resource adequacy issues. Considering the level of projected demand growth in Ireland, the transition to ever higher levels of variable renewables, and the need to manage the transition from an aging fleet of conventional fossil fuel units, the SEM CRM will continue to play a central role in securing the level of investment required in the coming years.

Given the importance of the CRM as a measure, any policy changes or amendments must remain sufficiently flexible both to ensure generation adequacy and security of supply and to facilitate the achievement of the ambitious decarbonisation objectives on the island of Ireland in a cost effective and efficient manner. Given the extent and ambitious nature of Ireland's 2030 80% target, the SEM's CRM, in conjunction with the energy and ancillary services markets, provides a necessary revenue stream to ensure adequate levels of future investment including in flexible generation, such as demand response and battery storage.

During the recent electricity market design (EMD) negotiations, Ireland along with several other Member States successfully argued for a more flexible and simplified process for assessing capacity mechanisms from a state aid perspective. It was agreed that the Commission will come forward with proposals on streamlining and simplifying the process for assessing capacity mechanisms shortly after the EMD Regulation enters into force. This commitment is very welcome and will be monitored closely as EMD progresses. The state aid decision on Ireland's capacity mechanism is due to expire in 2028. The SEM will be required to apply for a new decision from the European Commission. In preparation for this application, the Department will engage with key stakeholders across the SEM to develop a

shared vision for how to ensure optimum operation of the CRM in the period to 2038 against the backdrop of the energy transition.

Unlike the pre-ISEM project administratively determined capacity payment mechanism, the value of capacity in the market under the CRM is determined through competitive auction. The CRM includes penalties for generators that receive reliability option payments after a successful bid but are then not available to produce when required at times of system stress. Despite these changes, the CRM has not performed to the level required to keep up with increasing tightness between supply and demand in the electricity market in Ireland. The CRU is implementing a programme of actions to address electricity security supply risks over the coming years.

The Implementation Plan for Ireland was prepared in fulfilment of the requirement set out in Article 20 of the Regulation 2019/943 on the internal market for electricity (recast), part of the CEP. The requirement is for Member States with capacity mechanisms to prepare and submit an Implementation Plan containing information about its measures under certain pre-defined headings relating to principles and objectives for market operation. The submission of the Implementation Plan is followed with a review by the Commission, both being legal conditions for the approval of any national capacity mechanism. This was detailed in the Guidance for Member States on implementation plans pursuant to Art. 20 (3)-(5) of Regulation (EU) 2019/943 ("Market Reform Plans").

Ireland's Implementation Plan recognises that markets, if well designed, free of regulatory distortions and sufficiently connected to the EU electricity grid, can provide the right amount and type of capacity to meet demand. Capacity mechanisms should only be introduced to address residual concerns, i.e., problems or circumstances which cannot be solely resolved by market reforms. Once the residual concerns have been eliminated and market reforms have started to work, adequacy problems are expected to decrease and ultimately disappear. To enable this, regulatory measures to eliminate distortions and to reform markets need to be effective and credible for investors and all other market participants. In December 2019, Ireland's draft Implementation Plan was submitted to the Commission, which published it as part of their consultation process in early 2020. The Commission sent its opinion to the DECC in April 2020. It then published the opinion on 28th May 2020.

The Implementation Plan was updated to reflect the Commission's suggestions on priority action in the wholesale market. The Commission emphasised its opinion of the requirement for thorough implementation of CEP rules in the Irish wholesale market. The updated Implementation Plan was published on the Department's website on 9th October 2020.

Article 20 (6)-(8) of Regulation (EU) 2019/943 (Electricity Regulation) requires all Member States with identified adequacy concerns to monitor the application of their implementation plans and to publish the results of the monitoring in an annual report ("Monitoring Report") that shall be submitted to the Commission. This report contains updates on the progress to date achieved towards measures detailed in the Implementation Plan relating to market reform, resource adequacy, and ongoing or future market reform measures. This report details and explains any previous delays or possible future delays, whilst also setting out anticipated issues and planned mitigation measures.

The first monitoring report was prepared in fulfilment of this requirement for Commission opinion under Article 20 (7) and submitted in February 2022. The second report was submitted in early 2023 and sets out the additional progress on those measures made since the first monitoring report was submitted. Ireland is currently drafting the third monitoring report which will be submitted imminently.

DS3 System Services

Due to Ireland's isolated island status and the dramatic increase in wind penetration levels in recent years, the level of non-synchronous power on the SEM system has risen at a faster rate than in any other region in Europe over this timeframe. Overseen by the SEM Committee, DS3 was initiated in 2011 and was established to increase the amount of non-synchronous generation on the Irish power system in a safe and secure manner. EirGrid, as the Transmission Service Operator, is responsible for administering DS3 which involves the procurement of a suite of system services from a range of service providers, including conventional generators, wind farms, interconnectors, storage, and demand side units. The services provided through DS3, which range from inertia, reserves, voltage, and ramping, offer an enhanced portfolio of options to the TSO for managing an electricity system with higher penetrations of renewable generation. The programme also encourages new entrants to the energy market. It is important to highlight the overwhelming success of the DS3 programme in facilitating the integration of renewables on the SEM system, which in terms of SNSP is unprecedented.

During a period of considerable upheaval, DS3 provides a reasonably predictable revenue stream, which in conjunction with energy market revenues in the CRM, are considered vital to facilitating the necessary investment in flexible generation to meet Ireland's ambitious climate action goals. To date, the DS3 Programme has enabled EirGrid and SONI to increase levels of instantaneous SNSP to 75% with plans identified to move to SNSP of 95%

by 2030. As highlighted in section 2.4.3, EirGrid's DS3 Programme has been and will remain a vital component in the decarbonisation of the power sector on the island of Ireland and the integration of intermittent RES, primarily wind, onto the SEM system. It is important to highlight that the nature of System Services on the Irish system is continuously evolving. The original aim of the DS3 programme was to ensure that the TSO could securely operate the power system with increasing amounts of variable non-synchronous renewable generation as Ireland progressed toward its 2020 renewable electricity target.

The existing arrangements give service providers a good estimate of revenues to 2026. The SEM Committee is now working on the implementation of System Services Future Arrangements which will include daily auctions for system services accompanied by a layered procurement framework for products that are not amenable to daily auctions at Go Live. The RAs are working closely with TSOs on the implementation of this project which will allow the SEM system to facilitate closer to 100% non-synchronous generation – a key component of Ireland's decarbonisation pathway. Ireland's ambitious renewable energy targets create a host of new challenges for our all-island electricity system. In this regard, the next phase of the TSO System Services programme will be critical in meeting these challenges.

The SEM also ensures that liquid and transparent trading arrangements are accessible by all market participants. Transparency of data facilitates competition and provides an effective market power mitigation measure, enabling participants and stakeholders to comprehend price formulation and market signals. Physical cross-zonal capacity is released for use only in centralised short-term markets, facilitating scheduled flows of power to and from the all-island market where it is efficient to do so, and increasing competition and efficiency.

The design provided for Inter-TSO collaboration to effect flows close to real-time and intra-day cross border trades occurring in the Intra-day market in order to facilitate the efficient use of the interconnector in real time.

Shaping Our Electricity Future (SOEF)

The successor to the DS3 Programme is Shaping Our Electricity Future (SOEF). The system operations pillar contains four main system operation workstreams of Operational Policy, Standards and Services, Operational Tools, and Technology Enablement

An Operational Policy Roadmap to 2030 was published in Q4 2022. The roadmap sets out the key actions in the operational policy space that will be required to deliver on climate action targets while continuing to securely operate the electricity system. It outlines the

context, drivers, timelines, milestones, actions, and stakeholder impacts that are needed in each operational policy area. The Operational Policy Roadmap is divided into three policy areas: 1. Dynamic Stability, 2. Reserves and Ramping, and 3. Operational Security. The operational policy roadmap will be reviewed and updated if required, every two years.

The introduction of 'Hybrids' presents an opportunity for both market participants and system operators to optimise the use of grid infrastructure by increasing the overall capacity factors of connected entities, with the potential for improving security of supply. EirGrid is working closely with ESB Networks to unlock the potential for these developments. Three areas are covered:

- A contractual framework approach to facilitate Multiple Legal Entities behind a single connection point;
- Recommendations on revisions to the over-install policy; and
- A technical assessment for sharing of Maximum Export Capacity (MEC) behind a single connection point.

TSO-DSO joint system operator programme.

EirGrid and ESB Networks are working closely together to ensure that the needs of both distribution and transmission systems, and ultimately the needs of consumers, are met. A key focus is a new TSO-DSO Operating Model.

3.4.3.2 Measures to increase the flexibility of the energy system with regard to renewable energy production such as smart grids, aggregation, demand response, storage, distributed generation, mechanisms for dispatching, re-dispatching and curtailment, real-time price signals, including the roll-out of intraday market coupling and cross- border balancing markets

The introduction of a firm Day Ahead Market schedule and price under I-SEM, resulting in more efficient short-term price signals, will also have played a role in stimulating more DSU investment. The continued roll-out of smart metering in Ireland is also anticipated to see a further increase in aggregated demand side response.

The DS3 Programme has been and will remain a vital ingredient in power generation, decarbonisation, and procurement of flexible generation on the island of Ireland and the integration of record levels of intermittent RES, primarily wind, onto the SEM system.

The CAP commits to strengthening the policy framework to incentivise electricity storage and interconnection. Increased levels of storage and interconnection will be critical to absorbing high levels of renewable generation on to the system, as renewables require back-up which will have to be provided by quick response plant, storage, or interconnection.

3.4.3.3 Where applicable, measures to ensure the non-discriminatory participation of renewable energy, demand response and storage, including via aggregation, in all energy markets

In regard to non-discriminatory participation of renewables, demand response and storage, national policy in Ireland will continue to be in accordance with and framed by adherence to EU legislation and future implementation of the Clean Energy Package.

A key challenge in transposing IMED 2019/944 was to consider how best to encapsulate new categories of market actors within the domestic regulatory framework. The Commission for Regulation of Utilities (CRU) issue licences to electricity undertakings, pursuant to section 14 of the Electricity Regulation Act 1999 (ERA). In light of the expanded definition of electricity undertaking in Directive 2019/944 categories of licence for aggregation, demand response and energy storage were inserted into section 14(1) of the ERA by way of Regulation 5(2)(c) of SI 20/2022.

Other market participants required a more proportionate regulatory framework. Following extensive consultation, the CRU determined a hybrid form of regulation, namely a licencing framework for electricity undertakings engaged in new activities, as set out above, and a non-licence-based accreditation framework for smaller market participants who are not electricity undertakings be established. As a result, the transposition requirement in Article 59.1.b of the Directive, was achieved by way of insertion of Part IIIA into the ERA, enabling the CRU to ensure compliance by “other market participants” with their obligations under the Directive.

Initial auctions that have taken place under the CRM in the SEM successfully procured future investment in flexible generation, including DSU and battery storage that will be required to complement Ireland’s high and rising volume of intermittent renewables. In particular, the early auction results suggested that the advent of the CRM in the SEM had further spurred development of demand side response.

The introduction of a firm Day Ahead Market schedule and price, resulting in more efficient short-term price signals, will also have played a role in stimulating more DSU investment.

Looking ahead to future reforms related to demand side participation, in order to comply with the European Commission's State Aid ruling of November 2017, it is intended to modify the participation of DSU in the SEM CRM. When establishing the CRM, the SEM C determined that DSUs, although able to participate in the CRM auctions, would be exempt from reliability option (RO) payments where the contracted demand is delivered. RO difference payments would be applied to DSUs only when the demand reduction was not delivered, and the Strike Price was exceeded by the Market Reference Price (MRP). This decision recognised the fact that DSUs do not have offsetting energy payments, unlike other auction participants.

The Commission's November 2017 State Aid approval facilitated this different treatment of DSUs, but only as a temporary measure, with the Regulatory Authorities obliged to end the exemption from payback obligations for DSUs from the delivery period starting October 2020. To this end in March 2019 the SEMC published "DSU Compliance with State aid Consultation Paper" to provide stakeholders with an opportunity to comment on the proposals for achieving compliance with State aid, following which a formal decision paper was published in July 2019. Due to the timescales involved in making system changes and developing the profiles and code changes required to determine the actual delivered quantity of an Individual Demand Site (IDS) and therefore a DSU and to avoid double-counting of energy, the SEM Committee have proposed an interim solution, with an enduring solution to follow. It includes the following key features:

- The assumption that dispatched quantity was a suitable proxy for metered quantity for DSUs;
- Use of the Socialisation Fund to socialise the costs of DSU energy payments across Suppliers;
- Option for DSUs energy payments to be always made, or only at times of scarcity;
- Regarding the enduring permanent solution, the SEMC determined that the choice of mechanism should be determined in line with the following principles: The socialisation mechanism must be robust to the lumpy nature of DSU energy payments and must ensure that all DSU energy payments are made;
- The recovery mechanism should allocate the costs between Suppliers in a fair and reasonable way, in line with the equity assessment criteria applied in the design of the I-SEM, i.e. "that the market design should allocate the costs and

benefits associated with the production, transportation and consumption of electricity in a fair and reasonable manner;"

- The mechanism must be capable of implementation for 1st October 2020;
- The enduring solution is in the process of being implemented.

The DS3 Programme, soon to be supplemented and then replaced by the System Services Future Arrangements, has been and will remain a vital ingredient in power generation decarbonisation and procurement of flexible generation on the island of Ireland and the integration of record levels of intermittent RES, primarily wind, onto the SEM system.

The CAP commits to strengthening the policy framework to incentivise electricity storage and interconnection. Increased levels of storage and interconnection will be critical to absorbing high levels of renewable generation on to the system, as renewables require back-up which will have to be provided by quick response plant, storage, or interconnection.

3.4.3.4 Policies and measures to protect customers, especially vulnerable and, where applicable, energy poor customers, and to improve the competitiveness and contestability of the retail energy market

Under national objectives to protect energy customers and improve the competitiveness of the retail energy sector the CRU has been assigned a range of statutory functions under the Electricity Regulation Act 1999 (as amended).

As per the CRU's statutory functions set out in SI 630/2011 the CRU monitors the retail market to ensure that final customers are benefiting from competition in the supply of electricity and gas. This S.I. sets out the CRU's oversight of the development of competition, wider market monitoring, dispute resolution and enforcement functions.

Wider Market Monitoring

The CRU carefully monitors wholesale and retail gas, and electricity prices and publishes an annual Energy Monitoring Report, the most recent of which was published in July of 2023 and presents an overview of the year 2022. The CRU monitors the effect of competition in the market, including monitoring for any distortion of competition in the supply of electricity and gas to final customers and monitors the relationship between household and wholesale prices.

The CRU also oversees non-price aspects of competition and has taken steps to facilitate market access for new supplier firm entrants and increase transparency and consumer engagement in retail markets.

The latest market share figures available for April 2024 from the CRU are reported as follows:

Table 31: Market Share of Domestic Electricity Suppliers

Domestic Electricity Suppliers	Market share %
Electric Ireland	51.8
Bord Gais	15.1
SSE Airtricity	11.6
Energia	8.2
PrePay Power	8.1
Flogas	2.5
Pinergy	1.4
Yuno Energy	0.4
Domestic Gas Suppliers	**Market share %**
Bord Gais	40.7
Electric Ireland	24.6
SSE Airtricity	12.7
Energia	9
PrePay Power	9.1
Flogas	3.8

Electric Ireland holds approximately 52% electricity market share, while Board Gáis holds approximately 41% of the gas market. This owes to both companies' historic positions as monopoly holders prior to the liberalisation of the market in the early 21st century. Market shares of between 1.5%-25% among other suppliers across electricity and gas indicate the competitive health of these markets. One new energy supplier, Yuno Energy, entered the Irish retail energy market in 2023. Its aggressive price cutting in recent months is expected to increase its market share and has already had knock-on effects in price cutting throughout the wider market. Most recently reported Estimated Annual Bills are available for April 2024. The market average is now €1,770 for electricity and €1,514 for gas. Currently Bills are still 60% and 91% higher than December 2020 prior to the energy price rise. Bills are currently 24% and 19% lower than their peak in September 2022 for electricity and gas, respectively.

Recently the Minister for the DECC, requested that a review of the pricing and hedging strategies of retail energy suppliers be carried out to ascertain if there had been any market failures (particularly in the case of vulnerable customers) during the energy crisis. The CRU published their report in September 2023 which outlines that there was no evidence of market failure within Ireland's retail energy markets. The CRU found no evidence of suppliers short selling or taking speculative positions. This prudent approach to hedging taken by suppliers protected customers from the worst impact of the extreme volatility that was seen in wholesale gas markets.

Under article 27 of the 2019 Electricity Directive, Member States are obligated to ensure that all household customers, and where Member States deem it to be appropriate, small enterprises, enjoy universal service, namely the right to be supplied with electricity of a specified quality within their territory at competitive, easily, and clearly comparable, transparent and non-discriminatory prices. This has been provided for in domestic legislation through numerous statutory instruments. Ireland operates a Supplier of Last Resort (SoLR) framework in line with this article. The primary objective of the SoLR process is to ensure that customers' electricity and gas supply is not interrupted. In Ireland to date there have been three managed supplier exits. The mechanism functioned as intended and all domestic and non-domestic customers of the exiting suppliers were transferred to the respective SoLR in electricity and gas with no loss of supply. Transferred customers are placed on the standard market tariff of the SoLR. The CRU is currently undertaking a review of the SoLR framework with a view to incorporate lessons learned from the previous three supplier exits and examine further measures to strengthen protections for Irish customers that are experiencing an SoLR event. The findings of this review will be published later this year.

The CRU investigates any suspected anti-competitive behaviour in the energy market that falls within its statutory remit, noting the role and competencies of other authorities within the state. Investigations conducted as recently as 2022 found the full compliance of all parties with all statutory requirements and the terms electricity supply.

Protection from unfair pricing, restrictive pricing, and anti-competitive behaviours in the energy market

In addition to its continued responsibility for ensuring retail market competition the CRU has an important statutory customer protection role. Below are examples of the suite of protections & tools in place for gas and electricity customers.

Estimated Annual Bill Reports: From June of 2024, the CRU began publishing Estimated Annual Bill reports monthly, across the gas and electricity retail markets. The purpose of the reports is to provide consumers and industry with relevant up-to-date information on household electricity and gas prices available, with the aim of empowering consumers to decide a tariff suitable to them. The CRU actively encourages customers to switch supplier to avail of the best and most suitable tariff for them. This encourages competition across gas and electricity suppliers;

Biannual retail market reports: The CRU publishes a bi-annual report on arrears and non-payment of account disconnections. The purpose of this information paper is to provide customers, industry, and other interested stakeholders with information on trends in the number and percentage of customers in arrears and the number of disconnections carried out due to non-payment of account;

Regular reporting on arrears and disconnections: The CRU also keeps the Department up to date on the number of customers in arrears on their energy bills and the number of customers disconnected for reason of non-payment of account on a monthly basis;

- Switching: Switching is a key indicator of competition and supplier activity within the retail market and an opportunity for customers to make savings. Switching rates were robust in 2022, with 16.85% of domestic electricity customers and 17.82% of domestic gas customers switching supplier during the year. The CRU reports on switching rates regularly to the Department and publishes these within their biannual retail market reports;
- Price Comparison Websites: The CRU approves certain price comparison websites via an accreditation process to ensure that customers can access clear, independent, and accurate information to determine the best price plan and energy supplier based upon their usage. The CRU carries out ongoing reviews and audits of the accredited price comparison websites. The CRU intends to consult on the Price Comparison Website Accreditation Framework in 2024. This consultation will review a number of areas, including:
- How to incorporate export tariffs;
- How to enable customers to use their smart meter data when using price comparison websites;

- Ensuring that customers have access to price comparison tools that compare dynamic electricity price contracts;
- Ensuring that microenterprises with yearly consumption of below 100,000 kWh shall have access to price comparison websites.

Consumer Rights: The CRU has a dedicated section on their website informing customers of their rights as an energy customer from their energy supplier or network operator with information provided in relation to marketing and advertising, billing, vulnerable customers, connections, and pre-pay or pay as you go meters;

Customer Care Team annual and quarterly insights reports: The CRU has a dedicated Customer Care Team (CCT) which provides an information and dispute resolution service to customers, from which it receives valuable insights on issues faced by customers on a quarterly basis. Key issues and trends are regularly shared with the CRU's policy and compliance teams where further action may be required. The CRU publish data on the volume of contacts and complaints received, broken down by area and provider with a more detailed annual report that also includes case studies of disputes the CRU has handled;

Consumer Surveys: Each year the CRU commissions surveys of residential and small business gas and electricity customers, to measure consumer engagement, experience and attitudes in the electricity and gas markets in Ireland. The findings of these surveys are published on the CRU's website. The CRU is currently reviewing the approach taken to these surveys, including the scope of questions asked, before commencing the next survey;

Annual Compliance and Enforcement Report: This report provides an insight into the CRU's compliance and enforcement activities undertaken each year across energy suppliers and network operators. Theses audits and investigations are the result of direct reporting by market participants, trends in customer complaints received by the CRU and other topical issues identified by the CRU policy teams. These audits and investigations are an important regulatory tool to ensure suppliers and network companies are adhering to the terms and conditions of their licences and that customers rights are protected;

Electricity & Gas Supplier Handbook: The CRU regularly updates this handbook which sets out the minimum levels of service that licensed energy suppliers are required to adhere to in their interactions with energy customers. Suppliers are required to have in place a customer charter and a series of codes of practice on marketing and advertising, customer

sign up, billing, disconnection, complaint handling, vulnerable customers, PAYGM and budget controllers, and the terms and conditions for supply;

Additional Customer Protection Measures: The CRU published Additional Customer Protection Measures for domestic electricity and gas customers for winter 2022 and again for winter 2023. These measures aim to protect customers, particularly those in financial hardship, during winter months and are in addition to the existing protection measures in the above-mentioned handbook. The measures this year also include extensions to the disconnection moratoria for both vulnerable and other domestic customers for non-payment of account;

Vulnerable Customers: One key consumer protection measure was that suppliers were required to proactively inform all domestic customers of the eligibility criteria, how to apply, and the benefits of registering as a vulnerable customer. This measure saw the number of electricity and gas customers registering as vulnerable increase significantly. Suppliers have also indicated there was an increase in customers signing up to have a 'nominated representative' to manage their account, after information was transmitted to customers about this last winter.

Market Reform: The electricity market reform Directive amends Directive 2019/944, agreed as part of the EU's Clean Energy Package. The Directive, along with the accompanying electricity market Regulation, develops the existing rules governing electricity market design for EU member states and builds on previous achievements towards the development of the Internal Energy Market (IEM). The amendments within the EMD are focussed largely on consumer protections measures, increased regulation, and market oversight to limit the risk and impact of supplier failure and a more planned approach to emergency measures in the event of a price crisis. The Directive obliges MS to ensure a more stable retail electricity market by making electricity prices less dependent on volatile fossil fuel prices, shielding consumers from price spikes, accelerating the deployment of renewable energies, and improving consumer protection. DECC will lead on the legal transposition of the Market Reform Directive in 2024. This will be carried out in close collaboration with the CRU who will hold responsibility for implementing most of the reform required. Key areas of the CRU's programme of work for 2024 including the Supplier of Last Resort review currently underway and the intended consultation to be led by CRU with respect to energy sharing and trading will inform this work. 3.4.3.5 Description of measures to enable and develop demand response, including those addressing tariffs to support dynamic pricing

Many of the objectives listed under section 2 in relation to the IEM, regarding demand response, were either addressed in the I-SEM market design or were already implemented, or being implemented, by the regulators and TSOs as part of that process or are being addressed as part of the implementation of the Electricity Market Regulation in the SEM, again by the Regulators and the TSOs.

In 2024 the CRU will be leading on the National Energy Demand Strategy (NEDS). The proposed project scope consists of the following priority focus areas:

- Area 1: Smart Services - putting in place regulatory measures that will encourage greater flexibility among domestic customers and smaller business customers;
- Area 2: Demand Flexibility and Response - putting in place schemes to incentivise the provision of demand response at certain times, or system conditions;
- Area 3: New Demand Connections - targeted initially at very large electricity and gas energy users seeking to connect new demand. This will include a review to provide a pathway for new Large Energy User (LEU) connections to the electricity and gas systems which ensures large demand connections are low or zero carbon, or bring significant flexibility with them when they connect. A subsequent focus will be on existing demand, where there is contracted demand already in place.

Given the urgency of delivering outcomes promptly to maximise the impact on carbon emissions, there will be an emphasis on progressing the project at pace. This will be done using phasing, paralleling of workstreams, and adopting a discovery-led approach where appropriate. Phase 1 of the NEDS, which focuses on defining the strategy through public consultation and industry engagement, is expected to complete in summer 2024 with the publication of a decision paper and strategy for the commencement of Phase 2. Phase 2 will focus on achieving the aim of 15-to-20% flexible electricity demand by 2025 by increasing penetration of flexibility products, procurement of flexibility, and establishing demand flexibility requirements at point of connection. A review of progress will take place in 2026, which will inform the approach to Phase 3.

As set out in the CAP, a comprehensive roll-out of smart meters to every house in Ireland began in March 2021, and is expected to complete by the end of 2024. The first phase of the National Smart Metering Programme culminated in the Smart Metering services activation in February 2021, which introduced remote meter readings, smart bills, access to historical

consumption, and time-of-use tariffs to the Irish market. The CRU are currently reviewing the uptake of time-of-use tariffs as part of their Energy Demand Strategy, and working to identify measures which will enable consumers to take advantage of the benefits they offer. CRU published a consultation paper on how to incentivise greater uptake in June 2023 and released a decision paper in December 2023 which implemented measures to incentivise uptake. Dynamic pricing will enable consumers to reduce their energy costs by responding to price changes in spot markets, and by doing so, facilitate greater levels of consumer demand response. CAP 2023 requires the CRU to implement 'Dynamic Green Electricity Tariffs' by 2024, and a consultation on this implementation process is underway and was open for responses until 19th April. After considering consultation responses, the CRU will announce its regulatory policy regarding dynamic price contracts. It is expected that this will be decided on and published in Q2 2024.

Households are now able to access their smart meter data directly, without the need to go through their energy supplier or move to a time or Use tariff, following the launch of ESBN's Customer Portal. This portal allows smart meter customers to register for independent access to their electricity consumption data, to better understand their electricity demand profile and be able to assess opportunities to reduce their use, shift consumption to off-peak periods, and compare tariff options between suppliers.

In 2023, a Smart Energy Services working group was established which aims to build on the success of Ireland's smart metering rollout by developing practical measures to empower Ireland's citizens to play a central role in the energy transition. The work of this group, with a core membership of DECC, CRU, SEAI and ESBN, supports various smart energy objectives, including the development of real-time energy monitoring through home energy management systems, which will give citizens access to real-time information, enabling them to optimise their energy use and make savings through smart tariffs.

3.4.4 Energy Poverty

The ESRI has estimated that, with unprecedented energy inflation, 29% of households are in energy poverty in Ireland and that this will rise with increases in energy costs. However, this methodology is limited by the fact it does not tell us enough about the intensity of the energy poverty being experienced or correlate that with the energy efficiency level of these homes. As energy costs are a huge driver for the overall rise in the cost of living, with impacts on levels of energy poverty, it is essential that this methodology is improved and optimised for

Ireland's situation. As such, the Government has funded the ESRI to pursue the following actions:

- Recommend a methodology for measuring energy poverty in Ireland;
- Commence a survey which would provide the data required to inform this measurement and enable tracking over time;
- Carry out analysis on the policies in place to determine which can best alleviate energy poverty;
- Allow Ireland to achieve compliance with the requirements set out in EU legislation in relation to measuring, tracking, and publishing levels of energy poverty.

Ireland's current strategy to combat energy poverty is laid out in the Energy Poverty Action Plan, approved by Government, and published in December 2022. This Plan set out the range of measures implemented across Government during winter 2022/23 to support people with energy costs, as well as the longer-term actions taken to ensure those most at risk of energy poverty can adequately heat and power their homes. A cross-departmental and inter-agency Steering Group was established to develop, implement, and oversee the policies and measures detailed in the Action Plan.

The Group is chaired by DECC and has been meeting regularly since August 2022. The members of the Group represent: DECC (Chair), Department of Social Protection, Department of Health, Department of Housing, Heritage and Local Government, CRU, Sustainable Energy Authority Ireland, Health Service Executive, Department of Public Expenditure, NDP Delivery and Reform, Department of Finance, the Department of Rural and Community Development and the Economic and Social Research Institute.

A central part of the work of the Steering Group is to facilitate structured, whole-of-Government engagement with key stakeholders. The Action Plan outlined that this engagement should include events such as an annual plenary session with stakeholders to ensure their voices are heard as part of the annual report process. This builds on the significant engagement that has continued with stakeholders since a public consultation was held in 2022 during development of the Energy Poverty Action Plan.

The Energy Poverty Stakeholder forum was the first conference held under the aegis of the Energy Poverty Action Plan on the questions of energy poverty, efficiency, and affordability. The forum was held in-person, on Friday, 7th July 2023 at the Radisson Blu Royal Hotel, Dublin.

The forum was organised and hosted by the Energy Poverty Action Plan Steering Group, and was opened by Ossian Smyth TD, Minister of State with responsibility for Communications and the Circular Economy. This inaugural Energy Poverty Stakeholder Forum provided a valuable opportunity for the voices of relevant stakeholders to be heard as part of the annual report process, and in advance of Budget 2024. This Forum will be held annually, building continually on the engagement with stakeholders so far.

The actions fall into two overarching categories – near-term, where the focus is on supporting people to get through winters immediately following the publication of the plan, and medium- to long-term, with a focus on using deeper energy efficiency upgrades to help tackle the root causes of energy poverty and ensure an inclusive and just transition to a carbon neutral society.

The near-term actions that were implemented last year and this winter, are the result of work that has been underway throughout 2022 and 2023 across three main areas:

- Income support (with a total of €2.9bn being allocated to the three Electricity Costs Emergency Benefit Schemes – €1.57bn in 2022 and €1.2bn in 2023);
- Targeted social protection (through €1.2bn of social protection lump sum payments in 2022 and 2023);
- Consumer protection (through a package of strengthened obligations on suppliers and network operators mandated by the CRU).

The impact of these measures for Winter 2022/23 was monitored and found by the ESRI to have been effective in mediating energy poverty. Measures introduced for Winter 2023/24 will be monitored closely and evaluated in 2024. Furthermore, a report comparing the application of these measures with emergency measures adopted in other EU Member States to address high energy costs will be prepared and laid before the Oireachtas in Q4 2024.

In addition, further measures are being introduced to strengthen the safety net for people struggling to meet their energy costs. These measures operate alongside existing sources of support, such as the energy supplier hardship fund or the Additional Needs Payment scheme operated by the Department of Social Protection (DSP).

DECC will also seek to inform people of their potential eligibility for ‘vulnerable customer’ status. This will extend the protection against disconnection for non-payment of account for a longer period over the winter. This winter the vulnerable customer moratorium runs from 1st

December 2023 to 31st January 2024 for all bill pay customers and from October 2023 to 31st March 2024 for vulnerable customers.

These actions are also closely linked with a communications and market research initiative led by DECC to measure customer sentiment and ensure the consumer experience informs ongoing policy action. How best to target energy poverty measures has been a key concern. To date, this has primarily been done by providing lump sum payments through existing social protection measures. This is a challenge across the EU and the European Commission estimates that only one third of expenditure to assist in meeting energy costs across the EU has been targeted at the financially vulnerable.

The Action Plan also complements the Government 'Roadmap for Social Inclusion 2020-2025', which has the primary ambition to reduce consistent poverty to 2% or less. The Roadmap includes a number of goals, but of particular relevance is Goal 60, which seeks to improve how current energy poverty schemes target those most in need, as part of the CAP. Goal 60 was delivered earlier this year with changes introduced to ensure that the Warmer Homes Scheme better prioritises those most in need. The most recent progress reports recognise the challenges of increased energy costs and acknowledges the steps taken by Government in response.

While this Action Plan has been developed in response to an unprecedented rise in energy and wider living costs, the core principles that defined the previous Strategy to Combat Energy Poverty still stand:

- Adequate supplies of light, heat and power are fundamental to being able to participate in society and essential for social inclusion;
- Energy poverty is a function of three elements: a household's income, the cost of energy and the level of energy efficiency of the home;
- Energy poverty is strongly correlated with basic deprivation i.e. it is a symptom of inadequate resources to cover living costs rather than solely an energy problem;
- Energy poverty has long-term debilitating effects for individuals and society with growing evidence that it contributes to higher levels of respiratory and cardiovascular disease, excess winter mortality and poorer overall states of mental health and wellbeing.

The Steering Group will be responsible for drawing together updates on key indicators from across its membership to provide short quarterly updates on issues such as volumes of disconnections and arrears, consumer sentiment and progress under key actions. An annual

report outlining activity and progress under the various strategy actions in the previous year will be submitted to Government and published in Q2 2024.

DECC is currently running a public consultation to engage with relevant stakeholders and consult with the public in the coming months in the context of the development of a revised Action Plan. Following completion of the consultation the revised Action Plan will be presented to stakeholders at the second Annual Energy Poverty Stakeholder Forum in May 2024 and subsequently brought to government for approval.

The European Commission published a number of recommendations to tackle Energy Poverty in October 2023. While some of these recommendations are already in operation in Ireland, it is intended to use these as a measurement framework. In developing the revised Action Plan, the Steering Group will monitor the impact of recommended actions already in operation and assess the possible usefulness of others for possible introduction.

It is envisaged that the revised Action Plan will contain short term measures to support households during winter 2024/25, plans to expand the membership of the Energy Poverty Steering Group to possibly include representatives from civil society and local authorities. Longer-term measures such as the establishment of an Energy Poverty Observatory will also be developed in addition to the existing measures to tackle energy poverty.

3.4.4.1 Policies and Measures to Achieve the Objectives set out in point 2.4.4

Existing Measures:

Housing Upgrade Energy Efficiency Measures

- Better Energy Warmer Homes Scheme – free energy efficiency home upgrades for lower income households, including deeper measures and heating upgrades where appropriate;
- One Stop Shop Service – increased grants are available for houses owned by Approved Housing Bodies who rent to lower-income tenants.
- Community Energy Grant Scheme – increased grant amounts available for home upgrades for lower income households;
- Energy Efficiency Obligation Scheme – Under SI 522/2022 5% of an obligated party’s annual EEOS target must be delivered in an eligible energy poor home;
- Local Authority housing upgrade programme - programme to upgrade the social housing stock;

- Housing Assistance for Older People - support for older people to upgrade their home, can include insulation and heating upgrades in some cases;
- Housing Adaptation Grant – support for adaptations to the home which can include insulation and heating upgrades in some cases;
- Split Incentive - SEAI grants are available to smaller private landlords as well as a new tax incentive for landlords upgrading their rented properties. The new Home Energy Upgrade Loan is also available to smaller private landlords.

Consumer Protection Measures

Special protections against vulnerable customers including rights against disconnection for priority vulnerable customers. The Energy Supplier Handbook – puts a code of practice in place that sets out, in plain English, the services an energy supplier will provide, and the quality levels offered, including in relation to vulnerable consumers.

The consumer protection obligations on suppliers mandated by the CRU are:

- A winter moratorium on disconnections for all domestic electricity and gas customers was implemented from 1st December 2023 until 31st January 2024;
- Extended debt repayment periods of 24 months minimum;
- Reduced debt burden on pay-as-you-go top-ups - a maximum of 10% of a single customer vend can be put against debt;
- Increase of PAYG emergency credit from €10 to €20;
- Better value for customers on financial hardship meters – by being automatically placed on the most economic tariff;
- Promotion of the Vulnerable Customer Register, which has seen an increase in registration of 30%.

The CRU has suspended the €200 gas meter exchange siteworks charge associated with a customer moving from a PAYG gas meter to a billpay meter. This ensures customers do not face a penalty for moving from PAYG to billpay.

Vulnerable customers who are critically dependent on electrically powered equipment, cannot be disconnected for non-payment of account at any time. It is important that people who are in such situations contact their energy supplier to register with them as a vulnerable

customer. Their energy supplier will then notify ESB Networks, which maintains a Vulnerable Customer Register.

Suppliers are also required to ensure that all registered vulnerable customers are on the most economic tariff available for their chosen payment method and billing format.

Additional Consumer Protections Measures

- **Emergency Costs Electricity Benefits Scheme III** – The delivery of three electricity credits to every household worth €137.64 each in the billing cycles of December 2023, January/February 2024, and March/April 2024;
- **Household Benefits Package** – monthly income support to assist eligible households with their electricity and gas bills;
- **Lump Sum Payment** – additional payments to cost of living recipients to help with cost-of-living crisis of which energy costs are the largest portion;
- **Fuel Allowance** – weekly income support paid during the winter months to assist households in receipt of eligible social protection payments with their energy costs.

Windfall Gains Tax Measures

The Government has brought in measures to address windfall gains in the energy sector on the back of Council Regulation 2022/1854 (on an emergency intervention to address high energy prices).

Government implemented the measures outlined in this Regulation by way of two separate pieces of legislation:

- A Temporary Solidarity Contribution (TSC), based on taxable profits in the fossil fuel production and refining sectors (which apply for 2022 and 2023);
- A Cap on Market Revenues of some generators (such as wind, solar and hydropower) in the electricity sector (which will apply for the period December 2022 to June 2023);

The first return from the TSC amounted to €167m and will be used towards the cost of providing the payments under the Electricity Costs Emergency Benefit Scheme III. There will be another return made in 2024 for the fiscal year 2023. The legislation providing for a Cap on Market Revenues was enacted on 17th November 2023. It is envisaged that payment into

a dedicated fund from this measure will be made in Q1 2024.These funds are required under the Regulation to be used to support final electricity consumers.

Solar PV for the Medically Vulnerable

A new Solar PV scheme for vulnerable customers registered as being dependent on electrically powered assistive devices, is currently underway. This €20m scheme is targeted to provide direct support to over 3,000 vulnerable customers who may have limited opportunity to reduce their demand. The scheme will provide customers with a 2 kW solar PV system, to meet some of their electricity requirements.

Reduce Your Use Campaign

During the evolving energy crisis, the ongoing Government of Ireland Reduce Your Use/Stay Warm and Well public information campaign has provided and continues to provide clear and timely advice to Irish families, households, and businesses.

A key component of the campaign strategy is to ensure that Government is actively listening to people, understanding, and responding to their needs and concerns to determine the most useful advice, information and interventions that can be provided.

To ensure this is achieved, quantitative research has been carried out by Amárach Research fortnightly since October 2022, and monthly since April 2023. A nationally representative group is surveyed to test response to messaging and consumer sentiment. The results of this tracker indicate that overall, there has been some reduction in the difficulty of meeting energy costs since October 2022.

Energy Engage Code

The Department has engaged with Irish energy suppliers and their advocacy group, the Electricity Association of Ireland (EAI), advising on the drafting of their ‘Energy Engage Code;’ This is a document, recently updated in October 2023, which provides guidelines to energy suppliers on how they treat customers. Among the items included is an important, Department-supported policy which states that energy suppliers will not disconnect a customer for reason of non-payment when they continue to engage with their supplier. This policy in conjunction with CRU moratoria has seen disconnections for reason of non-payment reduce dramatically since 2020.

Planned Measures

Funding ESRI Research Programme in order to develop better indicators of energy poverty and conduct further research on the theme in Ireland. Budget 2024 – announcement of ring-fenced revenue from increases in the carbon tax for climate action, including to fund energy efficiency in lower income households and social housing.

The Department is committed to ensuring that policies that have an impact on consumers are evidence-based, costs minimised as far as possible, and assessed according to the policy objectives of sustainability, security, and affordability. Working closely with the Irish Government Economic and Evaluation Service, the Department will carry out a review in 2024 to standardise the approach and ensure that all future policy proposals made by the Department are underpinned by a standardised model of good practice to ensure consistency of approach across Energy Divisions in assessing the affordability of each project with a particular focus on customer value, and a risk assessment, including any risk to security of supply, for those living in or at risk of energy poverty. Arising from the above analysis, should specific policy measures pose a risk to vulnerable customers, recommendations to mitigate these risks will be made to the inter-departmental and inter-agency Energy Poverty Steering Group for inclusion in the Energy Poverty Action Plan.

3.5 Dimension Research, Innovation and Competitiveness

3.5.1 Policies and measures related to the elements set out in point 2.5

Impact 2030 is Ireland's strategy for research and innovation to 2030. Impact 2030 positions research and innovation (R&I) at the heart of addressing Ireland's societal, economic, and environmental challenges. Impact 2030 identifies 'Climate, Environment and Sustainability' (including energy) as a key challenge area. It commits to maximising the collective impact of research and innovation in meeting Ireland's climate targets, including through support and delivery of R&I commitments in the annual Climate Action Plan (CAP).

Ireland's National Recovery and Resilience Plan includes details that outline how Ireland will use funding from the EU's Recovery and Resilience Facility to address the green and digital transitions. This includes the establishment of a National Challenge Fund, administered by Science Foundation Ireland, to fund research and innovation projects to develop solutions in the areas of Climate and Digital (see 3.5.3). The National Smart Specialisation Strategy for Innovation 2022-2027 has identified 'Green Transformation for Enterprise' as one of five national strategic priorities, along with 'International collaboration on Research, Development and Innovation' and 'Improving the national or regional enterprise research and innovation system.'

Irelands CAP 2023 included, for the first time, a dedicated R&I chapter which outlined the current situation in climate and climate-related R&I nationally and internationally, assessing any gaps in the area, and identifying potential cross-cutting initiatives. The draft CAP 2024 updates the current situation and sets out the need for a more strategic approach to climate and climate-related R&I. This will be addressed by an action to "Develop an Agreed Framework to Guide Climate and Climate-Related Strategic Research and Innovation." This framework will address the need for high-level leadership to deliver current and future climate R&I priorities across Government and to ensure that Government Departments and Agencies work together effectively. The Headline R&I Actions in CAP 2024 are:

Table 32: CAP 2024 Research & Innovation Actions

Action
Develop an agreed framework to guide climate and climate-related strategic research and innovation
Establish a new Climate Science and Policy Analysis Unit within the EPA's Climate Change Programme

Publish 2030+ Roadmap to determine pathways to deploy offshore/ ocean energy technology
Establish new collaborative Research Centres to work across Ireland on subjects of national importance including Energy, Climate Action, and Sustainability
Progress the development of a proposal for an offshore renewable energy innovation park
Increase investment in research to support agricultural and land use diversification in line with environmental considerations
Provide mechanisms to pilot sustainable energy demonstrators
Ireland to lead JPI Oceans European Joint Action to establish a knowledge hub on Blue Carbon policy- related research
Develop and publish spatio-temporal water maps to identify waterways at risk and indicators of climate change
Establish an EPA Climate Research Fellowship Programme
Establish Climate Research and Innovation Missions to focus on specific challenges that require coordinated action by multiple stakeholders and to scale promising innovations for wider applicability

The Environmental Protection Agency (EPA) provides and supports development of timely evidence and knowledge to drive climate action in Ireland. Its remit includes compilation and reporting of national emissions statistics, climate adaptation, climate research, climate science behavioural insights and engagement. The EPA compiles and reports Ireland's greenhouse gas emission inventory and projections on an annual basis to meet Ireland's EU and UNFCCC obligations. These figures meet the requirements of the Climate Action and Low Carbon Development Act, as amended, and inform the monitoring of Ireland's climate action performance.

The EPA plays a key role in adaptation governance and implementation structures by delivering across the areas of climate risk, climate services and evidence and knowledge. This includes providing technical support for climate adaptation in Ireland by developing and delivering Climate Ireland (Ireland's National Adaptation Platform), and associated guidance and tools for policy makers, local authorities (planners, climate officers, engineers) and sectoral adaptation leads and developing Ireland's climate adaptation network. The EPA works to integrate climate resilience and adaptation priorities across EPA work areas to optimise co-benefits for the environment and public health focusing on water quality and quantity, Environmental Licensing, and incorporating climate change risk into emergency preparedness. The insights gained through the EPA's 'Climate Change in the Irish Mind' study of Irish population's beliefs, attitudes, policy preferences, support climate change awareness and engagement campaigns and the design of national policy and climate action.

Ireland's Climate Change Assessment (ICCA) was published by the Environmental Protection Agency (EPA) in early 2024. ICCA is the first comprehensive and authoritative assessment of the state of knowledge of climate change in Ireland. This major scientific assessment serves to complement and localise the global assessments undertaken by the Intergovernmental Panel on Climate Change (IPCC). Its findings build upon these assessments and add important local and national context. Undertaken by leading researchers, the assessment is based on scientific research and observations in Ireland, linked to EU and global analyses. ICCA will be an important resource for understanding climate change in an Irish context including the underlying science, mitigation and adaptation measures, and the opportunities afforded us in making the transition to a climate neutral economy and society. ICCA also contains detailed information about research gaps, which will be considered when delivering the CAP 2024 Action "Develop an agreed framework to guide climate and climate-related strategic research and innovation".

EPA Research 2030 is a 10-year strategic framework for the Environmental Protection Agency's Research Programme that aims to generate evidence to support Ireland's response to global challenges, including climate change and biodiversity loss. EPA Research 2030 seeks to put science and innovation at the centre of environmental protection in Ireland through the development and proactive transfer of knowledge. Framed around four thematic research hubs, EPA Research 2030 supports research in diverse areas related to climate, the environment, and sustainability that will contribute to advancing Ireland's ambitions to become carbon neutral and climate resilient and support us in meeting our national and international commitments.

The Sustainable Energy Authority of Ireland (SEAI) Statement of Strategy 2022-2025 lays out a pathway for SEAI to achieve Ireland's energy targets in areas like home upgrades, supporting businesses and the public sector, increasing the uptake of EVs and the phasing out of fossil fuels across the economy. This will be informed by the strong research and analysis functions of SEAI and underpinned by robust corporate governance structures. SEAI's remit in respect of RD&D activities is to coordinate Irish energy research, lead and support excellent research, development, demonstration & innovation activities, to be at the forefront of knowledge generation relevant to the energy sector, and to promote its application in policy and practice. This includes managing the National Energy Research Development and Demonstration Programme (see 3.5.3).

The SEAI Research and Policy Insights Directorate is responsible for providing actionable research, analysis, and insights to accelerate Ireland's national energy transition. The

Directorate works closely with policymakers, providing an evidence base to support decision making. The Directorate has responsibility for producing Ireland's national energy statistics and modelling national energy emission projections. This work underpins identifying Ireland's energy use today and how we expect to do against our decarbonisation targets for energy into the future. This helps identify where the biggest challenges and opportunities lie.

The Directorate both performs and funds energy research, which focusses on addressing those challenges and supporting development of solutions to bridge the gap to achieving national energy decarbonisation targets. The Decarbonised research and analytical teams produce the evidence base to support policy decisions in relation to Heat and Electricity and develop roadmaps to support deployment of low carbon technologies towards Ireland's Net Zero future. The Directorate is highly collaborative, informing and drawing expertise from across the Irish, European, and International energy systems, including national leadership in EU SET-Plan and International Energy Agency (IEA). Irish energy researchers are enabled by the Directorate through research funding, offshore test site provision and international engagement supports.

In 2024 the SEAI Directorate will complete a detailed technology analysis of each energy/low carbon technology which will be required to meet Ireland's long-term targets. This assessment considers the technology and its market, against a number of criteria, in order to focus on potential barriers or bottlenecks that may block or slow down development of the technologies. The assessment criteria are the readiness levels across a key number of development stages within a technology and its market such as technology, price, commercial, regulatory, supply chain skills and stakeholder acceptance. Each criterion is assessed using a three-point scale of low, medium, and high. Depending on where a technology and its market is at on the scale, the assessment is then linked to different policy initiatives or actions to speed up the development of the technology and its markets. This assessment framework will assist with energy research and innovation investment prioritisation with a view of achieving targets in 2030 and 2050. This will be done with the goal of building capacity in the energy research & innovation system in Ireland and developing enterprise opportunities. It will then analyse the RD&D readiness of technologies against which research resources are available and identify any gaps for these technologies and how targeted mission-oriented RD&D can fill those gaps. Technologies identified as ready for market deployment will be analysed to identify their respective resources and any gaps that may need to be addressed to support mass deployment of that technology to help Ireland achieve its 2030 and 2050 target and objectives.

Various sectoral strategies and plans outline plans for demonstration and deployment of low-carbon technologies. Summary details are outlined in the table below:

Table 33: Sectoral strategies and plans for demonstration and deployment of low-carbon technologies

Strategy/ Plan	Main Points in relation to technology development, demonstration, and deployment
Policy Statement on Geothermal Energy for a Circular Economy	• The policy statement sets out the Irish approach to build a geothermal energy sector as a mechanism for transition to a circular economy. • The deployment of greater numbers of heat pumps to replace fossil fuel boilers will ensure that excess heat can be recycled for later use and as such, reduce demand for electricity at peak times, and allow for sufficient supply of cool buildings with the increase of climate change. • The Statement commits to the development of a strategy for the deployment of geothermal energy and will be developed to support district heating schemes. • The Statement outlines the general approach to be taken in developing a regulatory framework for geothermal energy in Ireland, which will integrate with existing environmental, health and safety and planning regulatory frameworks. This addresses some of the following: the ownership of geothermal energy; the appointment of the Geothermal Regulatory Authority; mineral rights; access to land and the subsurface; and risk-based regulation. • A potential introduction of a requirement that geothermal energy be assessed for deployment in publicly funded buildings that are new builds or where there is a material change in the heating/cooling systems. Assessments will consider the long-run cost and gross final energy consumption of alternative renewable heating/cooling system
National Hydrogen Strategy	• The Irish Government has committed to supporting pilot projects that can demonstrate renewable hydrogen technology in an Irish context across the value chain, that demonstrate and develop our regulatory regime and can provide early evidence of the market opportunity for renewable hydrogen. It is expected that collaborative pilots will deliver the most learning. An initial investment fund will be made available to support these pilot projects. Further Government support

	may be required to build commercial routes to market for larger projects towards the end of the decade. • The potential production of hydrogen from Bioenergy, with Carbon Capture and Storage, is recommended for further consideration as part of the development of a strategy for negative emissions technologies, as called out in Ireland's Long-term Strategy on Greenhouse Gas Emissions. Scaling up renewable hydrogen production is addressed, and a commitment is made to developing a national certification scheme for hydrogen production methods, the establishment of a hydrogen demonstration fund to enable early innovations, and the delivery of 2 GW of offshore wind to support the production of renewable hydrogen and other non-grid limited uses, during the 2030s.
Ireland's Biomethane Strategy	• Biomethane will be used as a direct substitute for fossil gas in various applications, such as, for example, high-temperature heat. • Utilising biomethane for high temperature heat processes is a key decarbonisation option for industry in Ireland. Climate Action Plan 2024 sets a KPI for 2.1 TWh zero carbon gas being consumed in the industrial heating sector by 2030. This is likely to be met by biomethane due to the development timeline and expected economics of green hydrogen in Ireland. • Biomethane production and the decarbonisation of Ireland's heat sector will be further supported through the proposed introduction of a Renewable Heat Obligation scheme. • While electrification looks certain to be the future technology for HGVs due to advancements in battery technology, there is some potential for Compressed Natural Gas (CNG) vehicles to be fuelled by biomethane which offers an immediate option for the existing HGV fleet to reduce emissions. • Green Biorefineries with anaerobic digestion (AD) involve products such as proteins or fibre-based materials that may be extracted. The resulting by-product or residual streams could be used as a substrate or co-substrate for anaerobic digestion. • To reduce AD project development times and avoid planning and licencing delays, the Strategy contains actions for the development of an online information hub to outline the requirements for AD projects, depending on scale of plant, feedstock type, and tonnages to reduce uncertainty for stakeholders.

Powering Prosperity - Ireland's Offshore Wind Industrial Strategy	• Building the competitiveness and capability of Irish companies in offshore wind is crucial and will be achieved via targeted and wide-ranging supports. Ireland has recently published Powering Prosperity – Ireland's Offshore Wind Industrial Strategy, the first strategy of its kind for the State. This strategy aims to build a successful, vibrant, and impactful offshore wind energy industry in Ireland, ensuring that the sector creates as much value as possible throughout the country and maximises the economic benefits associated with Irish Government ambitions. It includes 40 actions to be implemented in 2024 and 2025 and was developed as part of close ongoing collaboration between the Department of Enterprise, Trade and Employment and other government departments and agencies within the Offshore Wind Delivery Taskforce. • Powering Prosperity explores opportunities to leverage Ireland's existing strengths in RD&I, finding ways to support the sector to reach the cutting edge of future developments in offshore wind. This includes measures relating to floating offshore wind technology, which has been deployed in a small number of sites globally but has not yet been developed to the point of maximising this asset particularly in more challenging marine environments. Actions which support technology development, demonstration, and deployment include: • Increase participation in business leadership programmes amongst the offshore wind supply chain and develop specific capability supports for new entrants to the offshore wind sector (Enterprise Ireland) [Action 3] • Drive increased start-up and high potential start-up generation in offshore wind, through enhanced entrepreneur development programmes and targeted funding supports (EI/DETE) [Action 5] • Through engagement with industry partners, raise awareness of and encourage participation in national competitive call for clusters under the National Clustering Programme once announced (DETE, EI, IDA, SEAI, MI, IMDO) [Action 11] • Progress the development of an Offshore Wind Centre of Excellence including a feasibility study and developing a detailed project plan for delivery with delivery of same subject to funding approval (DETE). [Action 25] • Develop a plan to promote engagement with and use of existing marine test sites (DETE). [Action 27]

	• Maintain State support for our existing or planned test sites and explore the feasibility of supporting additional test sites (DECC, SEAI, MI). [Action 28] • Investigate the feasibility of a floating offshore wind demonstrator site (DECC/DETE). [Action 26] • Examine the case for the development of a regulatory sandbox for offshore wind and related technologies (DETE) [Action 29]
Ireland's Transition to a Low Carbon Energy Future 2015-2030	• Carbon Capture and Storage (CCS) is recognised as a potential bridging technology that could support the transition to a low carbon economy. Ireland adopted a 5-year CCS review process, which will inform any decision to commit resources to put regulatory and permitting systems in place.
Future Framework for Offshore Renewable Energy Policy Statement 2024	• The Future Framework for Offshore Renewable Energy Policy Statement is an over-arching future framework for development of offshore renewable energy in Ireland's territorial seawaters and exclusive economic zone. The framework aims to deliver 20 GW by 2040; and at least 37 GW in total by 2050. It includes actions to: • maintain State support for our existing or planned test sites and explore the feasibility of supporting additional test sites, aligned with a similar action in Powering Prosperity; and • establish a dedicated ORE technology innovations research and development advisory group including research, industry, and government representatives, chaired by SEAI.

3.5.2 Where applicable, co-operation with other Member States in this area, including, where appropriate, information on how the SET Plan objectives and policies are being translated to a national context

Ireland has strong connections with our international energy research & innovation counterparts through participation in the European Commission's Strategic Energy Technology Plan (SET Plan), energy research & innovation programmes run by the European Commission (such as Horizon Europe, ERA-NET Partnerships, Clean Energy Transition Partnerships etc.) and through several IEA Committees in which DECC and SEAI participate or facilitate participation.

SET Plan Objectives and National Energy RD&D Funding Programme

The National Energy RD&D Funding Programme, operated by the SEAI, aims to stimulate and accelerate the development & deployment of energy/low-carbon technology related products, processes & systems in the Irish marketplace; to grow Ireland's national capacity to carry out internationally leading RD&D activities; and to support solutions that enable technical & other barriers to market uptake of energy/low-carbon technology related products, processes & systems to be overcome. Through Ireland's active participation in Europe's SET Plan Steering Group and within individual SET Plan Implementation Groups, research calls are aligned with SET Plan priorities. This enables alignment of national research priorities with research and innovation programmes both at EU level and across other member states. This also increases co-operation between national programmes to avoid duplication of research.

Clean Energy Transition Partnership

The Clean Energy Transition Partnership (CETP) aims to empower the clean energy transition and contribute to the EU's goal of becoming the first climate-neutral continent by 2050, by pooling national and regional RDTI funding for a broad variety of technologies and system solutions required to make the transition. The total available budget is more than €140million across all national and regional funding partners and European Commission (EC) co-funding. There is €0.5million available annually through SEAI to support Irish participants. Geological Survey Ireland is an additional national funding partner in relation to geothermal energy modules.

To cover different topics and RDI types, the Call is structured into 12 Call Modules, aimed at different energy technologies and/or systems as well as both research and innovation-oriented approaches on different Technology Readiness Levels (TRLs), complementing and completing each other. SEAI funds across all 12 modules. International opportunities such as these build research capacity and allow Irish companies to establish new alliances with EU and international partners and begin working on EU projects.

The CETP builds on the existing SET Plan Implementation Working Group initiatives which brought together energy-relevant ERA-NETs. SEAI participated as a national funding partner on two ERA-NET Co-fund actions that commenced under the Horizon 2020 framework: the Smart Energy Systems ERA-Net and the Ocean ERA-Net. Under Horizon Europe, both ERA-Net partnerships were amalgamated within the CETP, along with a number of other energy-related ERA-Net initiatives (e.g., in relation to bioenergy, solar power, geothermal energy, buildings, industry etc).

Ireland and the International Energy Agency (IEA)

The SEAI is designated by DECC to manage aspects of Ireland's participation in IEA research and development activities. SEAI represents Ireland on the Committee of Energy Research and Technology (CERT) which oversees the activity of five working parties, who in turn oversee the activities of Technology Collaboration Programmes (TCPs). Ireland has also joined the IEA's Expert Group on Research and Development which consider R&D priority setting and evaluation.

SEAI acts as Ireland's national signatory for IEA TCP Implementing Agreements. The strategy for TCP engagements aligns with national strategic objectives related to renewable energy, energy efficiency, climate action and coordination of energy-related research. Each Executive Committee is represented by a designated SEAI staff member. SEAI coordinates Ireland's participation in these tasks/annexes through a competitive appointment call released on an annual basis. The call is open to public and private sector organisations based in the Republic of Ireland (including Irish subsidiaries of overseas companies) including businesses, research performing organisations (e.g., universities, institutes of technology and publicly funded research institutions), and NGOs.

Ireland joined three new IEA (TCPs) in 2023: (i) District Heating and Cooling (ii) Hydrogen and (iii) Heat Pumping Technologies. Ireland is also a member of the Bioenergy, International Smart Grids Network (ISGAN), User Centred Energy Systems (USERS), Energy in Buildings and Communities (EBC), Wind, Ocean, Energy Technology Systems Analysis (ETSAP) and Hybrid and Electric Vehicles (HEV) TCPs. This brings Ireland's membership of TCPs up to 11. In addition, Ireland is currently supporting the involvement of circa 90 Irish Experts in almost 50 Tasks/Annexes under these TCPs – see figure 2 below.

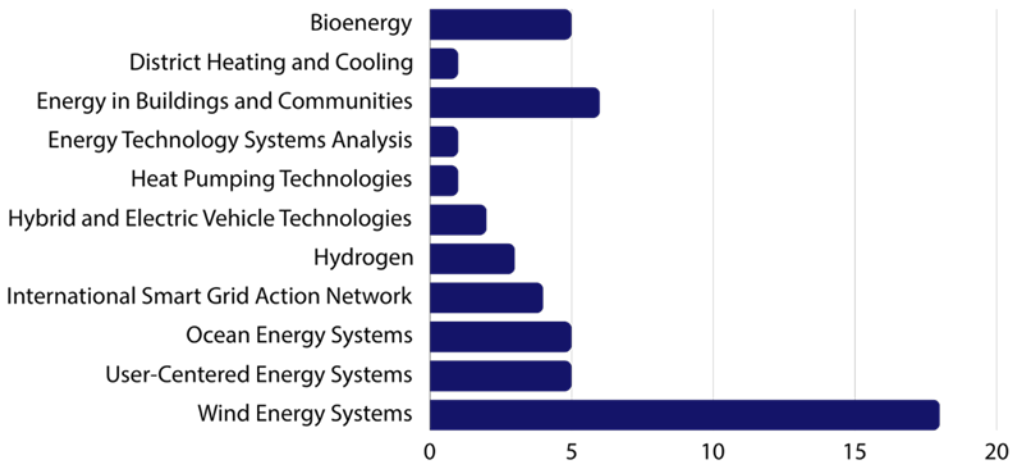


Figure 2: Tasks Ireland is supporting involvement in within IEA TCPs

North Seas Energy Co-operation (NSEC)

As part of its membership of NSEC, Ireland is committed to regular exchanges with key actors including in the area of research & innovation, to reap the full renewable energy potential of the North Seas to the benefit of Europe as a whole. Ireland works in the NSEC on the prioritisation of the offshore research agenda and according SET plan funds.

Horizon Europe Missions, Partnerships and Research Infrastructures

Ireland participates in several energy and climate related European Partnerships under Horizon Europe including the Climate JPI, Biodiversa+, and the Clean Hydrogen JU.

Ireland is participating in the Horizon Europe Missions related to energy and climate:

- Adaptation to Climate Change;
- Restore our Ocean and Waters;
- 100 Climate-Neutral and Smart Cities;
- A Soil Deal for Europe.

DECC is providing national coordination and support for the ‘Adaptation to Climate Change’ and ‘100 Climate-Neutral and Smart Cities Missions’. The same is provided by the Department of Agriculture, Food, and the Marine for the ‘A Soil Deal for Europe Mission’ and

by the Marine Institute for the 'Restore our Ocean and Waters' Mission. Local Authorities from Dublin, Cork and Galway are participating in the Cities Mission.

The EPA has supported Ireland's membership of the Integrated Carbon Observation System (ICOS)-European Research Infrastructure Consortium (ERIC) as the National Focal Point since Ireland became a full member in January 2023.

3.5.3 Where applicable, financing measures in this area at national level, including Union support and the use of Union funds

The societal benefits of research and innovation are both significant in scale and wide-ranging. There is a need to ensure that the best scientific evidence and advice is available to underpin Government policy and support the actions in Ireland's NECP. Ireland has strategically programmed and built a strong energy and climate science research and innovation infrastructure in recent years, with funding provided to Ireland's research organisations to carry out science and policy-relevant research. The inclusion of 'Climate, Environment and Sustainability' and 'Agriculture, Food and the Marine' as key challenge areas in Impact 2030 reflects the continuing urgency of the need to address climate change.

Two 'Project Ireland 2040' funds launched under Ireland's National Development Plan have supported innovation in areas relevant to Ireland's NECP. The first is the Climate Action Fund, which provides assistance and financial support to projects which will help Ireland achieve its climate and energy targets. The Disruptive Technologies Innovation Fund, while not specifically aligned with climate action, has to-date supported 10 projects to a total value of €24.5m in the area of 'Environment, Climate and Sustainability'. These funds have a collective budget of an estimated €1bn over the period 2018-2027. They offer the potential for innovative interventions which in the absence of support from the funds, would not otherwise be developed.

The overarching objectives of the SEAI Research, Development and Demonstration (RD&D) Funding Programme, in place since 2018, are to:

- Accelerate the development and deployment in the Irish marketplace of competitive energy-related products, processes and systems;
- Support solutions that enable technical and other barriers to energy market uptake to be overcome;

- Grow Ireland's national capacity to access, develop and apply international-class energy RD&D;
- Provide guidance and support to policy makers and public bodies through results, outcomes and learning from supported energy projects.

The Programme is open to public and private sector organisations based in Ireland (including Irish subsidiaries of overseas companies) who wish to carry out projects in Ireland. From 2018-2023 over 240 projects have been awarded and over €75 million invested. SEAI works to ensure that outputs arising from SEAI-funded research are openly available and requires this of research awardees. SEAI supports impact research outcomes by ensuring accessibility, by bridging these outcomes to policymakers, and by practically implementing them into programmes, ensuring that state-of-the-art considerations are brought to customers in a timely manner.

The National Energy RD&D Programme takes a technology-agnostic approach when funding energy RD&D. Prioritisation of energy areas to be funded are decided on the basis of an annual cross-Government consultation which is run by the SEAI (which focuses specifically on the energy sector and its connections to other sectors). This coordinated approach ensures that energy research funding is highly targeted. Funding is available to all relevant areas, and recent research projects include those in areas such as: bioenergy, offshore wind energy, ocean energy, smart grids, hydrogen, solar energy, energy in transport, energy in agriculture, energy efficiency, behavioural change and energy modelling.

The Programme seeks to grow national capacity in energy research such that researchers in academia and industry are well placed to compete for national non-domain specific R&D funding and are in a position to be international thought leaders and actors (through, for example, thought leadership within relevant domains, playing leadership roles in IEA activities, and leading and participating in international collaborative initiatives such as Horizon Europe). DECC has committed to increase in a stepwise fashion public funding for the Programme. This funding will supplement the funding provided to the Prototype Development Fund, and other national initiatives funded by other Government Departments. Since this commitment was made, SEAI’s RD&D budget has increased from €4.5 million in 2020 to a projected €13.8 million in 2024.

The SEAI RD&D Programme has contributed to Ireland's transition to a clean and secure energy future by supporting and connecting research institutes, industry, and public sector

bodies with policy makers in Ireland and delivering impact for Ireland through a series of associated activities. These include an annual Energy Research and Policy Conference series which has been running since 2019, a Connecting Energy Research and Policy Seminar Series launched in 2023 and an SEAI RD&D Impact Report due to be launched in 2024. These activities highlight how vital research is for Ireland's transition to a clean, secure energy future and accelerate the delivery of Ireland's ambitions, to benefit everyone.

The Renewable Energy Directive (RED III) sets a target of at least 5% of new RE capacity to be of innovative RE technology by 2030. Ireland is addressing this challenge through different instruments. A business case will be developed for a new Low Carbon Technology Demonstration Pilot Call in 2024 by the SEAI National Energy RD&D Funding Programme. The proposed pilot would invest in several key innovative technology development and demonstration projects in Ireland and would be open to applications from a range of RE technology areas, effectively fostering an indigenous innovative technologies pipeline to contribute to installed capacity. Offshore renewable energy (ORE) has been identified as key to decarbonising Ireland's energy system. Reflecting this, continued and increased funding will be allocated to Ireland's suite of offshore/ocean test site facilities. Access programmes will be continued and enhanced to maximise the benefit Ireland's suite of ORE test-sites:

- Lir National Ocean Test facility in Cork, a small-scale site includes state-of-the-art wave tanks comprising a deepwater basin and wave test tanks, that allow for scaled testing in a controlled environment, addressing Technology Readiness Level (TRL) 1-4;
- SmartBay Marine and RE Test Site in Galway Bay is an intermediate scale site, for marine energy and monitoring technology, addressing projects at TRL 4-6 stage;
- AMETS (Atlantic Marine Energy Test Site) off the Mayo coast, where it is intended that full scale Marine Energy devices could be tested at their final stages of pre-commercial development, TRL 7-9. (under development, intended to be ready for access by 2027).

The Environmental Protection Agency EPA Research Programme includes a specific strand on climate change evidence needs, recognising the need for research to inform a practical response to, and strategic engagement on, climate change. EPA Research has a strong focus on informing policy and knowledge transfer. The EPA has a statutory role in coordinating environmental research in Ireland and convenes a coordination group

comprising relevant public bodies across the research and policy domains. The EPA invested €14.3M in new research projects awarded via the 2023 EPA Research Call.

Climate science aspects of the EPA Research Programme aim to provide:

- Advanced analysis of GHG emissions and removals, enabling improved policy development and decision making;
- Research based information in support of risk and vulnerability analysis and adaptation actions in Ireland;
- Solutions to achieve our 2020 targets and to identify and test solutions for achievement of societal and economic low carbon transformation to 2050;
- Information on pathways for achievement of highest air quality standards in Ireland and advance integrated assessment of air pollution, short life climate forcers, and other wider environmental issues.

Domain agnostic funders of research in Ireland also have an important part to play in the energy and climate research ecosystem in Ireland (see list below). State bodies such as Enterprise Ireland, the Irish Research Council and Science Foundation Ireland are part of a network which supports energy & climate research in Ireland – the focus of the Irish Research Council and Science Foundation Ireland (SFI) is primarily on early-stage research, whilst the focus of Enterprise Ireland is primarily on supporting R&I in businesses in the manufacturing and internationally traded services sectors. Science Foundation Ireland is managing the €65m National Challenge Fund, supported by funding from the EU's Recovery and Resilience Facility under the National Recovery and Resilience Plan. SFI has launched eight challenges, including challenges in 'Energy Innovation', 'A Healthy Environment for All' and 'Sustainable Communities.' SFI also funds a group of large-scale SFI Research Centres: several Centres are in areas related to climate and energy, including BiOrbic Bioeconomy SFI Research Centre, and MaREI SFI Research Centre for Energy, Climate and Marine. SFI has recently joined with UK Research & Innovation and Northern Ireland's Department of Agriculture, Environment and Rural Affairs to fund a co-located IE-NI-UK research centre in climate, water and biodiversity. This Co-Centre for Climate+ Biodiversity and Water is co-led by Trinity College Dublin andQueen's University Belfast, and involves 14 research organisations across IE, NI and the UK.

National research funders involved in climate and energy research funding include:

- Department of Agriculture, Food and the Marine (DAFM): DAFM Competitive Research Funding Programme
- Department of Transport: National funding through Departmental vote, Green Public Transport Fund
- Environmental Protection Agency: EPA Research Call
- Enterprise Ireland: Commercialisation Fund, Disruptive Technologies Innovation Fund, Innovation Partnership Programme
- Geological Survey Ireland: Geothermica ERA-NET programme, GSI Research Programme, CET Partnership.
- Marine Institute: Marine Research Programme, Marine Research Programme Industry-led Awards
- Science Foundation Ireland (SFI): SFI Future Innovator Prize, SFI Industry Fellowship, SFI Research Infrastructure, SFI Frontiers for the Future Programme, Strategic Partnerships Programme, SFI Research Centres.
- Irish Research Council: Employment Based Postgraduate Programme, EPS Postgraduate Application, EPS Postdoctoral Fellowship Programme, Ulysses, Laureate Awards, Government of Ireland Postgraduate Scholarship, Government of Ireland Postdoctoral Fellowship.
- Sustainable Energy Authority of Ireland: National Energy RD&D Funding Programme.
- Met Éireann: Weather and Climate Research Programme.

DECC and SEAI proactively and strategically engage across the energy funded research arena to align disparate funding priorities to national climate and energy research ambitions. This is achieved, for example, through inputting to Science Foundation Ireland's strategy and convening a quarterly energy research funders forum. The Energy Research Funders Forum was launched in 2022 and has members representing from R&I funders (incl. SFI, EPA, IRC, EI, IDA) consenting / planning structures (MARA and OPR), and Gov Departments (incl. DECC, DPER, D/ Taoiseach, DoT, DAFM, and DFHERIS). Similarly, the EPA coordinates the National Environmental Research Group, which publishes an annual report on climate research in Ireland.

The EU Framework Programmes for RTD are an importance source of funding to support researchers based in Ireland to collaborate with partners from Europe and further afield. In Horizon 2020, the Framework Programme which ran from 2014-2020, researchers based in Ireland won approximately €81M in energy-related RD&D funding and approximately €41M in funding from Societal Challenge 5 (Environment).

Within Horizon Europe, the successor programme to H2020, a budget of €15.1bn has been allocated to Cluster 5 Climate, Energy and Mobility for the period 2021-2027, with a further €9bn allocated to Cluster 6 Food, Bioeconomy, Natural Resources, Agriculture and Environment. Irish industry, academia, public sector bodies and civil society organisations participate in Horizon Europe with SEAI fulfilling the role of National Contact Point for Energy within Cluster 5 (Climate, Energy and Mobility) in conjunction with Enterprise Ireland. SEAI also represents Ireland as a National Delegate on the Cluster 5 Horizon Europe Programme Committee. The EPA fulfils the role of National Contact Point for Environment within Cluster 6 of the Horizon Europe Work Programme (Food, Bioeconomy, Natural Resources, Agriculture and Environment), in conjunction with Enterprise Ireland. Clusters 5 and 6 are the main sources of environment, climate, and energy research funding in Horizon Europe. Researchers based in Ireland have won €116M from Clusters 5 and 6 during the first two years of the programme.

As of February 2024, 29.2% of all Horizon Europe funded projects involving Irish participants are making a contribution to climate. 65.2% of projects are making a contribution to sustainability, and 7.6% are making a contribution to biodiversity[2].

Ireland has leveraged the SEAI National RD&D Programme with EU funding previously through European Research Area Networks (ERA-NETs), and currently through the Clean Energy Transition Partnership (CETP), where Ireland has committed €500k per annual CETP Call. The CETP is an EC co-funded partnership under Horizon Europe (2021-2027). The CETP builds on the existing SET Plan Implementation Working Groups; which bring together EU member states, industrial initiatives and stakeholders and researchers; as well as on the energy-relevant ERA-NETs. SEAI acts as a national funding partner within the CETP partnership (as does GSI for certain research topics) to support the participation of Irish researchers in this initiative. The CETP Strategic Research and Innovation Agenda (SRIA) was adopted at the European Strategic Energy Technology Plan (SET Plan) Conference in November 2020. Ireland has supported CETP projects since its first Call in 2022. The EPA develops climate research capacity in engagement with European

programmes under Horizon Europe and JPI Climate which explore Ireland's emissions pathways and scenarios for energy use and other sectors and supports adaptation planning through environmental monitoring and reporting programmes.

DECC hosts the National Contact Point for the LIFE programme, which provides funding for the support of Environment, Nature Conservation and Climate Action, and for the Innovation Fund, which supports the demonstration of innovative low-carbon technologies. Since 2013, Irish researchers and innovators have won €88m from the LIFE programme. Ireland has recently won funding for two projects from the Innovation Fund, including a project to decarbonise the production of high-pressure steam used in an aluminium refinery.

Irish organisations are also active in inter-regional climate and energy projects funded through Interreg. This includes:

- The Bryden Centre, funded by Interreg VA (Northern Ireland, Western Scotland, Ireland border region), which is a €9.4 million cross-border, renewable energy research centre.
- The Renewable Engine project, funded by Interreg VA, a €5.8 million cross-border project to support technology development in the Renewable Energy and Advanced Manufacturing sectors through the provision of industrial research support and technology development grants to industrial partners.
- The Cascade project, funded by Interreg North-West Europe, which aims to introduce circular carbon management systems in seven pilot regions in France, Germany, Luxembourg, the Netherlands, Belgium and Ireland.
- The HYDEA project, funded by Interreg Atlantic Area, which aims to use green hydrogen technologies alongside other renewable technologies to improve the energy efficiency and reduce the carbon emissions of ports in the Atlantic Area.

4. Current Situation and Projections with Existing Measures

4.1 Projected Evolution of Main Exogenous Factors Including Energy System and GHG Emission Developments

The emissions projections for the final update of the NECP are prepared by the EPA and take into account projected activity data provided by a number of key data providers including:

- Economic forecasts projections provided by the Economic and Social Research Institute (ESRI) using an integrated energy, economy and environment model called I3E;
- 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 are aligned with University of Missouri Food and Agricultural Policy Research Institute (FAPRI) Projections (January 2024) for medium-term developments in EU and World agricultural commodity markets.

Teagasc assume that agricultural policy continues as currently implemented and the Trade and Cooperation (Brexit) Agreement (TCA) reached between the EU and the UK governs UK-EU trade for the period to 2033. Furthermore, the analysis assumes no new bilateral trade agreements between the EU, UK, and other countries. 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.

Ireland's final update of the NECP 2023-2030 is based on two scenarios; the With Existing Measures (WEM) scenario and the With Additional Measures (WAM) scenario. The modelling will not capture all the policies outlined in CAP 24 and may not reflect policy developments that have occurred since the input assumptions closed in late 2023.

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 2022 (the latest inventory year) and the projected emissions reduction is commensurate with the resources or legislation already in place or committed to by Government Departments or Agencies.

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 full target of Electric Vehicles on the road by 2030 in CAP 2024. The full amount of this ambition is not currently in the With Existing Measures scenario as actions still remain to be taken that would deliver it.

4.1.1 Macroeconomic forecasts (GDP and population growth)

Between 2016 and 2022, Ireland's population increased by 387,274. Natural increase made up 167,487 of the change. The estimate for net migration therefore is 219,787. According to the CSO, between 2013 and 2023 Ireland had the third highest percentage increase (14.4%) in population in the European Union (EU27), after Malta (28.3%) and Luxembourg (23.0%). Gross domestic product (GDP) increased by 9.4% in 2022 while gross national product (GNP), a measure of economic activity that excludes the profits of multi-nationals, rose by 3.9%. Projections for GNI*, an indicator designed to exclude globalisation effects that disproportionately impacting Irish economic metrics, are sourced from the ESRI, from the Environment, Energy and Economy I3E computable general equilibrium (CGE) model. The I3E model is an intertemporal CGE model, which reproduces the structure of the economy in its entirety. It includes productive sectors, households, and the Government, among others. In the model, the nature of all existing economic transactions among diverse economic agents is quantified. According to microeconomic behaviour, producers/consumers maximise their profits/utility given their budget constraints. In other words, a CGE model examines how inputs and outputs flow between production sectors of the economy and finally result in final goods consumed by households.

In addition, the Department of Finance published a report “Horizon Scanning – calibrating medium to long-term economic projections”[35], in October 2023. The macroeconomic forecasts, contained in this report, see table below, were used to benchmark I3E GNI* outputs underpinning emission projections.

Table 34: Macroeconomic forecasts

Macro-Economic forecasts	Unit	2022	2023	2024	2025	2026	2027	2028	2029	2030	2040	2050
GNI*	Growth %		-4.41	3.22	3.05	3.03	3.01	3.00	2.98	3.00	3.21	3.30
Population	Million	4.93	4.96	5.00	5.04	5.08	5.12	5.17	5.21	5.25	5.69	6.17

4.1.2 Sectoral changes expected to impact the energy system and GHG emissions

The projections for GVA outlined in the table below are also sourced from the ESRI, from the Environment, Energy and Economy (I3E) computable general equilibrium (CGE) model.

Table 35: Sectoral Gross Value Added

	Unit	2023	2024	2025	2026	2027	2028	2029	2030	2035	2040
Agriculture	EUR Mil	7,304	7,477	7,733	7,995	8,262	8,535	8,814	9,101	12,554	17,330
Construction	EUR Mil	8,500	8,438	8,673	8,916	9,169	9,431	9,703	9,986	13,822	19,285
Services	EUR Mil	200,781	199,507	205,568	211,773	218,138	224,679	231,392	238,301	325,730	446,495
Energy Sector	EUR Mil	4,858	4,973	5,135	5,302	5,474	5,647	5,826	6,010	8,228	11,300
Industry	EUR Mil	68,071	69,265	71,477	73,748	76,081	78,479	80,944	83,481	114,650	158,382

[35] https://www.gov.ie/en/publication/c31bc-horizon-scanning-calibrating-medium-to-long-term-economic-projections/.

4.1.3 Global energy trends, international fossil fuel prices, EU ETS carbon price

Both scenarios use fuel prices from the European Commission recommended harmonised trajectories. The figure below outlines wholesale fossil fuel price under a high price scenario in Europe, while table 36 below details the project global energy price trends through to 2050. In the EU reference scenario, the prices were chosen to reflect the likelihood of near-term sustained higher prices and intensified uncertainty around longer-term future fuel prices. In addition, other scenarios include a varying carbon tax that increases by €7.50 per annum, reaching €100 per tonne by 2030, and is constant thereafter, and the European Commission WEM trajectory for ETS Price. The EC's WEM trajectory envisages that the ETS price will be €80 until 2030 and €160 in 2050.

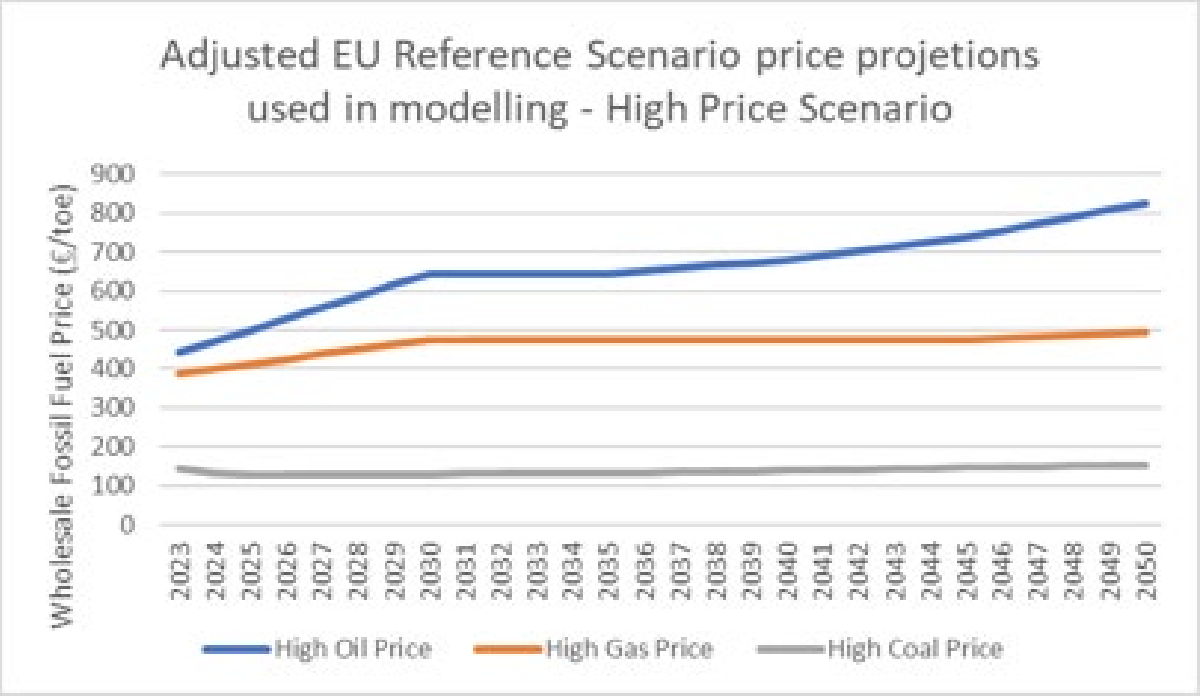


Figure 3: EU Reference Scenario price projections used in modelling.

Table 36: Projected global energy price trends

Sectoral Gross Value Added	Unit	2022	2023	2024	2025	2026	2027	2028	2029	2023	2040	2050
International Fuel Prices												

Oil	EUR2023 /GJ	11.28	15.84	12.30	13.10	13.89	14.69	15.49	16.28	17.08	17.88	18.91
Gas	EUR2023/ GJ	13.96	34.63	10.81	11.15	11.48	11.82	12.15	12.48	12.82	13.15	13.15
Coal	EUR2023/ GJ	3.74	7.44	4.05	3.67	3.56	3.57	3.58	3.59	3.60	3.61	3.86
Carbon Price ETS Sector	EUR2023/ ton CO_2	66.35	95.45	95.45	95.45	95.45	95.45	95.45	95.45	95.45	95.45	101.42

4.1.4 Technology cost developments

Since the last NECP, updates have been made to how technology cost development is calculated. The cost assumptions applied in modelling the heat sector for 2023 are detailed in the table below. There are number of reports due to be completed in 2024.

Table 37: Heating technology cost assumptions applied in modelling of heat sector

Technology	Size (kW)	Capex (2023€/kW)	Opex (2023€/kW)
Biomass Boiler	100	1,205	24
	300	1,205	24
	1000	1,205	24
	3000	1,205	24
	10000	744	15
	30000	480	10
Biomass CHP	100	633	13
	300	633	13
	1000	633	13
	3000	633	13
	10000	391	8
Ground Source Heat Pump	5	3,470	24
	10	2,128	12
	50	1,497	5
	100	1,177	4
	500	796	2
Air Source Heat Pump	5	1,475	24
	10	955	12
	50	476	10
	100	381	7

	500	262	4
Gas Boiler	5	546	24
	10	283	12
	50	138	9
	100	107	7
	500	58	3
	1000	45	3
Oil Boiler	5	671	38
	10	348	19
	50	220	9
	100	147	7
	500	58	3
	1000	39	3
Electric Heating	5	469	24
	10	469	12
	50	1,077	2
	100	1,077	1
	500	1,077	1
	1000	1,077	1

4.2 Dimension Decarbonisation

4.2.1 GHG Emissions and Removals

4.2.1.1 Trends in current GHG emissions and removals in the EU ETS, effort sharing and LULUCF sectors and different energy sectors

The projected trends in GHG emissions in the EU ETA, effort sharing and LULUCF sectors are outline in the table below.

Table 38: Projected trends in GHG emissions (WEM) (kt Co_2eq)

	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2035	2040	2050
ETS sector	15336.81	14707.39	11927.59	11954.29	11473.36	11296.81	10213.96	9455.70	9342.2.0	8700.91	8713.06	7914.55	7729.92
Effort Share sector	46418.31	45897.50	45466.19	45241.11	45070.24	45096.98	44719.00	44346.73	43958.46	43466.92	39988.44	37011.24	34917.65
LULUCF	4627.79	3983.34	5613.8	6643.15	6768.08	7456.8	7383.35	7628.86	7905.57	7944.19	9391.77	8511.11	7645.45

The EPA has produced final estimates of GHG emissions for the period 1990-2022. Ireland's ESR emissions annual limit for 2022 is 42.36 Mt CO_2eq. Ireland's final 2022 greenhouse gas ESR emissions are 45.90 Mt CO_2eq, this is 3.54 Mt CO_2eq more than the annual limit for 2022. This value is the national total emissions less emissions generated by stationary combustion, i.e., power plants, cement plants, and domestic aviation operations that are within the EU's emissions trading scheme. This indicates that Ireland is not in compliance with its 2022 Effort Sharing Regulation annual limit, exceeding the allocation by 1.63 Mt CO_2eq after using the ETS flexibility and by 0.81 Mt CO_2eq after using both ETS and LULUCF flexibilities. It should be noted that the final quantity of LULUCF flexibility available to Ireland will be finalised 2032. Both Agriculture and Transport accounted for 76.4% of total ESR emissions in 2022.

For 2022, final total national GHG emissions (excluding LULUCF), as outlined in the table below, are estimated to be 60.60 Mt CO_2eq, which is 1.9% lower (or 1.15 Mt CO_2eq) than emissions in 2021 (61.76 Mt CO_2eq) and follows a 5.1% increase in emissions reported for 2021. Emissions are 0.4% lower than pre-pandemic 2019 figures.

Table 39: GHG emissions for 2021 and 2022 for Ireland kt CO_2eq

Mt CO_2eq	2021	2022	% Change
Agriculture	23435.75	23356.81	-0.3%
Transport	11088.58	11751.29	6.0%
Energy Industries	10261.93	10078.17	-1.8%
Residential	6878.72	5787.38	-15.9%
Manufacturing Combustion	4613.57	4302.06	-6.8%
Industrial Processes	2471.83	2287.99	-7.4%
Commercial Services	764.92	765.00	0.0%
F-Gases	744.76	741.27	-0.5%
Public Services	671.62	657.04	-2.2%
Waste	823.43	877.87	6.6%
Total	61755.12	60604.89	-1.9%

Agriculture is the largest contributor to overall emissions at 38.5% of the total (excluding LULUCF). Transport and Energy Industries are the second and third largest contributors at 19.4% and 16.6%, respectively. Residential and Manufacturing Combustion emissions account for 9.6% and 7.1%, respectively. These five sectors accounted for 91.2% of national total emissions in 2022. The remainder is made up by the Industrial Processes sector at 3.8%, F-Gases at 1.2%, Commercial Services at 1.3%, Public Services at 1.1% and Waste

at 1.5%. Agriculture emissions trended upwards for several years, increasing by 3.9% or 0.88 Mt CO_2eq in 2018 following an increase in 2017 of 3.6%. The most significant drivers for the increased emissions in 2018 are higher dairy cow numbers (+2.7%) with an increase in milk production of 4.4%. In the last 5 years (2017-2022), dairy cow numbers have increased by 13% and corresponding milk production by 21%. This reflects national plans to expand milk production under Food Wise 2025 and the removal of the milk quota in 2015. In 2018, there were also increased CO_2eq emissions from synthetic fertiliser application on agricultural soils (+10.6%). Other cattle and sheep numbers decreased by 1.2% and 1.7% respectively, whereas pig and poultry numbers increased by 0.7% and 0.5%, respectively. Total fossil fuel consumption in agriculture, forestry and fishing activities increased by 6.3% in 2018.

Recent trends in agricultural emissions show a more positive, downward trend. Emissions from the agriculture sector decreased by 0.3% or 0.08 Mt CO_2eq in 2022, driven by decreased fertiliser nitrogen use (-14%). Limestone application emissions increased, (4.4%) increased numbers of livestock including dairy cows (0.9%), other cattle (0.3%) and sheep (4.2%). Total milk production increased by 0.7% in 2022, with milk output per cow also decreasing (0.2%). Figures published by the EPA in July 2024 indicate that agricultural emissions declined by a further 4.6% in 2023 compared to 2022. The key drivers behind this reduction were an 18% reduction in fertiliser use, reduced lime application and an overall reduction in the numbers of non-dairy livestock.

Under the Irish Climate Act of 2021; a target has been set for reducing overall emissions from Agriculture by 25% from the 2018 baseline year by 2030, down to 17.38 Mt CO_2eq. per annum by 2030.

The latest estimates show that total emissions in the agriculture sector have increased by 16.4% from 1990 to 2022 mainly driven by a 18.4% increase in methane emissions from enteric fermentation and a 25.3% increase in emissions from manure management. After initially showing a rising trend in emissions in the 1990s, the agriculture sectoral emissions began to decrease steadily between 1998 until 2011. However, from 2011, emissions trended upwards again with an overall peak in emissions reported in 2021.

In the decade 2012-2022, dairy cow numbers increased by 42.5% with a corresponding milk production increase of 68.6%. This reflects national plans to expand milk production under Food Wise 2025 and the removal of the milk quota in 2015. In the same 10-year period sheep numbers increased by 14.7%, pigs by 4.6% and poultry by 20.4%.

Regarding the mitigation pathway set out for agriculture in Ireland; the sector has made substantial progress on some mitigation measures. For example, the purchase of chemical nitrogen (N) by Irish farmers fell to 343,000 tonnes in 2022 from the 2018 baseline of 408,000 tonnes, which represents a 14% decrease in chemical N purchases on the previous year. This figure has dropped by a further 18% in 2023, which will likely contribute to an expected overall reduction in emissions from agriculture again in 2023. There is a risk of a rebound in chemical N use if prices fall, which is being managed through a continued focus at farm level on replacing chemical nitrogen with organic sources and improving nitrogen use efficiency, supported by knowledge transfer programmes such as the Teagasc Sign Post Farm programme.

GHG emissions from the Transport sector increased by 6% in 2022. This increase continues to reflect the rebound in economic activity and continued demographic growth following the ending of COVID travel restrictions on passenger car and public transport usage in 2021. At the end of 2022, there were just under 72,000 battery electric (BEVs) and plug-in hybrid electric (PHEVs) vehicles in Ireland, approximately 37% of the Climate Action Plan target for 2025 of 195,400 or <8% of the 2030 policy target of 944,600 vehicles. As a result, the continued uptake of electric vehicles has meant the annual target in 2022 was exceeded. Sectoral emissions in the Energy Industries sector show a decrease of 1.8% in 2022 due to reductions in coal, oil, and peat use (-16.1%, -29.1%, and -24.8%) in electricity generation. The use of natural gas increased by 12.6% in 2022 and is it at its highest level since 2010. In 2022 renewables accounted for 38.6% and natural gas was 48.8% of electricity generated in 2022. Coal, oil, and peat generation accounted for 10.9% of electricity generated.

Emissions in the Residential sector are 5.79 Mt CO_2eq or 9.5% of national total emissions in 2022 and decreased by 15.9% or 1.09 Mt CO_2eq since 2021. Within the different fuels used in the household space and water heating, decreases were seen in all fuels; coal, peat, kerosene, and natural gas by 33.1%, 11.0%, 16.5%, and 9.3%, respectively. High fuel prices and a mild winter were significant contributors to the reduction in fossil fuel use, in addition to the introduction of new, nationwide solid fuel regulations.

Emissions relating to Manufacturing Combustion and Industrial Processes combined accounted for 10.9% of Ireland's total emissions in 2022, or 6.59 Mt CO_2eq. Emissions from the Manufacturing Combustion sector decreased by 6.8% or 0.31 Mt CO_2eq in 2022. There were decreases in combustion emissions from major sub sectors including non-ferrous metals, chemicals, food processing, beverages and tobacco sector and non-metallic minerals, i.e. 11.4%, 8.7%, 2.1% and 8.0%, respectively. In 2022, significant fuel reductions

occurred in this sector with coal, petroleum coke and natural gas use all decreasing by 20.8%, 14.6% and 7.5% respectively.

Emissions from the Industrial Processes sector decreased by 7.5% (0.19 Mt CO_2eq) in 2022 from 2.47 Mt of CO_2eq to 2.29 Mt CO_2eq, following a 17.3% increase in 2021. Total process emissions from the mineral products subsector (including cement) decreased by 8.4%.

In 2022, total emissions (combustion and process) from the cement sector decreased by 8.2% and amount to 2.88 Mt CO_2eq, or 4.8% of national total emissions. Cement sector emissions are now 89.3% higher than the 2011 low during the economic recession. Emissions from Commercial Services remained the same and Public Services decreased by 2.2% in 2022. Natural gas and oil decreased by 2.5% and 2.3% within the Public Services sub-sector.

Emissions from the Waste sector, which account for 1.4% of total national emissions, increased by 6.6% in 2022, largely as a result of an increase in emissions of methane from landfills by 7.6%. Actual generation of methane at landfills fell 6.0% in 2022, but methane flared and utilised for electricity generation also fell by 14.3%, with net overall increase in emissions. Emissions associated with landfills increased by 0.05 Mt CO_2eq.

F-Gas emissions in 2022 are at similar levels to 2021, down only 0.5%, following an increase of 5.5% in the previous year. The small decrease is due to a reduction in PFCs and NF3 use in the semiconductor industry.

The LULUCF sector is made up of six land use categories (Forest Land, Cropland, Grassland, Wetlands, Settlements, and Other Land) and Harvested Wood Products. This sector accounts for 6.2% of national total emissions (including LULUCF).

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). This sector is a net source of CO_2eq emissions in all years 1990-2022. The net CO_2 emissions to, or removals from, the atmosphere are estimated with respect to overall carbon gain or loss for relevant carbon pools for the defined land categories. These pools are above-ground biomass, below-ground biomass, litter, dead wood, soils, and harvested wood products. Emissions from biomass burning (wildfires), drainage of organic soils and emissions from mineralisation in soils are also estimated.

The main sources of emissions are from the drainage of grasslands on organic soils and the exploitation of wetlands for peat extraction. Forest land and Harvested wood products are a carbon sink (CO_2 removal) for all years 1990-2022. The carbon sink associated with Forest

land is on a declining trend. A complex dynamic exists between land use categories and the relative contributions between the carbon pools in biomass and soils lead to fluctuations in emissions and removals over the period 1990-2022. In any one year the Cropland land use can act as either a small sink (removal) or a small source of emissions. This results from the dynamic of using temporary grassland as part of cropping rotations. The Settlements and Other Land uses are comparatively less important and do not affect the absolute level of emissions or the trend over time to a significant extent.

Emissions from the LULUCF sector in 2022 were 20.5% below those in 1990 and decreased by 13.9% between 2021 and 2022. There has been a significant long-term decline in the area of land afforested annually and an increase on the level of harvest and increased emission from forestry on organic soils resulting in a reduction in the contribution of the forest land sector to the removal of CO_2 from the atmosphere.

Although forests planted in Ireland since the mid-1900's have resulted in a significant forest sink, this sink has been in decline in recent years. Under a business-as-usual scenario (BAU), Ireland's forest estate is projected to transition from a sink to an emission source in the near future. This is due to a number of combined factors including the decline in recent afforestation rates (c. 2,273 in 2022), continued emissions from organic soils, a projected increase in the level of harvest, deforestation, and a reduction in landscape level sequestration potential due to age class structural shifts.

The Environmental Protection Agency's (EPA) WEM scenario projects that LULUCF emissions will continue to rise by 89.8% from 4.2Mt CO_2eq in 2018 to 7.9 Mt Co2eq in 2030. Looking at longer term trends, the share of CO_2 in total GHG emissions has increased to 60.6% of total GHG emissions in 2022 compared to 59.6% in 1990. The share of CH_4 and N_2O emissions, primarily from the agriculture sector, have fallen from 40.3% of total GHG emissions in 1990 to 38.2% in 2022 as emissions (primarily CO_2) from other sectors grew at a faster rate. Emissions from F-gases account for 1.2% of the total in 2022. The trend in national total emissions (excluding LULUCF) from 1990 to 2022 is +9.7%.

4.2.1.2 Projections of sectoral developments with existing national and Union policies and measures at least until 2040 (including for the year 2030)

The emissions projections under the WEM and WAM scenarios in the following tables which have been prepared for the NECP are projecting from the final 2022 inventory baseline year. The Projections with existing policies and measures scenario assumes that no additional policies and measures, beyond those already in place by the end of 2022, are implemented.

Table 40: Projections of sectoral developments (WEM)

ktCO2eq	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2035	2040	2050
Energy Industry	10261.93	10078.17	7513.39	7616.57	7119.66	6944.43	5852.88	5091.86	4988.69	4347.12	4428.81	3887.13	3998.75
Residential	6878.72	5787.38	5793.30	5799.21	5745.72	5649.87	5523.78	5358.26	5166.02	4906.69	3052.13	1895.33	1507.62
Manufacturing Combustion	4613.57	4302.06	4167.33	4032.61	4021.77	3995.36	3942.60	3891.89	3840.67	3788.38	3452.79	3108.61	2720.80
Commercial/ Public Services	1436.54	1422.04	1386.09	1350.14	1321.89	1293.75	1264.42	1232.84	1198.36	1152.81	962.40	933.13	1036.69
Transport	11088.58	11751.29	11781.61	11575.45	11450.67	11454.85	11435.98	11386.86	11305.40	11188.26	9657.08	7641.92	5057.05
Industrial Processes	2471.83	2287.99	2178.61	2205.22	2231.72	2258.34	2286.60	2315.25	2344.28	2373.70	2556.75	2562.23	2571.85
F-Gases	744.76	741.27	727.51	726.74	679.54	648.84	637.82	615.43	607.38	612.60	685.29	822.13	1166.53
Agriculture	23435.75	23356.81	22997.21	23069.24	23178.62	23379.00	23243.07	23187.37	23149.98	23120.95	23320.74	23551.90	24136.35
Waste	823.43	877.87	848.74	820.23	794.01	769.36	745.80	722.67	699.87	677.31	585.51	523.40	451.92

Table 41: Projections of sectoral developments (WAM)

ktCO2eq	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2035	2040	2050
Energy Industry	10261.93	10078.17	7513.44	7563.05	7036.40	6857.92	5809.96	4902.73	4321.49	3850.51	3790.72	2835.18	2716.72
Residential	6878.72	5787.38	5802.11	5816.83	5769.27	5512.22	5231.75	4926.51	4598.89	4205.23	2091.18	601.67	221.69
Manufacturing Combustion	4613.57	4302.06	4167.33	4032.61	4019.27	3986.11	3912.58	3798.48	3552.85	2909.43	2561.61	2053.80	1315.47
Commercial/ Public Services	1436.54	1422.04	1395.79	1369.53	1345.97	1259.70	1166.61	1055.39	898.03	611.74	388.35	232.91	51.66
Transport	11088.58	11751.29	11772.26	11545.27	11389.51	10896.08	10391.94	9868.84	9320.59	8730.50	7127.06	5656.71	4657.62
Industrial Processes	2471.83	2287.99	2178.61	2205.22	2231.72	2258.34	2286.60	2315.25	2344.28	2373.70	2556.75	2562.23	2571.85
F-Gases	744.76	741.27	727.56	726.73	679.45	651.02	642.13	621.68	615.41	622.56	703.35	856.46	1261.45

Agriculture	23435.75	23356.81	22553.19	22088.62	21391.62	21015.26	20532.24	20041.24	19575.78	19118.28	19050.99	18997.18	18911.83
Waste	823.43	877.87	848.74	820.23	794.01	769.36	745.80	722.67	699.87	677.31	585.51	523.40	451.92

Under the With Existing Measures scenario, the projections indicate that Ireland will cumulatively exceed its ESR 2021-2030 emissions allocation of 369.4 Mt CO_2eq by 80.3 Mt CO_2eq without the use of flexibilities. Under the With Additional Measures scenario, the projections indicate that Ireland will cumulatively exceed the ESR 2021-2030 emissions allocation by 50.1 Mt CO_2eq without the use of flexibilities.

EPA projections show that use of the EU-ETS flexibility alone is not projected to achieve compliance under the ESR. When the ETS flexibility is applied projections indicate that Ireland will cumulatively exceed the ESR 2021-2030 emissions allocation by 31.1 Mt CO_2eq even with implementation of policies and measures in the With Additional Measures scenario.

The revised LULUCF Regulation (2023) incorporates new rules around LULUCF flexibilities which incorporates split budgets 2021-2025 to 2026-2030.[36] In addition, 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.[37] If this EU-wide target is not achieved, based on a compliance check to be completed in 2032, then the LULUCF flexibility will not be available to Ireland.

In the interim, based on the latest LULUCF inventory data, a best-case value of 2.68 Mt CO_2eq per annum LULUCF flexibility has been applied in combination with the ETS flexibility. In the WAM scenario, with the use of ETS and LULUCF flexibilities projections show that Ireland will be cumulatively 17.7 Mt above target.

[36] https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A02018R0842-20230516&qid=1710343267770, Article 7 (1) (a) and (aa)

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

Looking at the projections in more detail by sector:

Under the WEM scenario, emissions from the energy industries sector are projected to decrease by 57% from 10.1 to 4.4 Mt CO_2eq over the period 2022 to 2030. This scenario projects Ireland reaching 69% of renewable electricity share by 2030. Renewable electricity generation capacity is dominated by wind energy, with solar and hydro sources also contributing to the mix.

In terms of inter-connection, the With Existing Measures 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 to 1,350 MW from 2026. Under the WAM scenario, emissions from the energy industries sector are projected to decrease by 62%from 10.1 to 3.9 Mt CO_2eq over the period 2022 to 2030. This scenario projects Ireland reaching 80% of renewable electricity share by 2030. In addition to the WEM measures, the WAM scenario includes Production of up to 5.7 TWh of Biomethane by 2030; Additional interconnection LirIC (700 MW) between Northern Ireland and Scotland, and MARES Connect (750 MW) between Ireland and Wales.

The Transport sector is projected to contribute to 21% of Ireland's total emissions by 2030 in the WEM scenario. Under the With Existing Measures scenario, transport emissions are projected to decrease by 5% over the period 2022-2030 from 11.8 to 11.2 Mt CO_2eq. Measures included in the WEM scenario are:

- A 10% blend for petrol and a 12% blend for diesel at the pumps by 2025 is assumed and blends remain at this level until 2030.
- For uptake of Electric Vehicles, the With Existing Measures scenario assumes approximately 693,000 electric vehicles on the road by 2030. This includes approximately 430,000 passenger battery electric vehicles and 263,000 passenger plug- in hybrid electric vehicles.
- Under the With Additional Measures scenario, transport emissions are projected to decrease by 26% over the period 2022 to 2030 from 11.8 to 8.7 Mt CO_2eq.

Measures in the WAM scenario include:

- It is assumed that incremental blend increases will occur reaching a 10% blend for petrol and a 20% blend for diesel at the pumps by 2030 as detailed in Climate Action Plan 2024.

- Uptake of electric vehicles totalling 945,000 by 2030, as a result of the implementation of the Climate Action Plan 2024. This includes over 845,100 private electric vehicles, and 98,500 commercial electric vehicles.
- This scenario also includes a reduction in total vehicle kilometres to be achieved by behavioural and sustainable transport measures outlined in the Climate Action Plan 2024.

Under the WEM scenario, emissions from the residential sector are projected to decrease by 15% between 2022 and 2030 from 5.8 to 4.9 Mt CO_2eq. The With Existing Measures scenario assumes the following:

- Domestic heat pump uptakes based on grant rates as of February 2022 (funded by National Development Plan 2021-2030 allocation) and, based on building regulations, an 'effective' ban on oil boilers (from 2022) and gas boilers (from 2025) in new dwellings, based on building regulations;
- Implementation of a range of residential energy efficiency programmes also 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 completion of two district heating schemes currently under development with a combined capacity of 0.075 TWh by 2030.

Under the With Additional Measures scenario, emissions are projected to decrease by 27 % between 2022 and 2030 from 5.8 to 4.2 Mt CO_2eq. This scenario assumes full implementation of the relevant With Existing Measures scenario and relevant measures in the Climate Action Plan 2024 (with the exception of biomethane), these include:

- The installation of 680,000 heat pumps by 2030 (400,000 in existing homes and 280,000 in new homes). no new oil boilers (from 2022) and gas boilers (from 2025) in new dwellings, based on building regulations;
- Residential Energy Efficiency programmes involving upgrades to homes, and retrofits to achieve the cost optimal equivalent of a BER 'B2' rating in 500,000 dwellings by 2030;

- District heating growth to 1.2 TWh in 2030 in the Residential sector. The remaining 1.5 TWh of the full 2.7 TWh outlined in the CAP 2024 is allocated to the Commercial and Public Services Sector (see Section 5.6);
- An effective ban on fossil fuel boilers in existing residential buildings after 2031 is also assumed.

Total emissions from agriculture (including fuel used in agriculture, forestry, and fishing) are projected to decrease by 1.0% over the period 2022-2030 from 23.4 to 23.1 Mt CO_2eq under the WEM scenario. The WEM scenario assumes that those measures for which there is legislative levers in place prior to the end of 2022 are included in the scenario:

- Emissions from the manufacturing combustion sector contributed 7% of Ireland's total emissions in 2022.

Under the **With Existing Measures** scenario: emissions from manufacturing combustion are projected to reduce by 12% between 2022 and 2030, from 4.3 to 3.8 Mt CO_2eq (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.

Under the **With Additional Measures** scenario, emissions from manufacturing combustion are projected to decrease by 32% from 4.3 to 2.9 Mt CO_2eq between 2022 and 2030. This scenario assumes further roll out of energy efficiency programmes including those listed above. It also includes:

- As indicated in the CAP 2024; a total of 5.7 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.

Emissions from the Commercial and Public Services Sector contributed 2% of Ireland's total emissions in 2022.

Under the **With Existing Measures** scenario, emissions from the commercial and public services sector are projected to decrease by 19% between 2022 and 2030 from 1.4 to 1.2 Mt CO_2eq.

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.

Under the **With Additional Measures** scenario, emissions from the commercial and public services sector are projected to decrease by 57% between 2022 and 2030 from 1.4 to 0.6 Mt CO_2eq. 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). As indicated in CAP 2023; a total of 5.7 TWh of biomethane use across the heat sector by 2030 (split between Commercial/Public Services and Manufacturing Combustion for these Projections). This scenario includes district heating growth to 1.5 TWh in 2030 in the Commercial and Public Services sector. The remaining 1.2 TWh of the full 2.7 TWh outlined in CAP 2023 is allocated to the Residential Sector (see Section 5.4). An effective ban on fossil fuel boilers in new non-residential buildings after 2030 based on advancing the energy and carbon performance requirements of the Building Regulations as indicated in CAP 2024.

The Industrial Processes and Waste sectors contributed 4% and 1% of Ireland's total emissions in 2022, respectively. There is only one scenario (With Existing Measures) for greenhouse gas emissions projections from these sectors based on available data.

Emissions from Industrial Processes include process emissions from mineral, chemical, metal industries, non-energy products and solvents. Emissions are projected to increase by 4% between 2022 and 2030 from 2.3 to 2.4 Mt CO_2eq. 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 23% between 2022 and 2030 from 0.9 to 0.7 Mt CO_2 eq. 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% of Ireland's total national greenhouse gas emissions in 2022. 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 by 17% from 0.74 to 0.61 Mt CO_2eq between 2022 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 16% between 2022 and 2030 from 0.74 to 0.62 Mt CO_2eq 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.

4.2.2 Renewable Energy

4.2.2.1 Current share of renewable energy in gross final energy consumption and in different sectors (heating and cooling, electricity, and transport) as well as per technology in each of these sectors

Figure 4 charts by source the renewable energy share of gross final energy consumption from 2002 to 2022, while Table 42 outlines the share of RE in gross final energy consumption by source.

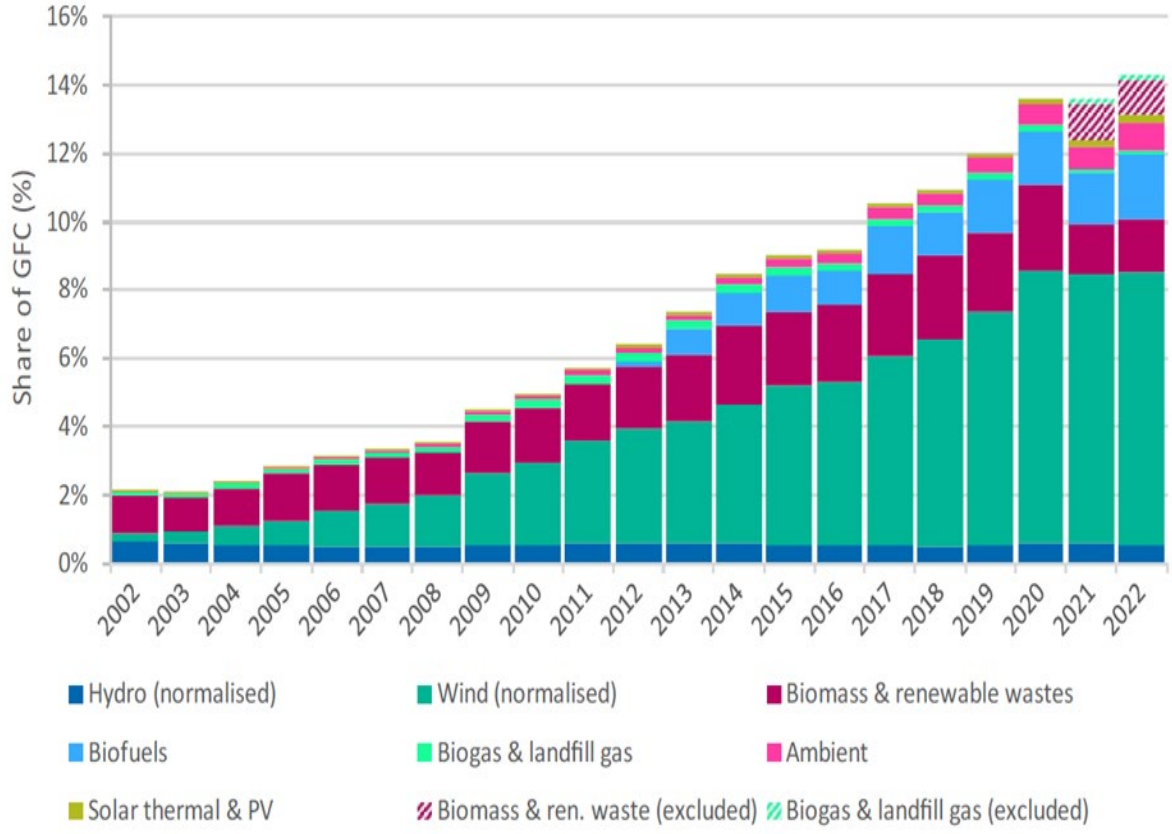


Figure 4: RES of gross final consumption by source (Source: SEAI Energy in Ireland 2023 (Figure 8.13))

Table 42: Current share of renewable energy in gross final energy consumption by source, (SEAI Energy in Ireland Report 2023 (Table 8.3))

	Quantity (TWh)				Share (%)				Change to 2022 (%)		
	2022	2021	2018	2012	2022	2021	2018	2012	2021	2018	2012
Hydro (normalised)	0.76	0.76	0.72	0.76	3.8%	4.1%	4.6%	9.3%	+0.2%	+5.5%	+0.6%
Wind (normalised)	11.15	10.79	8.69	4.26	55.8%	58.1%	55.4%	52.3%	+3.3%	+28.3%	+161.5%
Biomass & renewable wastes	2.16	1.98	3.48	2.30	10.8%	10.6%	22.2%	28.3%	+9.1%	-38.1%	-6.4%
Liquid biofuels	2.68	2.11	1.80	0.19	13.4%	11.4%	11.5%	2.4%	+27.1%	+48.7%	+1,285.8%
Biogas & landfill gas	0.13	0.09	0.30	0.30	0.7%	0.5%	1.9%	3.7%	+51.0%	-56.0%	-56.2%
Ambient	1.17	0.92	0.51	0.22	5.8%	5.0%	3.3%	2.7%	+26.8%	+127.9%	+434.9%
Solar thermal & PV	0.31	0.24	0.18	0.11	1.6%	1.3%	1.1%	1.3%	+28.4%	+77.4%	+184.4%
Total included in RES	**18.36**	**16.89**	**15.69**	**8.15**	**91.8%**	**91.0%**	**100.0%**	**100.0%**	**+8.7%**	**+17.0%**	**+125.4%**
Biomass & ren. waste (excluded)	1.45	1.44	0	0	7.2%	7.8%	0%	0%	+0.3%	-	-
Biogas & landfill gas (excluded)	0.18	0.23	0	0	0.9%	1.2%	0%	0%	-20.1%	-	-
Total renewable energy in GFC	**19.99**	**18.56**	**15.69**	**8.15**	**100.0%**	**100.0%**	**100.0%**	**100.0%**	**+7.7%**	**+27.4%**	**+145.4%**

Overall and Modal Shares of Renewable Energy

The renewable electricity target is commonly referred to as the RES-E target. The RES-E target was for 40% of gross electricity consumption to come from renewable sources in 2020 The actual RES-E achieved in 2020 was 39.1%, falling just short of the national target. Nevertheless, the development of renewable electricity was a major success in Ireland since 2005. Ireland's NECP 2021-2030 included a planned RES-E of 70% in 2030, which will ensure that renewable electricity continues to form the backbone of our RE use for the coming decade and beyond. Ireland's CAP 2023 includes a target to increase the share of electricity generated from renewable sources to 80% of demand.

Figure 5 below highlights the energy flow in Ireland as of 2022 while figure 6 details the renewable energy contribution to gross final energy consumption by mode. Figure 7 shows

Ireland’s current share of renewable energy across the three modes RES-T, RES-H and RES-E, while Table 43 tracks Ireland's progress towards overall renewable share (RES) target.

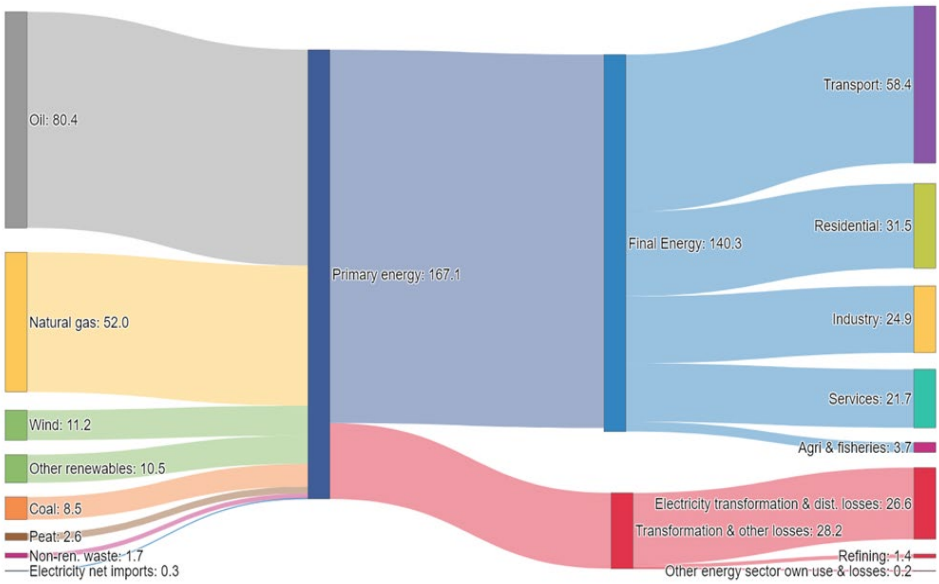


Figure 5: Energy Flow in Ireland in 2022 (TWh) (Source SEAI Energy in Ireland 2023 (Figure 2.2))

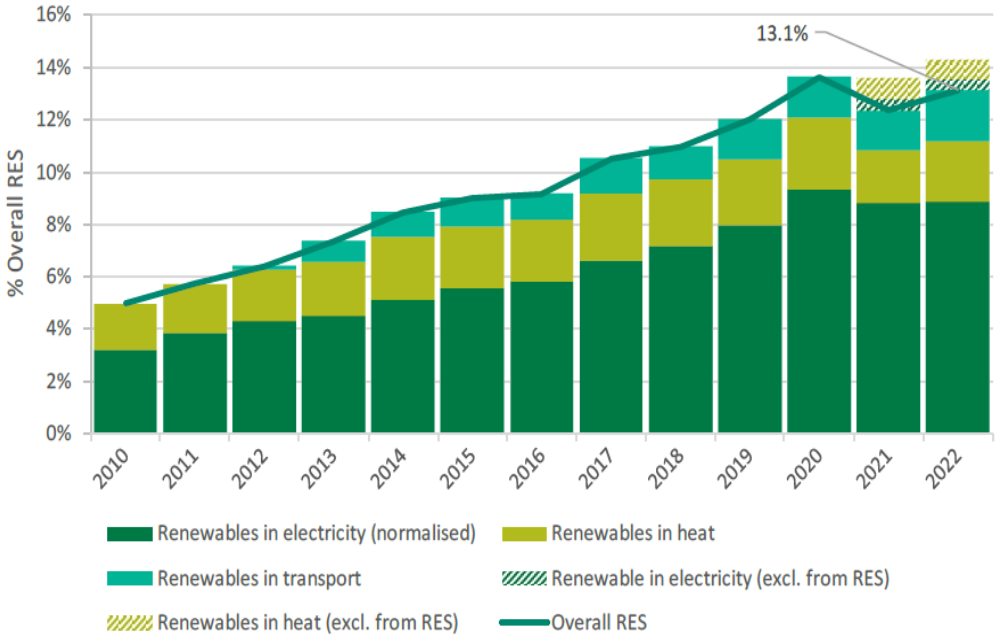


Figure 6: Renewable energy contribution to gross final energy consumption by mode (Source: SEAI Energy in Ireland 2023 (Figure 8.10))

Table 43: Ireland's progress towards overall renewable share (RES) target (SEAI Energy in Ireland Report 2023 (Table 8.2))

	2020	2021	2022	2030 Target
RES-E	39.0%	36.4%	36.8%	80%[21]
RES-T	10.1%	4.4%	5.5%	14% (RED II) / 29% (RED III)
RES-H	6.3%	4.9%	6.3%	24%[22]
Overall RES	**13.5%**	**12.5%**	**13.1%**	**34.1%**

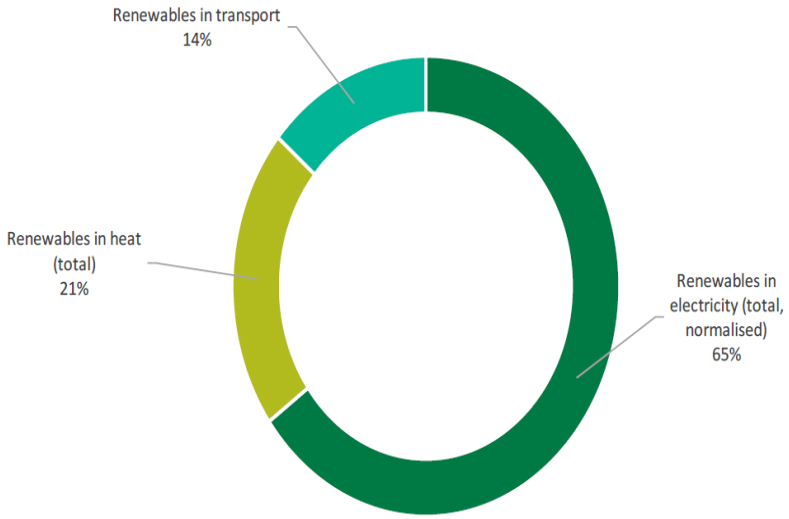


Figure 7: Current share of renewable energy (overall RES) by mode (Source: SEAI Energy in Ireland 2023 (Figure 8.9))

Figure 8 below highlights the renewable energy contribution to gross electricity consumption by technology from 2005-2022 while Table 44 outlines the quantities and shares and their changes over time for the renewable energy contribution to gross electricity consumption.

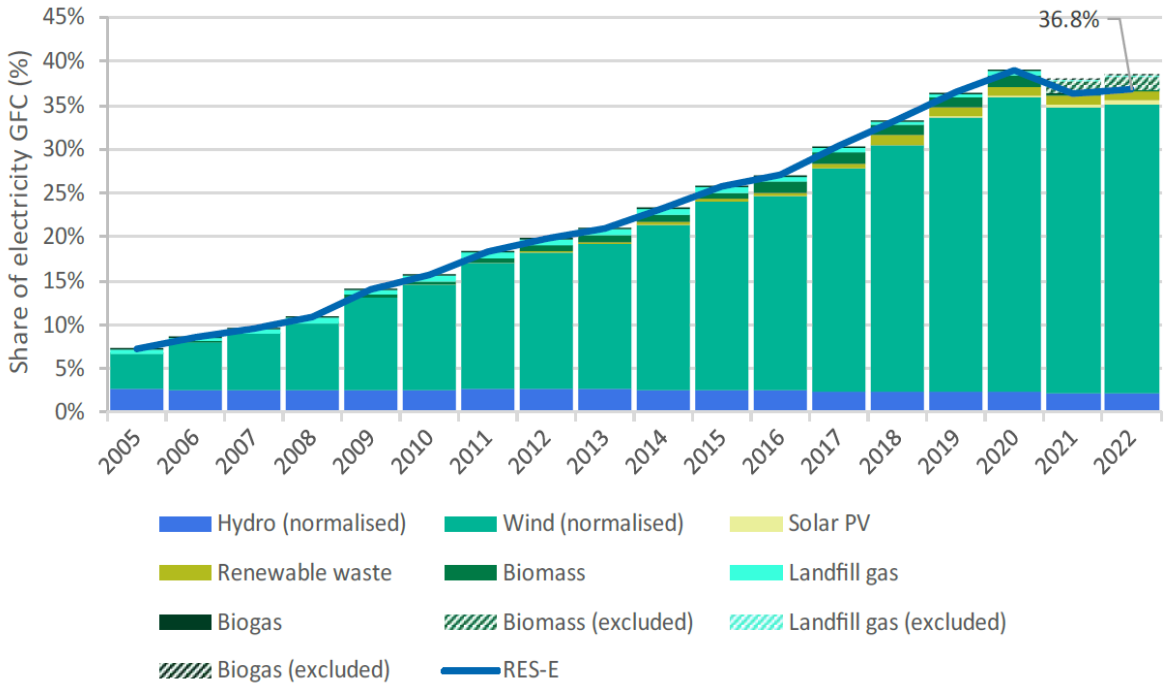


Figure 8: Renewable energy contribution to gross electricity consumption by technology (RES-E normalised) (Source: SEAI Energy in Ireland 2023 (Figure 8.16))

Table 44: Renewable energy contribution to gross electricity consumption (normalised)

	2023		1-year change 2022to 2023		5-year change 2018 to 2023		10-year change 2013 to 2023		20-year change 2003 to 2023	
	Quantity (GWh)	Share (%)	(GWh)	(%)	(GWh)	(%)	(GWh)	(%)	(GWh)	(%)
Hydro	942	2.7%	241	34%	248	36%	343	57%	344	58%
Wind	11667	33.7%	457	4%	3026	35%	7125	157%	11213	2469%
Biomass	347	1.0%	-160	-32%	13	4%	121	53%	347	NA
Renewable Waste	346	1.0%	-1	0%	15	5%	271	365%	346	NA
Landfill Gas	96	0.3%	-5	-5%	-43	-31%	-60	-39%	26	37%
Biogas	59	0.2%	1	1%	14	32%	30	106%	43	270%
Solar PV	644	1.9%	494	329%	626	3432%	643	NA	644	NA
Total renewable	14101	40.7%	1026	8%	3899	38%	8473	151%	12963	1139%

Renewable Heat

The RES-H target for 2020 was for 12% of energy used for heating and cooling to come from renewable sources. The actual RES-H achieved in 2020 was 6.3%, falling short of the

national target. Under RED III, which entered into force in November 2023, Member States must increase the share of renewable energy in heating and cooling by at least 0.8 pp and 1.1 pp as annual averages for the periods 2021-2025 and 2026- 2030, respectively.

Between 2008 and 2014 there was a reduction in overall amount of energy used for heat, which contributed positively towards the RES-H target, as the share of renewable heat is measured against a smaller total. During this period the quantity of renewable heat energy increased by 38% but the share of renewable heat energy increased by 81%. This trend reversed after 2014, when the total energy used for heat began increasing again following the return to economic growth and a reduction in international oil prices. Between 2014 and 2020 the quantity of renewable heat increased by 16%, but so did the overall amount of energy used for heat, meaning that the share of renewable heat remained virtually unchanged

Following a decline in the contribution from renewables to thermal energy in the early 1990s (from 2.6% in 1990 to 2.1% in 1995), RES-H share grew between 2000 and 2014, from 2.4% to 6.3%, and fell in 2015 to 6.2%, increasing again in 2016 and 2017 to 6.7% before small decline in 2018 to 6.5%. This overall trend in growth from 2000 has been dominated by solid biomass, mostly due to the increased use of wood waste as an energy source in the wood products and food sub-sectors of industry. In addition, recent growth in RE use in the residential and services sectors can be attributed to the support of grant schemes and revisions to building regulations requiring a share of the energy demand in new dwellings to come from renewable sources. The decrease shown for 2021 can be attributed to the transition from REDI to REDII and the introduction of new sustainability and verification criteria for biomass fuels. In 2022 the RES-H increased again to 6.3% and steps have been taken to introduce a biomass certification process, to bring the use of biomass fuels in line with sustainability criteria.

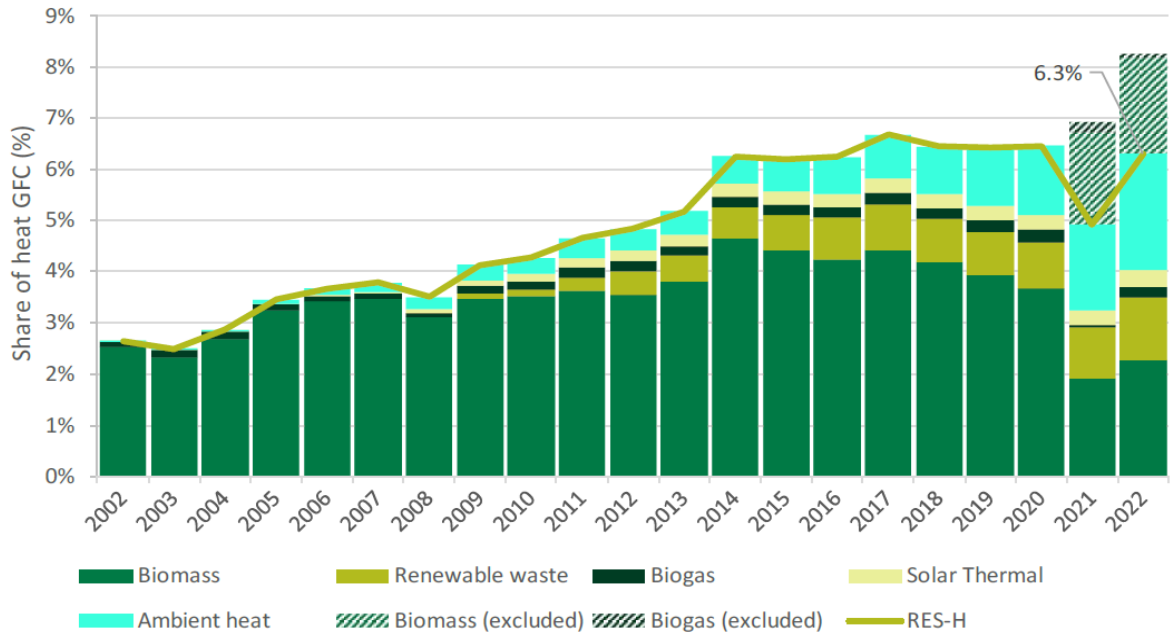


Figure 9: RES in heat (RES-H) (Source: SEAI Energy in Ireland 2023 (Figure 8.18))

RES-H is dominated by the use of solid biomass and renewable wastes in industry, as seen in Figure 8. Using ambient energy (via ground-source and air-source heat pumps) has grown more than ten-fold between 2005 and 2020 and is now a significant source of RES-H, accounting for approximately 27.6% of renewable heat energy (TWh) in 2022. Recent growth in RE use for heat has been due to increased use of renewable wastes in industry and increased use of heat pumps delivering ambient energy in the residential and services sectors. The latter is mostly due to revisions to building regulations for new dwellings and the support of grant schemes.

Renewable Transport

REDI established a mandatory minimum target for the share of RE sources in transport (REST) by 2020: 10% of all petrol, diesel, biofuels, and electricity consumed in road and rail transport. Ireland exceeded this target reaching 10.2% RES-T in 2020. REDII requires Ireland, along with all Member States, to set an obligation on fuel suppliers to ensure that the share of renewable energy within the final consumption of energy in transport is at least 14% by 2030. Pursuant to Art 26.1 of the RED it falls that a RES-T target of at least 9% by 2030 applies for Ireland under RED II. The 2022 RES-T was 5.5%, an increase over a 2021 RES-T of 4.4%, reflective of the revised REDII calculation methodology which places limits on the counting of biofuels produced from certain feedstock within the calculation of the RES-T, i.e., the 1.7% limit on Annex IX Part B feedstocks (UCO and Cat. 1 & 2 tallow) within the gross

final consumption of energy in road and rail transport. In 2022, biofuels produced from Annex IX Part B feedstock accounted for 4.6% of final energy consumption in transport. Further, within the overarching RES, renewable energy supply in transport accounted for 14% of all renewable energy supply. Figure 9 shows the proportion of renewable energy (TWh) in transport up to 2022.

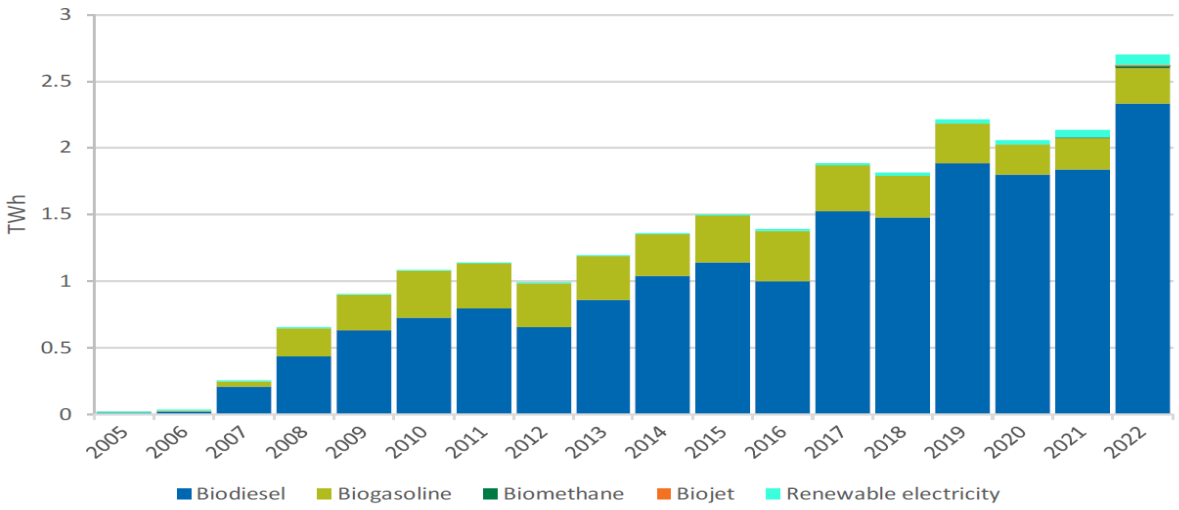


Figure 10: Renewable energy in transport by source (SEAI Energy in Ireland Report 2023 (Figure 8.15))

Indicative projections of development with existing policies for the year 2030 (with an outlook to the year 2050)

Overall, RE share in gross final consumption is anticipated to be in the order of 20.1% by 2025 in the WEM scenario. These projections do not include the anticipated impact of policies and measures announced after the end of 2022 (the end of the latest inventory year). Ireland is likely to achieve 84% of the required progress towards the 2025 target of 24% under RED. Progress on RE has been slower than anticipated in general across Europe. In the context of 2030 RE targets, Ireland is starting from a point below its expected baseline of 19% from 2022. For the WEM scenario, a slower rate of delivery of renewable electricity generation is assumed, leading to a RES-E share of 69% in 2030, see Table 45 below. Projected growth in data centre electricity demand is taken from the EirGrid's best estimate "Median" scenario. While the commitments in CAP will assist in accelerating the deployment of renewable generation in the next decade, the RE target is calculated as the proportion of energy consumed in the economy and electricity demand. Additional final energy demand has been added since the previous NECP submission, and where this

demand increases ahead of the roll out of renewable generation capacity it results in a greater challenge to meeting RED.

Irish authorities are considering the available options under the Governance Regulation and RED to set a cost-effective pathway to meet the compliance milestones to 2030. As per Figure 10 below, the outlook to 2030 for the WEM (baseline) scenario suggests an outturn of 31% overall RES. As for 2030, this is a baseline scenario only and does not include the impact of more recently announced policies and measures beyond what has been implemented by end of 2022.

By the end of 2023, Ireland took additional measures to meet the 2021 baseline target for renewable energy across renewable electricity, renewable heat and renewable transport. These measures are set out in this NECP and Ireland's Climate Action Plans and include:

RES-E

- **Renewable Electricity Support Scheme**: The scheme is Ireland's flagship support scheme for utility-scale renewable electricity development. Over 1GW of new wind and solar generation was secured in the first RESS auction (RESS 1). While the RESS auction was held in 2020, the successful projects had until the end of 2023 to reach commercial operation. As a result of the RESS 1 auction, in 2022 Ireland saw the largest volume of new renewables connected to its grid in a single year. The second RESS auction (RESS 2) was held in 2022, with the first projects reaching commercial operation towards the end of 2023.
- **(Offshore) Renewable Electricity Support Scheme (ORESS)**: The first Maritime Area Consents (MACs) were awarded in late 2022 to six offshore wind projects, supporting over 4.2GW of capacity. In June 2023, Ireland's first offshore wind auction, ORESS 1, was held. Over 3 GW of capacity was procured. This is the largest volume of RE Ireland has ever procured at auction.
- **Policy Statement on the Framework for Phase Two Offshore Wind:** In March 2023, Government adopted the Policy Statement on the Framework for Phase Two Offshore Wind. This policy provides certainty that consents for future offshore wind development will take place within only designated areas, following significant community engagement and environmental scoping. The first of these designated areas, the South Coast Designated Maritime Area Plan Proposal was published in July 2023 and was followed by an intensive period of local engagement with coastal

communities and other maritime users to determine the appropriate location for offshore wind developments off the South Coast.

- **Establishment of MARA**: The Maritime Area Regulatory Authority (MARA) was established in July 2023, a significant milestone in the State's stewardship of the maritime area.
- **Micro-Generation Support Scheme**: Under this scheme, a domestic solar PV grant was introduced in February 2022. By the end of 2023, 22,214 homes had received grant supports under the scheme, to a total value €52.2m.
- **VAT reduction on domestic solar panels**: In May 2023, a zero percent VAT rate was introduced for the supply and installation of domestic solar panels. It is estimated that reducing the VAT rate to zero will reduce the average costs of the supply and installation of solar panels for consumers from €9,000 to €8,000.
- **Planning exemption for certain solar panels**: In October 2022, Government introduced revised planning exemptions for the installation of solar panels on the rooftops of houses and certain non-domestic buildings. Houses, regardless of location, are now able to install unlimited solar panels on their rooftops without any requirement for planning permission, subject to certain conditions.
- **Non-Domestic Microgeneration Scheme**: The solar PV grant scheme was extended in September 2022 to the non-domestic sector for installations up to 6kW. In July 2023, an extended funding range from €2,700 to €162,600 was introduced to support non-domestic installation sizes between 7 kWp and 1,000 kWp (1 MW) capacity, on a pilot basis to the end of 2023. This includes cohorts typically covered under the Small-Scale Renewable Electricity Support Scheme (SRESS). By the end of 2023, offers had been made to 819 applicants, supporting approximately 65MW in capacity, to a value of approximately €13.5 million across a range of non-domestic sectors such as education and care providers, food and retail businesses, community & leisure organisations, as well as larger commercial enterprises.
- **Clean Export Guarantee tariff**: The Clean Export Guarantee (CEG) tariff became available upon the transposition of Article 21 of the Renewable Energy Directive (RED II) into Irish law on 15 February 2022. The CEG tariff provides an opportunity for micro-and small-scale generators in Ireland to receive payment from their electricity supplier for all excess renewable electricity they export to the grid. This remuneration is intended to reflect the wholesale market value of the electricity.

RES-H

- **Support Scheme for Renewable Heat (SSRH)**: In March 2023, the eligibility criteria for the SSRH were modified to attract a larger number of applications. Relevant changes included: increasing the support for heat pump installations to a maximum of 40% of costs from the previous level of 30%; introducing support for additional retrofit measures in buildings to facilitate the installation of heat pumps; and improvements to the application process and speedier approvals.
- **National Retrofit Plan**: The National Retrofit Plan sets out how the Government will deliver national residential retrofit (including heat pump installation) targets. The Plan contains policies, measures and actions to address barriers to retrofit including:
    - In February 2022, the new National Home Energy Upgrade Scheme was amended to provide grant levels of up to 50% of the cost of a typical B2 home energy upgrade with a heat pump (up from the 30-35%).
    - In February 2022, the SEAI launched a national awareness and demand generation campaign for residential retrofit and a network of one stop shops were established to offer a start-to-finish project management service, including access to financing, for home energy upgrades.
    - Also in February 2022, enhanced grant levels were announced across SEAI schemes including increasing the grants for heat pumps from €3,500 to €6,500. Additional changes were made to the terms and conditions of the grant schemes to encourage and allow more people to install heat pumps with Government support. Over 6,000 heat pumps were installed over 2022 and 2023.
    - In November 2022, a new tax deduction was announced for small-scale landlords who undertake retrofitting works of up to €10,000 per property.
    - From 2022 to the end of 2023, six retrofitting centres of excellence in retrofit skills training had been established.
- **Local Authority Efficiency Retrofitting Programme**: Under the Local Authority Efficiency Retrofitting Programme, during 2022 and 2023, 4,113 heat pumps were installed.

RES-T

- **RTFO rate increases 2022-2023**: Ireland increased the renewable transport fuel obligation rate, from an obligation rate of 12.395% of renewable transport fuel (by volume) in road transport fossil fuel in 2021, to a rate of 14.94% (by volume) in 2022. This was increased again in 2023 to a rate of 16.99% (by energy).
- **Launch of Zero Emission Vehicles Ireland**: In July 2022, Zero Emission Vehicles Ireland (ZEVI) was established as a dedicated Office within the Department of Transport, charged with supporting consumers, the public sector and businesses to continue to make the switch to zero emission vehicles.
- **Apartment Charger Grant**: The grant was introduced in July 2022 to assist residents and owners of apartments and multi-unit developments who want to install a home charger for their EV.
- **EV Commercial Fleet Trial**: The trial was launched in November 2022 to give up to 200 businesses an opportunity to trial a battery electric commercial vehicle. 14 vehicles were delivered in 2022. 96 companies completed the trial in 2023.
- **National EV Infrastructure Strategy 2022-2025**: The Electric Vehicles Charging Infrastructure Strategy 2022 – 2025 and associated implementation plan was published in January 2023. The strategy presents an ambitious pathway and practical steps for delivery of a national EV charging network, along with a funding allocation of €100 million for public charging infrastructure over the lifetime of the strategy.
- **Continued roll out in 2022 and 2023 of the following schemes and grants**:
    - The EV Purchase Grant Scheme for battery electric vehicles, with grants available up to €5,000 in 2023 and 15,846 vehicles grant aided through the scheme in 2023;
    - Alternative Fuelled Heavy Duty Vehicle Grant, to help bridge the gap between a low emission HGV vehicles and a fossil fuel HGV vehicle, with 25 vehicles supported through the scheme in 2023;
    - The eSPSV Grant Scheme for taxi drivers to help them make the switch to electric, with 653 vehicles grant aided in 2023;
    - The Low Emissions Vehicles Toll Incentive (LEVTI) Scheme, which provided tolling reductions of 50% for battery electric vehicles and 25% for plug in hybrid vehicles. €3.5 million in refunds were issued in 2023.

- The Home Charger Grant Scheme, which provided up to €600 towards a home charger, with 20,427 home charger grants provided in 2023.

- **Continued roll out in 2022 and 2023 of taxation incentives**:
  - Vehicle Registration Taxation relief was continued to provide relief up to €5,000 for the purchase of a battery electric vehicles;
  - Electric vehicles also continued to benefit from benefit in kind relief and a low rate of annual motor tax.

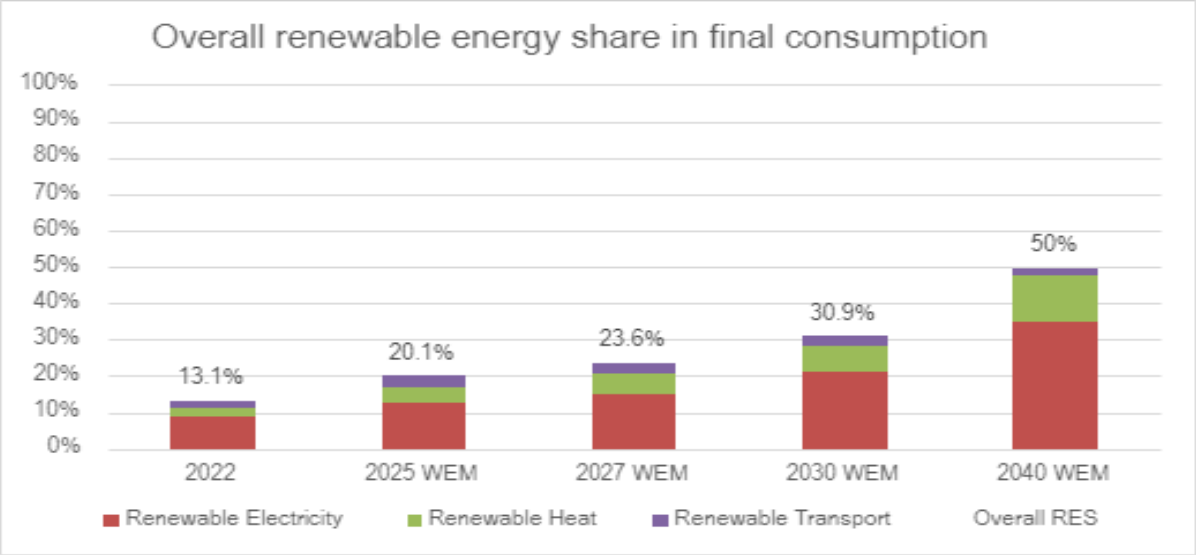


Figure 11: Overall renewable energy share in gross final consumption (WEM)

Table 45: Trajectories for renewable heating and cooling, electricity, and transport (WEM)

Renewable Trajectories	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2040	2050
RES-H&C (%)	6.3%	4.9%	6.3%	10.1%	12.2	13.1%	14.3%	15.9%	17.6	19.5%	21.7%	43.4%	47.4%
RES-E (%)	39.0%	36.4%	36.8%	39.5%	44.1	46.4%	50.5%	53.7%	56.3	60.3%	68.9%	87.0%	96.7%
RES-T (%)	10.1%	4.4%	5.5%	7.5%	8.5%	9.3%	10.1%	10.9%	12.1	13.8%	16.3%	45.3%	60.1%
Overall, RES Share (%)	13.5%	12.5%	13.1%	15.2%	18.5	20.1%	21.9%	23.6%	25.2	27.3%	30.9%	49.6%	58.9%

Article 4(a)(2) Target for RES Increase	0.0%	-	18.0%	-	-	43.0%	-	65.0%	-	-	100.0	-	
RES Min Trajectory (%)	16.0%	-	20.9%	-	-	27.6%	-	33.6%	-	-	43.0%	-	
RES Proj Trajectory	13.5%	12.5%	13.1%	15.2%	18.5	20.1%	21.9%	23.6%	25.2	27.3%	30.9%	-	
Shortfall (%)	2.5%	-	7.8%	-	-	7.6%	-	10.0%	-	-	12.1%	-	

4.3 Dimension Energy Efficiency

4.3.1 Current primary and final energy consumption in the economy and per sector (including industry, residential, service and transport)

Primary Energy Requirement

Figure 12 below details the total primary energy requirement by sector from 2002 through to 2022, while Table 46 highlights the growth rates, quantities and shares of total primary energy requirement by sector across the same timeframe. Figure 12 outlines the renewable and non-renewable gross final energy consumption by mode.

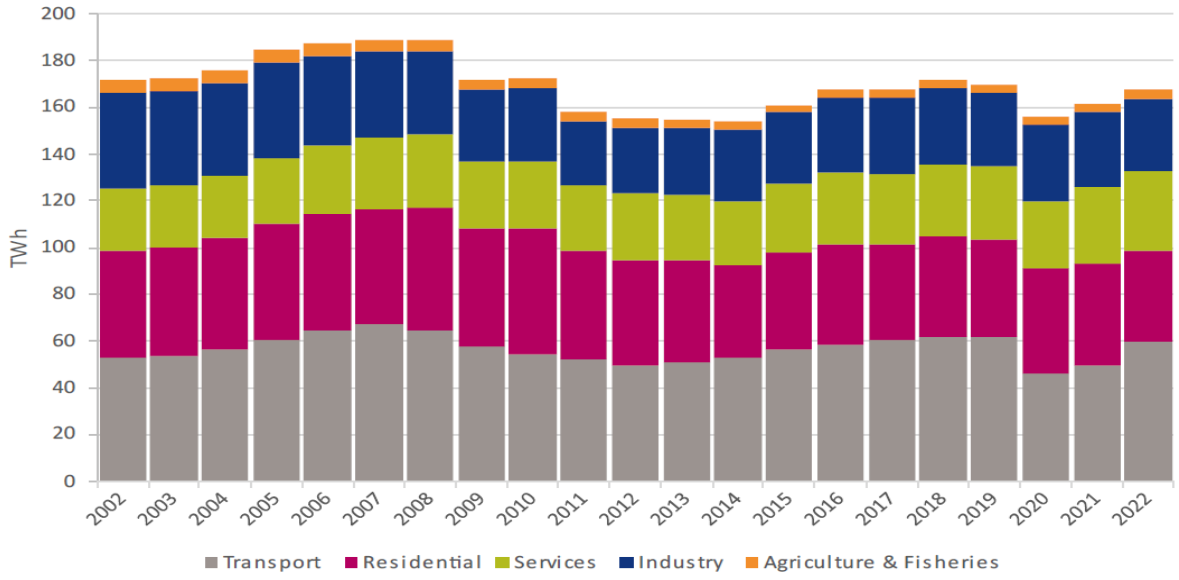


Figure 12: Total primary energy requirement by sector, (SEAI Energy in Ireland Report 2023 (Figure 10.1))

Table 46: Growth Rates, Quantities and Shares of TPER by sector

	Overall Growth %	Average Annual Growth %			Quantity (GWh)		Shares %	
	2005-2022	1 year 2021 to 2022	5 year 2017 to 2022	'10 year 2012 to 2022	2005	2022	2005	2022
Industry	-23%	-4.0%	-1.0%	0.9%	40376	31064	21.9%	18.5%
Transport	-1%	20.1%	-0.2%	2.1%	60256	59637	32.7%	35.6%
Residential	-23%	-11.7%	-1.4%	-1.5%	49929	38589	27.1%	23.0%
Services	20%	5.5%	2.8%	2.0%	28406	34216	15.4%	20.4%
Agriculture & Fisheries	-23%	22.2%	5.1%	0.9%	5446	4211	3.0%	2.5%

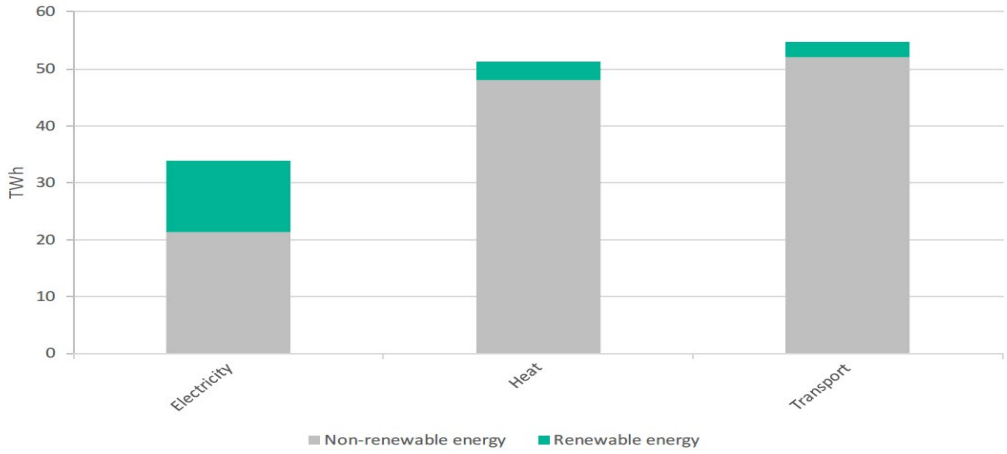


Figure 13: Renewable and non-renewable gross final energy consumption by mode, (SEAI Energy in Ireland Report 2023 (Figure 8.12))

Final Energy Demand

Figure 14 presents the annual total final consumption by sector from 2002 to 2022. The growth in final energy consumption by sector is outlined in further detail in Table 47 below.

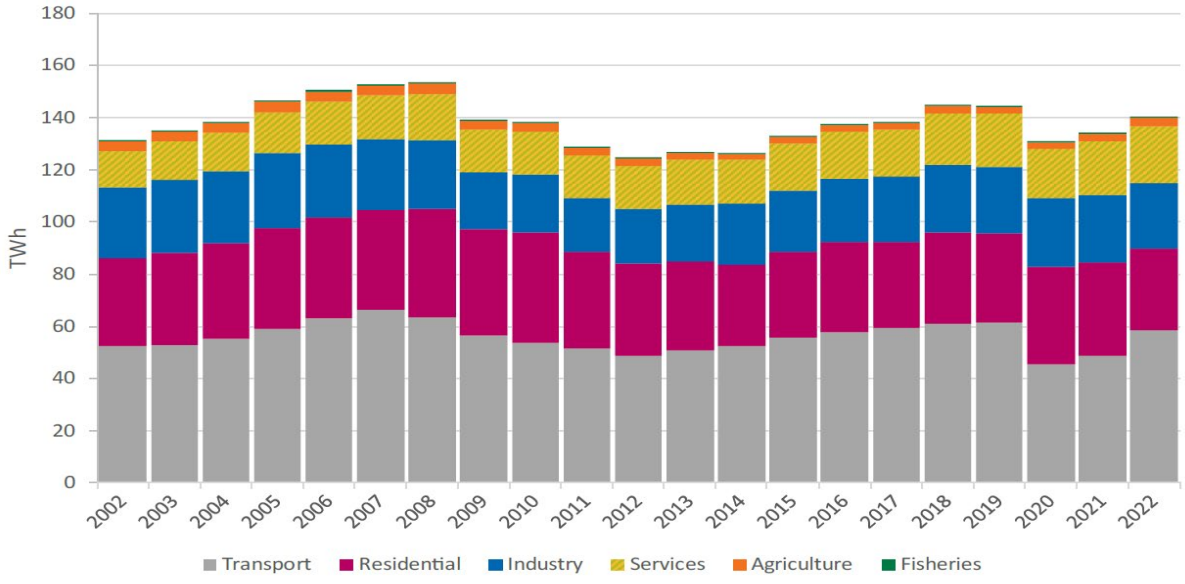


Figure 14: Annual Total Final Consumption by sector (SEAI Energy in Ireland Report 2023 (Figure 5.4))

EirGrid's All Island Generation Capacity Statement outlines that the demand forecast in Ireland is heavily influenced by the expected growth of large energy users, primarily data centres which can require the same amount of energy as a large town. EirGrid's analysis

shows that demand from data centres could account for 31% of all demand by 2027 (in a median demand scenario). In July 2022, the Department of Business, Enterprise, and Innovation published a statement on The Role of Data Centres in Ireland's Enterprise Strategy. This statement acknowledges that, as large consumers of electricity, data centres pose particular challenges to the future planning and operation of a sustainable power system. The increased renewable electricity requirement linked to energy intensive investments will be mainly delivered by the development of the new Renewable Energy Support Scheme (RESS) which will also reflect falling costs across a range of renewable technologies and an ambition to increase community and citizen participation in RE projects.

Table 47: Growth in final energy consumption by sector

	Overall Growth %	Average Annual Growth %			Quantity (GWh)		Shares %	
	2005-2022	1 year 2021 to 2022	5 year 2017 to 2022	'10 year 2012 to 2022	2005	2022	2005	2022
Industry	-13.4%	-4.1%	-0.3%	1.9%	28835	24978	19.7%	17.8%
Transport	-1.1%	19.9%	-0.3%	2.0%	59132	58466	40.3%	41.7%
Residential	-18.4%	-12.2%	-0.9%	-1.1%	38332	31289	26.1%	22.3%
Services	37.0%	5.8%	4.1%	3.0%	15860	21735	10.8%	15.5%
Agriculture & Fisheries	-16.4%	27.0%	7.1%	1.7%	4453	3722	3.0%	2.7%
Total	-4.4%	4.7%	0.3%	1.2%	146612	140189	-	-

4.3.2 Current potential for the application of high-efficiency cogeneration and efficient district heating and cooling

The 2022 National Heat Study highlights the potential for up to 54% of heat in buildings to be supplied by district heating. The CAP includes an ambition to deliver up to 2.7 TWh of district heating by 2030 based on systems that use renewable energy and/or waste heat as their primary source and commits to providing a national level assessment of the size and location of potential candidate areas for district heating. The full potential potential for the application of high-efficiency cogeneration and efficient district heating and cooling will be evident on foot of the completion of the national level assessment.

4.3.3 Projections considering existing energy efficiency policies, measures and programmes as described in point 1.2.(ii) for primary and final energy consumption for each sector at least until 2040 (including for the year 2030)

- The results for energy savings from energy-efficiency policies and measures in the With Existing Measures (WEM) scenario are included in Table 40. Primary energy savings include the primary energy equivalent (PEE) of electricity savings in the end-use sectors. Autonomous savings are not accounted for in these tables;
- In the WEM scenario, most national energy-efficiency programmes are assumed to continue delivering level of savings commensurate with the programme supports in place as at the end of 2022. With few exceptions, such as domestic and non-domestic building regulations and EV deployment, which are included over entire forecast horizon, no further savings are included after 2030 in the WEM scenario;
- The energy-efficiency savings by policy and measure are (currently) modelled based on Government expenditure on energy-efficiency support programmes and the anticipated effect of regulations and tax incentives driving energy efficient investments. As energy demand varies with prices, different scenario input price assumptions would lead to different energy-efficiency savings estimates. For example, the energy price input assumption directly influences the savings quantified for policy measures such as carbon tax, smart meters and retrofit programmes incentivising switching from fossil fuel boilers to heat pumps.

The total primary and final energy consumption forecasts under the WEM and the WAM scenarios are outlined in Table 48 and Table 49 below.

Table 48: Energy consumption by sector (WEM)

Total Primary Energy Consumption (ktoe)	2021	2022	2023	2030	2040	2050
Household	3,734	3,280	3,094	3,034	2,484	2,543
Services (excl ICT)	2,135	2,091	1,824	1,847	1,763	1,774
ICT	657	865	933	1,235	1,320	1,452
Industry	2,766	2,655	2,514	2,669	2,726	2,786
Transport	4,166	5,004	5,260	5,672	5,154	4,809
Other	293	370	352	352	388	414

Total	13,751	14,265	13,978	14,808	13,835	13,778
Total Final Energy Consumption (ktoe)	**2021**	**2022**	**2023**	**2030**	**2040**	**2050**
Household	3,055	2,660	2,672	2,647	2,099	2,138
Services (excl ICT)	1,373	1,392	1,399	1,435	1,417	1,444
ICT	369	453	555	896	1,070	1,199
Industry	2,238	2,143	2,156	2,339	2,463	2,515
Transport	4,154	4,989	5,244	5,599	4,989	4,571
Other	250	332	330	339	378	404
Total	11,440	11,969	12,356	13,255	12,415	12,271

Table 49: Energy consumption by sector (WAM)

Total Primary Energy Consumption (ktoe)	**2021**	**2022**	**2023**	**2030**	**2040**	**2050**
Household	3,734	3,280	3,096	2,889	2,195	2,228
Services (excl ICT)	2,136	2,092	1,826	1,817	1,617	1,508
ICT	656	865	932	1,186	1,267	1,395
Industry	2,766	2,655	2,515	2,645	2,668	2,673
Transport	4,166	5,004	5,258	5,046	4,583	4,607
Other	293	370	352	351	387	415
Total	13,751	14,265	13,979	13,933	12,718	12,825
Total Final Energy Consumption (ktoe)	**2021**	**2022**	**2023**	**2030**	**2040**	**2050**
Household	3,055	2,660	2,674	2,511	1,872	1,923
Services (excl ICT)	1,373	1,392	1,400	1,410	1,301	1,209
ICT	369	453	555	896	1,070	1,199
Industry	2,238	2,143	2,156	2,339	2,417	2,375
Transport	4,154	4,989	5,240	4,968	4,440	4,439
Other	250	332	330	339	375	397
Total	11,440	11,969	12,355	12,463	11,475	11,541

4.3.4 Cost-optimal levels of minimum energy performance requirements resulting from national calculations, in accordance with Article 5 of Directive 2010/31/EU

A 2019 report was completed by the Department of Housing, Planning and Local Government on the Development of Cost Optimal Calculations and Gap Analysis for Non-residential Buildings in Ireland under Directive 2010/31/EU on the Energy Performance of Buildings (recast).

4.4 Dimension Energy Security

4.4.1. Current energy mix, domestic energy resources, import dependency, including relevant risks

Current Energy Mix

Ireland's current energy mix is illustrated below in Figure 15 and detailed further in Table 50 in terms of primary energy requirement by fuel. Primary energy requirement in Ireland in 2022 increased by 3.9% on the previous year. Over the period 2002–2022 Ireland's annual TPER fell in absolute terms by 9%.

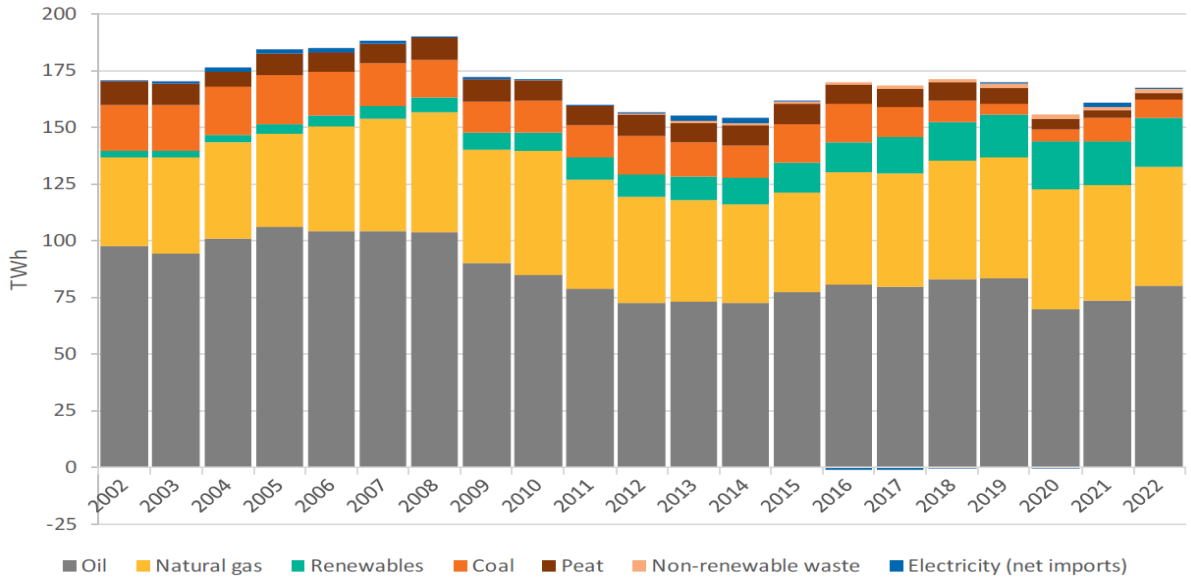


Figure 15: Current Energy Mix

The following are the main trends in the national fuel share:

- Overall primary energy use grew by 3.9% in 2022;
- Fossil fuels accounted for 86.9% of all the energy used in Ireland in 2022. Demand for fossil fuels increased by 5.18 TWh, to 145.16 TWh but was 8.98 TWh lower than in 2018;
- Coal use in 2022 was 80% of that used in 2021, and its share of TPER fell to 5.1%.
- Peat use in 2022 was 85% of that used in 2021, falling to 2.59 TWh, and its share of overall energy use was 1.6%;

- Oil continues to be the dominant energy source and increased its share of TPER from a 46% share of TPER in 2021 up to 48.1% in 2022. Total TWh generated from oil consumption in 2022 was 13% higher (80.39 TWh) than 2021 levels (73.67 TWh). This is lower than 2018 levels when oil accounted for 48.6% of TPER (83.21 TWh);
- Natural gas use increased in 2022 by 2% to 52.00 TWh, with its share of TPER being 31.1%. Natural gas use was 10% higher than in 2012;
- Total renewable energy increased by 13.0% during 2022, to 21.67 TWh. The overall share of renewables in primary energy stood at 13.0% in 2022;
- Energy from non-renewable wastes increased by 3.8% in 2022, to 1.73 TWh, and accounted for 1% of primary energy;
- Ireland was a net importer of electricity in 2018, importing 0.25 TWh.

Table 50: Primary energy by fuel type compared with previous years

	2022		1-year change (2021–2022)		5-year change (2017–2022)		10-year change (2012–2022)		20-year change (2002–2022)	
	Quantity (GWh)	Share (%)	(GWh)	(%)	(GWh)	(%)	(GWh)	(%)	(GWh)	(%)
Oil	80387	48.1%	6719	9%	599	1%	7894	11%	-25846	-24%
Gas	52000	31.1%	1017	2%	1811	4%	5004	11%	11257	28%
Renewables	21550	12.9%	2494	13%	5981	38%	11986	125%	17242	400%
Coal	8454	5.1%	-2137	-20%	-4879	-37%	-8819	-51%	-13428	-61%
Peat	2595	1.6%	-487	-16%	-5488	-68%	-6591	-72%	-6609	-72%
Wastes non-renewable	1726	1.0%	63	4%	409	31%	1194	225%	1726	NA
Net electricity imports	252	0.2%	-1336	-84%	931	-137%	-162	-39%	-1793	-88%
Total	166962	100.0%	6332	4%	-637	0%	10506	7%	-17452	-9%

Domestic Energy Resources

Indigenous production from the Kinsale gas field, decreased by -88% over the period between 1995 and 2015 from 2,254 ktoe (29,077 GWh) to 262 ktoe (3,382 GWh). Production increased dramatically with the commissioning of the Corrib entry point, resulting in total indigenous production of 2,570 ktoe (33,152 GWh) in 2016, increasing further in 2017 to 2,910 ktoe (37,545 GWh). This is the highest natural gas production level ever recorded in Ireland, with Corrib reaching its production peak, while the Kinsale gas fields approached the end of its production life, with production from these fields ceasing in 2020 and ultimately being fully decommissioned in 2022. The level of supply from Corrib has steadily declined in

the intervening years, falling to 917 ktoe (11,834 GWh) in 2023, and is expected to decline further out to 2030. Renewable gas production, i.e. biomethane, is a growing indigenous supply source, with an initial supply of 0.15 ktoe (2 GWh) in 2021 growing to 4.3 ktoe (56 GWh) in 2023.

Figure 15 below outlines the indigenous primary energy production by energy type in Ireland from 2002 – 2022. Indigenous RE production increased by 258% between 2005 and 2018 to 1,326 ktoe. Indigenous production of all energy in Ireland reached the highest level ever with a new peak in 2018 of 5,040 ktoe, up from the previous peak in 2017 at 4,884 ktoe, however this has fallen since with the reduction in Corrib gas production. Overall indigenous primary energy reduction from natural gas in 2022, which accounted for 37% of total of the primary energy produced in Ireland that year at 13.55 TWh, is 58% less than what was produced in 2018, and 7% less than in 2021. Wind at 30.6% of the overall share of total production is the next largest indigenous energy product source, while Solar PV, which only account for 0.4% of total indigenous energy production in 2022, had increased by 86% on its 2021 figure.

Peat production is markedly down since 2013 following significant production during that summer which provided favourable harvesting conditions for peat. In 2022 peat production was in line with the previous year at 1.49Wh.

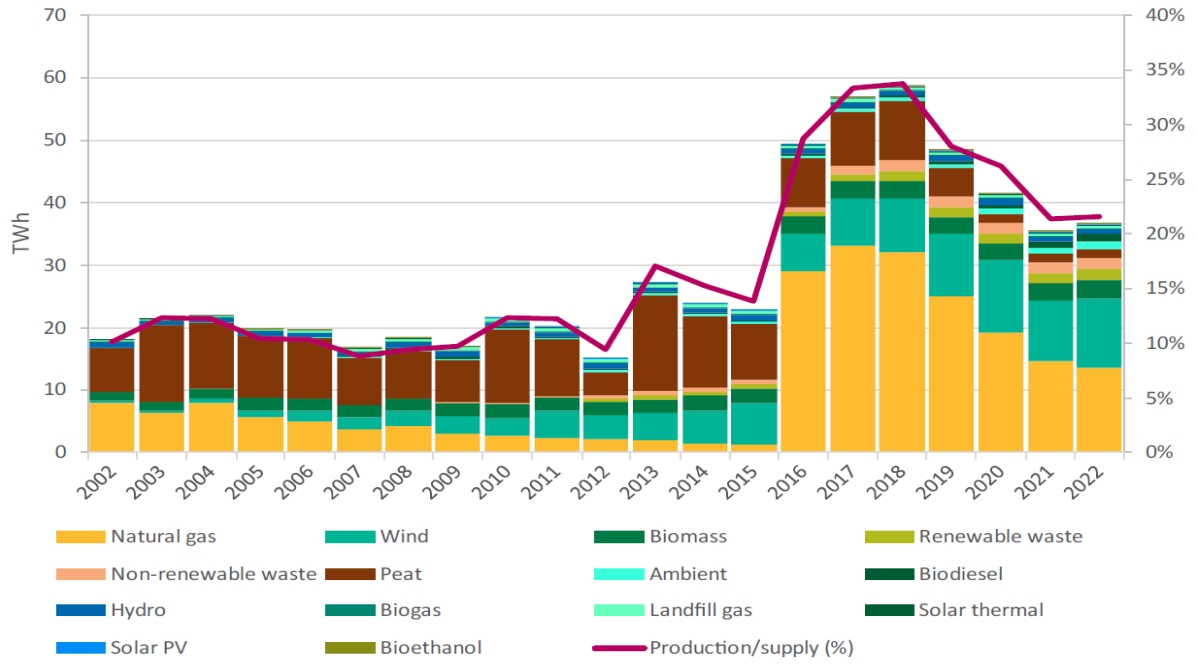


Figure 16: Indigenous Primary Energy Production by Energy Type (Source: SEAI Energy in Ireland 2023 (Figure 3.2))

Import Dependency

Ireland imports most of its energy, and at a greater rate than the EU average (See Figure 16). In 2022, Ireland imported (156.56 TWh) over four times more energy than was produced by our indigenous energy production sources (36.67 TWh). Oil and natural gas are by far our largest energy imports (66.0% and 24.6% of total imports in 2022 respectively), but we also import significant quantities of coal (7.1%), and some RE (1.3%), in the form of biomass, biodiesel and bioethanol. Given that the Irish oil market is characterised by a lack of indigenous crude oil production, with no commercially viable finds having been discovered, there is limited scope for reducing petroleum import dependency in the short to medium term, and Ireland will remain reliant on imports to meet oil demands.

Our electricity interconnectors help us to balance the all-island grid loads, through near continuous importing and exporting of electricity to and from Northern Ireland. When averaged over the full year of 2021, we imported three times as much electricity as we exported. In the first 9 months of 2022, Ireland imported 1.2% of its electricity supply through interconnectors with mainland UK and Northern Ireland. One year later, in the first 9 months of 2023, Ireland had imported 9.1% of its electricity supply. The step-change increase in 2016 was due to the connection of the Corrib field to the gas grid. This more than doubled our indigenous energy production from a baseline of about 20,000 GWh during 2000–2015 to a maximum of 50,000 GWh in 2018. Even around this peak, indigenous production only accounted for about 34% of total energy supply. Since then, we have seen three trends – a decline in indigenous production from the Corrib gas field, a decline in using peat for energy, and an increase in indigenous RE. 2021 was the first year since 2016, in which our indigenous production of energy from renewables (17,500 GWh) exceeded that of indigenous gas (14,600 GWh). As output from the Corrib gas field continues to decline, we will need to add more and more RE capacity to maintain and then grow our indigenous supply of energy. Besides the commitments to 5.5 GW of solar and 7 GW of offshore wind mentioned previously, the Government has committed resources for 2 GW of green hydrogen to be in development by 2030, along with up to 5.7 TWh of biomethane from agriculture and AD by 2030.

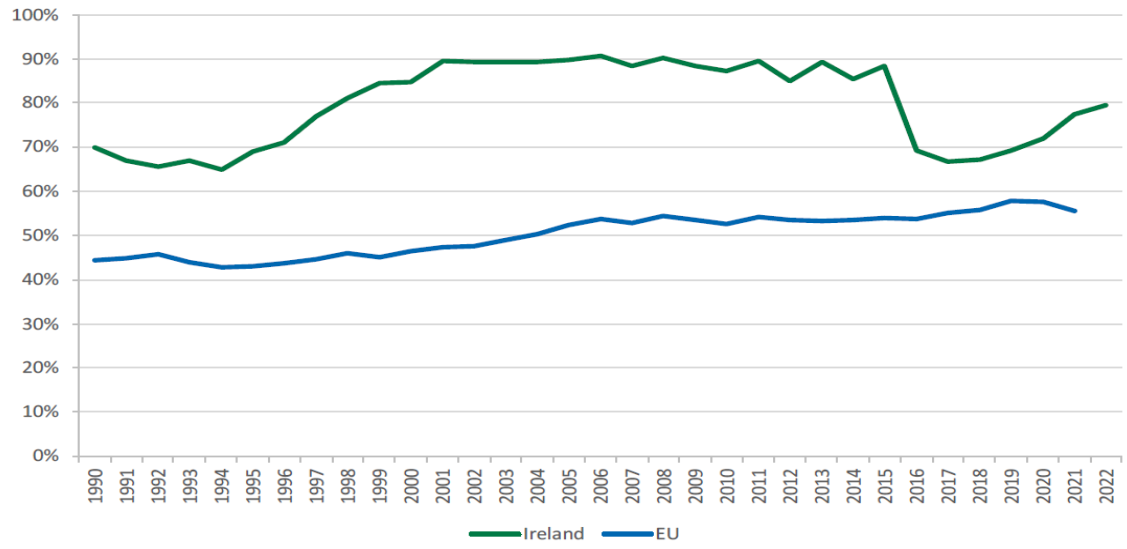


Figure 17: EU and Ireland import dependency (Source: SEAI Energy in Ireland 2023 (Figure 3.6))

Figure 18 shows the trend for net fuel imports (imports minus exports) over the period 2002 - 2022. The dependence on oil, due largely to energy use in transport, is the most striking feature. Between 2008 and 2021 net imports of oil have fallen 26.5%. In 2021 total net fuel imports increased by 12.4% due to a post-Covid lockdown bounce back in the economy and travel but were still 18% below 2001 levels while oil imports were 24% below 2001. This increase in imports carried through to 2022, where total imports (in TWh) were 3.7% higher than 2021, and oil imports increased 4.6% (TWh) on 2021 levels. In 2021 gas imports increased by 7.4% to compensate for lower indigenous output. Gas imports increased by a further 5.8% in 2022.

Coal imports increased by 387% in 2021 because of the extended outage of two large gas plants requiring extended running of Moneypoint coal fired station. In 2021, oil, gas and coal accounted for 60%, 28% and 8.6% of net imports, respectively. Contributions to the increase in import dependency in 2021 were:

- Natural gas imports were up 7.4% to 3,126 ktoe;
- Net oil imports were up 2.8% to 6,780 ktoe (2021);
- Coal imports were up 387% to 969ktoe.

Countering these was:

- An 16.9% decrease in renewable energy imports (biomass and biofuels) to 142 ktoe.

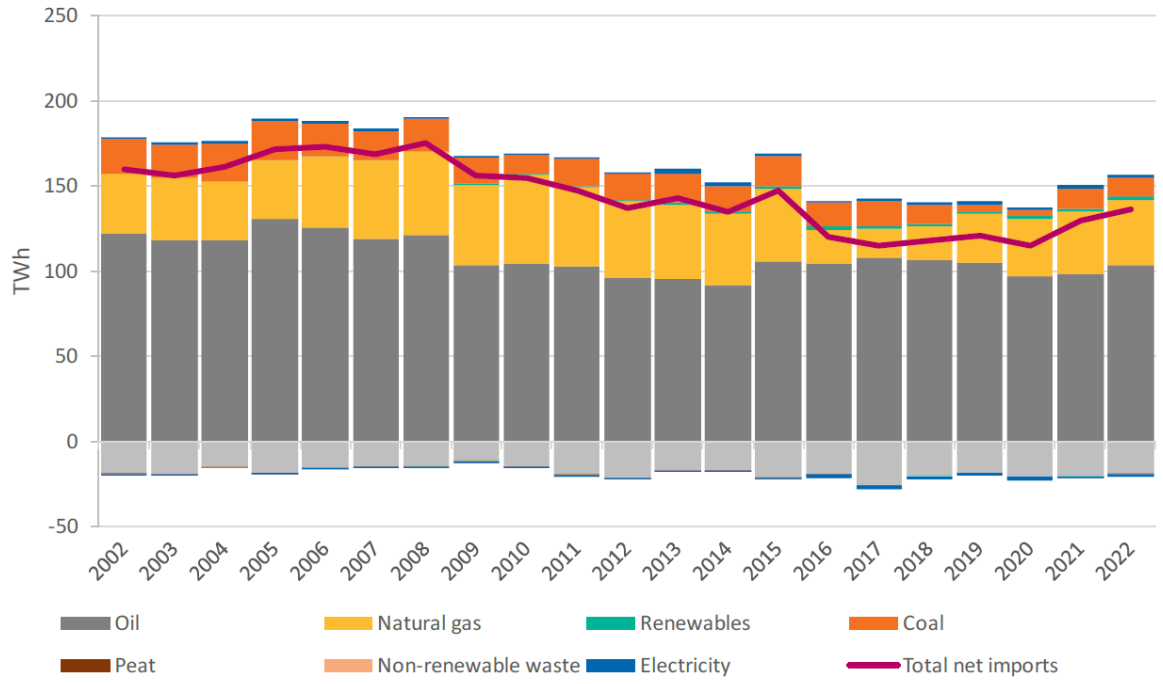


Figure 18: Imports (positive) and exports (negative) by energy type with total net imports (Source: SEAI Energy in Ireland 2023 Figure 3.3))

Relevant Risks – Petroleum Product Availability

Petroleum products will remain part of Ireland's energy mix in the medium-term. Ireland, given its import dependency and its geographical position is vulnerable to both domestic supply constraints (for example, caused by severe weather) and international oil emergencies (caused by geopolitical or other factors). These risks are mitigated by the State's stockholding of 90 days of petroleum product and by the Oil Emergency Response Plan (OERP) and associated Oil Emergency Allocation Scheme (OEAS), which may be utilised in the event of a prolonged supply constraint.

4.4.2. Projections of development with existing policies and measures at least until 2040 (including for the year 2030)

- Increase in RE in line with scenarios in the final NECP. Potential development of ocean energy technologies, depending on technology developments;
- Further electricity interconnection to France and Britain in line with scenarios in the draft NECP;
- Commercial peat harvesting to end 2028 with generation from peat to end by 2030 and expected well in advance of this;

- 100% oil import dependency unless there is a commercial oil find. Corrib gas field – expected lifetime of 15 years to 2030. Declining production from the Corrib gas field as per Table 42.

Table 51: Ireland's gas production outlook (maximum daily supply)

Max Daily Supply (GWh/d)	22/23	23/24	24/25	25/26	26/27	27/28	28/29	29/30	30/31
Corrib	38.7	32.2	31.4	27.4	23.5	20.5	18.0	15.9	14.2

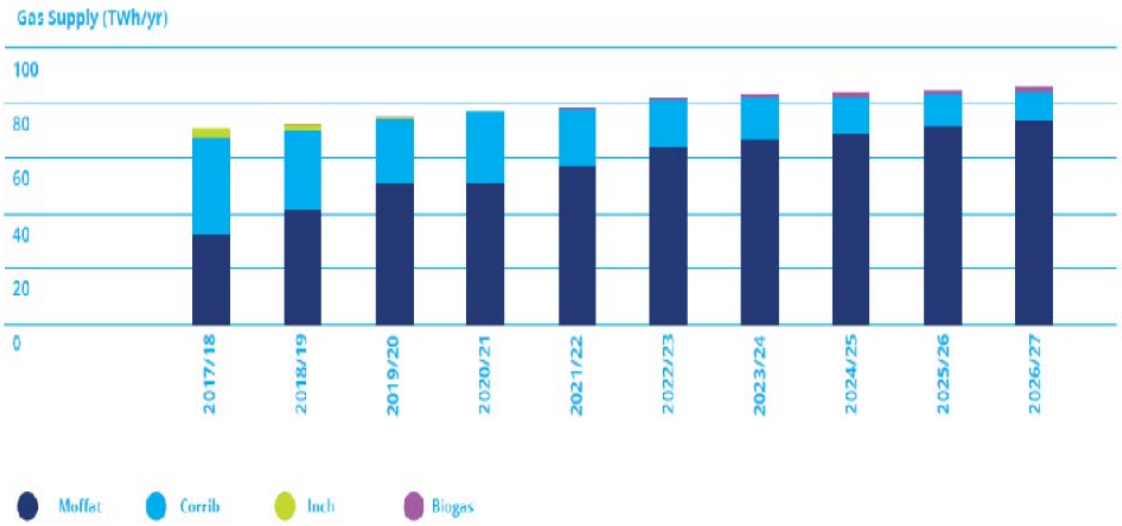


Figure 19: Ireland's gas production outlook (maximum daily supply)

The anticipated decline in domestic gas production implies Ireland's dependence on imports for gas in the medium term will increase. The Energy in Ireland to 2030 report, was published in November 2023 by the Government as part of an energy security package, which included a Technical Analysis of the Security of Energy Supply of Ireland's Electricity and Natural Gas Systems, which considered projections of natural gas demand to 2030 in the context of net zero by 2050. In addition, CRU are currently publicly consulting on GNI's proposed network development plan which will cover the period to 2031/32, with the consultation period closing on 3rd May 2024.

Table 52: Gross inland consumption, domestic energy sources and import (WEM)

	Unit	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2040	2050
Gross Inland consumption													
Solids	ktoe	1,213	989	695	609	460	316	307	296	285	270	103	52
Oil	ktoe	6,960	8,023	8,077	8,114	8,151	8,175	8,168	8,167	8,129	8,067	6,594	6,057
Natural Gas	ktoe	4,294	4,402	4,076	4,301	4,340	4,499	4,050	3,726	3,683	3,390	2,929	2,946
Nuclear	ktoe	0	0	0	0	0	0	0	0	0	0	0	0
Electricity	ktoe	137	22	240	210	260	208	433	585	547	441	0	0
Renewables	ktoe	1,646	1,855	2,055	2,710	2,942	3,175	3,408	3,648	3,928	4,430	6,851	8,068
Other	ktoe	143	148	153	154	157	160	164	167	171	175	213	230
Domestic Energy Sources													
Solids	ktoe	128	128	128	128	127	125	121	117	112	106	35	19
Oil	ktoe	0	0	0	0	0	0	0	0	0	0	0	0
Natural Gas	ktoe	1,258	1,165	1,073	981	889	797	706	614	522	430	0	0
Nuclear	ktoe	0	0	0	0	0	0	0	0	0	0	0	0
Renewables	ktoe	1,514	1,712	1,857	2,217	2,391	2,615	2,823	3,038	3,292	3,764	6,186	7,452

Table 53: Gross inland consumption, domestic energy sources and import (WAM)

	Unit	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2040	2050
Gross Inland consumption													
Solids	ktoe	1,213	989	695	608	460	313	300	287	272	255	62	7
Oil	ktoe	6,960	8,023	8,076	8,109	8,139	7,976	7,789	7,616	7,411	7,190	5,841	5,811
Natural Gas	ktoe	4,294	4,402	4,079	4,289	4,315	4,417	3,922	3,449	3,050	2,447	1,408	1,014
Nuclear	ktoe	0	0	0	0	0	0	0	0	0	0	0	0
Electricity	ktoe	137	22	240	211	243	168	383	503	273	154	0	0
Renewables	ktoe	1,646	1,855	2,052	2,708	2,963	3,304	3,627	4,034	4,789	5,658	8,736	10,371
Other	ktoe	143	148	153	154	157	174	192	211	230	250	302	338
Domestic Energy Sources													
Solids	ktoe	128	128	187	129	128	123	118	112	106	98	16	0
Oil	ktoe	0	0	0	0	0	0	0	0	0	0	0	0
Natural Gas	ktoe	1,258	1,165	1,073	981	889	797	706	614	522	430	0	0
Nuclear	ktoe	0	0	0	0	0	0	0	0	0	0	0	0
Renewables	ktoe	1,514	1,712	1,855	2,217	2,417	2,717	2,986	3,344	4,051	4,874	7,810	9,293

4.5 Dimension Internal Energy Market

4.5.1 Electricity Interconnectivity

4.5.1.1. Current interconnection level and main interconnectors

- EWIC – Ireland to GB – 500 MW.
- North South – Ireland to Northern Ireland – 400 MW (part of all island Market).

Table 54: Estimated levels of interconnection

Electricity Inter – connection	Unit	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029
SEM – France	MV	0	0	0	0	0	0	0	0	0	700 *Celtic*	700	700
SEM - GB	MV	1000 *East-West Moyle*	1000	1000	1000	1000	1000	1500 *Green link*	1500	1500	1500	1500	1500
Rep of Ireland - Northern Ireland	MV	450 *North-South(275kv)*	450	450	450	450	450	450	450	450	1500 *(Additional 400kv)*	1500	1500

Since 2018, the I-SEM is the wholesale electricity market for Ireland and Northern Ireland. It brings together these two markets into an all-island arrangement and as such the North South Interconnector is not technically an Interconnector as it does not connect two markets but lies within the same market i.e., the SEM

4.5.2 Energy Transmission Infrastructure

4.5.2.1 Key characteristics of the existing transmission infrastructure for electricity and Gas Transmission System

GNI operates both the transmission (2,427 km) and distribution networks (12,188 km) in the Republic of Ireland. The transmission network transports gas from the entry points at Moffat, Inch and Bellanaboy to the distribution networks and connected loads (e.g. gas-fired power generators). The Moffat entry point connects GNI's network to the National Grid gas network in the UK and allows for gas imports to Ireland via two subsea interconnectors (IC1 and IC2). The existing interconnectors do not allow Ireland to export gas to the UK as they are unidirectional. The landfall installations for the interconnectors entering Ireland are located

close to Loughshinny for IC1 and Gormanston for IC2 in the East of Ireland. The Bellanaboy entry point connects the Corrib gas field to the onshore GNI network. The Northern Ireland gas network connects to GNI's network at Twynholm in Scotland and delivers gas to Northern Ireland via the Scotland-Northern Ireland Pipeline (SNIP). The South North Pipeline (SNP) is an onshore gas transmission pipeline from Gormanston to Northern Ireland.

The distribution network currently delivers gas to circa 700,000 customers across Ireland. There are currently no major plans for gas network expansion in Ireland. Gas Network Ireland submits a 10 Year Network Development Plan to the Irish Regulator, the Commission for the Regulation of Utilities.

The table below outlines the major gas network infrastructure in Ireland while Figure 20 showcases where on the major gas infrastructure on the island of Ireland is.

Table 55: Major gas network infrastructure in Ireland

Infrastructure	Function	Capacity
Moffat Entry Point (Scotland, UK)	Entry point to GNI system serving Ireland via the onshore system in Scotland and sub-sea interconnectors, IC1 & IC2. It also serves Norther Ireland via Twynholm installation and SNIP pipeline. Physically unidirectional.	386.9 GWh/d
South North CSEP (Ireland)	Exit point to Northern Ireland, supplied from IC2.	66.6 GWh/d
Corrib Gas Field (Ireland)	Domestic production facility that began commercial operation in December 2015.	33 GWh/d

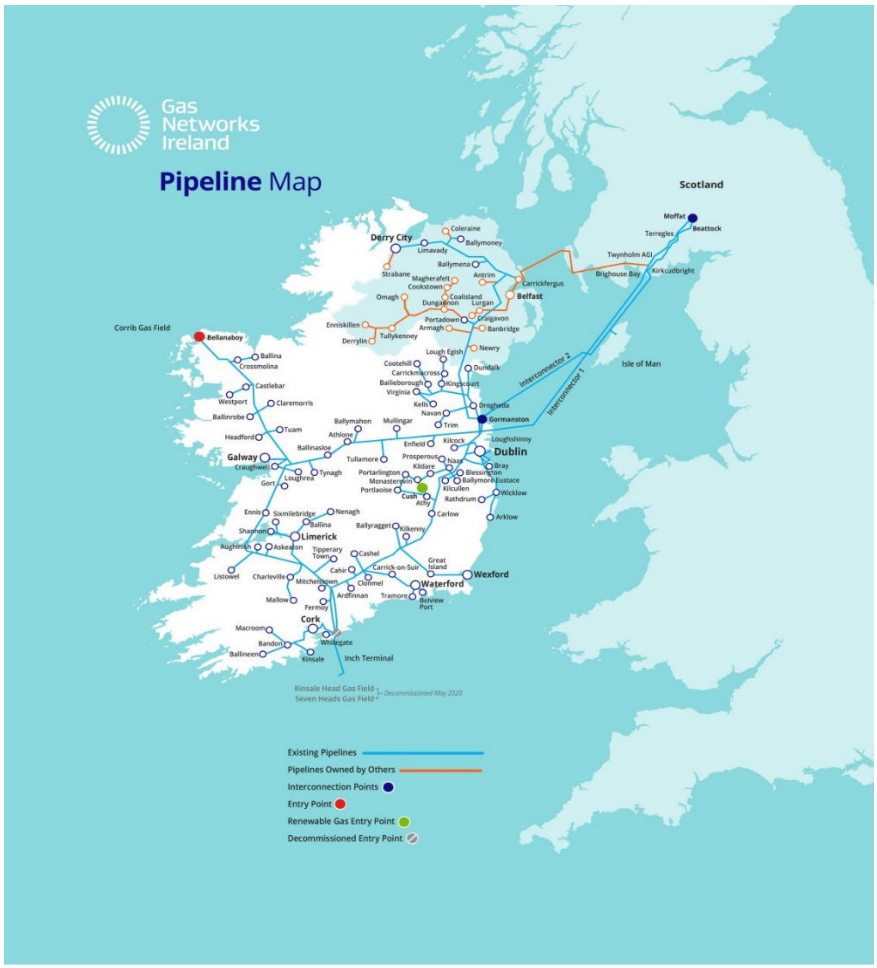


Figure 20: Map of Ireland's gas infrastructure

Electricity Transmission

The transmission system comprises approximately 6,400 km of high voltage (HV) overhead lines and underground cables and over 200 substations. Electricity generated in power plants is transformed to higher voltage levels – 110 kV, 220 kV, 275 kV and 400 kV, and fed into the transmission system. The Dublin area is an exception as the 100kV lines and cables and some of the 220/110kV transformer stations belong to the distribution system. Ireland's geographical location brings challenges in terms of interconnection with neighbouring countries. Ireland is currently exclusively connected to the UK through two electricity interconnectors: The 300 MW North-South interconnector, linking the electricity systems of Ireland and Northern Ireland, and the 500 MW East-West Interconnector connecting Ireland and Wales (UK). EirGrid owns and operates both interconnectors. Ireland is currently not meeting the indicative EU electricity interconnection target of at least 10% of installed capacity by 2020; its current level of interconnection is 0% due to the departure of the UK

from the EU. Direct connection to the EU will be restored with the construction and connection of the Celtic interconnector with France, to be grid integrated by 2027 (as assumed in WAM).

4.5.2.2 Key characteristics of the existing transmission infrastructure for electricity and Gas Transmission System

Electricity

Table 56: Proposed Interconnector Projects

Proposed Infrastructure	Capacity (MW)	Countries	Project Promoter	Expected Project Commencement Date
Second North-South interconnector	1500	Connecting Ireland and the UK (Northern Ireland)	Eirgrid	2023 (planning permission received)
Greenlink interconnector (EU PCI)	500	Connecting Ireland and the UK (Wales)	Greenlink	2024
Celtic Interconnector (EU PCI)	700	Connecting Ireland and France	Eirgrid and RtE	2027
MaresConnect	750	Connecting Ireland and the UK (Wales)	MaresConnect	By 2030

Electricity Interconnector Projects

Ireland is pursuing three new projects for interconnectors (see Table 56); a second North-South interconnector, the Greenlink interconnector and the Celtic interconnector. Only the Celtic Interconnector would, however, ensure continuous market coupling with the European Union as the United Kingdom has exited the EU. The existing North-South interconnector is running at full capacity and creates a market bottleneck. The construction of a new 400 kV AC 1,500 MW overhead line, the North-South interconnector, is currently planned to improve the security of electricity supply across the island of Ireland and improve the capacity and reliability of both grids. The increased capacity will also facilitate the connection of additional renewable capacity to the grid and help reduce curtailment. The Celtic Interconnector, between Ireland and France has begun construction and, on current progress, will be due for completion in 2027. Celtic will bring many benefits for Ireland, France, and the EU. It will allow for 700 MW of electricity, using High Voltage Alternative Current technology, to move between the countries. (This is equal to supplying power to around 450,000 homes.). This

interconnector will make the supply of electricity more secure as it would provide Ireland's only direct energy connection to an EU member state (following the UK's departure from the EU), while also lowering the price of electricity. The Greenlink Interconnector, between Wexford and Wales is expected to be commissioned by the end of 2024. Greenlink is a subsea and underground electricity interconnector cable (with two associated converter stations) linking the existing electricity grids in Ireland and GB and has a nominal capacity of 500 MW with flow in both directions. It has the potential to power 380,000 homes; it will increase energy security and will have strategic importance by doubling the interconnection capacity between Ireland and GB. It will provide greater market integration and competition to benefit consumers in Ireland, GB, and continental Europe.

The MaresConnect project, a point-to-point interconnector project from Ireland to GB is well-progressed and is currently in development phase. It has just recently progressed under the new round of the TYNDP 2024 application process. This 750 MW electricity interconnector linking the Irish and GB electricity transmission networks could enable bi-directional flow of power, responding to the varying supply and demand dynamics between the two nations.

CRU is also closely liaising with the regulator for gas and electricity markets in GB to explore the potential for a final project assessment process. EirGrid's all-island generation capacity statement 2019-2028 provides further data on potential demand increases which will have network implications. EirGrid assumes that due to the expected growth in demand from large energy users, the electricity demand in Ireland could grow by up to 52.6% in the next 10 years in a high demand forecast. To be prudent, in the generation capacity statement, there is also a scenario where this growth is much lower, at 27.8% in a low demand forecast.

4.5.3 Electricity and Gas Markets, Energy Prices

4.5.3.1 Current situation of electricity and gas markets, including energy prices

Consistent with the evolution of EU energy policy, the regulation of retail market prices for electricity in Ireland ended in 2011 and for gas in 2014. Price setting is wholly a commercial and operational matter for electricity suppliers with no regulatory approval involved. Accordingly, Government policy on energy costs is focused on the competitive market and the provision of supports for energy efficiency. In this regard, Government policy has supported competition to drive down prices, with data from approved price comparison sites also consistently highlighting that consumers can make significant savings by switching energy suppliers in the competitive market.

The most recent market monitoring report of the Commission for the Regulation of Utilities indicates that the total number of switches completed in the electricity market in 2022 was 418,595 which represents an increase of 16.83% from 2021, when 358,267 customers switched. The total number of switches completed in the gas market in 2022 was 128,304, representing an increase of 4.7% from 2021, when 122,526 customers switched. Despite this, there are several factors that have historically placed, and will likely continue to place, upward pressure on costs and consumer prices relative to many other EU member states. Prices in Ireland are influenced by several factors making Ireland more vulnerable to changes in international energy markets than other EU member states. These factors include, a lack of natural resources, as well as Ireland's peripheral geographical location, small market size, and dispersed, thinly spread population, which have served to place upward pressure on network costs. The SEAI, acting on behalf of EU statistics agency, Eurostat, is responsible for collecting and evaluating statistics on Irish electricity and gas prices, on which it publishes a regular six-monthly report, including analysis of recent trends and a comparison between Ireland with EU and Euro Area averages. The most recent SEAI report covered the period July to December 2023.

Business Electricity

The weighted average price of electricity to business consumers in Ireland has been above both Europe and Euro Area averages since the second half of 2011. In the most recent semester (July to December 2023) the weighted average price in Ireland decreased by 18% and was 20% and 16% above the EU and Euro Area average, respectively. Table 57 summarises the key changes for the electricity consumption bands for business in Ireland for the period July to December 2023 and compares with the changes across the EU and Euro Area January to June 2023, all consumption bands experienced decreases in the price of electricity to business in Ireland ranging from a decrease of 6% in band IA to 38% in band IG. Price decreased in all consumption bands in both the EU and the Euro Area with the exception of band IA, which increased by 1% and 4%, respectively. Ireland's ranking in the EU varied from sixth most expensive for band IG to second most expensive for bands IB, IC and IF.

Table 57: Electricity consumption bands for business – July to December 2023

Band	Band Share	Ireland c/kWh	Ireland Relative to:		Ranking* in:		Semester Price Change:		
			EU	Euro Area	EU	Euro Area	Ireland	EU	Euro Area
IA (<0.02)	6.1%	34.7	116%	112%	3	3	-6%	+1%	+4%

IB (0.02 - 0.5)	20.7%	29.9	129%	125%	2	2	-7%	-1%	+3%
IC (0.5 - 2.0)	9.8%	25.8	128%	124%	3	2	-10%	-5%	-3%
ID (2.0 - 20)	21.3%	21.8	116%	112%	5	4	-12%	-7%	-6%
IE (20 - 70)	7.7%	20.8	129%	127%	5	4	-11%	-17%	-19%
IF (70 - 150)	4.0%	20.3	133%	133%	3	2	-8%	-24%	-26%
IG (>150)	30.4%	17.8	133%	136%	6	4	-38%	-32%	-36%
Weighted Avg.	-	**23.3**	**120%**	**116%**	-	-	**-18%**	**-9%**	**-9%**
*A ranking of 1 means most expensive							**Source:** Eurostat and SEAI		

Business Gas

Since S2 2016, the weighted average price of gas to business consumers in Ireland has been above the EU and Euro Area average until S1 2019 when it dipped below the Euro Area average. In the most recent semester, it decreased by 15% and was 9% above the EU and Euro Area average.

Table 58 summarises the key changes for the consumption bands in Ireland for the period July to December 2023 and compares with the changes across the Europe and EU Area. Prices fell in all consumption bands in Ireland except for band I1, which rose by 5%. Prices decreased in all bands in the EU and Euro Area, except for band I2 in the EU, which did not change, and Bands I1 and I2 in the Euro Area, which fell by 2% and 7%, respectively. Ireland's highest ranking in the EU was third most expensive in band I1 and the lowest was in band I5 at 14th most expensive.

Table 58: Gas consumption bands for business – July-December 2023

Band	Band Share	Ireland c/kWh	Ireland Relative to:		Ranking in:		Semester Price Change:		
			EU	Euro Area	EU	Euro Area	Ireland	EU	Euro Area
I1 (<0.28}	9.5%	13.0	135%	131%	3	2	+5%	-1%	+2%
I2 (0.28 - 2.8)	17.5%	9.6	112%	109%	6	5	-8%	0%	+7%
I3 (2.8 - 28)	24.9%	7.0	102%	103%	9	6	-15%	-15%	-8%
I4 (28 - 280)	39.1%	5.6	94%	95%	11	6	-11%	-28%	-24%
I5 (280 - 1,1000	9.0%	4.0	79%	82%	14	8	-56%	-47%	-48%
Weighted Avg.	-	**7.2**	109%	109%	-	-	**-15%**	**-27%**	**-24%**
*A ranking of 1 means most expensive							**Source:** Eurostat and SEAI		

Household Electricity

The weighted price of electricity to household consumers in Ireland was above the EU over the period January 2020 to June 2023, except in January to June of 2022 and the same period in 2023 when it was slightly lower, approximately 3% lower than the Euro Area and EU27 average.

Table 59 summarises the key changes for the electricity consumption bands for households in Ireland for the period July to December 2023 and compares with the changes across the EU and EU Area. The price rose in all bands in Ireland, ranging from 12% in band DB to 27% in band DA. Price increased in all bands in Europe and the Euro Area. Ireland was 7th most expensive in the EU in band DD and 22nd most expensive in band DA.

Table 59: Electricity consumption bands for households - July to December 2023

Band	Band Share	Ireland C/kWh	Ireland Relative to:		Ranking in:		12-month Price Change:		
			EU	Euro Area	EU	Euro Area	Ireland	EU	Euro Area
DA (<1.0)	4.7%	38.6	75%	72%	22	18	+27%	+6%	+9%
DB (1.0 - 2.5)	11.8%	36.5	99%	96%	9	7	+12%	+1%	+6%
DC (2.5 - 5.0)	37.1%	37.9	112%	110%	9	6	+18%	0%	+4%
DD (5.0-15)	39.1%	37.6	116%	115%	7	4	+19%	+2%	+5%
DE (>15)	7.3%	35.5	116%	116%	9	7	+23%	-1%	+1%
Weighted Avg.	-	**37.5**		-	-	-	**+18%**	**+3%**	**+7%**

*A ranking of 1 means most expensive

Source: Eurostat and SEAI

Household Gas

The weighted price of gas to household consumers in Ireland was below the Euro Area average over the whole period and below the EU average between S1 2010 and S1 2013. It increased in Ireland by 6.6% in the most recent semester, compared to a 6% increase in the Euro Area and a 1.6% decrease in the EU.

Table 60 summarises the key changes for the consumption bands in Ireland for the period July to December 2023 and compares with the changes across the EU and EU Area.

Table 60: Gas consumption bands for households – July to December 2023

Band	Band Share	Ireland c/kWh	Ireland Relative to:		Ranking in:		12-month Price Change:		
			EU	Euro Area	EU	Euro Area	Ireland	EU	Euro Area
D1 (<5.6)	9.9%	18.5	106%	101.0%	10	10	+1.6%	-2.0%	+5.7%
D2 (5.6 - 56)	88.1%	16.4	123%	119.3%	6	10	+6.1%	-1.1%	+7.0%
D3 (>56)	2.0%	11.5	97%	96.0%	15	8	-0.2%	-11.5%	-4.8%
Weighted Avg.	-	**16.5**	-	-	-	-	**+6.6%**	**-1.6%**	**+6.0%**
*A ranking of 1 means most expensive							**Source:** Eurostat and SEAI		

In the main gas band, D2, the price rose in Ireland at a higher rate than the EU but slightly lower than the Euro Area. Ireland ranked as 6th most expensive in the EU and 10th most expensive in the Euro Area in band D2.

Bands outlined in the following tables below refer to consumption bands defined in the Transparency of Gas and Electricity Prices Regulation. Regarding price developments in the Irish energy retail markets, the CRU publishes regular quarterly and annual market monitoring reports, which include analysis of recent and long- term price trends. The latest CRU Market Monitoring annual report is for 2022. In addition to the aforementioned SEAI and CRU publications covering prices in the Irish energy retail markets, the SEMC Market Monitoring Unit publishes a monthly report analysing, inter alia, price trends within the all-island wholesale market. The latest such report covering the period September 2023 can be located on the SEMC website.

Table 61: Key electricity and gas price data

Business Electricity Prices - 2nd Semester 2023					
Business Electricity Prices (ex VAT) Weighted Average Across All Suppliers	**c/kWh S2 2023**	**Change Since S2 2022**	**Relative to EU average S2 2023**	**Relative to EU average S2 2022**	**Band Share of Market**
Band IA Consumption < 20 MWh	34.7	-6%	116%	125%	6.1%
Band IB 20 MWh < Consumption < 500 MWh	29.9	-7%	129%	138%	20.7%
Band IC 500 MWh < Consumption < 2,000 MWh	25.8	-10%	128%	137%	9.8%
Band ID 2,000 MWh < Consumption < 20,000 MWh	21.8	-12%	116%	123%	21.3%
Band IE 20,000 MWh < Consumption < 70,000 MWh	20.8	-11%	129%	120%	7.7%
Band IF 70,000 MWh < Consumption < 150,000 MWh	20.3	-8%	133%	111%	4.0%
Band IG > 150,000 MWh	17.8	-38%	133%	146%	30.4%

Business Gas Prices – 2nd Semester 2023

Business Gas Prices (ex VAT) Weighted Average Across All Suppliers	c/kWh S2 2023	Change Since S2 2022	Relative to EU average S2 2023	Relative to EU average S2 2022	Band Share of Market
Band I1 Consumption < 1,000 GJ	13.0	+5%	135%	126%	9.5%
Band I2 1,000 GJ < Consumption < 10,000 GJ	9.6	-8%	112%	121%	17.5%
Band I3 10,000 GJ < Consumption < 100,000 GJ	7.0	-15%	102%	101%	24.9%
Band I4 100,000 GJ < Consumption < 1,000,000 GJ	5.6	-11%	94%	76%	39.1%
Band I5 1,000,000 GJ < Consumption < 4,000,000 GJ	4.0	-56%	79%	93%	9.0%

Residential Electricity Prices - 2nd Semester 2023					
Household Electricity Prices (All Taxes Included) Weighted Average Across All Suppliers	c/kWh S2 2023	Change Since S2 2022	Relative to EU average S2 2023	Relative to EU average S2 2022	Band Share of Market
Band DA Consumption < 1,000 kWh	38.6	+27%	89%	74%	4.7%
Band DB 1,000 kWh < Consumption < 2,500 kWh	36.5	+12%	117%	106%	11.8%
Band DC 2,500 kWh < Consumption < 5,000 kWh	37.9	+18%	133%	114%	37.1%
Band DD 5,000 kWh < Consumption < 15,000 kWh	37.6	+19%	139%	119%	39.1%
Band DE Consumption > 15,000 kWh	35.5	+23%	139%	112%	7.3%

Residential Gas Prices - 2nd Semester 2023					
Household Gas Prices (All Taxes Included) Weighted Average Across All Suppliers	c/kWh S2 2023	Change Since S2 2022	Relative to EU average S2 2023	Relative to EU average S2 2022	Band Share of Market
Band D1 Consumption < 20 GJ	18.5	+1.6%	126%	121%	9.9%
Band D2 20 GJ < Consumption< 200 GJ	16.4	+6.1%	146%	136%	88.1%
Band D3 Consumption > 200 GJ	11.5	-0.2%	115%	102%	2.0%

4.5.3.2 Projections of development with existing policies and measures at least until 2040 (including for the year 2030)

Design of energy wholesale and retail markets will continue to evolve in line with EU and national policy objectives to facilitate increased levels of energy system decarbonisation, consistent with security of supply and price competitiveness.

4.5.3.3 Breakdown of current price elements that make up the main three price components (energy, network, taxes/levies)

The tables below provide details on the electricity and gas price components for household and non-household consumers for 2022 based on data from the Eurostat databank. Price components are broken down into those associated with energy & supply; network costs; taxes, fees, levies & charges; value added tax (VAT); renewable taxes; capacity taxes; environmental taxes; nuclear taxes and other costs. In the second semester of 2022 household electricity prices in Ireland increased by 39%, while household gas prices increased by 66%.

Electricity Price to Business

Table 62 shows the disaggregation of electricity prices to business (non-household) weighted across all consumption bands for 2022.

- The energy and supply component in Ireland was 21.16 c/kWh or 82% of the total price. This was the fourth highest in Europe after Greece, Bulgaria, and Romania;
- Network costs accounted for 14% of the price or 3.68 c/kWh in absolute terms. This was the third highest in Europe after Czechia and Slovakia;
- RE taxes accounted for 2% of the price or 0.48 c/kWh. This was the 14th highest in Europe.

Table 62: Electricity price breakdown to business in Ireland in 2022 (c/kWh)

Energy & Supply	Network Costs	Renewable Taxes	Capacity Charges	Environment Taxes	Other
21.16	3.68	0.48	0.04	0.02	0.56

Electricity Price to Households

Table 63 shows the disaggregation of electricity prices to household weighted across all consumption bands for 2022.

- The energy and supply component in Ireland was 22 c/kWh or 76% of the total price. This was the 7th highest in Europe;
- Network costs accounted for 34% of the price or 9.8 c/kWh in absolute terms. This was the highest in Europe;

- VAT accounted for 11% of the price or 3.1 c/kWh. This was the 16th highest in Europe;
- Renewable supports taxes accounted for 3% of the electricity price to households in Ireland and ranked 14th highest in Europe.

Table 63: Electricity price breakdown to households in Ireland in 2022 (c/kWh)

Energy & Supply	Network Costs	Value-added Tax	Renewable Taxes	Capacity Charges	Other
22	9.8	3.1	1	0.2	-7.3

Gas Price to Business

Table 64 shows the disaggregation of gas prices to business (non-household) weighted across all consumption bands for 2022.

- The energy and supply component in Ireland was 5.47c/kWh or 77% of the total price. This was the lowest;
- Network costs accounted for 17% of the price or 1.22 c/kWh in absolute terms. This was the highest in Europe;
- Environment taxes accounted for 6% of the electricity price to business in Ireland and ranked 9th highest in Europe

Table 64: Gas price breakdown to business in Ireland in 2022 (c/kWh)

Energy & Supply	Network Costs	Renewable Taxes	Capacity Charges	Environment Taxes	Other
5.47	1.22	0	0	0.42	0

Gas Price to Households

Table 65 shows the disaggregation of gas prices to households weighted across all consumption bands for 2018.

- The energy and supply component in Ireland was 6.17 c/kWh or 58% of the total price. This was the 15th highest in Europe;
- Network costs accounted for 27% of the price or 2.87c/kWh in absolute terms. This was the second highest in Europe;

- Value added tax accounted for 9% of the price or 0.99 c/kWh. This was ranked 18th in Europe;
- Environment taxes accounted for 6% of the gas price to households in Ireland and ranked 7th highest in Europe.

Table 65: Gas price breakdown to households in Ireland in 2022 (c/kWh)

Energy & Supply	Network Costs	Value-Added Tax	Renewable Taxes	Capacity Charges	Environment Taxes	Other
6.17	2.87	0.99	0	0	0.65	0

4.6 Dimension Research, Innovation and Competitiveness

4.6.1 Current situation of the low-carbon-technologies sector and, to the extent possible, its position on the global market (that analysis is to be carried out at Union or global level)

The SEAI Research and Technology Department provides energy/low carbon technology sector market support and technology-related policy support to DECC. It covers areas such as wind and electricity, heat and bioenergy, offshore energy, and international research. The group develops technology roadmaps (informed by SEAI modelling), promotes the growth of relevant supply chains, represents Ireland in technology for a, develops guidance relevant to technology sub-sectors for suppliers, installers, manufacturers, and consumers, and supports critical supply chain development, often in collaboration with partner state agencies such as the IDA Ireland and Enterprise Ireland.

SEAI, in partnership with Irish enterprise state agencies the IDA Ireland and Enterprise Ireland, performed an analysis of Ireland's Energy Supply Chain Opportunity in 2014. SEAI will compile a new report in 2024 to assess sustainable energy supply chain opportunity in Ireland. This report will provide evidence to government agencies and departments, industry, and other stakeholders on how to harness the sustainable energy supply transition to both reduce greenhouse gas emissions and stimulate economic growth, exports, foreign direct investment, and jobs. It will examine how well the Irish supply chain is positioned to capture new business as a result of the anticipated investment in sustainable energy related products and services. The annual European Innovation Scoreboard (EIS) provides a comparative assessment of the research and innovation performance of EU Member States and selected third countries, and the relative strengths and weaknesses of their research and innovation systems. According to the European Innovation Scoreboard 2023, Ireland is

considered a strong innovator, above the EU average index. Ireland is ranked 9th on the EIS 2023, ahead of Cyprus and France, and is performing at 115.8% of the EU average. The top five indicators for Ireland are 'Public-private co-publications' (247.4% of EU average), 'Population with tertiary education' (217.3% of EU average), 'Employment in knowledge-intensive activities' (208.4% of EU average), 'Foreign doctorate students' (207.2% of EU average) and 'Innovative SMEs collaborating with others' (201.7% of EU average). Between 2022 and 2023, the highest increase in indicator score was in the area of Innovators (SME Product Innovators and SME Business Process Innovators). Ireland's score in the Environmental Sustainability Indicator increased by 9.3% between 2022 and 2023.

4.6.2 Current level of public and, where available, private research and innovation spending on low-carbon-technologies, current number of patents, and current number of researchers

Public Research and Innovation Spend

A key metric for the assessment of innovative activity is R&D intensity (gross R&D expenditure as a percentage of GNP) which reflects the extent of research and innovation activities undertaken in a country in terms of resources input. Ireland's intensity rate in 2021 was 2.07% of GNI* and 1.49% of GNP, compared to the EU-27 average of 2.15%. The Europe 2020 strategy (a 10-year strategy developed by the European Commission in 2010) set a 3% objective for R&D intensity. The Irish Government has adopted an R&D intensity target for Ireland of 2.5% of GNI* as part of its aims within Impact 2030.

The recently introduced Research Classification Ireland allows identification of research expenditure on areas related to energy and climate. This is set out in the table below and shows that 3.7% (€35.5M) and 1.7% (€16.6M) of Government Budget Allocations for R&D (GBARD) were for 'environmental policy, climate change and natural hazards' and 'energy', respectively.

Table 66: GBARD (Government Budget Allocations for R&D) Classifications for Ireland 2022 presented using the new Research Classification Methodology[38]

RCI Socio-Economic Code	GBARD 2022 €m	% of Total
RCS10 - ANIMAL PRODUCTION AND	77.8	8.1%

[38] The Research and Development Budget 2022-2023. Available at https://www.gov.ie/en/publication/16c4d-the-research-and-development-budget-2022-to-2023/

ANIMAL PRIMARY PRODUCTS		
RCS11 - COMMERCIAL SERVICES AND TOURISM	16	1.7%
RCS12 - CONSTRUCTION	5.4	0.6%
RCS13 - CULTURE AND SOCIETY	12.4	1.3%
RCS14 – DEFENCE	1	0.1%
RCS15 – ECONOMIC FRAMEWORK	8.3	0.9%
RCS16 – EDUCATION AND TRAINING	26.3	2.6%
RCS17 – ENERGY	16.6	1.7%
RCS18 – ENVIRONMENTAL MANAGEMENT	30.3	3.1%
RCS19- ENVIRONMENTAL POLICY, CLIMATE CHANGE AND NATURAL HAZARDS	35.5	3.7%
RCS20 – HEALTH	134.1	13.9%
RCS21 – INFORMATION AND COMMUNICATION SERVICES	117.8	12.2%
RCS22 – LAW, POLITICS AND COMMUNITY SERVICES	15.7	1.6%
RCS23 – MANUFACTURING	90.8	9.4%
RCS24 – MINERAL RESOURCES (EXCL. ENERGY RESOURCES)	4.9	0.5%
RCS25 – PLANT PRODUCTION AND PLANT PRIMARY PRODUCTS	12.2	1.3%
RCS26 – TRANSPORT	8	0.8%
RCS27 – EXPLORATION AND EXPLOITATION OF SPACE	38.4	4.0%
RCS28 - EXPANDING KNOWLEDGE	21.2	2.2%
VARIOUS	291.9	30.3%

Available data for GBARD classified under NABS (Nomenclature for the Analysis and Comparison of Scientific Programmes and Budget) shows that 9.8% (€94.4m), 2.1% (€19.8m) and 1.2% (€11.2m) of GBARD was allocated for R&D in agriculture, environment and energy, respectively. Within the EU-27, the comparable percentages are 3.1% for agriculture, 2.4% for environment, and 4.8% for energy. 31% of total GBARD for 2022 in Ireland was allocated for R&D performed in the higher education sector; it is likely that some of this R&D is related to climate and energy, although this information is not available from this dataset.

In 2022, Irish research funding organisations awarded a total of €79.8m for 183 projects in climate and climate-related research. The estimated 2023 budget for the R&D programmes of the EPA and the SEAI are €11.4m and €26.5m respectively. The trend in R&D budgets of these organisations is shown in the table below. The SEAI's allocation for R&D funding has increased stepwise since 2020.

Table 67: EPA and SEAI Research and Development Budgets 2019-2023

Research and Development Budgets of the EPA and SEAI (€'000)				
	2020 (Outturn)	**2021 (Outturn)**	**2022 (Outturn)**	**2023 (projected)**
EPA	9,596	9,528	9,684	11,418
SEAI	6,511	9,896	8,220	26,530

The table below shows the level of public investment in energy RD&D by Ireland and comparator countries in 2021, and the ratio of energy RD&D investment per thousand units of GDP. This shows that Ireland ranks 8th out of 9 comparator countries on the basis of the ratio of energy RD&D investment per thousand units of GDP.

Table 68: Ranked Countries by Energy RD&D per GDP[39]

Country	Energy RD&D Investment in 2022 (€M)	Ratio of Energy RD&D investment per thousand units GDP in 2022	Ranking (selected countries)
Austria	214.4	0.48	1
Belgium	262.9	0.48	2
Sweden	260.4	0.46	3
Czechia	103.0	0.37	4
Denmark	117.1	0.31	5
Netherlands	290.2	0.30	6
Portugal	69.6	0.29	7
Ireland	32.7	0.06	8
Hungary	6.8	0.04	9

[39] https://www.iea.org/data-and-statistics/data-tools/energy-technology-rdd-budgets-data-explorer

The figure below outlines public investment in energy research from 2018-2022 under IEA categories. Cross-cutting technologies includes investment in research centres that focus on multiple energy categories as well as investment in cross cutting themes such as energy behavioural change, clean energy finance, energy economics and energy systems modelling.

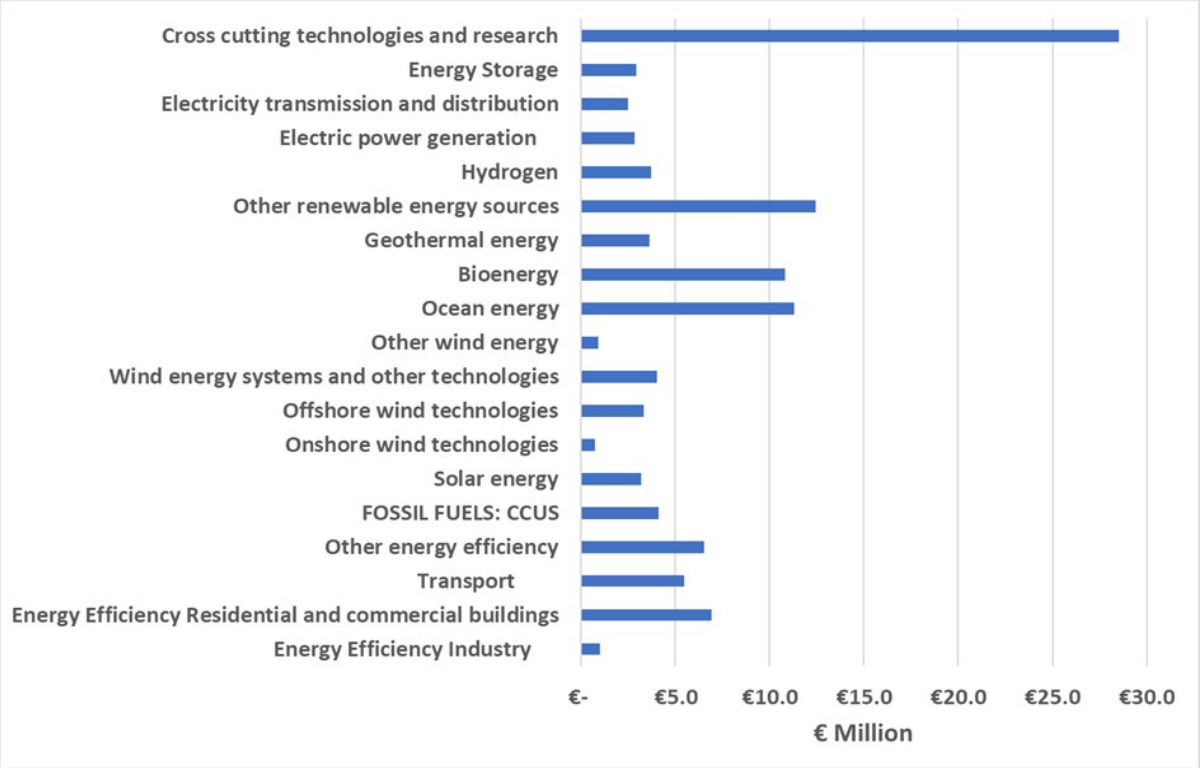


Figure 21: Public Investment in Energy Research in Ireland 2018-2022

State aid for environmental protection per GDP unit basis is an indicator of the amount of support provided to the uptake of environmental protection. For example, the support scheme for renewable heat (SSRH) funded by DECC and administered by SEAI and other similar schemes provide market support activation to assist the deployment of technologies within a particular sector. The table below shows that Ireland ranks 7th out of the 9 selected comparator countries for State Aid for environmental protection as a percentage of GDP.

Table 69: State Aid for Environmental Protection by Member State (2021)[40]

Member State	State Aid for Environmental Protection (including Energy Saving) in 2021 (millions €)	State Aid for Environmental Protection in 2021 (Percentage of GDP)
Denmark	829.10	0.25
Czechia	1915.07	0.33
Finland	1560.31	0.62
Austria	925.03	0.23
Netherlands	4057.83	0.47
Ireland	678.55	0.16
Slovakia	96.22	0.10
Belgium	1972.36	0.39
Portugal	11.91	0.01

Private Research and Innovation Spend

Ireland ranks first in Europe for the percentage of GERD performed in the business sector in 2020: 80.5% compared with 66.0% for the EU 27 average[41].

The most recent survey of Business Expenditure on Research and Development[42] shows that enterprises spent €3.88 billion on research and development in 2021.

- Research & Development (R&D) expenditure in 2021 (€3.88bn) was 19% higher when compared with 2019 (€3.26bn) (see table below);
- Current expenditure, comprising of labour costs and other current costs, accounted for 89% (€3.44bn) of all R&D expenditure in 2021;
- Capex accounted for the remaining 11% or €440.1m of total R&D expenditure.
- Irish-owned enterprises reported a 22% increase in R&D spend between 2019 and 2021, up from €963.0m to €1.18bn;

[40] https://webgate.ec.europa.eu/comp/redisstat/databrowser/explore/all/all_themes

[41] https://www.gov.ie/en/publication/16c4d-the-research-and-development-budget-2022-to-2023/

[42] https://www.cso.ie/en/releasesandpublications/ep/p-berd/businessexpenditureonresearchanddevelopment2021-2022/

- Enterprises estimated an R&D spend of €3.89bn for 2022, consisting of 90% current expenditure and 10% capex.

Table 70: Business Expenditure on Research and Development, 2017 and 2019-2022

Business Expenditure on Research and Development, 2017 and 2019-2022 (€'000)					
	2017	**2019**	**2020**	**2021**	**2022**
Current Expenditure	2,492,17	2,700,588	2,536,714	3,438,954	3,506,390
Capital Expenditure	278,041	555,707	854,451	440,053	380,762
Total Expenditure	**2,770,214**	**3,256,295**	**3,391,165**	**3,879,007**	**3,887,152**

While the available data does not include specific figures for private research and innovation spending on climate and energy, it does include details of spending across four Fields of Science and Technology (Natural Science, Engineering and Technology, Medical and Health Sciences, Agricultural Sciences) – see table below.

Table 71: Business Expenditure on Research and Development by Fields of Science and Technology, 2021 (€'000)

Field of Science	Business Expenditure on Research and Development 2021 (€'000)	% of Total
Natural Science	1,142,553	29.5%
Engineering & Technology	1,738,303	44.8%
Medical & Health Sciences	959,672	27.7%
Agricultural Sciences	38,478	1%
Total	**3,879,007**	-

Current Number of Patents

Patents are a key metric that indicates technological advancements that may transform the economy and drive the energy transition towards a carbon-neutral future. Figure 21 below compares the number of clean energy patents from Ireland with select other European countries between 2019 and 2021.

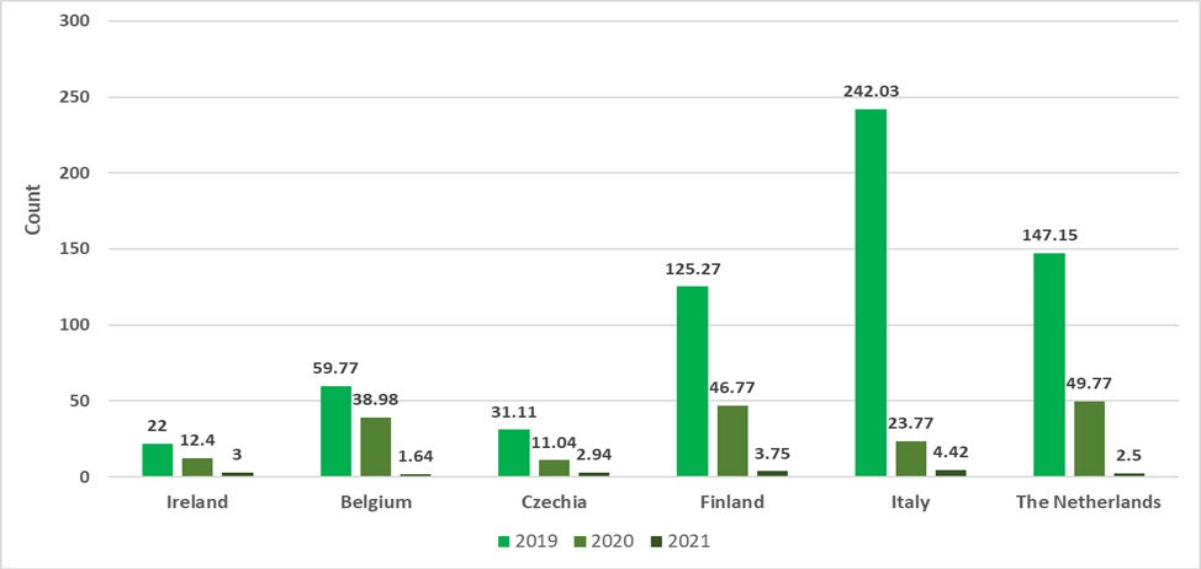


Figure 22: Clean Energy Patents by Country 2019 - 2021[43]

Based on statistics from the International Energy Agency, Ireland has had a steady decline in clean energy patents naming Irish inventors from 2019 to 2021, with 2019 showing the highest number (22) in this period. However, this reflects a general decline in clean energy patent applications across all countries.

The figure below shows a comparison of types of clean energy patents with Irish inventors with those from some comparator countries.

[43] See: https://www.iea.org/data-and-statistics/data-tools/energy-technology-patents-data-explorer (The counts presented are based on **fractional counts** by country of residence of the inventor(s); e.g., for a patent listing inventors from two different countries, each country will obtain a count of 0.5, to avoid double-counting of inventions.)

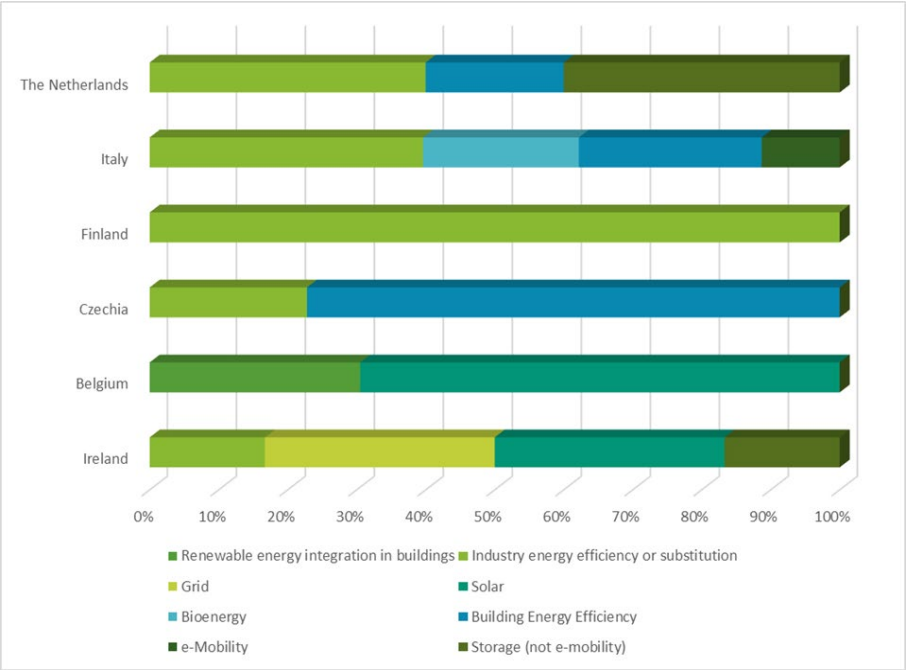


Figure 23: Types of Clean Energy Patents by Country (Percentage of Total)[44]

The largest number of patents applied for across the comparator countries are within the industry energy efficiency or substitution category. Ireland is an outlier in this regard with only 1/6 of patent applications made in this category. Ireland's patent applications were mostly in the areas of solar and grid energy patents, each consisting of one third of Ireland's patent applications. Ireland's remaining patent applications were in the storage (excluding e-Mobility) category.

The OECD has made available data on patents on environment-related technologies (which includes environmental management, climate change mitigation, climate change adaptation and ocean sustainability), that allows for comparison between countries. The table below shows the number of environment-related technology inventions per person for Ireland and several comparator countries in 2021 (the latest available data). Ireland ranks fourth in this list, with an invention-per-person rate similar to Italy.

[44] https://www.iea.org/data-and-statistics/data-tools/energy-technology-patents-data-explorer. Data is based on international patent family size 2 and greater, which counts only higher-value inventions that have sought patent protection in at least two jurisdictions.

Table 72: Environment-Related Technology Inventions per person (2021)[45]

Inventor Country	Environment-Related Technology Inventions per person (2021)
Finland	36.63
The Netherlands	22.15
Belgium	19.87
Ireland	10.97
Italy	10.58
Czechia	4.98

Figure 23 displays a count of the number of patents with Irish inventors in the area of environment-related technologies between 2000 and 2021. It shows a gradual rise in the number since 2000, with the highest number in 2019. The 2021 figure is 2.5-fold greater than the baseline year of 2000.

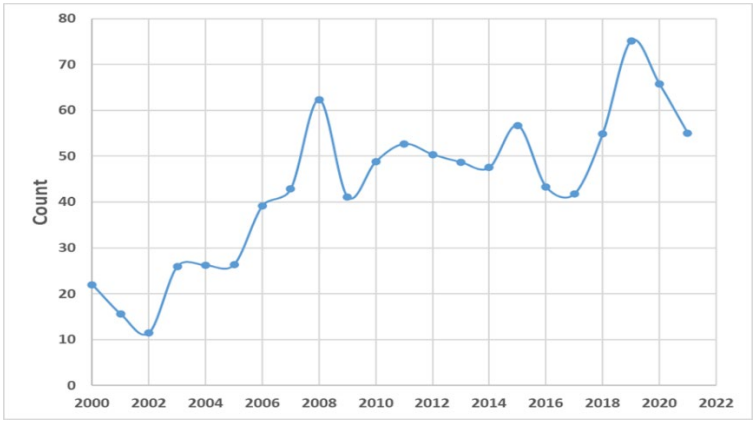


Figure 24: Number of Environment-Related Patents with Irish inventors, 2000-2021 Error! Bookmark not defined.

[45] https://data-explorer.oecd.org/?tm=patents&pg=0&snb=10

Current Number of Researchers

In 2021, there were an estimated 39,291 research personnel[46] (full-time equivalents) working across all employment sectors in Ireland. This was an increase of over 10% from 2021. The breakdown across sectors is shown in the table below.

Table 73: R&D Personnel (Full-Time Equivalent) by Sector (2018-2021)

R&D Personnel (Full-Time Equivalent) by Sector				
	2018	**2019**	**2020**	**2021**
Business Sector	18,956	19,773	20,322	22,946
Higher Education Sector	10,668	12,002	14,207	15,084
Government Sector	1,196	1,194	1,192	1,262
TOTAL R&D Personnel	**30,821**	**32,929**	**35,721**	**39,291**

Ireland ranks above the EU-27 and OECD average for total researchers per thousand labour force, at 10.7 (OECD = 9.0, EU-27 = 9.3). The available data does not include specific figures for research personnel working in the areas of climate and energy.

4.6.3 Breakdown of current price elements that make up the main three price components (energy, network, taxes/levies)

The tables below provide details on the electricity and gas price components for household and non-household consumers for 2023 based on data from the Eurostat databank. Price components are broken down into those associated with energy & supply; network costs; taxes, fees, levies & charges; value added tax; renewable taxes; capacity taxes; environmental taxes; nuclear taxes and other costs. There was a significant increase in the cost of electricity and gas in Ireland and across the EU, this was primarily due to external factors such as the energy crisis and Russia's war in Ukraine. Prices have stabilised and decreased from their peak in 2022.

Due to these recent increases in energy prices, Ireland introduced measures to alleviate the burden on final consumers. Domestic electricity customers, including pay as you go customers, received a payment of €200 between April and June 2022. Three further payments of €200 were made between November and December 2022, January and

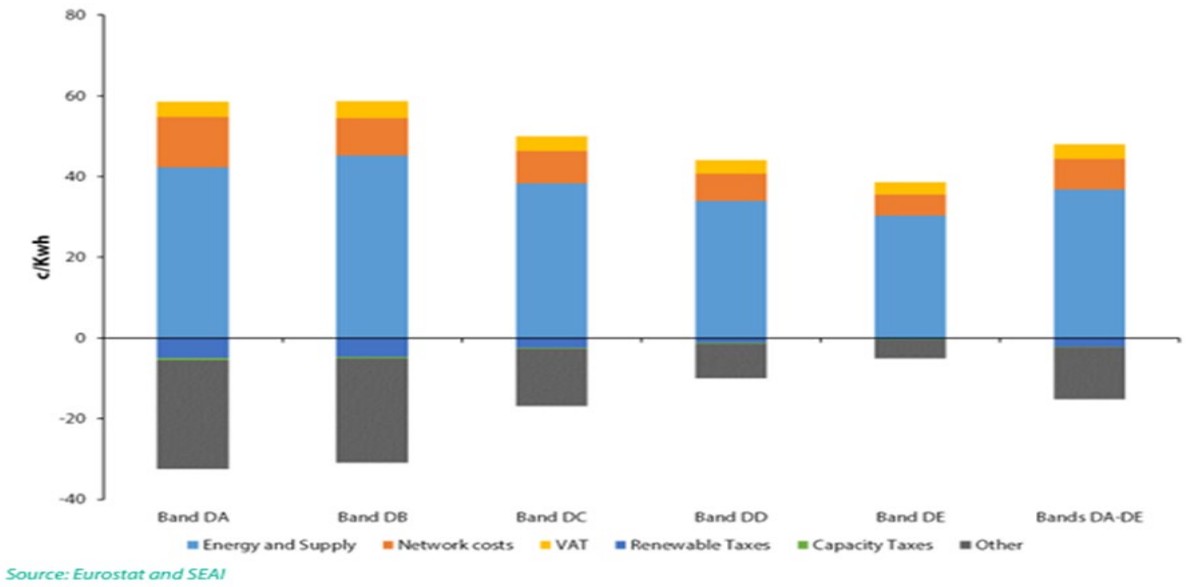
[46] Includes researchers, technicians and support staff.

February 2023 and March and April 2023. In Budget 2024 three further credits of €150 were announced, to be paid in December 2023, January 2024, and March 2024. These rebates were administered by electricity suppliers and are accounted for in the residential electricity prices for the relevant semester. Please see the table below which maps the rebates to the corresponding semester.

Period	Rebate Amount
January to June 2022	€200: Single payment of €200 between April and June 2022
July to December 2022	€200: Single payment of €200 between November and December 2022
January to June 2023	€400: Two payments of €200 were made between January and February 2023 and March and April 2023
July to December 2023	€150 : Single payment of €150 in December 2023, however some customers would not have seen this applied until their first bill of 2024

A further measure to tackle rising energy costs was introduced in the way of a cut in VAT on electricity bills from 13.5% to 9% from May 1st, 2022. This reduced rate is due to end on October 31st, 2024.

Figure 25: Energy price rebates 2022-2024



Source: Eurostat and SEAI

Figure 26: Disaggregation of Household Electricity price in Ireland (2023)

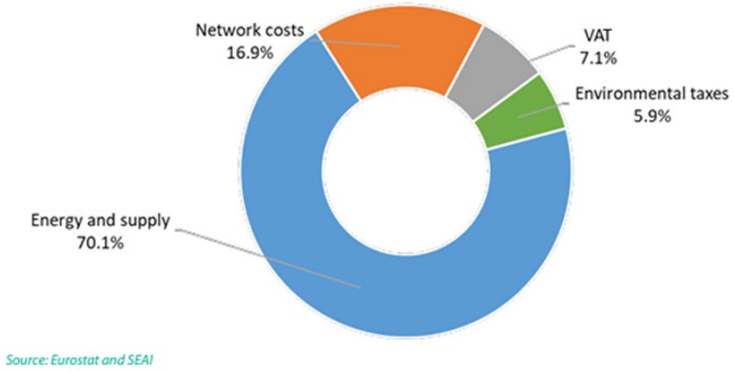


Figure 27: Disaggregation of Household Gas Price Bands D1-D3 in Ireland (2023)

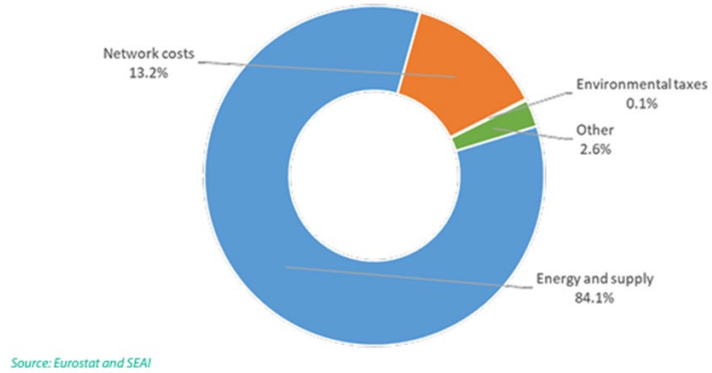


Figure 28: Disaggregation of Business Electricity Price (All Bands) in Ireland 2023

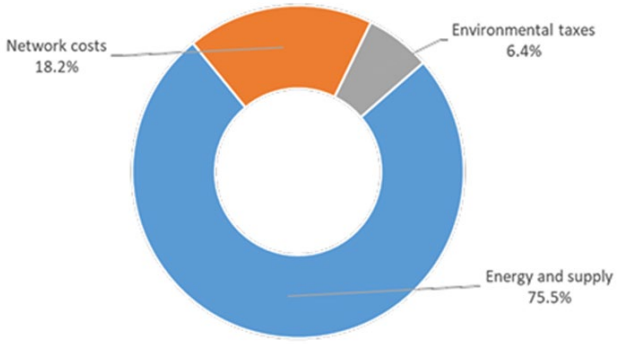


Figure 29: Disaggregation of Business Gas Price (All Bands) in Ireland

4.6.4 Description of energy subsidies, including for fossil fuels

The Public Service Obligation (PSO) levy has been in place since 2001 and is a vital policy support for the development of renewable electricity and to enable Ireland to reach our national and EU renewable energy and climate targets.

The CRU calculates the PSO levy based on the estimated generation required for the PSO Year and the estimated wholesale electricity market prices for the period. If the PSO levy calculated is positive, then a charge is placed on all final electricity customers. If the PSO levy calculated as negative, then the PSO is collected from those renewable electricity generators who are members of a two-way feed-in-tariff support scheme (namely RESS). In such cases the CRU may direct that final electricity customers be credited with a benefit, if deemed appropriate. Regulations made under the Electricity Regulation Act 1999 (as amended) provide the legal basis for the levy. The levy applies to all electricity customers and is reviewed annually.

The Scheme will provide for a renewable electricity (RES-E) ambition of up to a maximum of 55% by 2030 subject to determining the cost-effective level. RESS auctions will be designed in line with trajectory targets identified in Ireland's NECP. In addition, the first RESS auction will deliver 'shovel ready' projects, reducing the gap to 2020 targets and assisting in the early delivery for Ireland’s trajectory towards 2030 targets. Applications for the first RESS auction qualification were accepted in March 2020, with the auction bidding process to commencing in Summer 2020. Ireland’s recently launched Support Scheme for Renewable Heat (SSRH) is a Government-funded initiative designed to increase the energy generated from renewable sources in the heat sector. The scheme is open to commercial, industrial, agricultural, district heating, public sector, and other non-domestic heat users.

The primary objective of the support scheme for renewable heat is to increase the level of RE in the heat sector. This will contribute to meeting Ireland’s RE targets whilst also reducing GHG emissions. The Government-funded scheme will support the adoption of renewable heating systems by commercial, industrial, agricultural, district heating, public sector and other non-domestic heat users not covered by the ETS. The scheme aims to bridge the gap between the installation and operating costs of renewable heating systems and the conventional fossil fuel alternatives; and incentivise the development and supply of renewable heat. The scheme opened for applications relating to installation grants for air source heat pumps, ground source heat pumps and water source heat pumps in September 2018. The operational support component of the scheme opened in June 2019, including

support for biomass boiler/biomass HE CHP heating systems and biogas (anaerobic digestion).

Fossil fuel subsidies in taxation were estimated at €2.9bn in 2021, In 2000 - the first year of the series - total fossil fuel subsidies were estimated at €1.5bn in value. This increased to €3.1bn in 2008. Between 2009 and 2016 the value was estimated as between €2.7bn and €2.9bn. Total fossil fuel subsidies increased in value in 2017 and 2018, reaching the highest value of the series at €3.3bn in current prices in 2018. In 2020 fossil fuel subsidies fell to €2.5bn, with the reduction in transport fossil fuel consumption due to the COVID-19 pandemic accounting for the decrease. The 2021 figure was a 16% increase on 2020.

Direct fossil fuel subsidies accounted for 10% of total fossil fuel subsidies in 2021 while indirect subsidies arising from tax expenditures, price supports, and other Government revenue forgone accounted for 90%. Table 65 shows the value of direct and indirect fossil fuel subsidies from 2021. Environmental protection activities were subsidised to a value of €524m, or 59% of the total, while €371m, or 41%, was used to support resource management activities. In 2016, 31% of environmental transfers went to RE production, 26% to wastewater management, 23% to biodiversity protection and 9% to heat and energy saving measures.

Other activities, such as waste management and protection of air and climate, accounted for the remaining 10%. The largest subsidy to RE generation in 2017 was worth €278m and came from funds collected through the PSO (Public Service Obligation) Levy on electricity consumers. In the previous 2016 statistical release by the CSO referred to above, provisional data was provided on Potentially Environmentally Damaging Subsidies (PEDS) or other Government support measures that have social or economic objectives which may also incentivise behaviour that could be damaging to the environment. For example, transport fuel tax rebates encourage the consumption of fossil fuels. Table 65 provides details of the Potentially Environmentally Damaging Subsidies provided by the Irish Government in 2021, as estimated by the Central Statistics Office in November 2023.

The data indicate that 75% of environmental subsidies provided in Ireland are directed to Potentially Environmentally Damaging Subsidies.

Table 74: Direct Fossil Fuel Subsidies, 2021 [47]

Programme	€ Million
PSO Levy: electricity generation from peat	7.7
Fuel allowance	126.3
Electricity allowance	115.7
Gas allowance	22.1
Other supplements (including heating and diet)	4.1
Petroleum Infrastructure Support Scheme	0.9
Total Direct Fossil Fuel Subsidies	284.8

Agricultural Product Subsidies: Agricultural subsidies on products are paid per unit of a good produced, e.g. per head of cattle. Many agricultural product subsidies have been phased out and have been replaced by direct payments to farmers such as the Single Payment Scheme.

PSO (Public Service Obligation) Levy: The PSO Levy is calculated on an at least annual basis by the CRU and when positive is charged to all final electricity consumers in Ireland and when negative collected from renewable electricity generators who are members of a two-way feed-in-tariff support scheme (namely RESS). The PSO is used to support renewable electricity generators who are members of applicable support schemes.

Fuel Allowance: The Fuel Allowance Scheme was introduced in 1988. The aim of the scheme is to assist qualified households in receipt of certain social welfare payments with their heating costs. The allowance represents a contribution towards a person's normal heating expenses. It is not intended to meet those costs in full.

Electricity Allowance: The electricity allowance is part of the Household Benefits Package which is available to all householders over 70 years of age and to householders under 70 in certain circumstances.

[47] Central Statistics Office, published September 2023. Available at:

https://www.cso.ie/en/releasesandpublications/ep/p-ffes/fossilfuelsubsidies2021/fossilfuelsubsidies/#:~:text=The%202021%20figure%20was%20a%2016%25%20increase%20on%202020.&text=Direct%20fossil%20fuel%20subsidies%20accounted,%25%20(see%20Table%202.1).

Gas Allowance: The gas allowance is part of the Household Benefits Package which is available to all householders over 70 years of age and to householders under 70 in certain circumstances.

Other supplements (including Heating and Diet): These are supplements paid by the Department of Social Protection as an income support measure. The statistical release includes 50% of the amount of funding as an estimate of the proportion that went to heating rather than food support.

Petroleum Infrastructure Support Group: Annual contributions to this fund were made by companies holding Frontier Exploration Licences for hydrocarbon exploration offshore Ireland. The fund is administered by DECC, and its aims were to enhance understanding of the relatively underexplored Irish offshore area through funding of new research and data collection activities. As Ireland transitions to a low carbon economy, focus is increasingly shifting towards research and development of renewable energy sources, rather than fossil fuel-based studies. Against this backdrop, the Department has decided that there is no longer a requirement for it to support the continuation of research programmes that support hydrocarbon exploration and development activities. Accordingly, the orderly wind down of the Petroleum Infrastructure Programme is underway, and contributions to the Programme for periods commencing 1st July 2021 have not been sought.

Haulier's Diesel Rebate Scheme: This is a repayment to road transport operators of part of the tax that they pay on diesel purchased for use in the course of business. As a first step in relation to plans to phase-out energy subsidies, the CAP commits to model the impacts, both in terms of the economy and in terms of emissions, of removing fossil fuel subsidies.

In terms of **fossil fuel subsidies in public expenditure**, as noted in Section 3 of this document, the Department of Public Expenditure, NDP Delivery and Reform has published assessments of programmes that are considered likely to have negative climate and environmental impacts, including fossil fuel subsidies and other potentially harmful supports, both through a detailed Spending Review[48] and through inclusion in budgetary documentation alongside the Revised Estimates Volume for Public Services.[49] The staff paper and the accompanying budgetary documentation assess expenditures on the basis of

[48] A Review of Fossil Fuel Subsidies and other Potentially Climate Harmful Supports (DPENDR, February 2023)

[49] (DPENDR, December 2023)

their potential negative impact on climate and environmental outcomes. Hence, this is a broader assessment than just an assessment of fossil fuel subsidies.

Highlighting items as potentially unfavourable or harmful, as defined in this work, suggests increased focus is required on ensuring that any negative climate and environmental impact of this investment is minimised insofar as is possible by the holders of those policy areas.

5. Impact Assessment of Planned Policies and Measures

5.1 Impacts of planned policies and measures described in section 3 on energy system and GHG emissions and removals, including comparison to projections with existing policies and measures (as described in section 4)

The graphs and figures below illustrate the impact of planned policies and measures on the energy system and on GHG emissions at a sectoral level, based on both the With Existing Measures (WEM) and With Additional Measures (WAM) scenarios, defined as follows:

The **With Existing Measures (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 2022 (the latest inventory year) and the projected emissions reduction is commensurate with the resources or legislation already in place or committed to by Government Departments or Agencies.

The **With Additional Measures (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 & measures included in the WEM scenario, plus those included in Government plans but not yet implemented. The full amount of this ambition is not currently in the WEM scenario as actions still remain to be taken that would deliver it.

Figure 30 shows the primary energy requirement by scenario, while Figure 31 and 32, show the primary energy requirement for WEM and WAM scenarios.

The projected electricity demand for both WEM and WAM are shown in Figure 33 and 34. While electricity supply per fuel type for WEM and WAM are shown in Figure's 35 and 36.

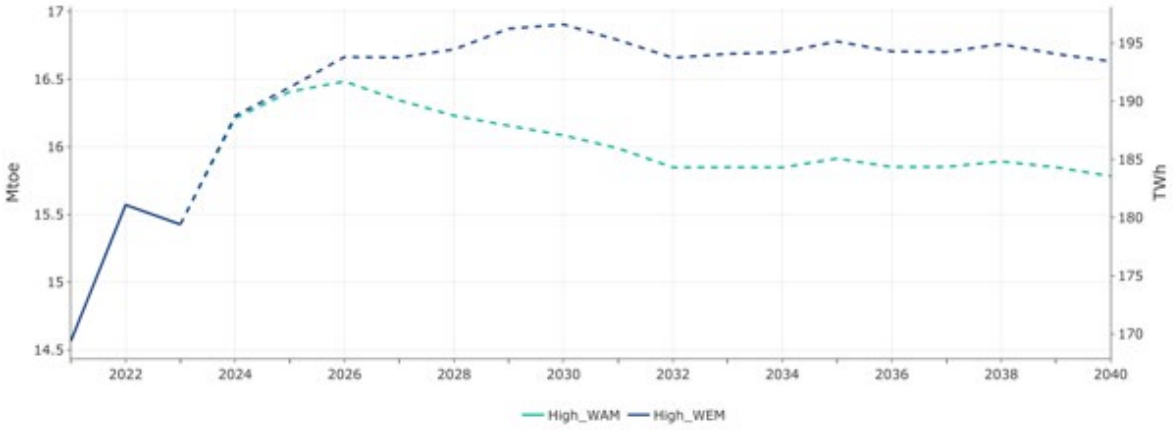


Figure 30: Total primary energy requirement by scenario

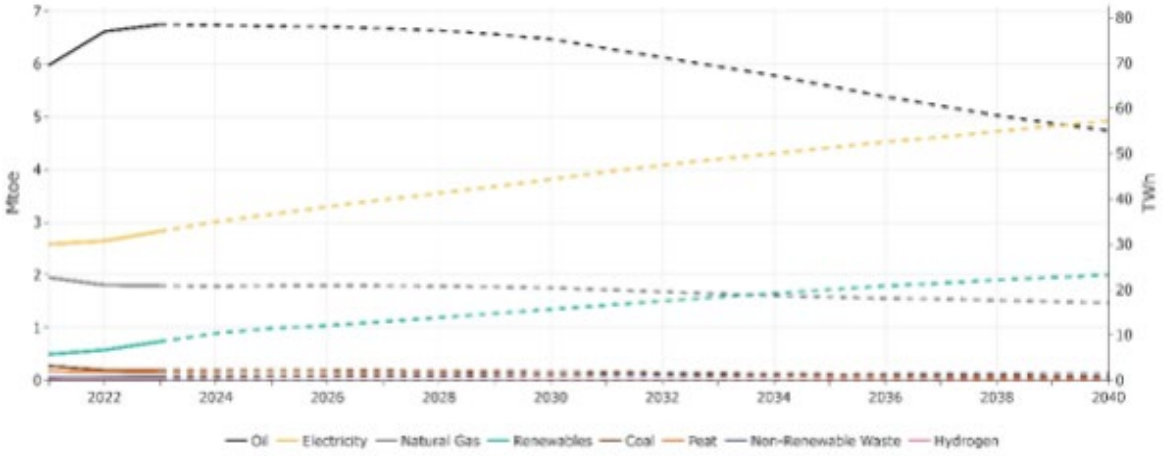


Figure 31: Total primary energy requirement by fuel (WEM)

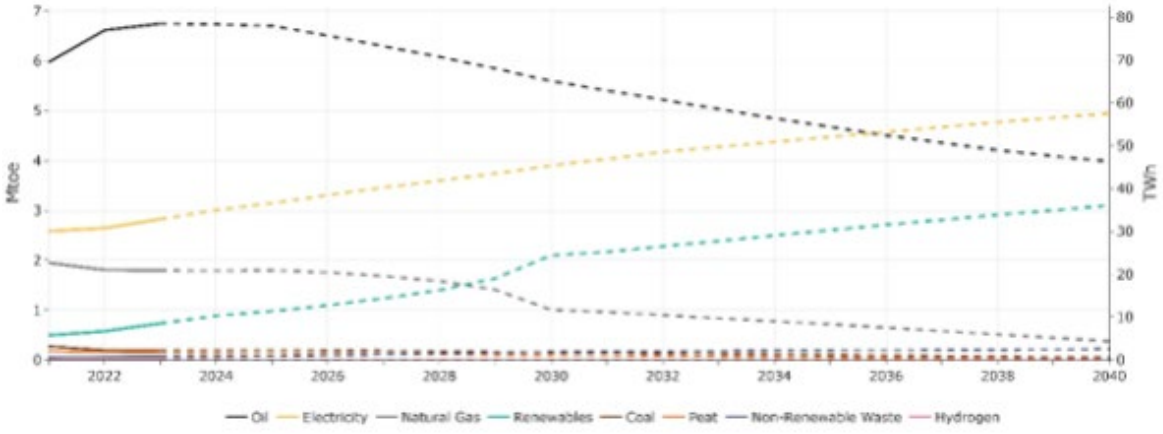


Figure 31: Total primary energy requirement by fuel (WAM)

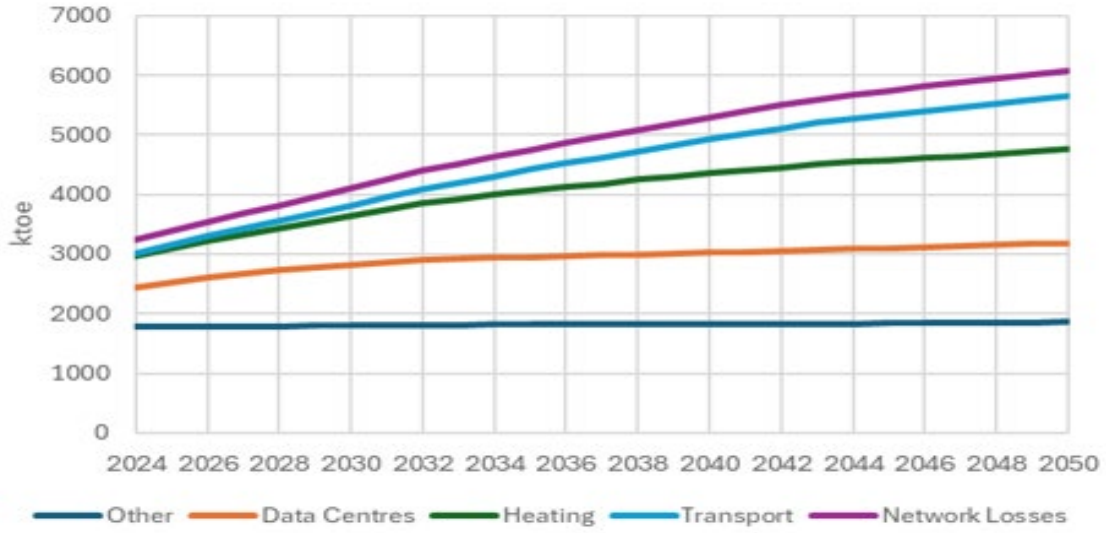


Figure 32: Electricity demand projected (WEM)

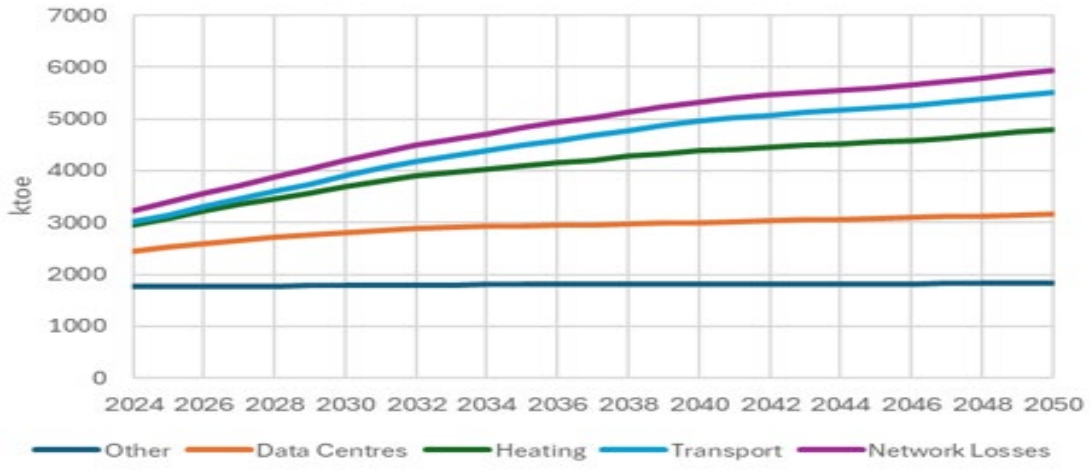


Figure 33: Electricity demand projected (WAM)

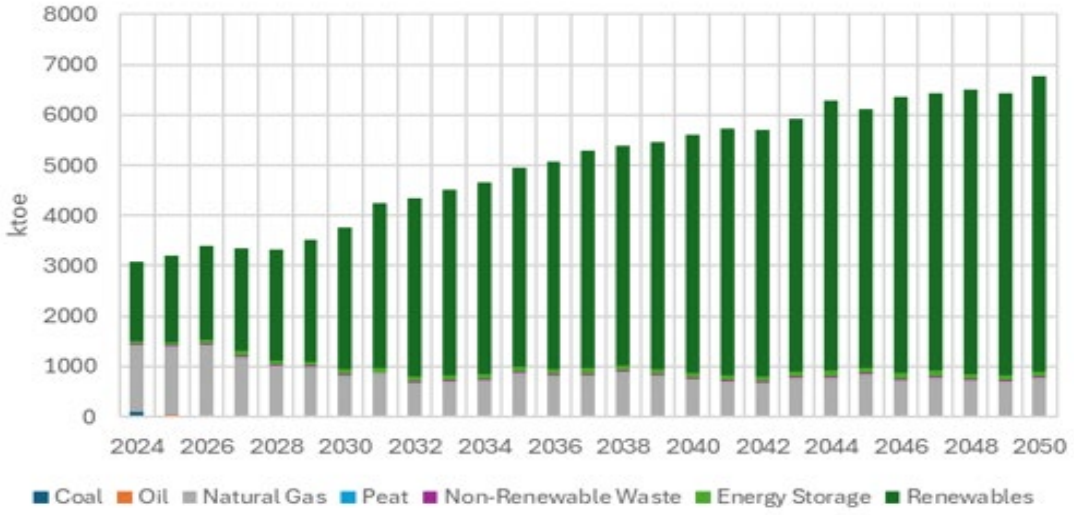


Figure 34: Electricity generation by fuel (WEM)

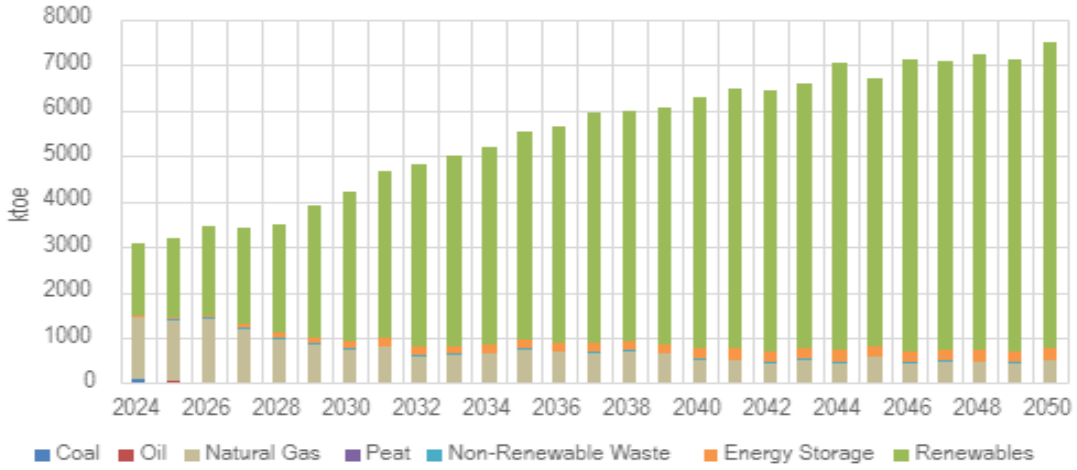


Figure 35: Electricity generation by fuel (WAM)

Final energy demand for both WEM and WAM scenarios are shown in Figure 37, and total final energy consumption by sector, is shown in Figure 38 and 39, and total final energy consumption by fuel is shown in Figure 40 and 41 for both WEM and WAM scenarios.

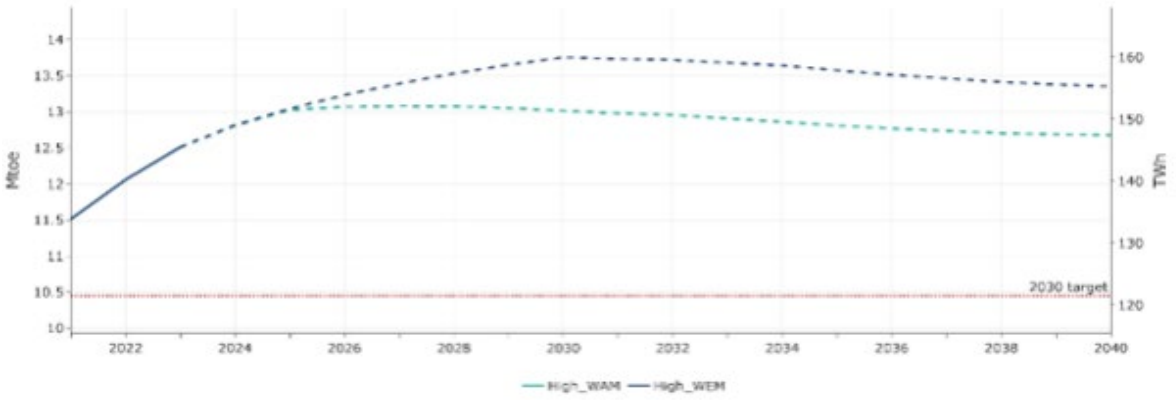


Figure 36: Total Final Energy Demand (WEM & WAM)

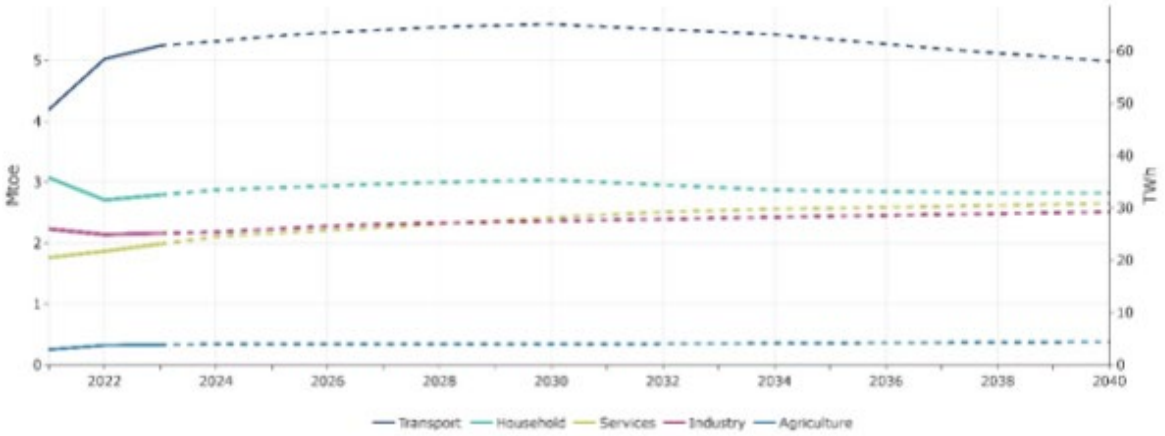


Figure 37: Total Final Energy Consumption by sector (WEM)

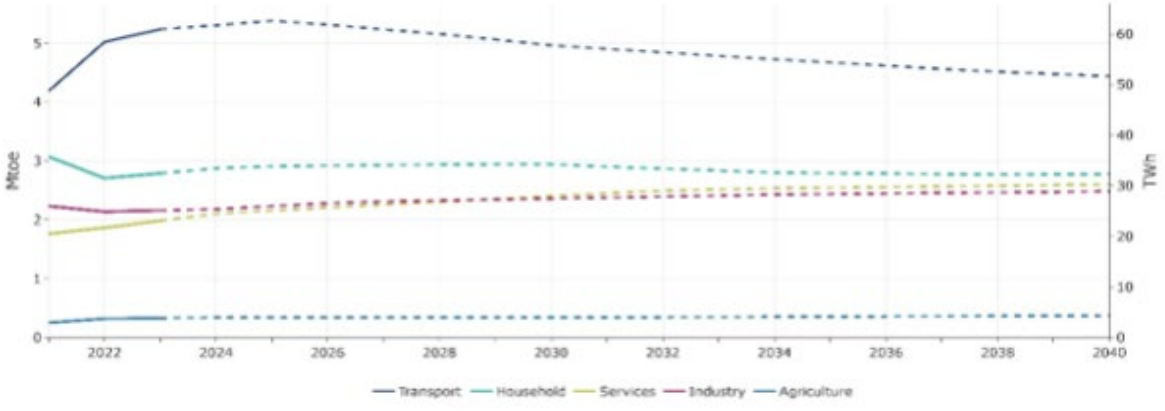


Figure 38: Total Final Energy Consumption by sector (WAM)

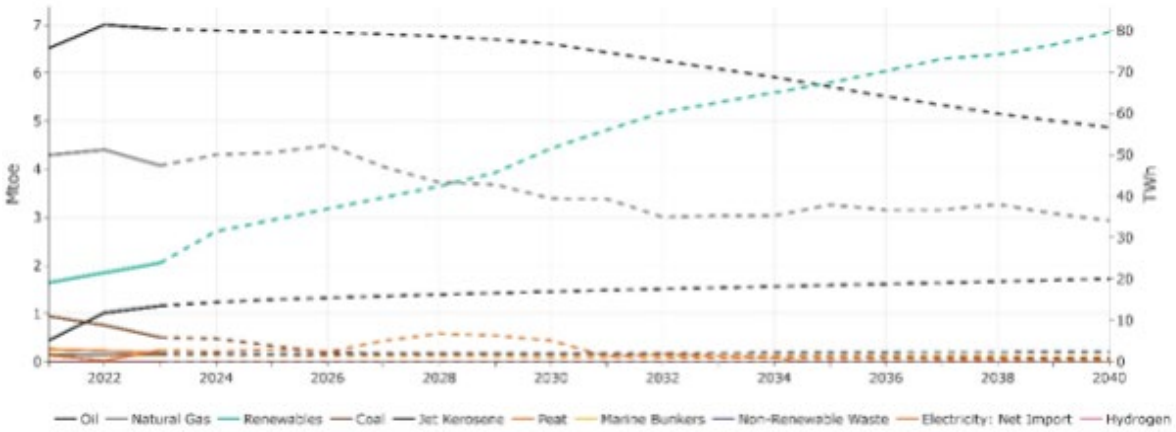


Figure 39: Total final energy consumption by fuel (WEM)

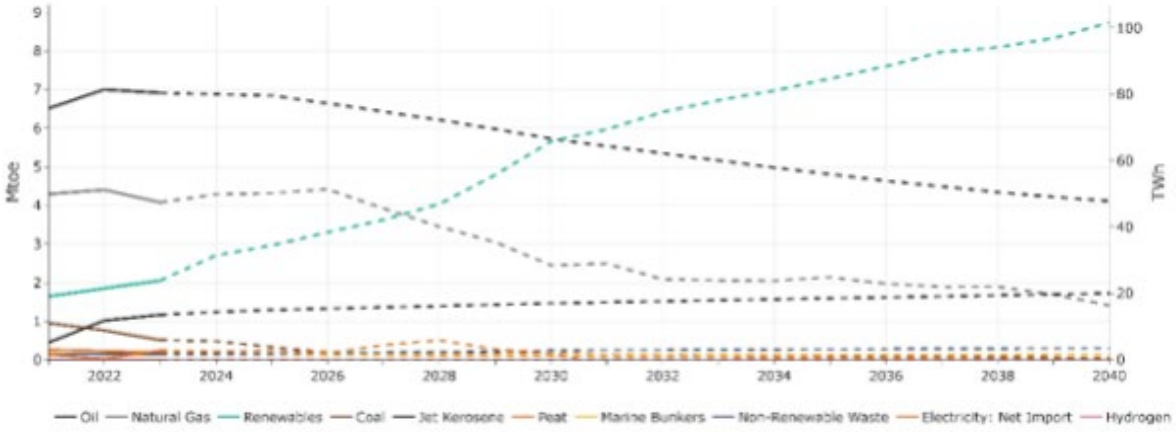


Figure 40: Total final energy consumption by fuel (WAM)

Figure 42 below, shows the overall, RES share in gross final energy consumption. Renewable transport, Renewable Electricity and Renewable heat are shown in Figure 43, 44, 45. And finally Renewable heat by technology is shown in Figure 46.

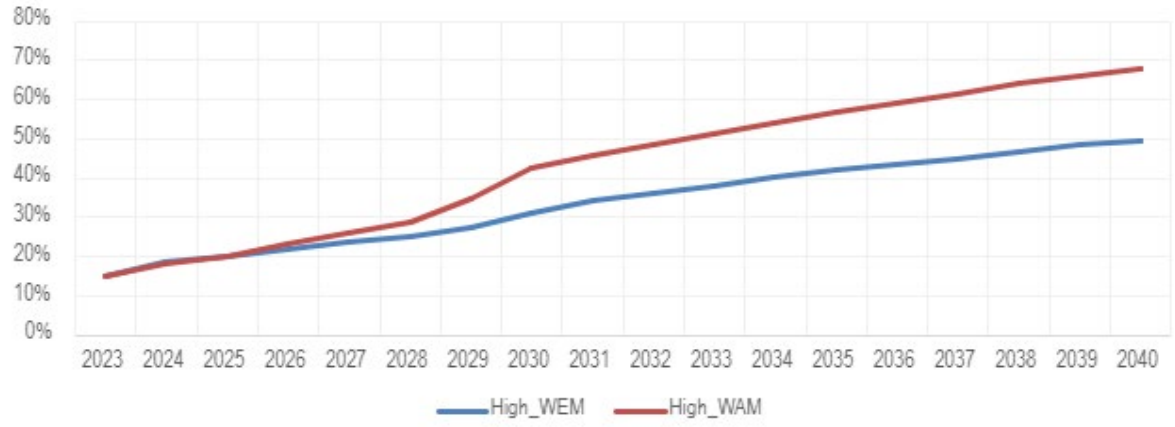


Figure 41: Overall, RES share in gross final consumption

Figure 42: Renewable Transport (RES-T)

Figure 43: Renewable Electricity (RES-E)

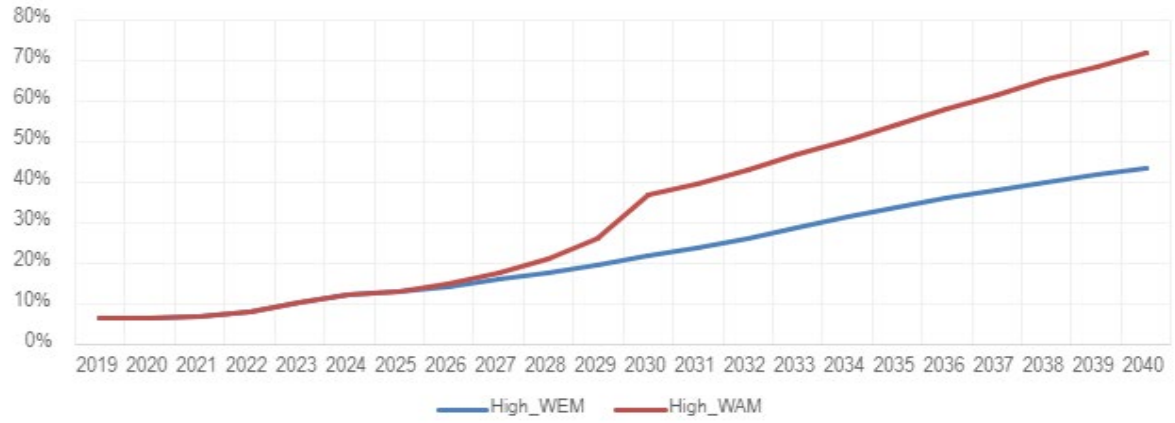


Figure 44: Renewable Heat (RES-H)

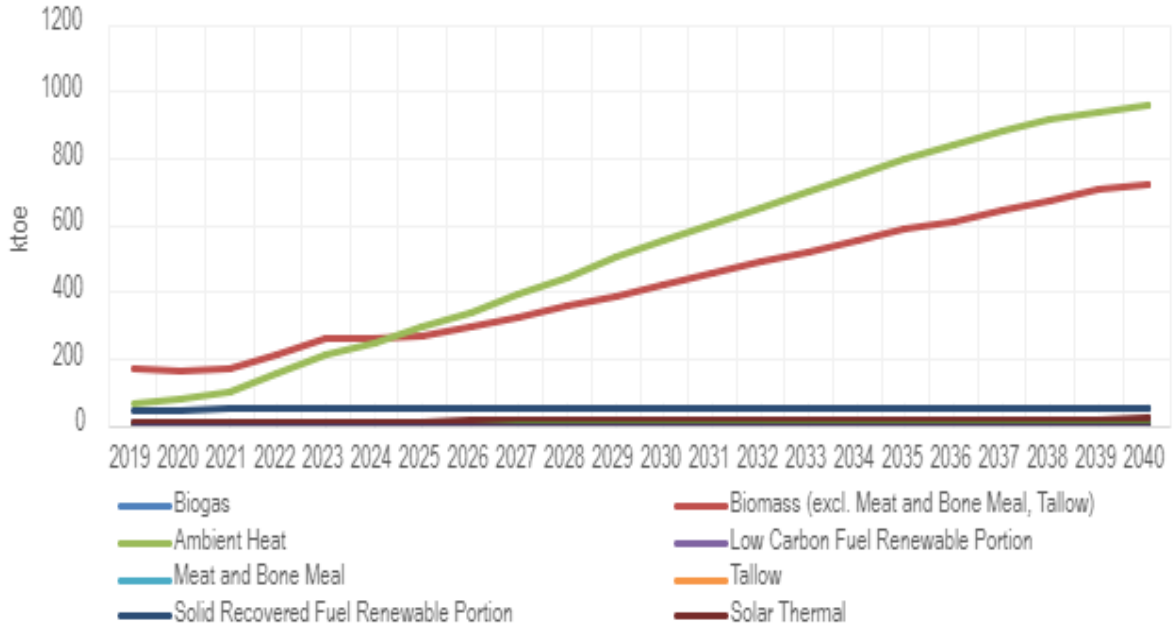


Figure 45: Renewable heat by technology

All GHG emissions with targets are shown in Figure 47 below. ETS Emissions (WEM and WAM) is shown in Figure 48. Effort sharing sector total GHG emissions is shown in Figure 49.

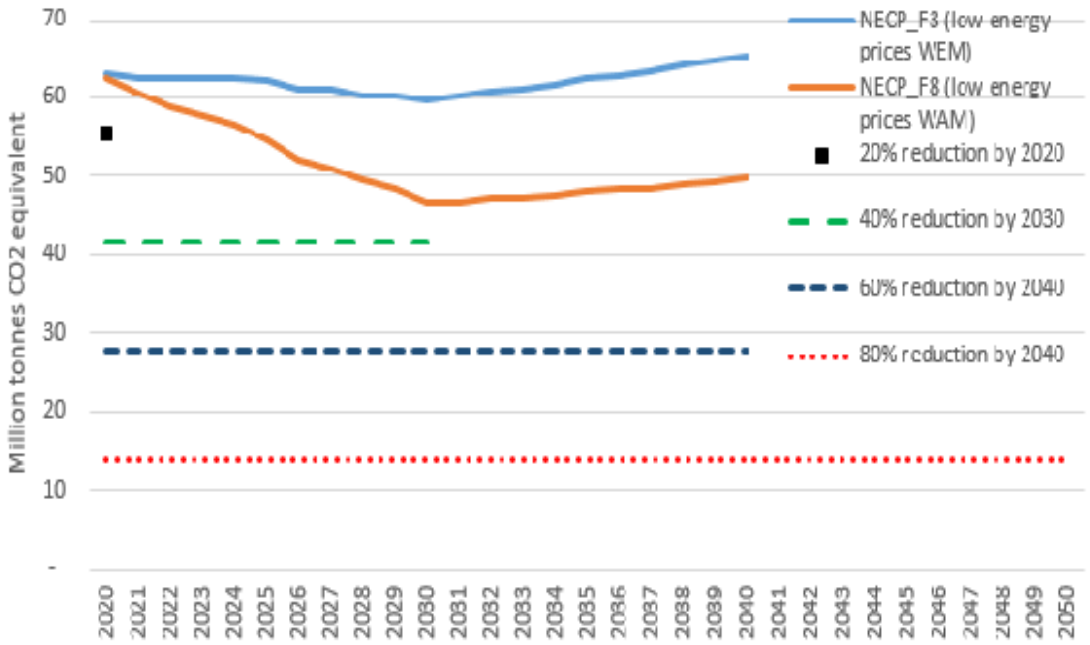


Figure 46: All greenhouse gas emissions with targets

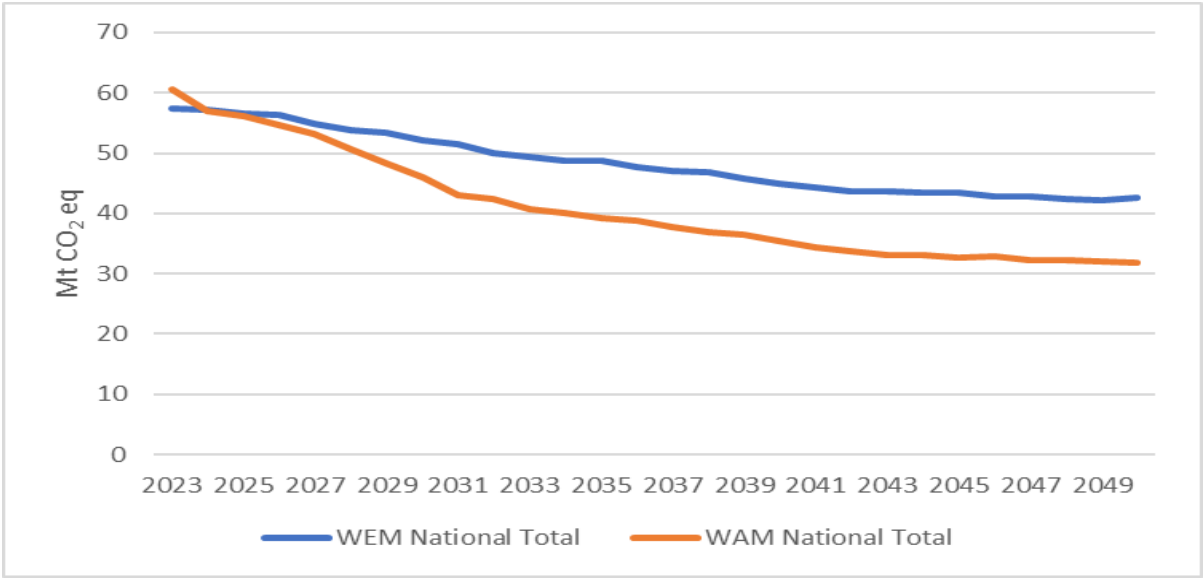


Figure 47: ETS Emissions (WEM & WAM)

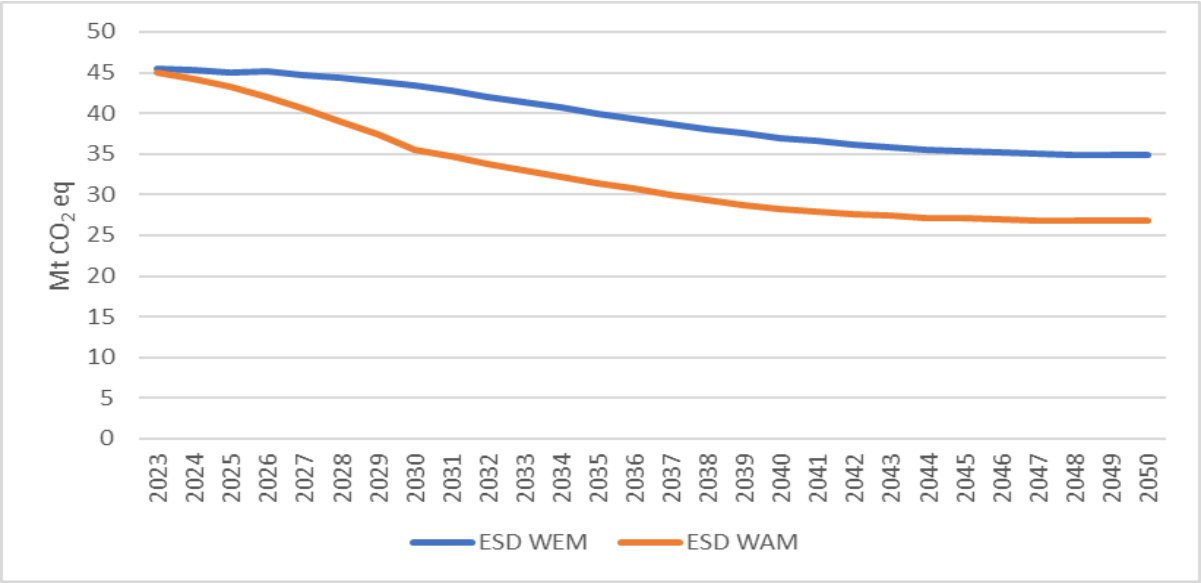


Figure 48: Effort sharing sector total greenhouse gas emissions

Ireland's Air Pollutant Emissions report[50], provides details of emissions of air pollutants in Ireland in the period 1990 to 2022 and projected emissions of these pollutants for 2030.

The European Environment Agency estimates there are approximately 1,600 premature deaths in Ireland every year due to poor air quality. The EPA, working with local authorities and other public bodies, has established 115 air monitoring stations and monitoring data from these stations are available in real time. The five air pollutants for which emission reduction commitments are set affect the environment and human health in different ways.

SO_2, NO_x and NH_3 are primarily associated with acid deposition leading to toxicity of soils and waters. Ammonia is also responsible for secondary particulate matter formation and nitrogen oxides are precursors to tropospheric (ground level) Ozone formation.

Sulphur dioxide (SO_2) is the major precursor to acid deposition, which is associated with the acidification of soils and surface waters and the accelerated corrosion of buildings and monuments. Emissions of SO_2 are derived from the sulphur in fossil fuels such as coal and oil used in combustion activities. Trends in SO_2 emissions and WAM projections with current and future emission reduction commitments are shown in Figure 50 below.

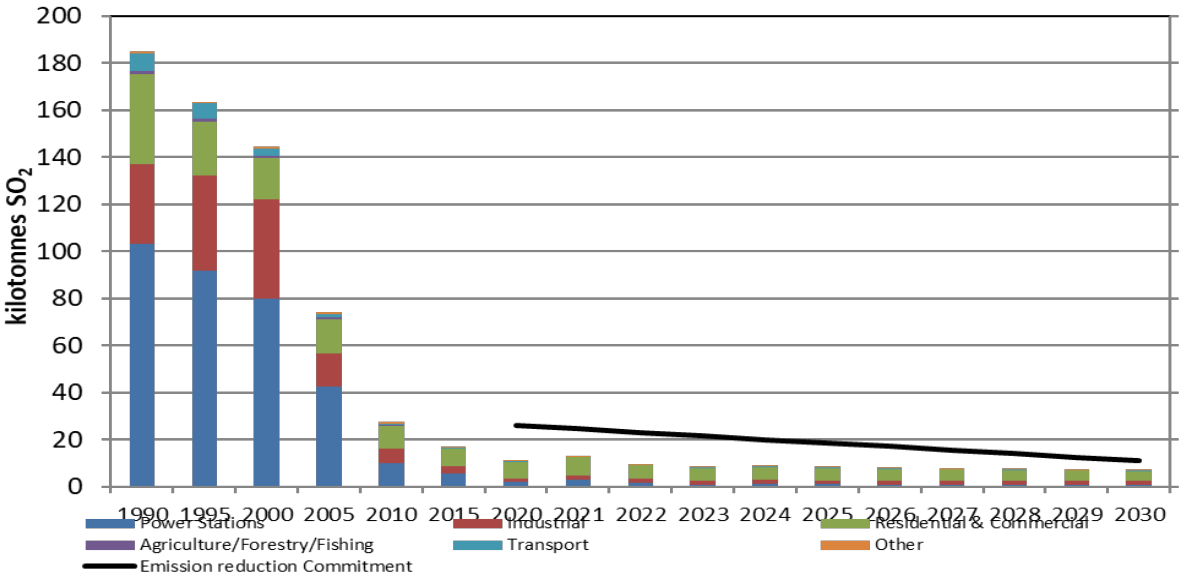


Figure 49: Trends in SO2 emissions and WAM projections with current and future emission reduction commitments.

[50] EPA-Air-Pollutant-Report-Final-May24.pdf

Emissions of nitrogen oxides (NOx) contribute to acidification of soils and surface waters, ground level ozone formation and excess nitrogen or saturation in terrestrial ecosystems. Agriculture (as a result of both organic and synthetic nitrogen use) and fossil fuel combustion in power generation and transport are the principal sources. Trends in NO_2 emissions are shown in Figure 51. NOx emissions and WAM projections with current and future emission reduction commitments are shown in Figure 52.

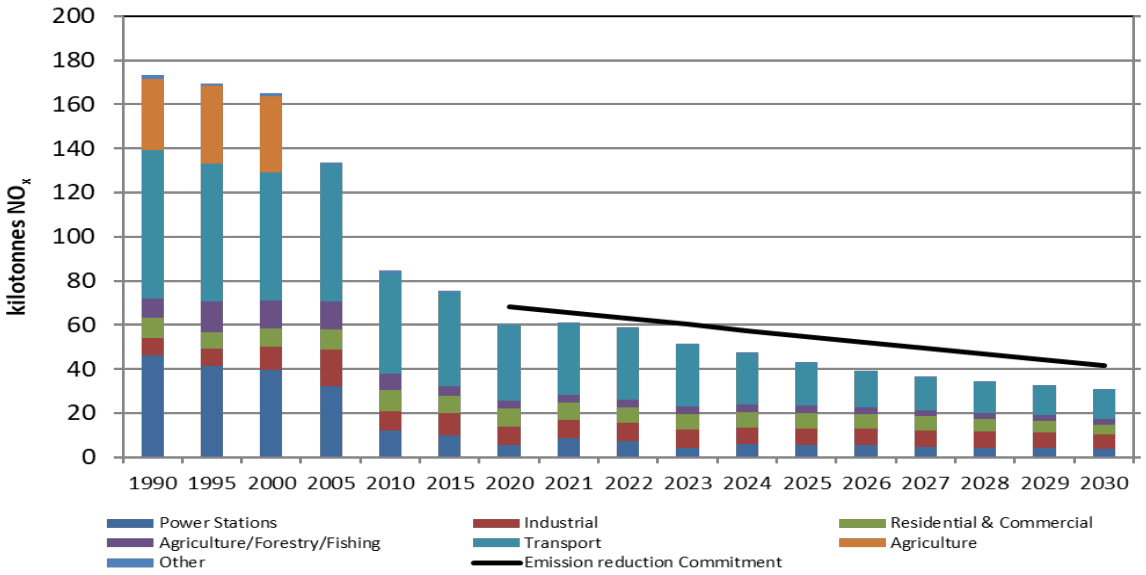


Figure 50: Trends in NO2 emissions, current and future emission ceilings

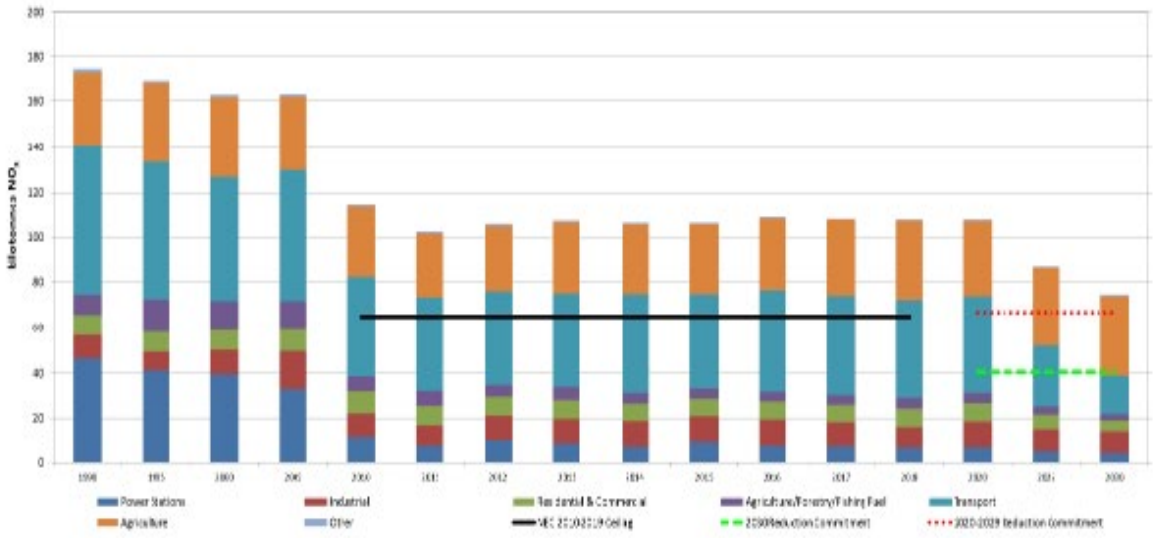


Figure 51: NOx emissions and WAM projections with current and future emission reduction commitments

Fine Particulate Matter, tropospheric Ozone, NOx and NMVOCs (non-methane Volatile organic compounds) directly impact human health, especially in higher concentrations in urban areas. NMVOC are emitted as gases by a wide array of products including paints, paint strippers, glues, cleaning agents and adhesives. They also arise as a product of incomplete combustion of fuels, from the storage and handling of animal manure and fertilisers in agriculture, and from the food and beverages industry.

Trends in NMVOC emissions and WAM projections with current and future emission reduction commitments are shown in Figure 53 below. NMVOC emissions after use of flexibility mechanism are shown in Figure 54.

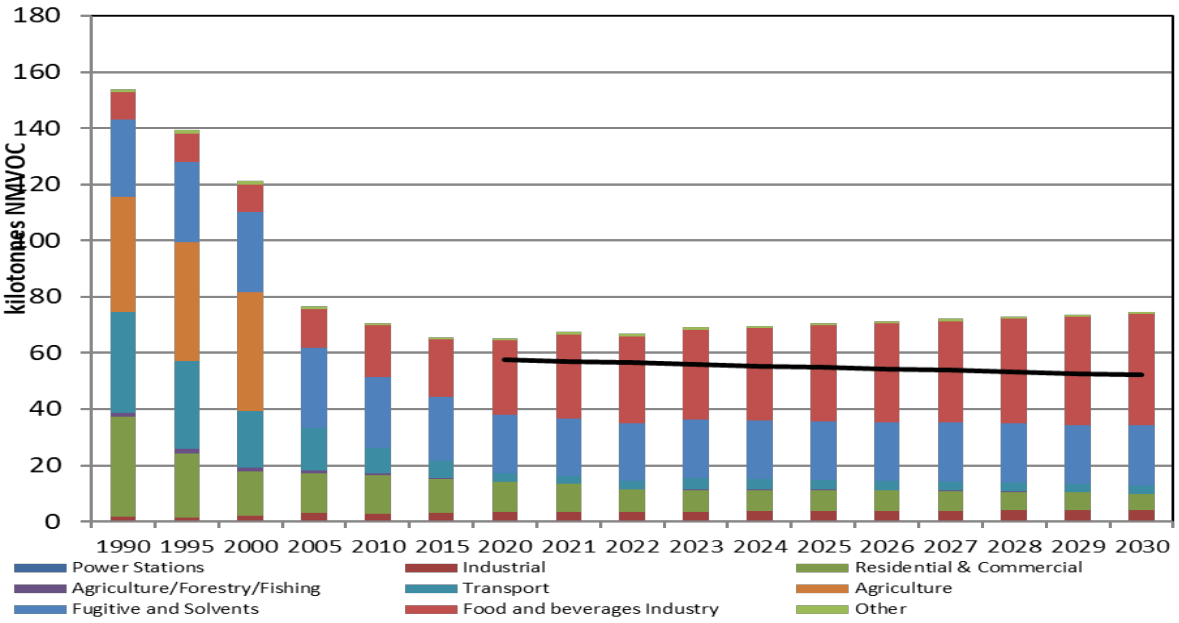


Figure 52: Trends in NMVOC emissions and WAM projections with current and future emission reduction commitments

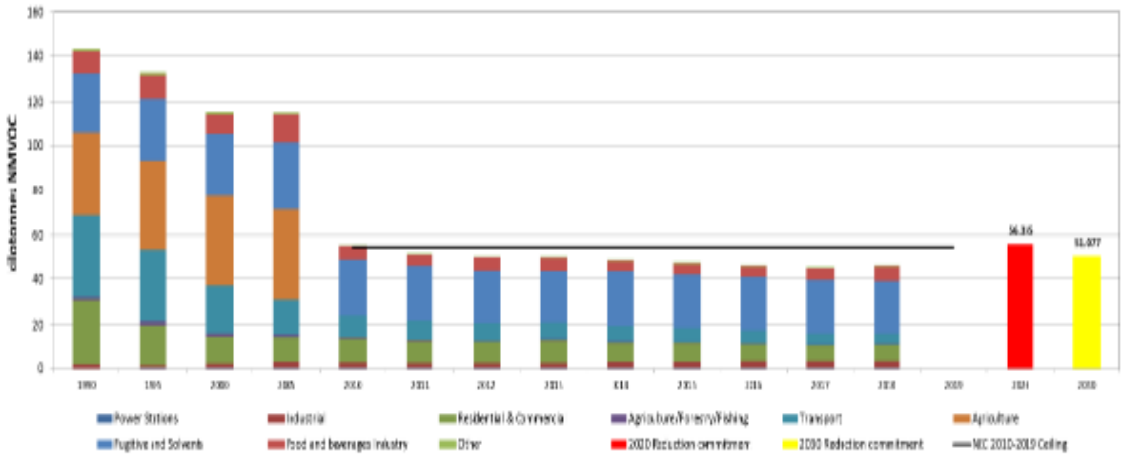


Figure 53: NMVOC emissions after use of flexibility mechanism

Ammonia (NH_3) emissions to air are associated with nitrogen deposition, acid rain and the formation of secondary particulate matter. The agriculture sector accounts for virtually all (99.4 per cent) of ammonia emissions in Ireland. Trends in NH_3 emissions and WAM projections with current and future emission reduction commitments are shown in Figure 55.

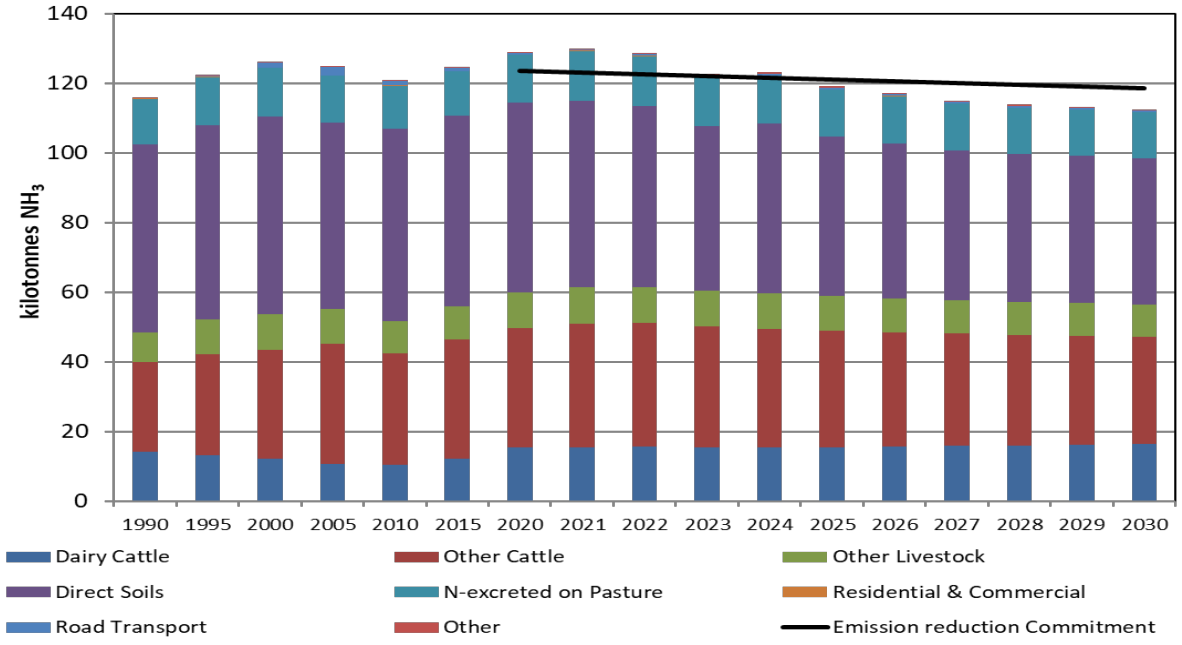


Figure 54: Trends in NH3 emissions and WAM projections with current and future emission reduction commitments

There are many sources of particulate matter (dust) including vehicle exhaust emissions, soil and road surfaces, construction works and industrial emissions. Particulate matter can be formed from reactions between different pollutant gases. Small particles can penetrate the lungs and cause damage. These are known as PM_{10} (diameter less than 10µm) and $PM_{2.5}$ (diameter less than 2.5µm). $PM_{2.5}$ is a better indicator of anthropogenic (man- made) emissions. Fine particulate matter $PM_{2.5}$ is responsible for significant negative impacts on human health.

Trends in $PM_{2.5}$ emissions and WAM projections with current and future emission reduction commitments are shown in Figure 56.

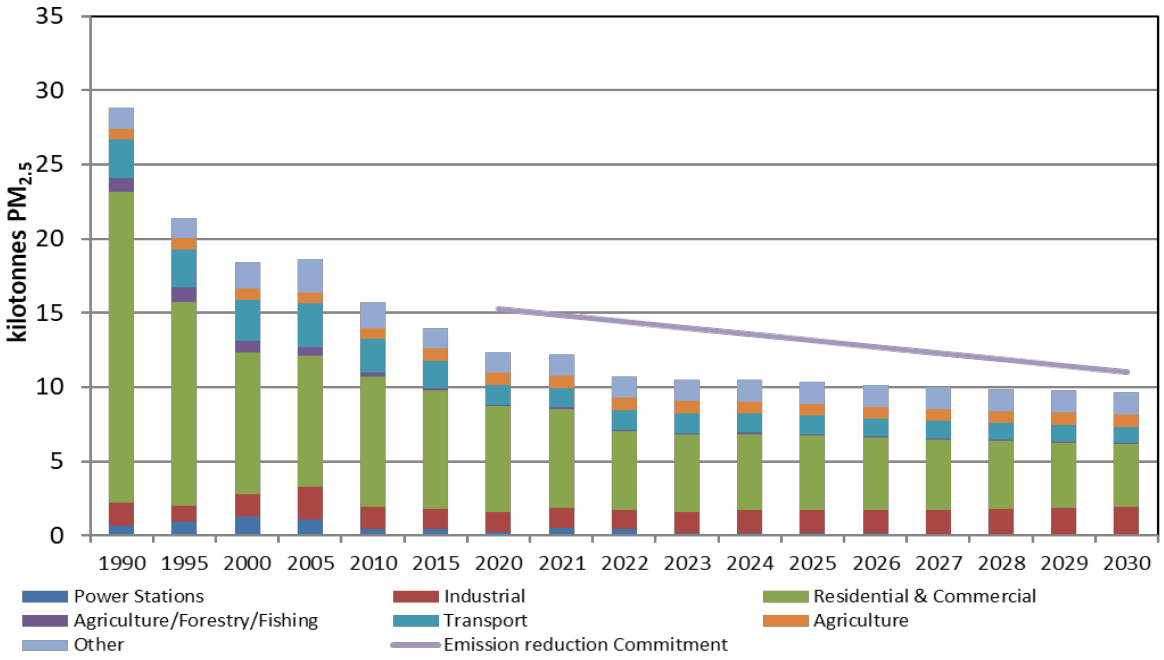


Figure 55: Trends in PM2.5 emissions and WAM projections with current and future emission reduction commitments

5.1.1 Assessment of policy interactions (between existing policies and measures and planned policies and measures within a policy dimension and between existing policies and measures and planned policies and measures of different dimensions) at least until the last year of the period covered by the plan, in particular to establish a robust understanding of the impact of energy efficiency / energy savings policies on the sizing of the energy system and to reduce the risk of stranded investment in energy supply

Climate Action Plan 24 is the main difference between the With Existing Measures scenario (WEM) and the With Additional Measures (WAM) scenario. Published in June 2019, the CAP commits to achieving a net zero carbon energy system by 2050 and a 2030 pathway that is consistent with the 2050 target. Many of the planned policies and measures affecting the evolution of the energy system are those same policies included in the With Existing Measures scenario (WEM) but with additional levels of ambition assumed in the With Additional Measures (WAM). For example, a Renewable Electricity Support Scheme (RESS) is included in all scenarios but with different levels of ambition for renewable electricity in 2030. Furthermore, a key measure in the CAP is an increasing carbon tax to 2030. The planned increasing carbon tax is an example of a crosscutting measure that will interact with all other policies and measures. Therefore, it is not possible to assess the policy interactions for all policies and measures.

5.1.2 Assessment of interactions between existing policies and measures and planned policies and measures, and between those policies and measures and Union climate and energy policy measures

The existing and planned policies and measures set out under Chapters 2 and 3 under the five dimensions will significantly contribute towards the achievement of the EU energy and climate goals. These policies and measures ensure that Ireland is on course to achieving our long-term goals towards 2050. There is potential for overlaps between the Energy Union climate and energy policies and national policy measures. In the Irish approach, the impacts of the Energy Unions measures are usually applied first. Then the impact of additional national measures is calculated sequentially in the model, thereby mitigating overlaps as much as possible. In particular, the building regulations and efficiency of passenger car regulations are likely to overlap with additional national policies, such as, the effective ban

on fossil fuel boilers in new buildings and the roll out of electric vehicles (lowering the average vehicle stock emissions performance).

5.2 Macroeconomic and, to the extent feasible, the health, environmental, employment and education, skills and social impacts including just transition aspects (in terms of costs and benefits as well as cost-effectiveness) of the planned policies and measures described in section 3 at least until the last year of the period covered by the plan, including comparison to projections with existing policies and measures

The macroeconomic assumptions that underpin the NECP are developed by the Economic & Social Research Institute (ESRI) with their I3E model.

Macroeconomic Joint Research Programme – Modelling

Separate to the macroeconomic assumptions that underpin the NECP developed by the ESRI, modelling and analysis is also needed to examine and investigate the combined macroeconomic, fiscal, expenditure and investment impacts across households and production sectors. To this end, a whole-of-Government approach is currently being taken to develop a modelling framework that can analyse the macroeconomic, fiscal, and distributional impacts of the climate transition. The Department of Finance and the Department of Public Expenditure, NDP Delivery and Reform (DPENDR) are funding and supporting climate macroeconomic modelling work in the Economic and Social Research Institute (ESRI). This work, to advance our macroeconomic, fiscal, and distributional analysis of climate change using the Institute's I3E (Ireland, Environment, Energy and Economy) model is in concert with the wider climate research programme being led by DECC and progressed through the Climate Research and Modelling Group chaired by the Department of the Taoiseach.

Economic Developments

As an update to the macroeconomic assumptions that underpin the NECP, the Department of Finance has separately recently published Ireland's spring economic outlook as part of the Stability Programme Update (SPU) 2024. As outlined in Ireland's SPU 2024 spring update,

the Irish economy has faced numerous headwinds over recent years and a loss in momentum is clear from the data in recent quarters. Despite this, available evidence suggests the economy is in reasonable shape, at least in aggregate terms. The brightest spots relate to the labour market and price dynamics. The Irish labour market has shown remarkable resilience. There were well over 2.7 million people in employment in the fourth quarter of 2023. As a result, the unemployment rate has remained low over the last year or so, consistent with any measure of full employment.

Inflationary pressures have eased significantly since there peak in the summer of 2022, with a headline average of 5.2% for 2023. Indeed, the inflation rate fell to 1.6% in April, its lowest rate since June 2021. ‘Core’ inflation has also been easing significantly while still remaining higher than headline, falling to 2.6% in April. This is the lowest rate of core inflation since September 2021.

Economic Outlook

Looking ahead, some of the headwinds that have dominated over the past year or so (the erosion of purchasing power due to higher inflation and the associated tightening of monetary policy) are set to ease, supporting a pick-up in economic activity as the year progresses.

The expansion in employment is expected to continue, albeit at a slower rate than last year with employment growth of 1.9% this year anticipated while the unemployment rate rises to 4.6%.

As lower wholesale gas prices continue to be passed through to consumers, a moderation in inflation throughout this year should help support the purchasing power of households and underpin spending growth this year. The inflation rate is expected to average 2.1% this year driven in large part by declining energy prices. However, ‘core’ inflation is expected to fall by less to 3% as pockets of inflationary pressure remain – especially in domestic services.

Against this backdrop, the domestic economy is expected to experience a modest pick-up in activity in the early part of the year, with Modified Domestic Demand growth then accelerating as the year progresses for an average growth of 1.9% growth. Growth of 2.3% for next year is anticipated.

Risks to the Economy

There remains considerable uncertainty surrounding the outlook for the domestic economy, with both upside and downside risks at present. On balance, risks are judged to be broadly balanced.

It is possible that the ongoing war in Ukraine and other geopolitical tensions could escalate or broaden to other countries, increasing uncertainty and further weakening economic activity amongst our main partners. Ireland remains highly reliant on imports of gas and other fossils fuels for electricity supply. Gas markets remain very tight with limited supply coming on stream in the near term. Any shocks to world markets would have a rapid pass-through to Ireland.

Domestically, the Irish economy is currently operating at capacity, and supply-side bottlenecks (e.g. housing and labour markets) and an acceleration of wage growth could further weigh on Ireland's attractiveness as a location for business activity. A sector- or firm-specific shock in the highly concentrated multinational sector would be damaging for the domestic economy.

On the potential upsides, a faster than expected fall in inflation could further boost real household incomes and drive stronger growth in consumer spending. In addition, a greater use of household's pandemic-era 'excess' savings could support higher levels of investment and overall domestic demand.

Beyond near-term risks, the economy is facing into a period of structural change characterised by simultaneous economic challenges in the form of decarbonisation (for example physical and transition risks from climate inaction – including risks to economy from cost of doing nothing, or risks to economy from slower pace of decarbonising economic activity), demographic change, digitalisation and de-globalisation – collectively the '4 Ds'.[51] Over the medium-term, the economy may evolve differently to that described earlier, depending on the evolution of these known, and other unknown, changes. Over the medium-term, the supply of labour is assumed to be driven by net migration flows, which have been

[51] See gov - Stability Programme Update 2024 (www.gov.ie) and Department of Finance, Summer Economic Statement 2023, *The Irish economy in 2030 – enabling a sustainable future for all* available at: https://www.gov.ie/ga/foilsiuchan/cfde8-summer-economic-statement-2023/

particularly volatile in recent years. The impact of plausible alternative scenarios for these variables on the central forecasts outlined in the SPU 2024 is considered.

Potential Fiscal Impacts of the transition to a lower carbon economy

In July 2023, the Department of Finance published research examining the Potential Fiscal Impacts of the transition to a lower carbon economy in Ireland.[52] This new research finds that current environmental taxes are an important source of revenue for the State. At present, environmental taxes contribute approximately €5.3 billion annually or around 6.4% of overall Exchequer tax revenue in 2022. This proportion in relative terms has, however, dropped from close to 11% of overall Exchequer tax revenue in 2012 and, over the next seven years, the transition to a lower carbon economy will have a significant impact on Exchequer finances. If current taxation policy remains unchanged, and if the necessary actions as set out in CAP 2024 are implemented to bring about the appropriate levels of emissions reductions, projected estimates point to a potential overall fall in Exchequer revenues over the medium term. Exchequer revenues raised by way of taxes on fossil fuels, including transportation, are estimated to fall over the medium term by around €1 billion, from around €5.3 billion in 2022 to around €4.3 billion in 2030. While this potential reduction in Exchequer tax revenues may seem relatively small in absolute terms, over the medium term it would mean environmental taxes could fall from around 2.1% of domestic economic growth (or GNI*) in 2022, to around 1.4% of GNI* in 2030. These falls in Exchequer revenue are based on expected changes in individuals and businesses adapting their behaviour to use less fossil fuels and fewer fossil fuel vehicles over the medium-term (between 2023 to 2030).

As the economy moves towards lower carbon use over the medium term, policy will need to consider how to use taxation as an instrument in the transition. In particular, policy makers will need to consider and decide how to protect current Exchequer revenue streams in an environmentally appropriate fashion, alongside influencing and encouraging behavioural change in order to achieve decarbonisation over the medium term, and carbon neutrality by no later than 2050. Against this background, policy formulation must also recognise that public finances in Ireland will come under increasing pressure from factors other than climate change, such as population ageing and other demographic changes. While it is important to understand that changes to taxation by itself cannot achieve the necessary GHG emissions

[52] See: 'gov - Potential fiscal impacts of the transition to a lower carbon economy in Ireland (www.gov.ie)' – Department of Finance July 2023.

reductions, as the transition to a lower carbon economy is an economy-wide problem, taxation has nonetheless an important role to play.

5.2.1 Broader Impacts of the Plan

In addition to the contribution of the policies and measures contained in this Plan to achieve our climate and energy targets, many of the changes that are required will have positive economic and societal co-benefits, including cleaner air, warmer homes, and a more sustainable economy for the long term. In line with the UN Sustainable Development Goals, climate action must be seen as complementary to other important policy objectives, such as promoting sustainable economic development pathways, improving energy security, and addressing air pollution impacts on human health. For example, a significant shift away from internal combustion engine vehicles in the transport sector, and the retrofitting of existing buildings with electricity-powered heat pump systems, are expected to result in significant improvements in local air quality metrics and health outcomes.

There are many co-benefits of climate action such as improved health and wellbeing that are achievable and can enhance social equality. The benefits span from individual wellbeing to community cohesion and resilience. Transitioning from fossil fuels to renewable energy sources can significantly reduce air pollution, leading to fewer respiratory illnesses and premature deaths. Transforming places through integrated spatial planning and compact urban redesign, and through placemaking, can boost liveability, stimulate the regeneration of urban and rural centres, improve rural connectivity, increase access to green and blue spaces, offer benefits to local businesses and build more cohesive and resilient communities. These transformations can lead to improved physical and mental health and wellbeing. Mobility solutions can promote healthy lifestyles by encouraging walking and cycling and can offer better accessibility. Improving the energy efficiency of buildings can bring improved indoor air quality, thermal comfort benefits and financial savings, and can build resilience to extreme events. Sustainable agriculture and reduced meat consumption can lead to more resilient food systems and healthier diets.

There is significant potential for Ireland to build prosperous livelihoods in the sustainable and resilient economy of the 21st century. Ireland has demonstrated success in long-term structural transformation to low emissions activity in services. Policy and analysis have tended to focus more narrowly on technological transition and management practices and on the circular economy and bioeconomy. Further economic opportunities exist in services sectors, both public and private, and in emissions-reducing and environmentally enhancing

activities. Building such livelihoods requires alignment of enabling measures that can support growth in sustainable social and local enterprises in addition to sustainable industrial development.

A national vision and strategy on prosperous livelihoods is needed to take advantage of the multiple opportunities of transformation. Elements of transitions and transformations to a low-emissions future are already under way, both globally and nationally, offering the potential for Ireland to build sustainable, prosperous, and resilient livelihoods. Enabling measures related to livelihoods can include conventional education, training and social protection, and innovative frontier measures such as universal basic services, universal basic income, and the shorter working week. Nationally, these opportunities have yet to be fully explored, requiring analysis and the building of long-term national visions for livelihoods to motivate progressive action. The design and implementation of long-term strategic policy for sustainable and resilient livelihoods will be needed to deliver on this potential. Possible routes to address the economic costs of policy change include the winding down of harmful subsidies, using environmental tax revenue and reform of general taxation and spending.

Adopting a holistic and systemic way of thinking is a necessary condition to identify and maximise win– win outcomes, across multiple social, environmental, and economic development priorities. This can be enabled by mainstreaming and prioritising sustainability, equity and wellbeing as fundamental values and goals of transformations, followed by reformulating policy and implementation directly towards achievement of these policy synergies. Systems change has the potential to improve human wellbeing in both the near and long terms.

Rising to this challenge is important not just for Ireland’s long-term economic and societal interests, but also in relation to the attractiveness of Ireland as a location for Foreign Direct Investment (FDI), as a tourism destination, and as a source of safe, high-quality agricultural and food products. In addition, our increased climate ambition will help to secure our international reputation, which in turn will underpin our ability to promote international policy objectives. This includes the priorities set out in Ireland’s new international development policy, A Better World, which explicitly places climate action as a core policy priority for Ireland’s global partnerships, in recognition of the adverse and dangerous impacts that it poses to the realisation of the SDGs.

The Department of Tourism, Culture, Arts, Gaeltacht, Sport, and Media plans to publish a new national tourism policy framework in the coming months. The policy framework will

mainstream environmental, economic, and societal sustainability across the entire tourism sector. The overall policy framework will be to ensure that by 2030 Ireland will have a thriving tourism sector, the continued development of which is consistent with our climate change commitments.

One aspect of the revision of the National Adaptation Framework (see section 3.1.3.2 of this NECP), is the updating of existing sectoral climate adaptation plans (Table 25). In parallel, DTCAGSM will lead the preparation of a Sectoral Adaption Plan for the tourism sector, in collaboration with stakeholder agencies. A tourism Sectoral Adaptation Team has been established to undertake this work.

5.2.2 Health

IEA analysis suggests energy efficiency retrofits in buildings create conditions that support improved occupant health and well-being. In terms of distribution, such benefits are particularly prevalent among vulnerable groups such as children, the elderly and those with pre-existing illnesses. Benefits include improved physical health such as reduced symptoms of respiratory and cardiovascular conditions, rheumatism, arthritis, and allergies, as well as fewer injuries. In quantifying these benefits, studies have found benefit to cost ratios of up to 4:1 when health and well-being impacts were included, with health benefits representing up to 75% of overall benefits. Improved mental health (reduced chronic stress and depression) has, in some cases, been seen to represent as much as half of total health benefits. Realised health improvements generate downstream social and economic impacts, including lower public health spending.

These health and well-being benefits are being validated in an Irish context under the Warmth and Wellbeing Scheme. The scheme aims to objectively measure and validate the health and wellbeing impacts of improving the living conditions of vulnerable people living in energy poverty with chronic respiratory conditions. The scheme was a collaboration between DECC and the Department of Health and was jointly administered by the Health Service Executive and the Sustainable Energy Authority of Ireland. Since 2016, almost 1,500 homes received free upgrades to their homes, including attic and wall insulation, window and door replacement and heating system upgrades where needed.

The London School of Hygiene and Tropical Medicine (LSHTM) were engaged to carry out, in collaboration with the HSE, an independent analysis of the health impacts of improved energy efficiency among the participants in the research element of this scheme. A report

has been submitted to the Department and is now subject to final reviews and comments for the project team. The report will be published in full shortly when it is finalised.

The report shows positive results for the participants resulting from the energy efficiency upgrades carried out in their homes. These included:

- Warmer, more comfortable homes, with heating systems that are easier to control;
- Improved physical health including reduced pain;
- Improved mental health and wellbeing including reduced feelings of anxiety and depression;
- Reduced visits to GP and A&E and fewer incidences requiring hospitalisation;
- Reduced prescription drug usage for their respiratory conditions;
- Being more comfortable inviting other to their homes.

Decarbonisation of heat and transport may also lead to health gains where levels of fine particulate matter ($PM_{2.5}$) air pollution are reduced. Biomass combustion for renewable heat can increase levels of air pollution so careful consideration of this potential negative health impact is required when assessing renewable heat policy. The WHO guidelines recognise that “no threshold has been identified below which there is no damage to health. Therefore, the WHO recommend aiming for the lowest concentrations of particulate matter possible.” Therefore, reduced adverse health impacts from reduced air pollution in Ireland can be a significant co-benefit of the decarbonisation of power generation, heat, and transport where climate and clean air policy objectives are fully aligned.

Recent research shows that air pollution has greater impacts on human health at lower levels than was previously understood. The impacts of air pollution (in particular, nitrogen pollution) on biodiversity and habitats are an area of growing concern. This increased understanding of the importance of air pollution has led to a requirement for strengthening policy responses on air quality for which DECC has primary responsibility. The impact of sectoral policies on the quality of the air we breathe, such as energy, transport, and agriculture, is becoming clearer. Initiatives to tackle GHG emissions over the last decade have led to the incentivisation of biomass for heating and diesel for motoring while in the agricultural sector increased livestock numbers has highlighted the impacts of, and challenges in, reducing ammonia emissions as well as greenhouse gases such as methane.

These unintended consequences illustrate the need for a means to integrate air quality concerns into broader policy making. They also demonstrate the need to align air quality, climate, and energy policy to ensure positive outcomes for human health and the environment.

Citizen involvement is a key pillar of our CAP. To underpin this aspect of the green transition the CAP sets out specific strategies including:

- Engagement Capacity Building and empowering Local Community Action;
- Realising the new economic opportunities in communities and regions;
- Just Transition for those facing particular challenges in adjusting through reskilling, energy poverty schemes and community participation;
- Empowering the new generation to have their voices heard and get access to the relevant information and science and the opportunity to lead change. Investment in the low carbon economy has the potential to create quality jobs and support local communities and workers in regions most strongly impacted by the on-going transformation to a decarbonised society. Fully realising the economic opportunities in the low carbon economy is vital to ensuring a 'Just Transition.'

5.2.3 Skills and Jobs

i. Skills Ecosystem

Ireland has a responsive and flexible skills ecosystem, designed to provide agile responses to emerging skills requirements, including in the priority area of the green transition. The National Skills Council (NSC) and nine Regional Skills Fora (RSF) foster engagement and collaboration between relevant government departments and agencies, the education and training system and enterprise. The NSC, launched in April 2017, is an advisory, non-statutory body made up of high-level representatives from public and private organisations. The Department of Further and Higher Education, Research, Innovation and Science (DFHERIS) has taken a series of steps to strengthen coordination and cooperation across the skills ecosystem, which has allowed for better utilisation of the skills intelligence and forecasting systems which inform the Council's work.

The broader skills ecosystem also encompasses entities including:

- The Skills and Labour Market Research Unit (SLMRU, hosted in SOLAS)

- The Expert Group on Future Skills Needs (EGFSN, Department of Enterprise, Trade and Employment)
- The National Training Fund Advisory Group (NTFAG, Department of Further and Higher Education, Research, Innovation and Science).

While DFHERIS has responsibility for skills policy, this broader skills ecosystem informs and drives responsive, flexible forecasting, planning and provision.

Since 2021, Ireland's skills ecosystem has produced a number of studies and analyses of skills requirements and skills shortages resulting from the green transition. The results of these analyses, detailed below, are guiding skills responses in this area.

ii. Skills demands

The Expert Group on Future Skills Needs report, *S*kills for Zero Carbon – The Demand for Renewable Energy, Residential Retrofit and EV Deployment Skills to 2030[53], was published in November 2021. This report sets out the demand for, and nature of, the skills required to deliver on key elements of Ireland's climate ambitions to 2030. It identifies the nature and scale of the skills needs of enterprises supporting the transition to a low carbon economy and includes a suite of recommendations that can be drawn upon to ensure that these future skills needs are fully addressed.

In the area of domestic retrofit and heat pump installation, Skills for Zero Carbon estimates FTE labour demand based on government targets of retrofitting 500,000 homes to B2 standard and installing 400,000 heat pumps by 2030. Overall, the model suggests that labour demand will increase rapidly, with demand reaching 17,400 FTE by 2030. The report also provides modelled FTE labour demand for job types, with insulation and airtightness works the largest category, creating demand of approximately 4,500 FTE by 2030.

Labour and skills requirements for domestic retrofit have also been analysed in the December 2022 Report on the Analysis of Skills for Residential Construction & Retrofitting, 2023 to 2030,[54] commissioned by SOLAS and DFHERIS. This report quantifies the additional construction skills required to deliver the Government's targets in new housing and

[53] https://www.egfsn.ie/all-publications/2021/skills-for-zero-carbon.html

[54] https://www.gov.ie/en/publication/10ae6-report-on-the-analysis-of-skills-for-residential-construction-retrofitting-2023-to-2030/

the retrofitting over the period 2023-2030. It considers the skills required to retrofit 446,300 homes, taking account of progress made towards the overall domestic retrofit target of 500,000 at the time of the report's publication. This report found that 22,779 new skilled workers would be required by 2030 to meet domestic retrofitting targets. These new entrants may be a combination of workers currently employed in the industry who are seeking to upskill, or jobseekers who wish to pursue a career in building or retrofitting. An updated version of the report, including updated projections, will be available later in 2024.

Skills for Zero Carbon also provides estimates of labour demand resulting from the broader adoption of EV technology. The report estimates that, by 2030, approximately 2,900 FTE mechanics with EV skills will be required, representing an average annual re-skilling requirement of just under 300 mechanics per year. The report further notes that labour demand for internal combustion engine (ICE) mechanics will continue, given that ICE vehicles will likely represent a sizeable share of the vehicle fleet until the 2040s at least, even as electric vehicle usage expands. The demand for ICE mechanics is, however, projected to decline from 2027 onwards, resulting in an overall reduction in labour demand for vehicle mechanics of approximately 1,200 FTE by 2030. It should be noted, however, that this modelling for electric vehicle skills requirements was conducted in 2021 and based on the previous target of 840,000 passenger EVs on Irish roads by 2030. To account for up-to-date targets and monitor emerging demands SOLAS is establishing, in Q1 2024, a new skills oversight group for electric vehicles and electro-mobility.

In the area of renewable energy, Skills for Zero Carbon provides modelled labour demand for the development of 5 GW of new offshore wind, 4 GW of new onshore wind, and 2.9 GW of new grid-scale solar energy by 2030. This was forecast to triple from approximately 3,500 FTE per year in 2020 to over 9,000 FTE per annum in 2030. The report also noted that as onshore wind is a comparatively mature industry in Ireland, most of this growth in labour demand is expected to come from offshore wind and solar, with growth in onshore wind more moderate. Labour requirements for the development of 5 GW of offshore wind are modelled in more granular detail in the Building our Potential: Ireland's Offshore Wind Skills and Talent Needs report, funded by Skillnet Ireland and commissioned by Greentech Skillnet, the business development agency for the renewable energy sector.[55] This report was undertaken in close collaboration with the Irish Government's Offshore Wind Delivery

[55] https://www.skillnetireland.ie/insights/building-our-potential-irelands-offshore-wind-skills-and-talent-needs

Taskforce, and officials from DFHERIS and DECC. The report details the significant jobs opportunities that can be realised within this sector. It projects two scenarios:

- 'Business As Usual' – the minimum likely demand in terms of workforce and skills development needed to reach Ireland's offshore wind targets.
- 'Intervention' scenario – where action is taken by Government and industry to maximise Irish content by addressing skills shortages and investing in infrastructure.

In the Business-as-Usual scenario, there is a cumulative labour demand of at least 19,500 FTE years up to 2030. In the Intervention scenario, demand rises to 30,000 FTE years. This equates to 2,800 FTE in an average year to 2030 under 'Business as Usual', and 4,200 FTE in an average year to 2030 under 'Intervention'. The report also develops a list of 42 key job roles likely be required in Ireland, along with the critical skills required for each, current shortages, and FTE projections. These roles range across the different lifecycle stages of an offshore windfarm, and include roles such as consents managers, community liaison officers, marine ecologists, electrical engineers, marine engineers, electrical technicians, port operatives, wind turbine technicians, and mariners.

iii. Skills for the Green Transition

Continuous pre-emptive workforce development is required to maximise opportunities in the green transition. Ireland's higher and further education systems are providing in-demand training to respond to the decarbonisation of the economy by adapting existing provision, and putting in place additional, training spaces where needed. Ireland's further education model is centred on apprenticeships, transferrable skills, and lifelong learning, to keep pace with future changes. Ireland's skills architecture will minimise skills mismatches and ensure the approach to skills development is routed towards the green transition and broader areas of opportunity and growth.

SOLAS's Green Skills for the FET Roadmap 2021-2030 is guiding the response of the further education and training (FET) sector to the future skills requirements of the green economy, including the development of specific and transversal green skills. This outlines three core objectives in respect of green skills in the FET sector:

- Developing Green Skills for Life, including the expansion of green skills training and awareness across the FET sector;

- Developing Green Skills for Construction, including training and upskilling those in construction in the latest green technologies; and
- Green Skills for Careers, to create career opportunities in the green economy for the employed, unemployed and those within vulnerable sectors.

The FET sector has been leading the response to the skills required for the decarbonisation of the built environment. A key measure here has been the development of a network of six NZEB/Retrofit Centres of Excellence which now operate in Laois Offaly Education and Training Board, Waterford Wexford Education and Training Board, Limerick Clare Education and Training Board, Cork Education and Training Board, Mayo-Sligo-Leitrim Education and Training Board, and City of Dublin Education and Training Board. These Centres of Excellence offer targeted upskilling courses aimed at those working in the construction sector. These NZEB courses are free, fast, and flexible with weekend and evening provision available. Course duration varies between 1 and 5 days, depending on the knowledge and skills required by the individual. Online/ remote options are also available. In many cases, where a person has an existing construction-related qualification, knowledge, or experience, they can learn these skills quickly, usually within three-four days. Over 20 courses are now available, with further provision planned. Since courses began in 2020, the number of enrolments has continued to increase steadily, rising from 793 in 2021, to 2,034 in 2022, and a record 4,452 in 2023. Under CAP 2024, SOLAS aims to expand enrolment numbers by at least a further 10% in 2024.

The NZEB/Retrofit Centres of Excellence provide targeted upskilling opportunities to the existing construction workforce. This is complemented by efforts build a skills pipeline by embedding NZEB/Retrofit skills into the curricula of relevant construction apprenticeships through the revalidation process. The NZEB Fundamentals Course, which is offered through the Centre of Excellence network, has been included as a specific module in Phase 2 of the Plumbing and Electrical Apprenticeships which were revalidated in June 2023. NZEB is embedded in Technical Guidance Document L (Conservation of Fuel and Energy – Dwellings) and thus is embedded in the Carpentry & Joinery curriculum. NZEB awareness will also be addressed in the Brick & Stone; Plastering; Refrigeration & Air Conditioning; and Pipefitting apprenticeship programmes when they are due to go through a revalidation process. Modern Methods of Construction provision has also been incorporated into the relevant recently revalidated Craft Apprenticeship Programmes where appropriate.

More broadly, Ireland's apprenticeship system is adapting to the skills requirements of the green transition by developing and updating curricula. The revised Electrical curriculum will incorporate modules on Alternative Electrical Energy Sources covering Solar PV Generation, Wind Generation, Energy Storage Technologies, and EV Charging. The Plumbing Curriculum will also incorporate a module on Renewable and Sustainable Energy covering Water Conservation Systems, Solar Heating Technology, Heat Pump Technology and Biomass Technology and Installation. Electric vehicle skills are also being incorporated into the curricula of apprenticeships in the motor family of trades as they go through revalidation. Automotive Technology will have a new module on Hybrid and Electric Vehicle Technology, as well as an introduction to alternative fuel types. While Heavy Vehicle Mechanics will also include a new EV/Hybrid module and Alternative Fuels module.

In higher education, the Irish government has been emphasising the importance of green skills to meet the demands of the modern workforce. Existing Government Initiatives such as Springboard+ and Human Capital Initiative (HCI) are in place to promote these skills and build the skills of the Irish workforce.

Springboard+ and HCI Pillar 1 complement the core State-funded education and training system and provide free and subsidised upskilling and reskilling higher education opportunities in areas of identified skills need. Courses are available to those employed, unemployed and those returning to the workforce. Courses are from Level 6 to Level 9 on the NFQ. All courses provide job-readiness training and most offer the opportunity for work placement, project-based learning, or industry site visits where appropriate. The Human Capital Initiative (HCI) is a 5 year (2020-2024) €300m investment aimed at driving innovation and agility in higher education. HCI is funded from the National Training Fund and sees our higher education institutions, enterprise partners and state agencies working together to address the key challenges the country is facing. HCI Pillar 1 funds upskilling programmes, Pillar 2 funds undergraduate places, and Pillar 3 drives innovation.

Springboard+ and the Human Capital Initiative (HCI) Pillar 1 play a vital role in the response to the green transition by providing funding for programmes in areas that promote green skills. Under Springboard+ 2023, there are 20 courses in green skills and green skills related areas providing 610 places. Under HCI Pillar 1, there are 22 courses in green skills and green skills related areas, providing 536 places.

HCI Pillar 3 has a budget of approximately €200 million over five years. It funds 24 projects, 17 of which involve collaborations between institutions. Each of these projects align

innovation and agility with national strategic objectives and future skills needs for society and the economy. HCI Pillar 3 and its constituent projects are having a significant impact on Ireland's higher education sector, and the growth of the Irish economy and skills base. HCI Pillar 3 has 12 projects that focus on Green Skills. These projects include:

The Sustainable Futures project is led by University College Cork in collaboration with Maynooth University, Atlantic Technological University, and multiple industry partners. The project involves the co-development of a systemic and integrated suite of new courses under the theme of Sustainability in Enterprise: Delivering a Low Carbon Future, designed to respond to emerging priority skills needs for enterprise during the transition to a circular and clean economy.

The Resilient Design Curricula for 21st Century Professionals project is piloting radical revision in architectural education to prioritise United Nations Sustainable Development Goals 2030 Climate Action (SDG 13.3) and Sustainable Housing (SDG 11.1), and the aligned Irish government policies of the Climate Action Plan and Housing for All. The project brings together all the Schools of Architecture in Ireland, with the aim of refocussing the architecture curriculum to have a sustainability focus.

Ireland's Knowledge Centre for Carbon, Climate, and Community Action (IKC3) is building a national platform for the development of knowledge and skills to support the transition to a decarbonised and sustainable economy. The consortium, led by Munster Technological University in collaboration with Trinity College Dublin and University College Dublin, involves a national and EU network of partners, and aims to take an innovative approach to education, integrating state of the art pedagogies and learning pathways. Approaches include stackable micro-credential courses, summer schools, dual and collaborative learning via deep learning demonstrations, micro-credentials, and digitisation.

Digital Academy for the Sustainable Built Environment (DASBE) seeks to create a National Digital Academy that enables the construction industry, SMEs, manufacturers, and workers to upskill and gain new knowledge in a cost-effective learning environment. Twenty-seven new programmes were developed to date within the DASBE project, which is led by Technological University of the Shannon: Midlands Midwest.

DCU Futures, a five-year, €19.9 million project led by Dublin City University is the most ambitious innovation in teaching and learning in the history of DCU. This project re-imagines undergraduate education to empower students in a world defined by unprecedented

technological and social change. The initiative aims to create capacity for over 1,000 additional students. DCU Futures involves reshaping the undergraduate learning journey by integrating classroom learning with real-world applications, strengthening digital skills, subject-specific competencies, and versatile cross-disciplinary abilities. DCU Futures has developed 10 new undergraduate programs, including a new BA in Climate and Environmental Sustainability.

Through HCI Pillar 3, in March 2024, DFHERIS also announced the allocation of €9.7 million to subsidise fees for approximately 14,000 learners across 654 micro-credential courses, ranging from 1 to 30 ECTS and spanning Levels 6-9 on the National Framework of Qualifications. A subsidy rate of 80% applies for courses addressing skills in key priority areas, including renewable energy, sustainability, construction and planning, artificial intelligence, cyber security, ICT, and electronic engineering. Other courses will provide a 50% learner subsidy rate. The subsidies offer learners a unique opportunity to access high-quality education at reduced rates, fostering a culture of lifelong learning and upskilling.

There are 1,755 places available on 81 micro-credential courses in green skills or green skills related areas.

In relation to renewable energy and offshore wind skills, in particular, Ireland's further and higher education sectors currently offer a range of courses which are directly relevant. These include the newly developed Wind Turbine Maintenance Technician apprenticeship. Kerry ETB is the coordinating provider for this Level 6, three-year programme, which has seen 26 apprentices enrol since it was launched in March 2022.

Through HCI Pillar 1, three courses specific to offshore wind were offered from September 2023, namely:

- Level 9 Offshore Wind and Ocean Energy Conversion, UCC
- Level 9 Postgraduate Certificate in Offshore Renewable Energy, UCC
- Level 9 Certificate in Leadership in Offshore Renewable Energy (MW), TUS

Greentech Skillnet, which is co-funded by industry and the Department, through Skillnet Ireland, supports the workforce development needs of businesses within the renewable energy sector. Greentech Skillnet is promoted by Wind Energy Ireland, and delivers critical upskilling supports to meet the skills needs to achieve our Climate Action Plan targets. Each year upskilling supports are provided to over 900 people in over 350 businesses across the

country. In 2023, Skillnet Ireland provided over €1,500,000 in grant funding to deliver industry-led upskilling programmes, research, and industry projects to the renewable energies sector. When combined with private sector match contributions, the GreenTech Skillnet full budget exceeded €2,100,000 in 2023. Greentech Skillnet offers a wide range of short upskilling and reskilling courses, and longer training programmes, of relevance both to renewable energy sector in general, and offshore wind in particular. Programmes delivered include the Skills Connect Wind Turbine Technician Programme, which supports approximately 30 unemployed people each year to become a fully certified Wind Turbine Technicians, and the Work in Wind (Graduate Level) training and work placement programme, which has supported over 90 people to choose a career in wind since 2021. In line with the findings of the Building our Potential report, Skillnet Ireland is expanding its provision in the area of offshore wind, through the creation of a matched skills development fund specifically for offshore wind. This fund will be created during 2024.

5.3 Overview of investment needs

Ireland strongly supports the transition to a low-carbon, more resource-efficient and sustainable economy. To deliver on climate, environmental and social sustainability goals, major private and public investments has already been deployed, this will need to continue and ramp up out to 2030 and beyond. The scale of the challenge is significant, and the investment required to deliver the green transition is substantial. Europe needs to invest €700bn annually to meet its energy transition goals to combat climate change (2023 Strategic Foresight Report). It is not possible to give a complete assessment of the investments required or the macroeconomic implications at this point.

As highlighted earlier in this chapter, to investigate the combined macroeconomic, fiscal, expenditure and investment impacts across households and production sectors, the Department of Finance, and the Department of Public Expenditure, NDP Delivery and Reform (DPENDR) are funding and supporting climate macroeconomic modelling work in the ESRI. This work, to advance our macroeconomic, fiscal, and distributional analysis of climate change using the Institute's I3E (Ireland, Environment, Energy and Economy) model is in tandem with the wider climate research programme being led by DECC and progressed through the Climate Research and Modelling Group chaired by the Department of the Taoiseach. Findings from this research will be used to inform future developments in the NECP process.

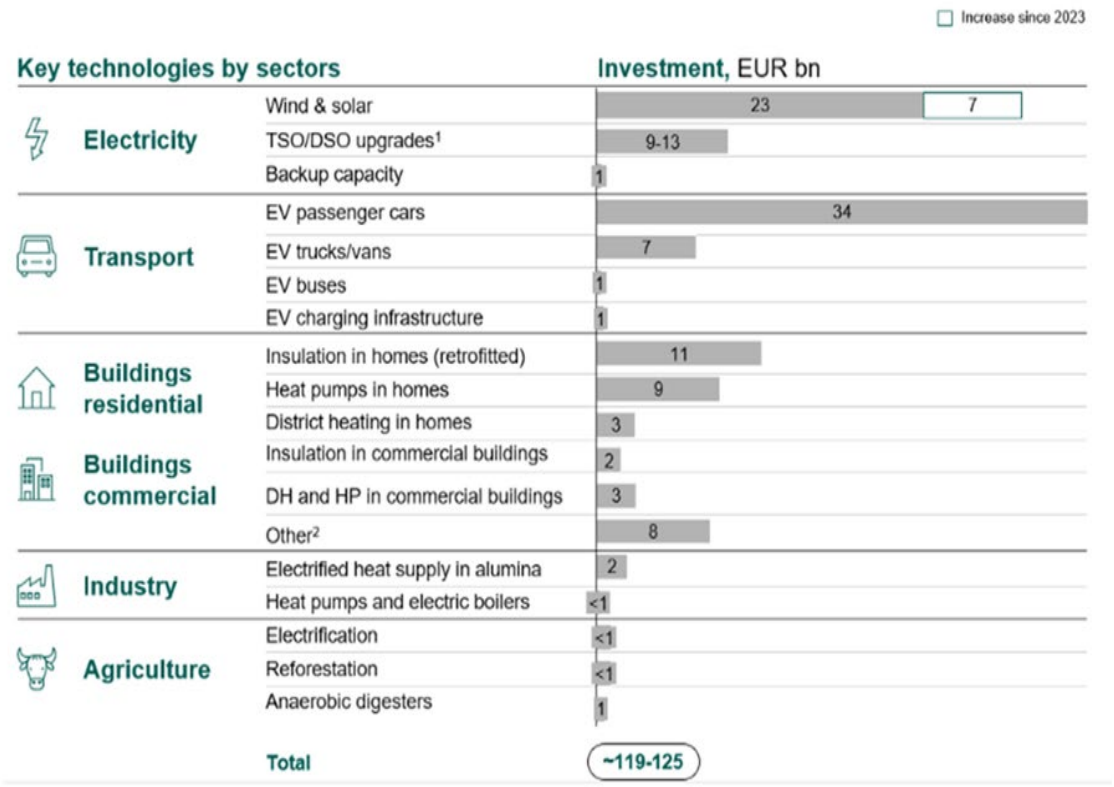


Figure 56: Estimated Investment Required to Mobilise Key Technologies (Source: CAP 2024, Figure 5.3).

Project Ireland 2040 is the Government's long-term overarching strategy to make Ireland a better country for all and to build a more resilient and sustainable future. The strategy ensures the alignment of investment plans with the stated National Strategic Objectives for 2040 in a considered, cohesive, and defined manner. This represents a shift from the approach of the past, which saw funding spread thinly across sectors and public investment decisions. Alongside the development of physical infrastructure, Project Ireland 2040 supports business and communities across all of Ireland in realising their potential. The National Planning Framework (NPF) (2019) and the National development Plan (NDP) 2021-2030 (2021) combine to form Project Ireland 2040. The NPF sets the vision and strategy for the development of our country to 2040 and the NDP provides the enabling investment to implement that strategy. The NPF stipulates that Ireland's planning system provide an established means through which to implement and integrate climate change objectives, including adaptation, at regional and local level and the transition to a low carbon and climate resilient society. The NPF specifically includes the following objectives:

National Policy Objective 53 – Support the circular and bioeconomy including through greater efficiency in land management, greater use of renewable resources and by reducing the rate of land use change from urban sprawl and new development.

National Planning Objective 54 – Reduce our carbon footprint by integrating climate action into the planning system in support of national targets for climate policy mitigation and adaptation objectives, as well as targets for GHG emissions reductions.

National Policy Objective 55 – Promote RE use and generation at appropriate locations within the built and natural environment to meet national objectives towards achieving a low carbon economy by 2050.

These national policy objectives also directly inform regional and local decision-making. Underneath the NPF sit the three Regional Spatial and Economic Strategies for each Regional Assembly.

The National Development Plan 2021-2030 (NDP) is the largest delivered in the history of the State, investing €165bn on priority solutions to strengthen housing, climate ambitions, transport, healthcare, jobs growth in every region and economic renewal for the decade. This will bring public investment to 5% of GNI, well above the EU average of 3% of GDP. This is a cross-departmental plan with linkages between sectors to meet National Strategic Outcomes (NSOs). An example of this is a transport-led housing development approach which will allow for the emergence of sustainable and well-connected communities where active travel is feasible. Along with allocations in the NDP supporting the realisation of Housing for All with investment to deliver an average of 6,000 affordable homes each year, significant investment is prioritised to meet ambitious climate targets.

The NDP has been designed to ensure that it supports the Government's climate ambitions. For the first time in Ireland, climate, and environmental assessment of the NDP measures was undertaken, along with an assessment of the alignment of the NDP as a whole with the principle of a green recovery. In 2023 the Department of Public Expenditure and Reform changed its name to the Department of Public Expenditure, NDP Delivery and Reform, highlighting the Government's commitment to delivering on its 2030 targets. Enhanced analytical capacity is being developed by the Department of Public Expenditure, NDP Delivery and Reform and the Department of Finance in collaboration with the ESRI to better assess and model the required investments and macroeconomic implications of Ireland's enhanced climate governance framework.

The NECP includes two planned electricity interconnectors. The Greenlink interconnector to Wales is a proposed €500m project. While the project is proposed as a private (merchant) investment, the promoters have been granted a “Cap and Floor” regulatory treatment for the interconnector from the Irish and UK regulators. Under such a regulatory arrangement, if revenue from the interconnector operations were to fall below the “floor” price, then the Irish and British consumers would fund the difference. The Celtic interconnector, proposed by the Irish and French TSOs, is approx. €1.19bn investment that will be funded in part by a CEF grant of €530m and in part by electricity consumers in Ireland and France. For both interconnectors, the consumer portion of the cost would be “socialised” – the costs will be included in the costs of distribution networks in the same way as all other electricity infrastructure investments are paid for.

Macroeconomic modelling

Modelling is needed to investigate the combined macroeconomic impacts of different policies across households and production sectors. A whole-of-Government approach is being taken to develop a modelling framework that can analyse the macroeconomic, fiscal, and distributional impacts of the climate transition. The Department of Public Expenditure, NDP Delivery and Reform (DPENDR) and the Department of Finance are funding and supporting climate macroeconomic modelling work in the Economic and Social Research Institute (ESRI). This work, to advance our macroeconomic, fiscal, and distributional analysis of climate change using the Institute’s I3E (Ireland, Environment, Energy and Economy) model is in concert with the wider climate research programme being led by DECC and progressed through the Climate Research and Modelling Group chaired by the Department of the Taoiseach.

Ireland Environment, Energy and Economy model (I3E)

Designing appropriate energy policies to ensure a smooth and least-cost transition to a low-carbon economy is imperative. Research is needed to better understand the economic and environmental impacts of policies to advise the policy-making process. For this purpose, the Ireland Environment, Energy and Economy model (I3E) has been developed.

The I3E model is a small open economy single country intertemporal computable general equilibrium (CGE) model with multiple firms, heterogeneous representative household groups (RHGs), multiple commodities, government, enterprises, and rest of the world accounts. In addition to the small open economy assumption, all markets in the I3E model operate under the perfect competition assumption. These two assumptions make all

economic agents a price-taker. In other words, neither firms nor consumers operating and living in Ireland can control or influence the equilibrium prices in both world markets and the Irish economy.

Economic opportunities in transitions and transformations

The Global Commission on Economy and Climate have noted the shortcomings of existing economic models in accounting for economic gains from transition[56]. The GCEC (2018) made a conservative estimate of a net global economic benefit of US$26 trillion through to 2030 if there is bold transformative policy action.

There is evidence of policy innovation in Ireland's development of green budgeting, with the state being one of the first EU Member States to do so, and in national development of green investment bonds. Irish involvement has also been evident in international sustainable finance in the United Nations Development Programme's Financial Centres for Sustainability initiative, a programme to accelerate sustainable finance, including policies to enable sustainable infrastructure. Irish policy has developed a Sustainable Finance Roadmap[57] as a multilateral public and private initiative with 18 priority measures. This includes a strategic goal of developing Ireland as a leading sustainable finance centre by 2025, and the aim of mobilising private finance to support investment towards achieving climate action targets.

Mobilising Private Sector Investment

The low-carbon transition will require significant private investment alongside Exchequer expenditure on a sustained basis over a number of decades. This investment will cover a range of activities: Developing disruptive innovations;

- Expanding new types of infrastructure, including clean sources of energy;
- Adapting existing infrastructures, such as retrofitting homes and offices to make them more energy efficient.

In order to meet the targets and objectives of the CAP, it is necessary to direct the private sector towards financing the necessary investments. We are taking the lead in developing innovative approaches to financing our decarbonisation objectives and have implemented

[56] Available here: newclimateeconomy.report

[57] Sustainable Finance Ireland, 2021, Available here: https://www.irishaid.ie/news-publications/publications/publicationsarchive/2023/march/irelands-climate-and-environmental-finance-report-2021.html

new measures including the Home Energy Upgrade Loan Scheme. To meet the scale of this challenge, the financial sector itself will also need to bring innovative solutions to the market.

Through the commercial State sector and other Public Bodies, we will seek to leverage the significant volumes of private sector capital that is available for well-structured projects, including wind (both onshore and offshore) and solar electricity generation, interconnection, and major transport infrastructure. NewERA will continue to work with the commercial State companies, the Ireland Strategic Investment Fund, the Strategic Banking Corporation of Ireland, and other Public Bodies, to identify priority opportunities in key sectors to mobilise private investment towards assisting in meeting our climate objectives.

The European Investment Bank (EIB), as the financing arm of the EU, is one of the world's main financiers of climate action and environmental sustainability. The EIB is supporting Ireland's transition to a low carbon, energy efficient, sustainable economy with investments in sectors, including public infrastructure, transport, housing, and renewable energy, among others. The EIB provides around €1 billion per annum in financing and investments to Ireland, with a target of 50% of this figure to be dedicated to climate action and environmental sustainability that aligns with the goals of the Paris Agreement in support of the EU's aim to be carbon neutral by 2050. Underscoring the bank's commitment to supporting the climate transition in EU Member States, in November 2023 the EIB and the Government signed an agreement that underpinned the new €500 million Home Energy Upgrade Loan Scheme which will be administered by the Strategic Banking Corporation of Ireland.[58]

Promoting a Sustainable Financial System

Under EU rules, financial institutions, when they are funding the acquisition of assets, will be required to understand the climate resilience and the sustainability of the technology they are investing in, as well as other climate vulnerabilities their assets might face. The new EU Corporate Sustainability Reporting Directive (CSRD) puts sustainability reporting on the same footing as traditional financial reporting and will require companies, inter alia, to report sustainability standards on a 'double materiality' basis meaning companies must disclose the

[58] Róisín Moriarty, Tadhg O'Mahony and Agnieszka Stefaniec, Jean L. Boucher, Brian Caulfield, Hannah Daly and Diarmuid Torney, 2023, IRELAND'S CLIMATE CHANGE ASSESSMENT Volume 4: Realising the Benefits of Transition and Transformation, Environmental Protection Agency, Ireland, 284 pp,

risks their activities pose to the environment and people, as well as the potential risks their companies may face in a changing climate.

The CSRD will be mandatory for:

- Public interest entities currently within the scope of EU non-financial reporting rules that have greater than 500 employees as of 1 January 2024;
- Other larger companies and public interest entities with greater than 250 employees as of 1 January 2025;
- Listed small and medium-sized enterprises as of 1 January 2026, with an 'opt out' possible until 2028;
- Large subsidiaries and branches of non-EU companies with a net turnover of €150 million in the EU as of 1 January 2028

To support the financial system in directing essential investments into climate action, the EU has developed a science-based taxonomy as the gold standard for sustainable activities. This aims to scale up sustainable investment, both to underpin the ambitions of the European Green Deal and to support the achievement of Member States' own climate action objectives. It provides a consistent, science-based, classification framework to companies, investors, and policymakers, through which economic activities can be considered environmentally sustainable, and sets out the requirements that must be met by each activity for it to be sustainable. Requirements for climate adaption and mitigation are already in force, with requirements for other environmental objectives expected to enter into force in January 2024. The Central Bank of Ireland continues to work closely with European Supervisory Authorities to develop supervision of climate risks and to mobilise capital for green and low-carbon investments. The Central Bank is also a member of the Network for Greening the Financial System and, by directly engaging with financial service providers, is focussed on climate and environmental risks being assessed for banks and insurers, as well as investment firms and intermediaries. Since the launch by the National Treasury Management Agency (NTMA) of Ireland's first sovereign green bond (ISGB) in 2018, a total of €10.8 billion have been allocated to green projects. These proceeds are governed by a Green Bond Framework which commits Ireland to allocate monies equivalent to the proceeds raised in accordance with the International Capital Market Association standard. Examples of the types of projects which receive allocations include investment in public transport, and flood relief schemes. A second ISGB was issued in January 2023, for a nominal value of €3.5 billion, with the allocations applied in accordance with the framework.

The NTMA intends to continue to develop the market for ISGBs. Given the increase in regulatory focus, and increasing appetite for sustainable and green products, it is crucial to develop the necessary skills and leadership capacity, and to advance environment, social and governance best practices across Ireland's financial services sector in order to promote and develop a sustainable financial system that will facilitate increased investment in zero-emissions technologies. The Sustainable Finance Skillnet, as part of Skillnet Ireland, will continue to support the upskilling of Ireland's financial services sector.

Compliance costs

Ireland is legally bound to achieve carbon neutrality by 2050 and to stay within three sequential carbon budgets between 2021 and 2035. However, projections for Ireland based on existing plans show it missing its targets. At the moment, the specific costs associated with missing our European targets are not fully clear but there are various mechanisms in place across the major climate and energy Directives and Regulations that will require Member States to take action or to use exchequer funding where a target has been missed[59]. To avoid this possibility, the Irish Government is committed to accelerating the policies and measures in place to bridge the gap between our projections and our targets, as laid out in the latest CAP and in this document.

There are other potential costs in failing to show ambition on our climate and energy targets. From an investment perspective there may be reputational damage and a lack of confidence in the market if it appears that Ireland is not showing the required commitment. Non delivery of our stated targets and plans may also impact investment and the scale or rate of deployment from the private sector. Ireland's annual CAP cycle will continue to increase ambition and provide more concrete pathways towards our targets. The suite of policies and measures that are covered in this document should provide clarity on our level of commitment to forming a clear trajectory towards a carbon-neutral society.

Climate Change costs

Finally, there could also be additional costs arising from climate extremes, as more adverse extreme weather events become more frequent. Ireland has seen an increase in major weather events over time. Truly extreme heat events that are rare in the present climate are projected to become more common under all scenarios. Changes will be larger for the very

[59] Estimating the Potential Cost of Compliance with 2030 Climate and Energy Targets, DECC, 2023. Available at: https://assets.gov.ie/246850/5982d0ec-1590-4caf-8c40-ce8bf178f5fc.pdf

infrequent, 1-in-50-year events (based upon present climate) than for 1-in-10-year events. The change for Ireland would be considerably greater under late action than in Early action scenarios. Extreme cold events are conversely projected to become rarer, with greater reductions in the occurrence of what today would constitute 1-in-50-year events than in 1-in-10-year events. Extreme precipitation events for Ireland are projected to become more frequent, with changes in rarer 50-year events being more marked than 10- and 20-year return periods. Under the Late action scenario's projected for Ireland, the annual maximum daily rainfall that used to occur once every 50 years, on average, will become approximately twice as frequent. The shortening of recurrence times that is projected out to mid-century or so can be stabilised or even reversed under the Early action scenarios by the end of the century[60].

Climate system tipping points represent thresholds beyond which components of the Earth system permanently switch to new states. Global tipping points would have considerable impacts, including sea level rise from collapsing ice sheets, dieback of the Amazon rainforest and carbon release from thawing permafrost. Several such tipping points would have implications for Ireland either through further shifting global climate or altering the regional climate in the North Atlantic and north-western Europe.

For Ireland, the Atlantic Meridional Overturning Circulation (AMOC) is the most important potential tipping point for the Irish climate, given the importance of the North Atlantic in determining our climate and agricultural productivity. The AMOC will almost certainly weaken over the 21st century, and a full collapse cannot be ruled out. If there were to be a collapse in the AMOC, as has occurred repeatedly in the past during rapid climate transitions of past glacial phases, winters would become considerably colder and summers warmer, and there would likely be an increase in storminess and potential implications for sea levels. These would have very profound implications for the Irish climate and society.

Future global sea level rise projections over the coming centuries have large uncertainties. Particular concern relates to retrograde ice sheets where much of the ice sheet is grounded below present-day sea level, which could reach tipping points whereby they become committed to collapsing over a multi-centennial period. The largest such ice sheet is the

[60] Clare Noone, Deirdre McClean, Danielle Gallagher, Jennifer McElwain and Peter Thorne, 2023, IRELAND'S CLIMATE CHANGE ASSESSMENT Volume 1: Climate Science – Ireland in a Changing World, Environmental Protection Agency, Ireland, 228 pp,

West Antarctic Ice Sheet (WAIS), which alone could contribute several metres of sea level rise. Historical global emissions may have already committed it to its long-term collapse.

Both the Greenland and Antarctic ice sheets have been considerably smaller in past warm periods, but proxies cannot determine the pace of past ice sheet collapse. Under Late action scenarios, highly uncertain ice sheet instabilities mean that 2m of sea level rise this century cannot be ruled out[61].

Increased rainfall and rising temperatures carry risks of more regular flooding and wildfires, limiting these risks could require further adaptation costs beyond the €0.1 billion per annum allocated for flood defences in the National Development plan[62]. Projections of the macroeconomic damage caused by future climate change are needed to inform public and policy debates about adaptation, mitigation, and climate justice. Global projections of macroeconomic climate-change damages typically consider impacts from average annual and national temperatures over long-time horizons. The potential damage costs of these climate impacts could far exceed the mitigation costs required to limit them.

5.3.1 Carbon Tax

As per Sections 27, 28 and 29 of the Finance Act 2020, the carbon tax will increase by €7.50 a tonne. The increase on transport fuels is effective from 11th October 2023, while the increase on home heating fuels will not take place until 1st May 2024, after the winter heating season.

Table 75: Carbon Tax by Fuel Type

Fuel Type	Typical Fuel Bundle	2023 (€48.50)	2024 (€56.00)	Impact of +€7.50
Petrol	60 litre fill	8.28	9.56	+1.28
Auto Diesel	60 litre fill	9.58	11.06	+1.48
Kerosene	900 litre tank	125.47	144.87	+19.40
Peat	12.5kg bale	1.26	1.46	+0.20
Coal	40 kg bag	5.80	6.70	+0.90

[61] Clare Noone, Deirdre McClean, Danielle Gallagher, Jennifer McElwain and Peter Thorne, 2023, IRELAND'S CLIMATE CHANGE ASSESSMENT Summary for Policymakers in Volume 1: Climate Science – Ireland in a Changing World, Environmental Protection Agency, Ireland, 22 pp,

[62]What climate change means for Ireland's public finances, 2023. Available at: https://www.fiscalcouncil.ie/wp-content/uploads/2023/10/What-climate-change-means-for-Irelands-public-finances-Casey-and-Carroll-2023-Irish-Fiscal-Advisory-Council.pdf

Gas	11,000 kWh	109.49	126.47	+16.98

The Programme for Government commits to spending of €9.5bn using revenues raised by the planned increases in the carbon tax to 2030. As per the commitment in the Programme for Government, the revenue that will be raised by these increases in carbon tax will be used to:

- Ensure that the increases in the carbon tax are progressive by spending €3bn on targeted social welfare and other initiatives to prevent fuel poverty and ensure a just transition;
- Provide €5bn to part fund a socially progressive national retrofitting programme;
- Allocate €1.5bn of additional funding to encourage and incentivise farmers to farm in a greener and more sustainable way.

In line with these commitments, €788m is being allocated as part of Budget 2024 to climate action measures and to ensure the most vulnerable are protected from unintended impacts of the tax increase. This represents an increase of €165m on the amount funded from the Carbon Tax increases in 2023. These measures, the implementing Departments, and the proportional division are outlined in Table 76.

Table 76: Climate Action Measures by Department

Department	Measures Funded	2024 Allocation (€m)	2024 Additional (€m)	2023 Allocation (€m)
DECC	Residential & Community Energy Efficiency Green Climate Fund Just Transition Fund	388	**+89**	299
DSP	Targeted Social Protection Interventions	262	**+44**	218
DAFM	Incentivising Green & Sustainable Farming Green Agricultural Pilots	113	**+32**	81
D/Transport	Greenways/Urban Cycling EV charging infrastructure Providing Grants for EVs	20	**-**	20
DHLGH	Peatlands Rehabilitation	5	**-**	5
Total		**788**	**+165**	**623**

5.3.2 Sector or market risk factors

Public funding is, as in all jurisdictions, dependent on the pace of economic growth and planned tax takes being available to fund planned policies and measures. The Minister for Public Expenditure, NDP Delivery and Reform and the Minister for Finance set out the Medium-Term Fiscal Strategy in the Summer Economic Statement (SES). This strategy set out the overall levels of planned expenditure to 2025. This strategy set an anchor for overall core expenditure to grow each year by just over 5% on average over the period to 2025, broadly in line with the trend growth rate of the economy. Capital ceilings for the period have been set out in the revised National Development Plan, following detailed engagement with Departments, while the additional current funding available under the medium-term expenditure strategy will be allocated at a departmental level on an annual basis as part of the estimates process.

This framework was adjusted for 2023 and 2024 due to the higher than anticipated levels of inflation experienced. Under the Ministers and Secretaries Amendment Act 2013, the Minister for Public Expenditure, NDP Delivery and Reform has responsibility for setting out for Government agreement the Ministerial Expenditure Ceilings. Managing expenditure within these Ceilings and the related allocations voted by Dáil Éireann, and the terms of the sanction provided by the Minister for Public Expenditure, NDP Delivery and Reform, is a key responsibility of every Department and Minister.

Each Accounting Officer is personally responsible for:

- The safeguarding of public funds and property under his or her control with systems of internal control in place;
- Ensuring that Department of Public Expenditure, NDP Delivery & Reform sanction for expenditure has been obtained;
- Ensuring that all relevant financial considerations are taken fully into account, and, where necessary, brought to the attention of Ministers in relation to the preparation and implementation of policy proposals.

Legal requirements in regard to securing value for money in the use of public resources range from the responsibilities of Accounting Officers under the Comptroller and Auditor General (Amendment) Act, 1993, the obligations on Secretaries General of Government Departments and Heads of Offices under the Public Service Management Act, 1997, requirements on certain public bodies in legislation establishing and governing the operation

of those bodies, and requirements under EU Regulations and Directives governing such matters as EU public procurement requirements.

It is a legislative requirement under the Climate Action and Low Carbon Development Act, as amended, to develop national climate action plans that deliver the best possible value for money consistent with the sustainable management of the public finances and to maximise, as far as practicable, the net benefits to society taking into account the impact of greenhouse gas emissions.

The ability to harness increased amounts of electricity generated from renewable sources on a relatively isolated grid system such as Ireland's depends on innovation and technical solutions being brought forward and delivered on. Delays arising because of legislative appeals under the spatial planning system are also a risk to the delivery on time of planned infrastructure projects. It is assumed that EU regulation over the period will ensure that industry can deliver products meeting higher environmental standards. The exit of the UK from the EU presents Ireland with challenges. Ireland will be the EU Member State most affected by the UK's decision to leave the European Union. Decarbonising the transport sector will require a transition away from conventional fuel use to alternative fuels and new technologies. This transition must have the capacity to cater for increasing travel demand, consequently, it is imperative that investment decisions avoid inflexible 'lock-ins' that would inhibit or delay growth of the transport network. Major operational and infrastructural changes are costly and take time; therefore, an initial transition must not preclude any subsequent transitions between technologies as this will create undesirable and expensive delays in providing for transport expansion. Alternatively fuelled vehicles are currently still more expensive than conventionally fuelled options, although recent trends have seen the price of these vehicles drop. It is also important to note that alternatively fuelled right hand drive vehicles are less readily available; this is a particular risk factor in the bus sector where the number of models available is severely limited. Generally, as greater market availability of low and zero- emission vehicles become more pronounced their economic viability should continue to improve in the longer term. Transitioning to alternatively fuelled vehicles potentially requires a significant change in infrastructural and fuel supply requirements. Impact assessments of the capacity and availability of renewable power and gas supplies will be required as more vehicles convert to alternatively fuelled models.

5.3.3 Analysis of additional public finance support or resources to fill gaps identified under point 2

As set out in the Summer Economic Statement (SES) 2023, an additional €2.25 billion was made available to be allocated in the 2024 to 2026 period, with the distribution of the additional funding across Departments was agreed by Government in March 2024. Recognising the capacity constraints in the economy, the additional funding will be targeted at projects that are at the appropriate stage of development for advancement in 2025 and 2026. This would include the consideration of which sectors have been able to utilise existing NDP allocations in recent years and who have a good track record of delivery. This funding will facilitate the progression of important projects and enable more rapid development of key Programme for Government commitments, including the delivery of actions to fulfil our climate action plan commitments.

Additional public investment at a time of higher inflation has a significant risk of fuelling further inflation, and thereby not significantly boosting infrastructure outputs. The Government is investing sums well above the EU norms in the current and future years of the NDP. Extra tax receipts now are better put to use in future years where the guarantee of funding is less assured and would allow us to avoid the strongly pro-cyclical capital investment policy that has been the typical outcome of the past. In this context, the Future Ireland Fund and Infrastructure, Climate and Nature Fund Bill 2024 was published in April 2024. The proposed Infrastructure, Climate and Nature Fund will seek to deal with the pro-cyclicality of capital spending. A €14 billion reserve will be established over the period 2024 to 2030. The Fund will provide support for the economy in times of exceptional need, helping to smooth the investment cycle and avoid the ‘stop-start’ public capital investment that we have experienced in the past. It will also invest in the transition to a low carbon economy, with €3.15 billion being set aside specifically to invest in environmental projects that address climate change issues and nature and water quality degradation over the period 2026 to 2030.

5.4 Impacts of planned policies and measures described in section 3 on other Member States and regional co-operation at least until the last year of the period covered

by the plan, including comparison to projections with existing policies and measures

5.4.1 Impacts on the energy system in neighbouring and other Member States in the region to the extent possible

In light of the UK's exit from the EU, Ireland has been left in a position where planned policies and measures have little or no impact on other Member States.

Table 77: Projected electricity imports and exports (WEM)

	Unit	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2040	2050
Great Britain													
Electricity Imports	**GWh**	809.18	908.87	1630.93	1751.32	3503.70	2984.69	2092.16	3092.06	3379.37	3033.72	2501.47	2534.89
Electricity Exports	**GWh**	1742.14	1909.47	940.33	818.40	1385.97	1697.77	1918.29	1282.58	1308.53	1535.78	3579.28	6072.82
Northern Ireland													
Electricity Imports	**GWh**	1273.84	1048.71	1435.37	1887.27	1527.39	1725.68	1551.59	2211.65	1869.98	2649.20	1280.01	1160.91
Electricity Exports	**GWh**	746.38	1052.75	635.51	380.69	621.64	595.78	1167.11	964.57	1229.37	1367.32	4869.21	5696.78
France													
Electricity Imports	**GWh**	0.00	0.00	0.00	0.00	0.00	0.00	4960.31	4570.92	4526.40	3744.98	5734.34	5160.49
Electricity Exports	**GWh**	0.00	0.00	0.00	0.00	0.00	0.00	478.94	825.76	879.26	1395.62	3273.46	3752.93

Table 78: Projected electricity imports and exports (WAM)

	Unit	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2040	2050
Great Britain													
Electricity Imports	**GWh**	816.21	929.44	1616.6	1771.17	3431.70	2792.64	2046.08	3001.57	2748.11	2507.05	1871.08	1811.69
Electricity Exports	**GWh**	1726.49	1874.14	969.38	803.92	1453.31	1833.70	2163.77	1519.86	1914.44	2117.09	5181.26	8785.53
Northern Ireland													
Electricity Imports	**GWh**	1324.24	1072.22	1420.01	1867.86	1509.14	1674.26	1580.40	2092.06	1572.65	2186.42	1224.63	1059.87
Electricity Exports	**GWh**	719.84	1049.17	663.40	375.62	659.16	676.11	1341.83	1239.91	2079.83	2290.73	6189.08	7219.47
France													

Electricity Imports	**GWh**	0.00	0.00	0.00	0.00	0.00	0.00	4890.12	4456.81	4112.75	3342.70	4637.84	3677.51
Electricity Exports	**GWh**	0.00	0.00	0.00	0.00	0.00	0.00	559.41	935.64	1259.02	1835.64	4467.95	5420.85

5.4.2 Impacts on energy prices, utilities, and energy market integration

The planned Celtic Interconnector is likely to drive down electricity prices for the consumer through increased competition. An additional benefit will be Ireland's inclusion in the European IEM, where we can maintain higher levels of wind and renewable energy. The UK remains a vital electricity partner for Ireland and further interconnection is being progressed. The planned Celtic Interconnector will connect Ireland's electricity network to France via an underwater connection. Once built, its 700 MW capacity will power 450,000 households, and help Ireland achieve its climate and energy goals. As well as the clear benefits in terms of improved security and diversification of electricity supply, the Celtic Interconnector will also facilitate the further development of RE, helping Ireland to meet its 80% target. By providing a direct electricity link with mainland Europe, Ireland will be connected to the EU's IEM after the UK's exit.

The Celtic Interconnector will help to lower electricity prices, reduce GHG emissions and provide greater energy security. To achieve its climate and energy goals, Europe needs to further develop cross-border electricity interconnections. The Celtic Interconnector project will help to meet these targets for interconnection which are key to the achievement of Europe's energy transition. Through facilitating more renewable energy to come onto the network, interconnection will also help to reduce GHG emissions associated with power generation in Europe. In addition, interconnection will increase the availability of renewable energy for European consumers as well as supporting European solidarity on energy, particularly in the case of unexpected energy events.

5.4.3 Where relevant, impacts on regional co-operation

Progress to date on the Celtic Interconnector is enabling Ireland and France to develop closer links and cooperate further in our efforts to achieve the ambitions of the Energy Union including actively exploring the feasibility of a second Ireland-France interconnector post-2030. Two interconnectors with France would establish strong energy links between the two States.

Connection to more than a single member state (and the UK) would significantly enhance security of supply and IEM integration. As envisaged in the 2023 National Policy Statement on Electricity Interconnection, Ireland is now turning its attention to exploring the feasibility of interconnection with other Member States in the context of its particular geographic circumstances. Additional energy links would open the possibility of Union maximisation of Ireland’s offshore renewable energy potential.