



**Roinn Cumarsáide, Gníomhaithe  
ar son na hAeráide & Comhshaoil**  
Department of Communications,  
Climate Action & Environment

# Annual Transition Statement

## 2017

## Contents

1. Introduction .....	3
2. The Impacts of Climate Change .....	6
3. International and EU policy developments.....	7
4. National Mitigation Policy.....	9
5. Overview of Mitigation Policy Measures .....	12
5.1 Cross-Sectoral Measures .....	12
5.2 Electricity Generation Sector.....	14
5.3 Built Environment Sector.....	16
5.4 Transport Sector .....	20
5.5 Agriculture, Forestry and Land Use Sector .....	22
6. National Adaptation Policy .....	25
7. Adaptation Policy Measures .....	27
8. Sectoral Adaptation Measures.....	29
8.1 Local Government Sector .....	29
9. Greenhouse Gas Emissions Inventory.....	31
10. Greenhouse Gas Emissions Projections .....	33
11. Compliance with EU and international obligations .....	34
Appendix 1 - Climate Action and Low Carbon Development Act 2015 .....	39
Appendix 2 - Electricity Sectoral Mitigation Transition Statement .....	41
Appendix 3 - Built Environment Sectoral Mitigation Transition Statement .....	46
Appendix 4 - Transport Sectoral Mitigation Transition Statement.....	69
Appendix 5 - Agriculture Forestry & Land Use Sectoral Mitigation Transition Statement .....	86
Appendix 6 - Sectoral Adaptation Measures .....	97
Appendix 7 – EPA Greenhouse Gas Emissions Inventory Report 2016 .....	104
Appendix 8 – EPA Greenhouse Gas Emissions Projections Report 2017 .....	119

## 1. Introduction

1. Section 14(1) of the Climate Action and Low Carbon Development Act 2015,<sup>1</sup> (the 2015 Act), provides that an Annual Transition Statement (ATS) must be presented to both Houses of the Oireachtas not later than 12 months after the passing of the Act and not later than each subsequent anniversary of such passing. This is the second Annual Transition Statement and is being presented to both Houses in line with the statutory deadline under the Act.
2. In accordance with section 14(2)(a) of the 2015 Act, this Statement contains an ‘annual national transition statement’ which includes an overview of climate change mitigation and adaptation policy measures adopted to reduce emissions of greenhouse gases and to adapt to the effects of climate change in order to enable the achievement of the ‘national transition objective’.<sup>2</sup> The 2017 Annual Transition Statement contains for the first time an ‘annual sectoral mitigation transition statement,’ as provided for in section 14(2a)(b) of the 2015 Act, for each of the four sectors covered by the National Mitigation Plan. It also contains a record of emissions of greenhouse gas set out in the most recent inventory prepared by the Environmental Protection Agency (EPA) and a projection of future emissions, together with a report on compliance with obligations of the State under EU law or an international agreement referred to in section 2 of the 2015 Act.
3. While an Annual Transition Statement must contain information in respect of the year immediately preceding the year in which the statement is presented, (i.e. 2016 in this instance), this year’s Annual Transition Statement also records key policy developments in relation to climate mitigation and adaptation in 2017.

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<sup>1</sup> See <http://www.irishstatutebook.ie/eli/2015/act/46/section/14/enacted/en/html#sec14>

<sup>2</sup> The objective of transitioning to a low carbon, climate resilient and environmentally sustainable economy by the end of 2050 – see section 3(1) of the Climate Action and Low Carbon Development Act 2015.

4. The enactment of the Climate Action and Low Carbon Development Act 2015 was a landmark national climate change policy measure adopted in 2015. At the core of the 2015 Act is a statutory recognition of the ‘national transition objective’ – the goal of pursuing a low carbon, climate resilient and environmentally sustainable economy by 2050. In order to facilitate the achievement of the ‘transition objective,’ the 2015 Act provides for the development and submission to Government for approval of a series of successive National Mitigation Plans and National Adaptation Frameworks which will lead to the achievement of the national transition objective in 2050. In addition, the 2015 Act also established independent advisory and Oireachtas accountability arrangements of which the Annual Transition Statement forms an important element.
  
5. Ireland’s first National Mitigation Plan was published on 19 July 2017.<sup>3</sup> The National Mitigation Plan takes a whole-of-Government approach to tackling greenhouse gas emissions; each Minister with responsibility for the largest emitting sectors (agriculture, transport, electricity and the built environment) has been requested by Government to develop sectoral mitigation measures for inclusion in the National Mitigation Plan. In accordance with the 2015 Act, the primary objectives of the National Mitigation Plan are to:
  - (i) specify the manner in which it is proposed to achieve the national transition objective;
  - (ii) specify the policy measures that, in the opinion of the Government, would be required in order to manage greenhouse gas emissions and the removal of greenhouse gas at a level that is appropriate for furthering the achievement of the national transition objective,
  - (iii) take into account any existing obligation of the State under the law of the European Union or any international agreement referred to in section 2, and
  - (iv) specify the mitigation policy measures (in this Act referred to as the “sectoral mitigation measures”) to be adopted by the Ministers of the Government, referred to in subsection (3)(a), in relation to the matters for which each such Minister of the Government has responsibility for the purposes of—
    - a) reducing greenhouse gas emissions, and
    - b) enabling the achievement of the national transition objective.

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<sup>3</sup> See <https://www.dccae.gov.ie/en-ie/climate-action/topics/mitigation-reducing-ireland's-greenhouse-gas-emissions/national-mitigation-plan/Pages/default.aspx>

6. The 2015 Act also provides for the making and submission to Government of successive National Adaptation Frameworks which will specify the national strategy for the application of adaptation measures in different sectors and by local authorities in order to reduce the vulnerability of the State to the negative effects of climate change and to avail of positive effects that may occur. The first National Adaptation Framework must be submitted to Government in accordance with the statutory deadline (10 December 2017).
7. Section 2 of this Annual Transition Statement provides a brief overview of the impacts of climate change and section 3 summarises recent international and EU policy developments. Sections 4 to 11 set out the matters which must be included in each Annual Transition Statement in the order in which they appear in section 14 of the Climate Action and Low Carbon Development Act, 2015.
8. Appendix 1 sets out the provisions of section 14 of the 2015 Act concerning the preparation of the Annual Transition Statement and its presentation to the Oireachtas. Appendices 2 to 5 set out the sectoral mitigation transition statements for the Electricity, Built Environment Transport, and Agriculture, Forestry and Land Use sectors. The measures presented in each sectoral mitigation transition statement sets out quantitative CO<sub>2</sub> savings per measure, where available, and a qualitative assessment on the likely impact of the measure. Measures listed include measures adopted by Government as set out in the National Mitigation Plan, with updates where relevant, reflecting the iterative or 'living' nature of the National Mitigation Plan. Appendix 6 includes an overview of national adaptation measures in place. Appendices 7 and 8 set out the latest available information from the EPA on emissions inventories and projections.

## 2. The Impacts of Climate Change

9. Warming of the climate system is unequivocal and it is extremely likely that human activity has been the dominant cause of the observed warming since the mid-20th century. Observations show that global average temperatures have increased by 0.85°C since 1850. The atmosphere and ocean have warmed, the amount of snow and ice have diminished and sea level has risen as the concentrations of greenhouse gas have increased. The projections of future global and regional climate change indicate that continued emissions of greenhouse gas will cause further warming and changes to the climate system.<sup>4</sup> Changes in Ireland's climate are in line with these global trends. Temperatures have increased by about 0.8°C over the period 1900-2012 - an average of about 0.07°C per decade.<sup>5</sup>
  
10. Climate change will have diverse and wide ranging impacts on Ireland's environment, society, and economic and natural resources. Impacts are predicted to include sea level rise; more intense storms and rainfall events; increased likelihood and magnitude of river and coastal flooding; water shortages in summer (particularly in the East of the country); increased risk of new pests and diseases; adverse impacts on water quality; and changes in distribution and phenology (the timing of lifecycle events) of plant and animal species on land and in the oceans. Against this background, strategies must be devised to reduce and manage climate change risks through a combination of mitigation and adaptation responses.

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<sup>4</sup> IPCC, 2013. Summary for Policymakers. In: Climate Change 2013: The Physical Science Basis. Contribution of Working Group I to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change.

<sup>5</sup> Dwyer, N. 2012. The Status of Ireland's Climate, 2012. EPA Report No. 26.

### 3. International and EU policy developments

11. The United Nations Framework Convention on Climate Change (UNFCCC), adopted in 1992,<sup>6</sup> has been at the centre of international efforts to address the challenge of climate change.

12. The Paris Agreement, adopted at the twenty-first Conference of the Parties to the UNFCCC (COP 21) in 2015, and which entered into force in November 2016, aims to strengthen the global response to the threat of climate change, including by:

- (i) holding the increase in the global average temperature to well below 2°C above pre-industrial levels and to pursue efforts to limit the temperature increase to 1.5°C above pre-industrial levels, recognising that this would significantly reduce the risks and impacts of climate change;
- (ii) increasing the ability to adapt to the adverse impacts of climate change and foster climate resilience and low greenhouse gas emissions development, in a manner that does not threaten food production; and
- (iii) making finance flows consistent with a pathway towards low greenhouse gas emissions and climate-resilient development.

13. The Paris Agreement will achieve its goals through the Nationally Determined Contributions submitted by the Parties, which set out the climate actions each Party will take and which, as provided for under the Paris Agreement, must increase in ambition over time.

14. UNFCCC negotiations since the adoption of the Paris Agreement in 2015 have focused on the design of the structures which will enable the Agreement to achieve its goals. Significant progress has been made in this regard, with agreement reached on the design of the frameworks for transparency and reviewing climate action and on the main elements of the Paris Agreement's "rulebook". It is anticipated that this work will be completed at COP 24 which will be hosted by Poland in December 2018.

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<sup>6</sup> See UNFCCC website - [http://unfccc.int/essential\\_background/items/6031.php](http://unfccc.int/essential_background/items/6031.php)

15. Ireland will contribute to the Paris Agreement via the Nationally Determined Contribution tabled by the European Union (EU) on behalf of Member States which commits to a 40% reduction in EU-wide emissions by 2030 compared to 1990. This 40% reduction comprises a 43% reduction in emissions from the EU Emissions Trading System (ETS) and a 30% reduction in emissions from other sectors by 2020 compared to 2005 levels.
  
16. Negotiations are nearing completion regarding Phase Four of the EU ETS, which is due to commence in 2021. These reforms are designed to strengthen the ETS as cornerstone of EU climate change mitigation policy by providing a much stronger price signal to encourage deeper emissions reductions, together with provisions for sectors at risk of carbon leakage, and funding for decarbonisation efforts in less developed Member States.
  
17. The specific details of the contribution to be made by each Member State in respect of the sectors of the economy outside the EU ETS, primarily in agriculture, transport and buildings, are set out in a European Commission proposal for an EU Effort Sharing Regulation published on 20 July 2016.<sup>7</sup> Ireland's proposed target under the Effort Sharing Regulation proposal is to reduce emissions in these sectors by 30% relative to 2005 by 2030. This proposal is accompanied by a proposal for the accounting of emissions from land use, land-use change and forestry in Member States' non-ETS targets.<sup>8</sup>

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<sup>7</sup> Proposal for a REGULATION OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL on binding annual greenhouse gas emission reductions by Member States from 2021 to 2030 for a resilient Energy Union and to meet commitments under the Paris Agreement and amending Regulation No 525/2013 of the European Parliament and the Council on a mechanism for monitoring and reporting greenhouse gas emissions and other information relevant to climate change, (COM 2016 482).

<sup>8</sup> Proposal for a Regulation of the European Parliament and of the Council on the inclusion of greenhouse gas emissions and removals from land use, land use change and forestry into the 2030 climate and energy framework and amending Regulation No 525/2013 of the European Parliament and the Council on a mechanism for monitoring and reporting greenhouse gas emissions and other information relevant to climate change, COM(2016) 479.



## 4. National Mitigation Policy

18. Mitigation refers to actions to reduce emissions of the greenhouse gases that are driving climate change. It includes strategies to reduce activities that give rise to greenhouse gases and to enhance carbon sinks. Section 1 of the Climate Action and Low Carbon Development Act 2015 provides a legal definition of the following terms:

- (i) “mitigation” means any human intervention aimed at reducing harmful influences on the earth’s climate system, including action aimed at reducing emissions and creating or enhancing sinks;
- (ii) “sink” means:
  - (i) a process or activity (including photosynthesis), whether natural or man-made that contributes to, or assists in, the removal of one or more greenhouse gases from the earth’s atmosphere, or
  - (ii) an ecosystem or a mechanism (whether natural or man-made), or part thereof, that contributes to, or assists in, the removal of one or more of such gases from the earth’s atmosphere.

19. The extent of the mitigation challenge presented by climate change and the scale of the transformation required if Ireland is to move to a low carbon and climate resilient economy are evident and have been acknowledged by the Government in the first National Mitigation Plan, published in July 2017.

20. The National Mitigation Plan covers greenhouse gas emissions in the Electricity Generation, Built Environment, Transport, and Agriculture, Forest and Land Use sectors. For each sector, the Plan sets out the sectoral policy context, the greenhouse gas emissions trends for each sector, the opportunities and challenges, mitigation measures currently in place and under development, and specific actions to take forward work within each sector.

21. The Plan contains a series of over 70 mitigation measures and 106 related actions to address the immediate challenge to 2020 and to prepare for the EU targets that Ireland will take on for 2030. It will also begin the development of work to meet the objectives of the National Policy Position for 2050.
22. This first National Mitigation Plan does not represent a complete roadmap to achieve the 2050 objective, but rather is a work in progress reflecting the reality of where we are in our decarbonisation transition.
23. Importantly, the National Mitigation Plan is a living document that will be updated as on-going analysis, dialogue and technological innovation generate more and more cost-effective sectoral mitigation options. This continuous review process reflects the broad and evolving nature of the sectoral challenges outlined in the Plan, coupled with the continued development and deployment of emerging low carbon and cost effective technologies across different sectors of the economy.
24. Under the 2015 Act, each National Mitigation Plan must specify the policy measures that Government consider are required to manage greenhouse gas emissions and the removal of emissions at a level that is appropriate for furthering the national transition objective set out in that Act. Given that this long-term objective must be achieved by 2050, it is not prudent or even possible to specify, in detail, policy measures to cover this entire period as we cannot be certain what scientific or technical developments and advancements might arise over the next 30 years or so.
25. This does not mean that inaction or a 'wait and see' approach is appropriate either, as early action that limits greenhouse gas emissions sooner will spread the burden of emissions reductions over a longer timeframe and, therefore, the overall cost of reductions will be less. While there is a need to ensure that action taken now does not lock Ireland into excessively expensive reduction pathways or solutions which depend on unsuitable technologies, there is nevertheless now a broad consensus internationally on what must happen to achieve the deep decarbonisation required within individual economies. Country-specific contexts and starting points vary greatly however and, in Ireland's case, the large share of national emissions from the agriculture sector presents particular challenges.

26. In this respect, Ireland's first National Mitigation Plan is a critical first step towards decarbonising our economy and this and successive Plans will, over time, build on this foundation with further policy development in the years ahead and expansion of the suite of measures already in place. This work is necessarily ongoing and envisages the Government, subject to budgetary considerations, adopting appropriate mitigation measures so as to achieve progressive emissions reductions in each of the four key sectors covered by this Plan. In this regard, and in line with the globally agreed 2030 UN Sustainable Development Goals, climate action should 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.

## 5. Overview of Mitigation Policy Measures

28. Mitigation policy measures currently in place in Ireland are set out in the National Mitigation Plan. Summary information on measures in place is set out in the relevant Sectoral Mitigation Transition Statements in the appendices to this Annual Transition Statement. Each Sectoral Mitigation Transition Statement lists the key measures which the Ministers for Agriculture, Food and the Marine; Communications, Climate Action and Environment; Housing, Planning and Local Government and Transport, Tourism and Sport are responsible for in order to reduce greenhouse gas emissions from those sectors. The Sectoral Mitigation Transition Statements details the key measures in place in the respective sectors, the objective for each measure, estimated mitigation potential and funding information, where available.

### 5.1 Cross-Sectoral Measures

#### *Carbon pricing*

29. The Government is committed to carbon pricing as a core element of the suite of policy measures to address and reduce greenhouse gas emissions over time. Carbon pricing has the potential to drive reductions in consumption of fossil fuels and encourage energy efficiency improvements by households and businesses.
30. Ireland is one of a minority of countries globally to have implemented economy-wide carbon pricing measures. Since 2005, electricity generation sites and large industrial installations have been included in the EU's Emissions Trading System (ETS). Outside of the ETS, a national carbon tax, currently set at €20 per tonne of CO<sub>2</sub> emitted, was introduced on a phased basis from 2009.
31. Over the longer term, carbon pricing will have a key role to play in the transition to a low carbon economy and has been recognised by the Climate Change Advisory Council as an important tool for Ireland to achieve its decarbonisation objective in a cost-effective manner by 2050. It will be important therefore that the rate at which carbon tax is set is kept under review to ensure that it is able to send a sufficiently strong signal to drive changes in household and business behaviour. In addition, clear long-term signalling by Government on the future evolution of carbon tax is vital. As a first step, the Department of Finance is commissioning further analysis to inform the policy direction of the tax with an examination of the mitigation and distributive impacts of the carbon tax as implemented and an assessment of its possible future price evolution.

*National Planning Framework – Ireland 2040*

32. The forthcoming National Planning Framework will address a broad range of issues in relation to planning for Ireland’s future over the period to 2040. The Framework aims to coordinate key areas such as housing, jobs, health, transport environment, energy and communications into an overall coherent strategy. It will have statutory backing and will provide a framework from which other, more detailed plans, including city and county development plans and regional strategies, will take their lead. The development of the Framework has provided a timely and key opportunity to ensure that the climate implications of our spatial choices are fully considered and addressed to ensure that our national planning system supports, and is aligned with, our national transition objective. The transition to a Low Carbon and Climate Resilient Society is identified as one of the ten key national strategic outcomes which will guide the implementation of the new National Planning Framework

*Public Capital Investment Plan 2018-2027*

33. The Government is currently finalising a new Capital Plan which will frame public investment priorities over the next decade. Building on the Mid-Term Review of the 2015 Capital Plan, published earlier this year, public capital investment under the new Plan will be closely aligned with, and essential for the delivery of, the strategic outcomes identified for the National Planning Framework and will propose specific investment priorities to deliver these strategic outcomes. The new Public Capital Investment Plan will also set out the substantial funding resources and the institutional framework within which Government will drive the development of Ireland’s public capital stock over the coming decade and support the delivery of the National Planning Framework . The Government is now working to finalise the National Planning Framework alongside the new Capital Plan to ensure close alignment between long-term planning objectives, the Government’s capital investment priorities in the years ahead and the need to make progress towards the national transition objective for 2050.

## 5.2 Electricity Generation Sector

34. The Energy White Paper, Ireland's Transition to a Low Carbon Energy Future 2015-2030, was launched in December 2015.<sup>9</sup> It sets out a vision and framework to guide Irish energy policy up to 2030. The White Paper restates the three pillars of energy policy – 'sustainability', 'security of supply' and 'competitiveness' - and the actions identified have been informed by the national transition objective. The overall aim of the White Paper is to transition to a low carbon energy system which provides secure supplies of competitive and affordable energy to citizens and businesses. It recognises that a radical transformation of our energy system is required to meet national, EU and international climate objectives, including greenhouse gas emissions reductions in the energy sector in the range of 80% to 95% compared to 1990 levels by 2050.
35. Since the publication of the Energy White Paper, significant progress has been made in the implementation of measures, including the enactment of the Energy Act 2016;<sup>10</sup> publication of A Strategy to Combat Energy Poverty in Ireland (February 2016);<sup>11</sup> development of new Public Sector Energy Efficiency Action Plan;<sup>12</sup> publication of a National Policy Framework on Alternative Fuels Infrastructure (May 2017);<sup>13</sup> development of a new Renewable Electricity Support Scheme<sup>14</sup> for commencement in 2018, subject to State aid approval from the European Commission; and development of a Support Scheme for Renewable Heat with the scheme due to commence in 2018, again subject to State aid approval. Budget 2018 allocated €6.8 million to fund the initial phase of the scheme.<sup>15</sup>

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<sup>9</sup> See <https://www.dccae.gov.ie/en-ie/energy/topics/Energy-Initiatives/energy-policy-framework/white-paper/Pages/White-Paper-on-Energy-Policy-in-Ireland-.aspx>

<sup>10</sup> See <http://www.irishstatutebook.ie/eli/2016/act/12/enacted/en/html>

<sup>11</sup> See <https://www.dccae.gov.ie/en-ie/energy/topics/Energy-Efficiency/energy-costs/Pages/Energy-Poverty-Strategy.aspx>

<sup>12</sup> See <https://www.dccae.gov.ie/documents/Public%20Sector%20Energy%20Efficiency%20Strategy.pdf>

<sup>13</sup> See <http://www.dttas.ie/sites/default/files/publications/public-transport/english/alternative-fuels-framework/6186npfalternative-fuels300517.pdf>

<sup>14</sup> See <https://www.dccae.gov.ie/en-ie/energy/consultations/Pages/Renewable-Electricity-Support-Scheme-Design-Consultation.aspx>

<sup>15</sup> See information on a consultation which was held in January 2017 <https://www.dccae.gov.ie/en-ie/energy/consultations/Pages/Renewable-Heat-Incentive-Consultation.aspx>

36. The current primary support mechanisms for renewable electricity are the Renewable Energy Feed-in Tariff (REFIT) schemes. The schemes are designed to provide certainty to renewable electricity generators by providing them with a minimum price for each unit of electricity exported to the grid over a 15 year period. The schemes are supporting onshore wind, hydro and biomass technologies.
37. All REFIT schemes are closed to new applications. However, the deadline for the receipt of additional information from applicants that applied for support under the REFIT 2 and 3 schemes (e.g. copy of full planning permission and/or a grid connection offer or agreement) has been extended to 31 December 2017.
38. The Department of Communications, Climate Action and Environment continues to progress the development of a new Renewable Electricity Support Scheme (RESS) which will be designed to assist Ireland in meeting its renewable energy contribution to EU-wide targets out to 2030. The RESS will provide pathways for delivering on the 2015 Energy White Paper commitment to ensure communities and citizens are at the centre of the future energy transition in Ireland. Communities are effectively being designed into the fabric of the new scheme and a comprehensive assessment of policies and support measures to increase community ownership from renewable electricity projects has been undertaken. Design of the RESS is nearing finalisation subject to final Government and EU State Aid approval of the scheme.
39. With regard to Ireland's renewable energy targets, the EU Renewable Energy Directive 2009/28/EC set Ireland a legally binding target of meeting 16% of our energy demand from renewable sources by 2020. Ireland is committed to achieving this target through meeting 40% of electricity demand, 12% of heat and 10% of transport from renewable sources of energy, with the latter transport target also being legally binding. While good progress has been made to date, with the Sustainable Energy Authority of Ireland (SEAI) advising that 9.5% of Ireland's overall energy requirements in 2016 were met from renewable sources, meeting the 16% target remains challenging. Details of progress towards the electricity and other sub-targets are set out in the table below.

Sector / Sub-sector	2020 target %	2016 achieved %
RES-E (Electricity)	40	27.2
RES-H (Heat)	12	6.8
RES-T (Transport)	10	5.0
<b>RES Overall</b>	<b>16.0</b>	<b>9.5</b>

Source: SEAI

40. Looking at renewable energy ambition beyond 2030, in November 2016 as part of its Clean Energy Package, the European Commission published a proposal for a recast Directive on the promotion of renewable energy sources. The proposal provides a framework for renewable energy development to 2030. It takes a fundamentally different approach to the existing renewables structure as it proposes an overall EU level target of at least 27% renewables by 2030 but does not seek to set individual Member State level targets. This aligns with the political agreement reached by the European Council in October 2014. The accompanying governance proposals envisage the 2020 national renewable energy targets (16% in Ireland’s case) will become the baseline out to 2030. Member States will set their own 2030 objectives, which must collectively add up to the EU target of ‘at least 27%’. Negotiations on the proposed Directive are advanced with the Presidency aiming to reach a General Approach on key elements of the proposals at the TTE (Energy) Council on 18 December 2017. The adoption of the Package will be a critical milestone on the path to achievement of Ireland’s national transition objective to 2050

### 5.3 Built Environment Sector

41. Improving energy efficiency is central to our transition to a low carbon economy. This is because 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 is the first step to take in the process of decarbonising our built environment. It is also a step everyone can take in some shape or form. In addition, the more energy use is reduced through efficiency measures, the lower the effort required to achieve renewable energy targets.



42. The Energy White Paper recognises that, in terms of energy efficiency, attaining the objective of a low carbon future will involve radically changing our behaviour as citizens, industry and Government and becoming significantly more energy efficient. The Government's energy efficiency schemes have already upgraded 350,000 homes throughout Ireland. In Budget 2018 the Minister for Communications, Climate Action and Environment secured €117m in capital and current funding for energy efficiency schemes in 2018. Of this amount, €84m will support residential energy efficiency programmes, €9m will support projects in the public sector and €14m will support the commercial and industrial sector – including small businesses and farms. This investment is expected to save over 120,000 tonnes in CO<sub>2</sub> emissions every year. It will support around 3,500 jobs, and reduce our overall dependence on imported fossil fuels.
43. Energy efficiency upgrades to the fabric of our 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<sub>2</sub> emissions connected with our energy use in those homes and workplaces. However, this is just the first step. To actually decarbonise our built environment, we need to go further and switch from using fossil fuel as the source for the energy we use in our buildings.
44. The proposed Support Scheme for Renewable Heat will stimulate and support the replacement of fossil fuel heating systems with renewable energy and contribute to meeting Ireland's 2020 renewable energy and emission reduction targets. Budget 2018 allocated €6.8 million to fund the initial phase of the Support Scheme for Renewable Heat, which is expected to start in 2018 subject to European Commission State Aid approval. The scheme, which has been approved by Government, is aimed at commercial, industrial, agricultural, district heating and other non-domestic heat users in the non-ETS sector. The first phase of scheme will provide for two types of support mechanism:
- (i) An on-going operational support (which will be paid for a period up to 15 years) for new installations or installations that currently use a fossil fuel heating system and convert to using biomass heating systems or anaerobic digestion heating systems; or
  - (ii) A grant (of up to 30%) to support investment in renewable heating systems that use heat pumps.

45. In the residential sector, Budget 2018 has allowed for the expansion of the Better Energy Homes grant programme to other technologies. A new grant for heat pumps will be available in early 2018 and increased grant amounts for heating controls and external insulation will also be available to households. In addition there will no longer be any Better Energy Homes grant funding for oil or gas boiler replacements, a significant step towards decarbonising heating in the residential sector. The funding will also provide for the expansion of the Better Energy Communities and a new guarantee of funding for every small community group that wants to engage in energy efficiency. Activity will significantly ramp up on the Warmth & Wellbeing scheme which will demonstrate the effect that energy efficiency can have on health and wellbeing and more than 9,000 low income homes will receive a free energy efficiency upgrade under the Warmer Homes scheme.
46. €5m has been allocated in 2017 to carry out a number of new approaches for deep retrofit as part of a pilot programme. The initial focus will be on the residential sector. Deep retrofit is the significant upgrade of a building towards nearly zero energy requirements where is practically feasible and achievable. The aim of the pilot is to fund fuel switching to low carbon heating technologies to demonstrate the multiple benefits of energy efficiency and investigate how best to support consumer decision making and investment in deep retrofit. Funding will be given to upgrade homes to an 'A' Building Energy Rating Certificate.
47. The commercial sector has significant potential to contribute to national energy efficiency and climate change objectives. Businesses who participate in the new Excellence in Energy Efficiency Design (EXEED) programme, launched by the Minister for Communications, Climate Action and Environment in 2017, are seeing an impressive 28% energy efficiency improvement on average. This helps to improve the competitiveness and resilience of Irish businesses. This programme will be expanded in 2018. The Department of Communications, Climate Action and Environment is currently consulting on how best we can increase awareness of the multiple benefits of energy efficiency for businesses and on farms and the allocation of additional funds will be guided by the results of this consultation.

48. The EXEED Certified Program was developed by the SEAI as a mechanism to independently certify assets as Energy Efficient Design entities. The objective is to apply a standardised framework for energy efficient design and management of assets in order to identify and implement opportunities for optimum energy performance and energy management over the life of an asset. The EXEED grant scheme provides grant support of up to €250,000. The grant level may be extended by 20% for small enterprises and by 10% for medium enterprises. Results achieved over the 2016-7 period involving 45 projects show average energy efficiencies of 28% being achieved. For 2016, EXEED supported 24 projects with grant assistance of €1.885m which resulted in 2.62 GWh of efficiency gains. The programme will see an increase in investment from €2.6m in 2017 to €10m for 2018. To complement the EXEED programme, the tax code provides for accelerated capital allowances (ACAs) for energy efficient equipment supporting the reduction of energy use in the workplace and the awareness of energy efficiency standards in appliances. This measure was extended in Budget 2018 to the end of 2020.
49. It should be noted that the public sector has already made a very significant contribution to national energy efficiency objectives, having already achieved energy efficiency gains of 20%. A Public Sector Energy Efficiency Strategy was launched in 2017 and was accompanied by new support schemes for the renovation of public buildings and schools. Participating schools reduced their energy bills by more than 40% on average. Given these promising results, the budget for these works will nearly double in 2018. It is hoped that this will identify the optimal approaches and standards that can be replicated and scaled more widely across the public sector.

The existing Energy Performance of Buildings Directive requires that all new buildings (public and private) are Near Zero Energy Buildings (NZEB) by 2020. It also requires that new buildings owned and occupied by public authorities are NZEB after 2018. NZEB is classified as a building that has a very high energy performance and that the nearly zero or very low amount of energy required should be covered to a very significant extent by energy from renewable sources, including energy from renewable sources produced on-site or nearby. Proposals to amend the Energy Performance of Buildings Directive, to help promote the use of smart technology in buildings and to streamline the existing rules, are currently being negotiated at EU level.

50. Part L of the Building Regulations for Dwellings sets the NZEB performance for buildings completed after the 31st December 2020, which represents a 70% improvement in energy performance when compared with the 2005 Part L requirements. Part L of the Building Regulations for Buildings other than Dwellings is currently under review in order to establish the NZEB performance requirement and it is anticipated that this will set a performance level representing an improvement in the order of 60% over current standards.

## 5.4 Transport Sector

51. Decarbonising the transport sector represents a significant challenge for Ireland. The scale of transition required is substantial; significant changes in how we travel and the types of fuels we use are needed. There were an additional 9.9 million public transport passenger journeys made in 2015 alongside increases in walking and cycling trips within the Dublin area. The transport system must respond to this additional demand whilst addressing the related congestion, climate mitigation and air quality concerns.
52. One way in which the transport sector is implementing National Mitigation Plan measures are actions taken in 2016 to invest in sustainable transport, promoting modal shift and improving energy efficiency. In 2016, €355m was invested in public transport and sustainable transport infrastructure, €249m was allocated to fund the operation of public transport and rural services, and €13.5m was spent on smarter travel projects and greenways. In addition to existing measures such as greater investment, there are a range of further policy measures being considered by Government aimed at reducing emissions within the sector, including: proposals to increase the biofuel obligation rate for transport fuels from 8% to 10% on 1 January 2019 and to circa 12% on 1 January 2020; CO<sub>2</sub> based taxation policies; vehicle emission standards regulations and energy efficiency savings mechanisms.

53. Based on current forecasts, transport emissions are projected to increase further due to a rise in population, economic growth and an increase in the national car fleet. In this context, developing cost-efficient mitigation measures for the transport sector is challenging. Nevertheless, Budget 2018 and the Mid-Term Review of the Capital Plan clearly reflect the Government's determination to address emissions through:

- (i) enhancing the capacity and quality of public transport to ensure that – where feasible - our increased transport demand is met by greener public transport (over €400m will be invested in public transport infrastructure in 2018 with a 4 year capital envelope of €2.7bn);
- (ii) investment of over €100m is committed to a multi-annual urban cycling and walking programme to support greater uptake of active travel and promote modal shift away from private car use; and
- (iii) based on the recommendations of the Low Emitting Vehicle Taskforce a suite of tax and expenditure measures, supported by Exchequer funding of €10m provided in Budget 2018, have been announced that clearly indicate the Government's commitment to a low-carbon Electric Vehicle (EV) future:
  - continuing the current VRT reduction and SEAI purchase grants for electric EVs; a new grant to support installation of home charger points for buyers of new and second-hand EVs;
  - a new EV Taxi Grant and supporting measures to stimulate take-up in the high visibility Taxi/Hackney/Limousine (small Public Service Vehicle) sector;
  - a new EV Public Engagement Programme to include driver experience opportunities;
  - public sector and commercial fleet trials allowing public bodies and business to trial EVs;
  - funding to support the development of charging infrastructure with a specific focus on rapid charging;
  - the Office of Government Procurement to introduce a new public procurement framework contract for EVs in 2018 to allow public bodies to purchase EVs with reduced administrative burden;

- a new Benefit-in-Kind (BIK) 0% rate to incentivise battery EVs without mileage conditions with the stated intention for this to continue for at least three years. The BIK rules will ensure that there is no BIK liability associated with recharging EVs in workplaces; and
- funding for a new toll incentive regime to incentivise ultra-low emitting cars.

## 5.5 Agriculture, Forestry and Land Use Sector

54. The agriculture sector measures which have been included in the National Mitigation Plan not only focus on the mitigation of greenhouse gases and improving resource efficiency but are also aimed at restoring, preserving and enhancing ecosystems related to building resilience of agricultural production systems (i.e. adaptation). Furthermore, good farming practices supported by the Common Agriculture Policy under Pillar 1 and the Rural Development Programme under Pillar II contribute to the protection of the carbon pool stored in Irish farmland. Pillar I sets the environmental baseline through greening and cross-compliance, with more targeted measures to meet specific priorities in a more targeted manner under Pillar II.
55. The focus on environmental protection has been strengthened under the current Common Agricultural Policy (CAP) 2014-2020 and further enhancements of environmental credentials are expected as the CAP undergoes review. There are seven Good Agricultural and Environmental Conditions (GAEC standards) under the Basic Payment Scheme under CAP Pillar I.
56. Three are related to protecting water quality, by establishing buffer strips around water bodies and other actions to minimise the risks of pollution to ground water. A further three standards are targeted at protecting soil and carbon stocks by setting minimum measures to protect soil cover and minimise erosion. The final standard sets minimum standards for the protection of landscape features such as: hedges, ponds, ditches, trees in line, in groups or isolated and field margins.

57. The Rural Development Programme (RDP) contains a range of measures built around the themes of innovation, efficiency and economic/environmental sustainability and contains a number of agri-environment and climate actions designed to deliver overarching benefits for the rural environment while addressing issues regarding climate change mitigation, water quality and the preservation of priority habitats and species.
58. In terms of the RDP Pillar 2 schemes, over 50,000 farmers have joined GLAS, which has a range of actions to address climate change, biodiversity and water quality. Some high level achievements in this area include:
- (i) 4,700 farmers committing to Low Emission Slurry Spreading techniques action within GLAS, with consequent reductions in CO<sub>2</sub> and Ammonia of the order of 1,420 tonnes of ammonia and 3,260 tonnes of CO<sub>2</sub>.
  - (ii) Carbon sequestration and biodiversity benefits from the planting of 1,300km of new hedges, 1,300 Traditional Orchards and 5,000 groves of native trees consisting of over 2 million native plants. The carbon sequestration potential of the 5,000 groves of trees on their own which equates to approximately 450 hectares of woodland is c. 900 tonnes of CO<sub>2</sub> annually.
  - (iii) The Beef Data and Genomics Programme has attracted almost 24,000 participants with another almost 1,700 applicants under a second tranche of the scheme, with over 900,000 million animals genotyped to date.
59. In 2016 there were over 34,700 tonnes of agricultural by product and processed residues and almost 21,900 tonnes of fish meal and oil available for biomass supply.
60. Of total funding of €626 million for the Rural Development Programme in 2018, €233.8 million of this will be for agri-environmental schemes, including the Green, Low Carbon, Agri-environment Scheme (GLAS) and Organic Farming measures. In addition, funding of €70m has been allocated to the Targeted Agricultural Modernisation Schemes (TAMS II); €50m to the Beef Data and Genomics Programme, and €23m to the Knowledge Transfer Programme. These programmes are drive climate efficiency improvements in energy and fertiliser use, animal breeding and other know-how improvements.

61. Forests play an important role in climate change mitigation as they have the potential to sequester and store large amounts of carbon dioxide from the atmosphere which can then be harvested as wood products that continue to store carbon over the long term and employed as a sustainable source of fuel. In this way forests directly sequester carbon and substitute other materials that are associated with high levels of emissions, such as steel, concrete and fossil fuels. Forests will play an important role in meeting EU emissions reductions targets during the 2021 to 2030 period.
  
62. Over the period 2021 to 2030, projections show that 4.5 Mt of CO<sub>2</sub> may be removed annually from the atmosphere by afforestation that has occurred since 1990. Based on proposed accounting rules under the LULUCF proposal, 2.2 Mt of CO<sub>2</sub> is forecast to be accountable against our Effort Sharing Regulation targets from afforestation. In 2016, 6,500 ha of new forests were planted in Ireland under the afforestation scheme. The overall target is to expand Ireland's forest estate from 11% to 18% by mid-century.
  
63. As part of the Forestry Programme 2014-2020, €106 million has been made available for forestry measures in 2018. This will support the establishment of 6,600 hectares of new forests and the construction of 100 km of forest roads, which will help to produce sustainable wood products and renewable fuels.



## 6. National Adaptation Policy

63. Adaptation refers to the process of adjustment to actual or expected climate and its effects. In human systems, adaptation seeks to moderate or avoid harm or exploit beneficial opportunities. In some natural systems, human intervention may facilitate adjustment to expected climate and its effects (IPCC, 2014). Section 1 of the Climate Action and Low Carbon Development Act 2015 provides a legal definition for adaptation as follows:

- a. “adaptation” means any adjustment to:
  - a) any system designed or operated by human beings, including an economic, agriculture or technological system, or
  - b) any naturally occurring system, including an ecosystem, that is intended to counteract the effects (whether actual or anticipated) of climatic stimuli, prevent or moderate environmental damage resulting from climate change or confer environmental benefits.

64. Adaptation is the approach for addressing the current and future risks posed by a changing climate. The aim of adaptation is to reduce vulnerability of our environment, society and economy and increase resilience. Adaptation also brings opportunities through green growth, innovation, jobs and ecosystem enhancement as well as improvements in areas such as water and air quality. Adaptation measures are typically categorised as “soft” (e.g. alteration in behaviour, regulation or system of management), “green” (measures that seek to utilise ecological properties to enhance the resilience of human and natural systems to climate change impacts) and “grey” (measures that involve technical or engineering solutions to climate impacts).

65. Most adaptation measures to date have been reactive in nature, taken in response to, for example extreme weather events such as Storms Brian and Ophelia in 2017 and Storms Desmond and Frank in 2015. Given the increased knowledge of climate change impacts, it is now necessary to adopt a planned approach to adaptation so that we are better placed to deal with its impacts. This planned approach is the result of a deliberate policy decision, based on the awareness that conditions have changed or are expected to change, understanding of vulnerabilities and that some form of action is required to reduce risk or avail of opportunities. By planning and anticipating climate change risk, it is possible to reduce the cost and maximise the effectiveness of adaptation actions.

66. While the impacts of climate change are more likely to increase sectoral risks opportunities may also emerge for a number of sectors. For example, increasing temperatures may lead to a lengthening of the growing season for the agricultural sector and improve growing conditions for tree species such as oak and ash in the forestry sector. Warmer winter temperatures may lead to fewer cold-related mortalities in the health sector, for example.

## 7. Adaptation Policy Measures

67. The Department of Environment, Community and Local Government<sup>16</sup> published a National Climate Change Adaptation Framework (NCCAF) in December 2012.<sup>17</sup> The publication of the NCCAF was the first step in developing a comprehensive national policy position within which adaptation measures to address the impacts of climate change could be taken and planned.<sup>18</sup> This non-statutory, but Government approved, framework mandated the development and implementation of sectoral adaptation plans and local authority adaptation strategies which, together, would form part of the national response to the impacts of climate change.

68. Implementation work under the NCCAF (2012) is being co-ordinated by the Department of Communications, Climate Action and Environment through a National Adaptation Steering Committee. The committee is chaired by the Department and includes membership from the relevant sectors as well as EPA, Department of Public Expenditure and Reform, with the local government sector represented through the County and City Management Association and the regional assemblies. In 2017, a subgroup of the Committee on adaptation governance was formed to discuss a number of specific issues including how to improve cross sectoral coordination as well as coordination with the local government sector.

69. Under Section 5 of the 2015 Act, the Minister for Communications, Climate Action and Environment must submit a statutory National Adaptation Framework to Government for approval (not later than 10 December 2017) and the Framework must be reviewed not less than once in every five year period. The National Adaptation Framework must specify the national strategy for the application of adaptation measures in different sectors and by local authorities in their administrative areas in order to reduce the vulnerability of the State to the negative effects of climate change and to avail of any positive impacts that may occur. The National Adaptation Framework will not identify specific locations or propose adaptation measures or projects in relation to sectors. Respecting the principle of subsidiarity, detailed adaptation measures will be developed across sectors and local government, in accordance with the National Adaptation Framework.

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<sup>16</sup> The climate functions of the former Departments of Environment, Community and Local Government and Communications, Energy and Natural Resources transferred to a newly configured Department of Communications, Climate Action and Environment with effect from July 2016.

<sup>17</sup> DECLG, 2012. National Climate Change Adaptation Framework: Building Resilience to Climate Change.

<sup>18</sup> The policy in relation to climate adaptation was subsequently restated in the National Policy Position on Climate Change (2014) which provides a high-level policy direction for the adoption and implementation by Government of plans to enable the State to pursue the national transition objective.

70. A draft National Adaptation Framework was published for statutory consultation for a period of six weeks on Friday 15 September 2017.<sup>19</sup> A final version of the National Adaptation Framework will be submitted to Government for approval prior to 10 December 2017, in line with the statutory deadline. Following approval of the National Adaptation Framework by Government a number of Government Ministers will be required to develop sectoral adaptation plans which will specify the adaptation policy measures the Minister in question proposes to adopt in a relevant area under their remit.

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<sup>19</sup> See <https://dcaae.gov.ie/en-ie/climate-action/consultations/Pages/Public-Consultation-on-Draft-National-Adaptation-Framework.aspx>

## 8. Sectoral Adaptation Measures

71. For the purposes of compiling the 2017 Annual Transition Statement, the Minister for Communications, Climate Action and Environment requested sectors to submit information on adaptation policy measures that have been adopted in their respective areas to enable the State to adapt to the effects of climate change and to pursue the achievement of the national transition objective. Responses received indicate that activity in relation to measures adopted to date has succeeded in building the evidence base and in filling many of the knowledge and research gaps; it also increased awareness and capacity within the sectors to assist them to plan for and address climate change adaptation. While this work was undertaken under the non-statutory National Climate Change Adaptation Framework referred to above, it will inform the development of statutory sectoral adaptation plans which will be mandated by Government, following the approval of the National Adaptation Framework. Details of sectoral adaptation activity are set out in Appendix 6 with notable progress achieved by the OPW (adaptation plan for flood risk management); Agriculture and Forestry; Transport; Biodiversity; Marine and the Energy sectors.

### 8.1 Local Government Sector

72. The key role that local authorities can play in addressing climate action is recognised in the Climate Action and Low Carbon Development Act 2015. This recognises the significant potential which exists within the local government sector to contribute to a low carbon, climate resilient transition. Local government is also aware of the challenges that exist where there are a number of Government Departments and agencies tasking local authorities with delivering on various climate change initiatives and projects at local level. In this regard, the important role played by the sector in coordinating actions and measurement of impacts is particularly noted. The National Adaptation Framework for its part will specify the national strategy for the application of adaptation measures in different sectors and by local authorities in their administrative area. In addition, section 15 of the 2015 Act provides that a relevant body (which includes a local authority) must have regard to the most recently approved National Mitigation Plan and National Adaptation Framework in the performance of its duties.

73. In relation to adaptation, local authorities play a pivotal role in planning for, and responding to, emergency situations. Given their close relationship with the community, local authorities can respond faster and more effectively to local climate events than central Government Departments or agencies. They possess up-to-date knowledge of the local natural and man-made environment and, therefore, have a key role to play in managing climate risks and vulnerabilities.

74. Given the important role of local government, the Department of Communications, Climate Action and Environment has been engaging closely with the sector, in collaboration with the EPA, the Centre for Marine and Renewable Energy and UCC to ensure appropriate guidance continues to be provided and capacity strengthened. A number of technical supports have been produced to assist in the development of local level adaptation strategies such as Climate Ireland and the Local Authority Adaptation Strategy Development Guidelines.<sup>20</sup> The guidelines are designed to assist local authorities to develop their own adaptation strategies and to ensure that they will complement adaptation plans to be prepared on a sectoral basis. The web resource Climate Ireland was developed as part of the EPA-funded project “A Climate Information Platform for Ireland” (ICIP). It has completed its initial research phase and is currently being examined with a view to putting it on a long-term operational basis so as to provide a comprehensive online resource on climate related information for all key stakeholders including the public. Building on this work, local authorities are actively working in consultation with DCCA and the EPA to develop a proposal for a regional approach to climate action. The proposed approach harnesses the potential to group certain local authorities based on similar geographical/topographical characteristics and on the basis of existing synergies in addressing threat and impacts of severe weather events and ongoing climate change risks.

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<sup>20</sup> <https://www.climateireland.ie> and <http://www.epa.ie/pubs/reports/research/climate/researchreport164.html>

## 9. Greenhouse Gas Emissions Inventory

75. The EPA is responsible for compiling the inventories of greenhouse gas emissions for Ireland in accordance with internationally agreed standards and for annual reporting on Ireland's inventories to the EU and the UN. The most recent EPA inventory report, reproduced at Appendix 7, contains the estimates of Ireland's greenhouse gas emissions for the years 1990-2016. For 2016, total national greenhouse gas emissions were estimated to be 61.19 million tonnes carbon dioxide equivalent (Mt CO<sub>2</sub>eq). This is 3.5% higher than emissions in 2015. Headline data from this report includes the following:

- (i) In 2016, emissions in the European Union's Emissions Trading Sector (ETS) sector increased by 5.4% and non-ETS emissions (covered by the Effort Sharing Decision- ESD) increased by 2.7%.
- (ii) Agriculture emissions increased by 2.7% in 2016. Over the past 4 years, there has been an increase of 22% in the number of dairy cows and an increase of 27% in milk production. This reflects national plans to expand milk production under Food Wise 2025 and the removal of the milk quota in 2015.
- (iii) Emissions from the Transport sector increased by 3.7% in 2016. This is the fourth successive year of increases in transport emissions. This is primarily due to an increase in road traffic, which accounts for 96% of the transport emissions.
- (iv) Greenhouse gas emissions from the Residential sector slightly increased by 0.1%. Coal use in households decreased, whereas kerosene use increased. The weather in 2016 was milder than average, resulting in less fuel used for heating.
- (v) The Industrial Processes sector shows an increase in emissions of 7.1%, mainly from increased cement production. These emissions are included in the ETS sector and contribute significantly to the ETS sector increase in 2016. Emissions from this sector are down 34% on 1990 levels, primarily due to the closing down of the chemical industry in Ireland.

- (vi) Emissions in the Energy Industries sector show an increase of 6.1% from 2015. This is primarily attributable to an increase in natural gas use of 27.7%. There was a decrease in coal and peat use for electricity generation by 2.3% and 6.3% respectively.
- (vii) Emissions from the Waste sector decreased by a small amount (1.2%) compared to 2015.
- (viii) Emissions from F-gases have increased by 10.2% in 2016. This is mainly due to the increase in mobile air conditioning and refrigeration units.



## 10. Greenhouse Gas Emissions Projections

76. The most recent projections were published by the EPA in April 2017 and the projections report is reproduced at Appendix 8. It provides an updated assessment of Ireland's progress towards meeting its emission reduction targets set under the 2009 Effort Sharing Decision for the years 2013-2020. Ireland's 2020 target is to achieve a 20% reduction of non-ETS sector emissions (i.e. agriculture, transport, residential, commercial, non-energy intensive industry and waste) on 2005 levels with annual binding limits set for each year over the period 2013-2020.

77. The April 2017 projections indicate that Ireland's emissions in 2020 could be in the range of 4-6% below 2005 levels under the 'With Existing Measures' and 'With Additional Measures' scenarios respectively.<sup>21</sup> Based on current emission projections, it is estimated that by 2030 total non-ETS emissions could be 1%-3% below 2005 levels. The estimates of greenhouse gas emissions to 2030 assume a continuation after 2020 of the effects of policies and measures that are now in place but no further policies or measures being implemented.

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<sup>21</sup> The 'With Existing Measures' scenario assumes that no additional policies and measures, beyond those already in place by the end of 2015 (latest national greenhouse gas emission inventory), are implemented. The 'With Additional Measures' scenario assumes implementation of the With Existing Measures scenario in addition to, based on current progress, further implementation of Government renewable and energy efficiency targets for 2020, as set out in the National Renewable Energy Action Plan (NREAP) and the National Energy Efficiency Action Plan (NEEAP).

## 11. Compliance with EU and international obligations

78. This section sets out a summary report on compliance, by the State, with any existing obligation of the State EU law and international agreements referred to in section 2 of the 2015 Act, where relevant in the context of the Annual Transition Statement.

*Directive 2001/42/EC on the assessment of the effects of certain plans and programmes on the environment – the SEA Directive; and Directive 92/43/EEC on the appropriate assessment to be carried out in accordance with the Habitats Directive.*

79. A Strategic Environmental Assessment (SEA) was undertaken for the National Mitigation Plan in accordance with the requirements of Directive 2001/42/EC on the assessment of the effects of certain plans and programmes on the environment, as implemented in Ireland through the European Communities (Environmental Assessment of Certain Plans and Programmes) Regulations (S.I. 435 of 2004 as amended by S.I. 200 of 2011). In July 2017, a Strategic Environmental Assessment SEA Statement and Natura Impact Statement (which supports the Appropriate Assessment process) were published alongside the National Mitigation Plan. The SEA Statement was prepared on foot of the SEA process and helped to evaluate, the range of environmental consequences that may occur as a result of implementing the National Mitigation Plan.

80. A Natura Impact Statement was prepared as part of the overall Appropriate Assessment process for the National Mitigation Plan in compliance with Article 6 of EU Directive 92/43/EEC of 21 May 1992, on the Conservation of Natural Habitats and of Wild Fauna and Flora (as amended). The purpose of the Appropriate Assessment is to ensure that the National Mitigation Plan does not result in any adverse effects, from a conservation perspective, on the integrity of any Natura 2000 European Sites, which are comprised of Special Areas of Conservation and Special Protection Areas.

81. A screening for the purpose of determining whether a Strategic Environmental Assessment (SEA) or Appropriate Assessment (AA) was also required in respect of the development of the National Adaptation Framework was undertaken in 2016, having regard to the SEA and Habitats Directives and implementing regulations. An examination of the proposed NAF, guided by section 5(2)(a) of the 2015 Act, concluded that, when finalised, the National Adaptation Framework will be a policy framework or strategy for the application of adaptation measures in different sectors. It will not identify specific locations, be they Natura 2000 sites or otherwise, nor will it propose adaptation measures or projects in respect of those sites. It will, in effect, set out general principles and generic actions that will facilitate the preparation of lower level operational plans, including the identification of locations or sites and adaptation approaches. In view of this core approach, it has been screened out for the purposes of SEA/AA.

*Directive 2003/87/EC relating to a scheme for greenhouse gas emission allowance trading.*

82. The European Union Emissions Trading System (ETS) is one of the key policy measures in the EU to reduce power generation and industrial greenhouse gas emissions in a cost-effective manner. The ETS includes some 11,000 stationary installations across the EU Member States plus Iceland, Liechtenstein and Norway. In the Irish context, 101 Irish installations fall within the ETS (as of November 2017) including installations in the power generation, dairy, food processing and pharmaceuticals sectors.

83. Emissions trading is a 'cap and trade' scheme whereby an EU- wide limit or cap is set for participating installations. The cap is reduced over time so that total emissions across the EU are reduced. Within that limit, allowances for emissions are auctioned or allocated for free, depending on the sector in which the installation is located. Individual installations must report their CO<sub>2</sub> emissions each year and surrender sufficient allowances to cover their emissions. If emissions exceed available allowances, an installation must purchase allowances. If an installation has succeeded in reducing its emissions, it can sell its leftover surplus allowances or retain these for a later compliance period.

84. The ETS is designed to bring about reductions in emissions at least cost, while incentivising decarbonisation across major EU industries, and to date has played an increasingly important role in incentivising the European power generation and industry sectors to implement the emissions reductions required to meet the EU objective of achieving a 20% reduction of greenhouse gas emissions on 2005 levels by 2020. The ETS came into being in 2005, with Phase One introduced as a three-year pilot which ran until 2007. Phase Two operated between 2008 and 2012, and Phase Three from 2013 until 2020.

85. A proposal for Phase Four of the EU ETS, which will run from 2021 to 2030, was made by the European Commission in July 2015. It is anticipated the proposed revisions to EU ETS for Phase Four of the Scheme, commencing 2021, will be agreed by the end of 2017.

*Decision No. 406/2009/EC (Effort Sharing Decision) on the effort of Member States to reduce their greenhouse gas emissions to meet the Community's greenhouse gas emission reduction commitments up to 2020.*

86. Progress, and projected headway, towards compliance with the 2009 Effort Sharing Decision (ESD) targets is measured by the EPA in their annual greenhouse gas inventory and greenhouse gas projections respectively and this is addressed in Sections 9 and 10 and Appendices 7 and 8, respectively.

87. For each year between 2013 and 2020, Ireland has a greenhouse gas emission reduction target under the 2009 ESD. For the year 2020 itself, the target set for Ireland is that emissions should be 20% below their value in 2005. This is jointly the most demanding 2020 reduction target allocated under the ESD and one shared only by Denmark and Luxembourg.

88. EPA projections of emissions for the period to 2020, published in April 2017, indicate that Ireland's emissions in 2020 could be in the range of 4-6% below 2005 levels. On a cumulative basis over the period 2013-2020, Ireland is projected to have a deficit of between 13.7 and 11.5 Mt CO<sup>2</sup>eq. To facilitate compliance under the Effort Sharing Decision, any overachievement of the binding emission limit in a particular year can be banked and used towards compliance in a later year. On a cumulative basis over the period 2013-2020, Ireland is projected to have a deficit of between 13.7 (With Existing Measures) and 11.5 Mt CO<sup>2</sup>eq (With Additional Measures). This takes into account the overachievement against annual limits in the period 2013-2015, allowances for which can be banked for use in later years. On the basis of these projections, Ireland is likely to have insufficient banked allowances from 2019 and will need to implement additional emissions reduction measures or purchase further allowances for compliance.

#### *International Agreements*

89. The United Nations Framework Convention on Climate Change, its Kyoto Protocol and the Paris Agreement are taken as the relevant international agreements which apply for the purposes of section 14 of the 2015 Act.

90. Ireland is a party to the United Nations Framework Convention on Climate Change (UNFCCC), the Kyoto Protocol, and the Paris Agreement, which together provide an international legal framework for addressing climate change.

91. As a Party to the UNFCCC, Ireland is required to report regularly on its implementation of the Convention. Ireland submits a National Communication to the UNFCCC every four years, most recently in 2014 and with its next National Communication due by 2018. As a developed country Party, Ireland is also required to submit enhanced reporting on the achievement of emissions reductions and on the provision of financial, technology and capacity building support through Biennial Reports, most recently in 2016. These Reports are subject to a Multilateral Assessment process at meetings of the UNFCCC which facilitate transparency and the sharing of experience among Parties.

92. The Kyoto Protocol is an international agreement adopted in 1997 under the UNFCCC, which commits its Parties to binding emissions reduction targets. Following its amendment in 2012 (the Doha Amendment), the Kyoto Protocol's current emissions reduction targets apply to the 2013-2020 period. Ireland contributes to the goals of the Kyoto Protocol through its obligations under the EU Effort Sharing Decision as described above.

93. The Paris Agreement was adopted in December 2015 and entered into force at COP 22 in November 2016, an unprecedented speed in the context of international agreements. The Paris Agreement is designed to achieve its objectives through the Nationally Determined Commitments (NDCs) submitted by each Party. These will increase in ambition over time and represent a progression by which the level of global greenhouse gas emissions should reach a peak as soon as possible, and rapid reductions thereafter. Progress made by Parties through their NDCs will be measured on a regular basis through a series of Global Stocktakes, beginning in 2023, which will assess international progress towards achievement of the goals of the Paris Agreement.

94. Ireland will contribute to the Paris Agreement via the NDC tabled by the EU in March 2015 on behalf of Member States, which commits to at least a 40% reduction in EU-wide emissions by 2030 (compared to 1990 levels). This is based on reductions in the ETS and non-ETS sectors of 43% and 30% respectively (compared to 2005 levels). The specific details of Ireland's contribution to this overall EU 30% reduction in the non-ETS sector, as well as the contributions to be made by other Member States, remain the subject of negotiations between the EU and Member States in the context of the Effort Sharing Regulation proposal, which was published in July 2016.

## Appendix 1 - Climate Action and Low Carbon Development Act 2015

### Climate Action and Low Carbon Development Act 2015 – Section 14

#### Presentation of Annual Transition Statement to each House of the Oireachtas

**14.** (1) *An annual transition statement shall, in accordance with this section, be presented to each House of the Oireachtas not later than 12 months after the passing of this Act, and not later than each subsequent anniversary of such passing.*

(2) *An annual transition statement shall comprise, in relation to the year immediately preceding the year in which the statement is presented—*

(a) *statement (in this Act referred to as an “annual national transition statement”) to be presented to each House of the Oireachtas by the Minister and such statement shall include the matters specified in subsection (4)(a),*

(b) *a statement (in this Act referred to as an “annual sectoral mitigation transition statement”) to be presented to each House of the Oireachtas by each Minister of the Government to whom subsection (3) applies and each such statement shall include the matters specified in subsection (4)(b), and*

(c) *if a request under subsection (5) is made, a statement (in this Act referred to as an “annual sectoral adaptation transition statement”) to be presented to each House of the Oireachtas by each Minister of the Government to whom such request is made and each such statement shall include the matters specified in subsection (4)(c).*

(3) *For the purposes of subsection (2)(b), this subsection applies to each Minister of the Government who has, in accordance with section 4(3)(b), submitted sectoral mitigation measures to the Minister that are included, pursuant to section 4(2)(d), in the most recent approved national mitigation plan.*

(4) *For the purposes of subsection (2)—*

(a) *an annual national transition statement shall include—*

(i) *an overview of the mitigation policy measures adopted to reduce emissions of greenhouse gases in order to enable the achievement of the national transition objective,*

(ii) *an overview of the adaptation policy measures that have been adopted in order to enable the State to adapt to the effects of climate change and to enable the achievement of the national transition objective,*

(iii) *a record of emissions of greenhouse gases set out in the most recent national greenhouse gas emissions inventory prepared by the Agency,*

- (iv) a projection of future greenhouse gas emissions prepared by the Agency, and*
- (v) a report on compliance, by the State, with any existing obligation of the State under the law of the European Union or an international agreement referred to in section 2,*

*(b) an annual sectoral mitigation transition statement shall include—*

- (i) a record of the sectoral mitigation measures adopted by the Minister of the Government presenting the annual sectoral mitigation transition statement concerned, and*
- (ii) an assessment of the effectiveness of the sectoral mitigation measures referred to in subparagraph (i) in the achievement of their purpose, and*

*(c) an annual sectoral adaptation transition statement shall include—*

- (i) a record of the adaptation policy measures adopted by the Minister of the Government presenting the annual sectoral adaptation statement concerned, and*
- (ii) an assessment of the effectiveness of the adaptation policy measures referred to in subparagraph (i) in the achievement of their purpose.*

*(5) Where, having regard to the requirements of adaptation in relation to the effects of climate change and the furthering of the national transition objective, the Minister considers it appropriate, the Minister may, in any year, request a Minister of the Government—*

*(a) to whom a request under section 6(1) has been made to make a sectoral adaptation plan, or*

*(b) who has, in accordance with section 6, made a sectoral adaptation plan, to present to each House of the Oireachtas an annual sectoral adaptation transition statement.*

*(6) Where—*

*(a) a request under section 6(1) has been made to the Minister to make a sectoral adaptation plan or the Minister has, in accordance with section 6, made a sectoral adaptation plan, and*

*(b) the Minister, having regard to the requirements of adaptation in relation to the effects of climate change and the furthering of the national transition objective, considers it appropriate, the Minister may, in any year, present to each House of the Oireachtas an annual sectoral adaptation transition statement and references in this section to a request under subsection (5) shall be construed as including a sectoral adaptation plan presented in accordance with this subsection.*



## Appendix 2 - Electricity Sectoral Mitigation Transition Statement

### Sector: Electricity Generation

#### Measure RE1: Renewable Electricity Feed-in-Tariff (REFIT) 1

<b>Sector</b>	Electricity Generation
<b>Programme/Scheme</b>	Renewable Electricity Support Schemes
<b>Measure Title</b>	Renewable Electricity Feed-in-Tariff (REFIT) 1
<b>Type of measure</b>	Policy Support Measure in place
<b>Objective of measure</b>	To support investment in renewable electricity generation through a Public Service Obligation levy on all electricity consumers thereby contributing towards Ireland's commitment to meet 40% of electricity demand from renewable sources by 2020
<b>Current Status (new, existing, in development)</b>	Existing
<b>Period during which measure will be in place</b>	In place until 2027
<b>Cumulative greenhouse gas reductions 2017-2020</b>	5.67 Mt CO <sub>2</sub>
<b>Cumulative greenhouse gas reductions 2017-2030</b>	19.71 Mt CO <sub>2</sub>
<b>Funding narrative</b>	This scheme is funded through a Public Service Obligation levy imposed on all electricity consumers
<b>Qualitative statement on impacts</b>	<p>Lower reliance on fossil fuel generation leads to reduced fuel imports.</p> <p>The deployment of renewable technologies has positive impacts in terms of direct jobs in construction, ongoing maintenance and operation of technologies, and the supply chain.</p> <p>Renewable generation (such as wind and hydro) has positive environmental benefits in terms of air quality.</p> <p>Through engaging in the development of renewable energy, communities can help build consensus on mitigation policy measures.</p>

## Sector: Electricity Generation

### Measure RE2: Renewable Electricity Feed-in-Tariff (REFIT) 2

<b>Sector</b>	Electricity Generation
<b>Programme/Scheme</b>	Renewable Electricity Support Schemes
<b>Measure Title</b>	Renewable Electricity Feed-in-Tariff (REFIT) 2
<b>Type of measure</b>	Policy Support Measure in place
<b>Objective of measure</b>	To support investment in renewable electricity generation through a Public Service Obligation levy on all electricity consumers thereby contributing towards Ireland's commitment to meet 40% of electricity demand from renewable sources by 2020.
<b>Current Status (new, existing, in development)</b>	Existing
<b>Period during which measure will be in place</b>	In place until 2032
<b>Cumulative greenhouse gas reductions 2017-2020</b>	7.89 Mt CO <sub>2</sub>
<b>Cumulative greenhouse gas reductions 2017-2030</b>	27.39 Mt CO <sub>2</sub>
<b>Funding narrative</b>	This scheme is funded through a Public Service Obligation levy imposed on all electricity consumers
<b>Qualitative statement on impacts</b>	<p>Lower reliance on fossil fuel generation leads to reduced fuel imports.</p> <p>The deployment of renewable technologies has positive impacts in terms of direct jobs in construction, ongoing maintenance and operation of technologies, and the supply chain.</p> <p>Renewable generation (such as wind and hydro) has positive environmental benefits in terms of air quality. Through engaging in the development of renewable energy, communities can help build consensus on mitigation policy measures.</p>

## Sector: Electricity Generation

### Measure RE3: Renewable Electricity Feed-in-Tariff (REFIT) 3 Scheme

<b>Sector</b>	Electricity Generation
<b>Programme/Scheme</b>	Renewable Electricity Support Schemes
<b>Measure Title</b>	Renewable Electricity Feed-in-Tariff (REFIT) 3 Scheme
<b>Type of measure</b>	Policy Support Measure in place
<b>Objective of measure</b>	To support investment in renewable electricity generation through a Public Service Obligation levy on all electricity consumers thereby contributing towards Ireland's commitment to meet 40% of electricity demand from renewable sources by 2020.
<b>Current Status (new, existing, in development)</b>	Existing
<b>Period during which measure will be in place</b>	In place until 2030
<b>Cumulative greenhouse gas reductions 2017-2020</b>	2.31 Mt CO <sub>2</sub>
<b>Cumulative greenhouse gas reductions 2017-2030</b>	8.00 Mt CO <sub>2</sub>
<b>Funding narrative</b>	This scheme is funded through a Public Service Obligation levy on all electricity consumers.
<b>Qualitative statement on impacts</b>	<p>Lower reliance on fossil fuel generation leads to reduced fuel imports.</p> <p>Employment potential, mainly in the agriculture and forestry sectors, through the domestic supply of solid biomass.</p> <p>Through engaging in the development of renewable energy, communities can help build consensus on mitigation policy measures.</p>

#### Measure RE4: Alternative Energy Requirement Programme (AER)

<b>Sector</b>	Electricity Generation
<b>Programme/Scheme</b>	Renewable Electricity Support Schemes
<b>Measure Title</b>	Alternative Energy Requirement Programme (AER)
<b>Type of measure</b>	Policy Support Measure in place
<b>Objective of measure</b>	To support investment in renewable electricity generation through a Public Service Obligation levy on all electricity consumers thereby contributing towards Ireland's commitment to meet 40% of electricity demand from renewable sources by 2020
<b>Current Status (new, existing, in development)</b>	Existing
<b>Period during which measure will be in place</b>	Support payments will end in 2021
<b>Cumulative greenhouse gas reductions 2017-2020</b>	1.76Mt CO <sub>2</sub>
<b>Cumulative greenhouse gas reductions 2017-2030</b>	6.07Mt CO <sub>2</sub>
<b>Funding narrative</b>	This scheme is funded through a Public Service Obligation levy imposed on all electricity consumers
<b>Qualitative statement on impacts</b>	<p>Lower reliance on fossil fuel generation leads to reduced fuel imports.</p> <p>The deployment of renewable technologies has positive impacts in terms of direct jobs in construction, ongoing maintenance and operation of technologies, and the supply chain.</p> <p>Renewable generation (such as wind and hydro) has positive environmental benefits in terms of air quality.</p> <p>Through engaging in the development of renewable energy, communities can help build consensus on mitigation policy measures.</p>

## Sector: Electricity Generation

### Measure RE5: Prototype Development Fund

<b>Sector</b>	Electricity Generation
<b>Programme/Scheme</b>	Offshore Renewable Energy
<b>Measure Title</b>	Prototype Development Fund
<b>Type of measure</b>	Exchequer funded grants to support wave and wind renewable energy technology in place.
<b>Objective of measure</b>	To support investment in the development of offshore wave and tidal energy devices up to commercial stage, leading to deployment at offshore generation sites and ultimately contributing to RES E post 2020
<b>Current Status (new, existing, in development)</b>	Existing
<b>Period during which measure will be in place</b>	To 2030, subject to Exchequer funding
<b>Cumulative greenhouse gas reductions 2017-2020</b>	Nil
<b>Cumulative greenhouse gas reductions 2017-2030</b>	Unknown. As technology is not expected to reach the commercial scale until late 2020s.
<b>Funding narrative</b>	The scheme assumes the continuation of Exchequer funding beyond 2021.
<b>Qualitative statement on impacts</b>	<p>Generation of electricity from offshore renewable energy sources will reduce fossil fuel imports.</p> <p>The deployment of offshore technologies presents employment opportunities in terms of the construction of devices and ongoing maintenance and operation.</p> <p>Test facilities attract key international device deployment companies and present opportunities to build an Irish supply chain around wave and wind devices.</p> <p>Renewable generation has positive environmental benefits. Through engaging in the development of offshore renewable energy, coastal communities can help build consensus on mitigation policy measures.</p>

## Appendix 3 - Built Environment Sectoral Mitigation Transition Statement

### Sector: Built Environment

#### Measure BE1: Better Energy Homes Scheme

<b>Sector</b>	Built Environment
<b>Programme/Scheme</b>	Better Energy Homes Scheme
<b>Measure Title</b>	<b>Better Energy Homes Scheme</b>
<b>Type of measure</b>	Economic Instrument - Fiscal Incentive (Grants)
<b>Objective of measure</b>	Improving the energy efficiency of homes to reduce occupants energy consumption, costs and emissions.  Renovate an increased quantum of homes by end 2020 to deliver a cumulative projected GWH savings of 1,900
<b>Current Status (new, existing, in development)</b>	Existing (NEEAP) Measure. Grants are provided to homeowners for insulation, high efficiency boiler upgrade, and other energy efficiency measures. Typical grant c.30% of investment undertaken.
<b>Period during which measure will be in place</b>	Already in Place
<b>Cumulative GHG reductions 2017-2020</b>	126 Kt CO <sub>2</sub> per annum by 2020 (473kt CO <sub>2</sub> cumulative 2014 – 2020)*
<b>Cumulative GHG reductions 2017-2030</b>	
<b>Estimated Savings (Tonnes of CO<sub>2</sub>)</b>	28.77 kt CO for 2016
<b>Funding narrative</b>	€23.2 M (2014+2015). By end 2015. Assuming current level of investment continues, spend to end 2020 at projected current spend levels will be €96 M (2014 – 2020)  €17.3 million spent for 2016 to upgrade 15,265 homes.  €18.712 million provided for in 2017
<b>Qualitative statement on impacts</b>	Besides the reduced energy consumption and reduced emissions homes are more comfortable/warmer which can often result in improved health and wellbeing outcomes.  The Sustainable Energy Authority of Ireland is currently engaged in a review of the technologies supported under the Better Energy Homes grant programme. Increased funding will allow SEAI to look at what new technologies might be supported under the scheme in 2018.

\* figure based on latest data available.

**Sector: Built Environment**

**Measure BE2: Better Energy Warmer Homes Scheme**

<b>Sector</b>	Built Environment
<b>Programme/Scheme</b>	<b>Better Energy Warmer Homes Scheme</b>
<b>Measure Title</b>	Better Energy Warmer Homes Scheme
<b>Type of measure</b>	Economic Instrument - Fiscal Incentive
<b>Objective of measure</b>	<p>Improving the energy efficiency of the housing stock of those in energy poverty to help reduce their energy consumption, costs and emissions.</p> <p>Renovate an increased quantum of homes by end 2020 to deliver cumulative projected GWH savings of 590 Gwh.</p>
<b>Current Status (new, existing, in development)</b>	Existing Measure (NEEAP) - delivers efficiency upgrades free of charge to homeowners in energy poverty.
<b>Period during which measure will be in place</b>	Already in Place
<b>Cumulative GHG reductions 2017-2020</b>	35 Kt CO <sub>2</sub> per annum by 2020 (145kt CO <sub>2</sub> cumulative 2014 – 2020)*
<b>Cumulative GHG reductions 2017-2030</b>	-
<b>Estimated Savings (Tonnes of CO<sub>2</sub>)</b>	3.9 kt CO <sub>2</sub> in 2016.
<b>Funding narrative</b>	<p>Assuming current level of investment continues, spend to end 2020 will be €147m.</p> <p>2016: €20.7 million spent.</p>
<b>Qualitative statement on impacts</b>	<p>This measure is targeted at those in or at risk of energy poverty and as such the improved living conditions as a result leading to improved health and wellbeing outcomes are likely to be more apparent in this scheme.</p> <p>In 2016, under the Warmer Home Scheme, 6, 743 homes in energy poverty received free upgrades at a cost of €20.68 million.</p> <p>In 2017 the scheme was expanded to allow for homes identified as being in particularly poor condition to get more extensive energy efficiency upgrades under the scheme, such as a new heating system and solid wall insulation, where recommended by an SEAI surveyor.</p>

\* figure based on latest data available.

**Sector: Built Environment**

**Measure BE3: Housing Assistance Package for Landlords**

<b>Sector</b>	Built Environment
<b>Programme/Scheme</b>	<b>Housing Assistance Package for Landlords</b>
<b>Measure Title</b>	Housing Assistance Package for Landlords
<b>Type of measure</b>	Economic Instrument – Fiscal Incentive
<b>Objective of measure</b>	A pilot scheme as part of the Better Energy Programme to encourage landlords participating in the Housing Assistance Package (HAP) to avail of the Better Energy Programme to incentivise energy standard improvements in the rental sector.
<b>Current Status (new, existing, in development)</b>	In development
<b>Period during which measure will be in place</b>	2018
<b>Cumulative GHG reductions 2017-2020</b>	Spend and impacts are reflected in other BEP measures.
<b>Cumulative GHG reductions 2017-2030</b>	
<b>Estimated Savings (Tonnes of CO<sup>2</sup>)</b>	Spend and impacts reflected in other BEP measures
<b>Funding narrative</b>	Costs will be met from existing allocations for Warmer Homes scheme
<b>Qualitative statement on impacts</b>	<ul style="list-style-type: none"> <li>• Improved comfort and living conditions leading to positive health and wellbeing impacts.</li> <li>• Improved energy efficiency of rental housing stock.</li> <li>• Jobs in construction and energy service companies.</li> </ul>



**Sector: Built Environment**

**Measure BE4: Better Energy Communities**

<b>Sector</b>	Built Environment
<b>Programme/Scheme</b>	<b>Better Energy Communities</b>
<b>Measure Title</b>	Better Energy Communities
<b>Type of measure</b>	Economic Instrument - Fiscal Incentive (Grants)
<b>Objective of measure</b>	Improving the energy efficiency of clusters of buildings in community based settings to reduce occupants energy consumption, costs and emissions.  Cumulative projected GWH savings of 2,280 assuming current level of uptake maintained.
<b>Current Status (new, existing, in development)</b>	Existing Measure (NEEAP). Grant support to existing facilities/building in the community sector and to clusters of homes at risk of energy poverty.
<b>Period during which measure will be in place</b>	Already in Place
<b>Cumulative GHG reductions 2017-2020</b>	140 Kt CO <sub>2</sub> per annum by 2020 (550kt CO <sub>2</sub> cumulative 2014 – 2020)*
<b>Cumulative GHG reductions 2017-2030</b>	-
<b>Estimated Savings (Tonnes of CO<sub>2</sub>)</b>	12 kt CO <sub>2</sub> savings in 2016
<b>Funding narrative</b>	The Better Energy Communities programme in 2016 saw 37 projects completed, delivering energy upgrades to 2,013 homes and 385 public, private & community buildings at a cost of €16.71 million. Funding for 2017: Total budget allocation : €21,100,000.
<b>Qualitative statement on impacts</b>	The Better Energy Communities scheme encourages community based partnerships to improve the thermal and electrical efficiency of the building stock and energy poor homes and facilities. It encourages implementation of deeper measures.

\* figure based on latest data available.

**Sector: Built Environment**

**Measure BE5: Warmth and Wellbeing Pilot Scheme**

<b>Sector</b>	Built Environment
<b>Programme/Scheme</b>	<b>Warmth and Wellbeing Pilot Scheme</b>
<b>Measure Title</b>	Warmth and Wellbeing Pilot Scheme (NMP Measure BE5)
<b>Type of measure</b>	Direct Support Economic Instrument – Fiscal Incentive and Research/Demonstration
<b>Objective of measure</b>	Provision of deep retrofits to the homes of people aged 55 and over or aged 12 and under suffering chronic respiratory conditions relating to the thermal efficiency of their homes. Research on the outcomes and impacts including on reduction in hospital bed nights alleviating pressure on the health system will inform better understanding of the wider benefits of upgrading homes to improve energy efficiency.
<b>Current Status (new, existing, in development)</b>	Existing
<b>Period during which measure will be in place</b>	2016 (for 3 years)
<b>Cumulative GHG reductions 2017-2020</b>	-
<b>Cumulative GHG reductions 2017-2030</b>	-
<b>Estimated Savings (Tonnes of CO<sub>2</sub>)</b>	New pilot scheme introduced in 2016 as part of the implementation of the Government's new Energy Poverty Strategy.  There are no anticipated savings for the scheme as it is a three year pilot programme.
<b>Funding narrative</b>	€20m over 2016-19. €548,700 spent in 2016 (new scheme). €8 million budget allocation for 2017 with €3.1 million spent to October 31 <sup>st</sup> 2017.
<b>Qualitative statement on impacts</b>	400 homes upgraded to end 2017 with a further 900 to be upgraded by the end of the pilot.

**Sector: Built Environment**

**Measure BE6: Deep Retrofit Pilot (Residential programme):**

<b>Sector</b>	Built Environment
<b>Programme/Scheme</b>	Pilot Programme
<b>Measure Title</b>	<b>Deep Retrofit Pilot</b>
<b>Type of measure</b>	Research – Demonstration
<b>Objective of measure</b>	<p>The initial focus will be on the residential sector. Deep retrofit is the significant upgrade of a building towards nearly zero energy requirements where is practically feasible and achievable.</p> <p>The aim of the pilot is to fund fuel switching to low carbon heating technologies to demonstrate the multiple benefits of energy efficiency and investigate how best to support consumer decision making and investment in deep retrofit.</p>
<b>Current Status (new, existing, in development)</b>	New
<b>Period during which measure will be in place</b>	From 2017
<b>Cumulative GHG reductions 2017-2020</b>	14 kt CO <sub>2</sub> eq.
<b>Cumulative GHG reductions 2017-2030</b>	70 kt CO <sub>2</sub> eq.
<b>Estimated Savings (Tonnes of CO<sub>2</sub>)</b>	N/A for 2016 as measure was introduced in 2017
<b>Funding narrative</b>	<p>€5m has been allocated in <u>2017</u> to carry out a number of new approaches for deep retrofit.</p> <p>Funding will be given to upgrade homes to an A BER.</p>
<b>Qualitative statement on impacts</b>	-

**Sector: Built Environment**

**Measure BE7: Energy Efficient Social Housing**

<b>Sector</b>	Built Environment
<b>Programme/Scheme</b>	<b>Energy Efficient Social Housing</b>
<b>Measure Title</b>	Energy Efficient Social Housing
<b>Type of measure</b>	Capital Programme
<b>Objective of measure</b>	Phase 1 commenced in 2013 to retrofit all relevant local authority dwellings with cavity wall and attic insulation; this programme will continue in 2017. Phase 2 was piloted in 2015/2016, and will be formally rolled out to all local authorities. Phase 2 will focus on the external fabric upgrade of those social housing units with solid/hollow block wall construction.
<b>Current Status (new, existing, in development)</b>	Existing and in development.
<b>Period during which measure will be in place</b>	Currently in place.
<b>Cumulative GHG reductions 2017-2020</b>	109.8 kt CO <sub>2</sub> (takes account of measures in place to 2016)
<b>Cumulative GHG reductions 2017-2030</b>	475.8 kt CO <sub>2</sub> (takes account of measures in place to 2016)
<b>Estimated Savings (Tonnes of CO<sub>2</sub>)</b>	5.4 kt CO <sub>2</sub> for 2016 (reflecting emphasis in 2016 on grant support for shallow retrofits, rather than substantial/deep retrofits.)
<b>Funding narrative</b>	Budgets agreed annually 2014-€27 million-13,107 dwellings 2014-€31 million-18,010 dwellings 2015-€27 million-14,843 dwellings 2016 €33 million-11,303 dwellings 2017- Estimate €19 million
<b>Qualitative statement on impacts</b>	This measure is likely to have a significant impact on those in or at risk of energy poverty. Improving living conditions and leading to improved health and wellbeing outcomes.

**Sector: Built Environment**

**Measure BE8: Green Public Procurement via Accelerated Capital Allowances (ACA)**

<b>Sector</b>	Built Environment
<b>Programme/Scheme</b>	Green Public Procurement via <b>Accelerated Capital Allowances (ACA)</b>
<b>Measure Title</b>	Green Public Procurement via Accelerated Capital Allowances (ACA)
<b>Type of measure</b>	Economic Instrument - Fiscal Incentive
<b>Objective of measure</b>	More energy efficient equipment used in the public and private commercial sectors.
<b>Current Status (new, existing, in development)</b>	Existing Measure (NEEAP)
<b>Period during which measure will be in place</b>	2008 onwards
<b>Cumulative GHG reductions 2017-2020</b>	199kt in total - 59 kt by 2020 in the Public sector and a further 140kt in the Private sector* SEAI to review impact in early 2018.
<b>Cumulative GHG reductions 2017-2030</b>	-
<b>Estimated Savings (Tonnes of CO<sub>2</sub>)</b>	SEAI to review impact in early 2018.
<b>Funding narrative</b>	Foregone tax TBD
<b>Qualitative statement on impacts</b>	2016: 1,417 products added, bring total to 17,728.

\* figures based on latest data available.

**Sector: Built Environment****Measure BE9: Energy Efficiency Fund**

<b>Sector</b>	Built Environment
<b>Programme/Scheme</b>	<b>Energy Efficiency Fund</b>
<b>Measure Title</b>	Energy Efficiency Fund
<b>Type of measure</b>	Economic Instrument
<b>Objective of measure</b>	If fully subscribed, the fund of over €70m has the capacity to leverage potential investment of €300m in energy efficiency.
<b>Current Status (new, existing, in development)</b>	Existing Measure
<b>Period during which measure will be in place</b>	2014-2018
<b>Cumulative GHG reductions 2017-2020</b>	See below
<b>Cumulative GHG reductions 2017-2030</b>	See below
<b>Estimated Savings (Tonnes of CO<sub>2</sub>)</b>	Action by Fund Manager to pursue investments is ongoing - information to assess impacts not yet available.
<b>Funding narrative</b>	Government has invested €35m in the fund.
<b>Qualitative statement on impacts</b>	Fund working with significant pipeline of potential projects.

**Sector: Built Environment**

**Measure BE10: Building Regulations & Nearly Zero Energy Buildings (NZEBS)**

<b>Sector</b>	Built Environment
<b>Programme/Scheme</b>	<b>Part L of the Building Regulations, NZEBs &amp; Major Renovations</b>
<b>Measure Title</b>	Part L of the Building Regulations, NZEBs & Major Renovations
<b>Type of measure</b>	Regulation
<b>Objective of measure</b>	<p>Review of Part L of building regulations for buildings other than Dwellings in 2017 to give in the order of 60% improvement in energy and CO<sub>2</sub> performance and to introduce cost optimal requirements for Major Renovations</p> <p>Review of Part L of building regulations for Dwellings in 2018 to give in the order of 70% improvement in energy and CO<sub>2</sub> performance over 2005 requirements and to introduce cost optimal requirements for Major Renovations.</p>
<b>Current Status (new, existing, in development)</b>	<p>This has been completed for Buildings other than Dwellings and will take effect from 1st Jan 2019. It will contribute to emissions reductions from 1st Jan 2021 onwards.</p> <p>This will be in place for Dwellings from early 2019. It will contribute to emissions reductions from 1st Jan 2021 onwards.</p>
<b>Period during which measure will be in place</b>	<p>2017 onwards for buildings other than dwellings, 2018 onwards for dwellings.</p> <p>These measures will contribute to emissions reductions from 1<sup>st</sup> Jan 2021 onwards.</p>
<b>Cumulative GHG reductions 2017-2020</b>	See below
<b>Cumulative GHG reductions 2017-2030</b>	See below
<b>Estimated Savings (Tonnes of CO<sub>2</sub>)</b>	<p>Nearly Zero Energy Buildings-Buildings other than Dwellings-This measure will provide a reduction in the order of 60% in carbon dioxide emissions from all new buildings other than dwellings completed after the 31<sup>st</sup> Dec 2020 this equates to 44.1kgCO<sub>2</sub>/m<sup>2</sup>/yr for a typical office. Forecasts are required to estimate cumulative emissions.</p> <p>Nearly Zero Energy Buildings-Dwellings This measure will provide a reduction in the order of 70% in Carbon emissions from dwellings completed after the 31<sup>st</sup> Dec 2020 this equates to 91.35 ktCO<sub>2</sub>e in the period 2020 to 2030</p> <p>Major Renovations- Buildings other than Dwellings – Performance requirements to be set at Cost Optimal Levels. Forecasts to be developed to estimate cumulative savings</p>

	Major Renovations- Dwellings – Performance requirements to be set at Cost Optimal Levels. Forecasts to be developed to estimate cumulative savings
<b>Funding narrative</b>	Cost is to industry but is set at cost optimum level
<b>Qualitative statement on impacts</b>	-



**Sector: Built Environment**  
**Measure BE11: BER Certificates**

<b>Sector</b>	Built Environment
<b>Programme/Scheme</b>	<b>BER Certificates</b>
<b>Measure Title</b>	BER Certificates
<b>Type of measure</b>	Regulatory Instrument
<b>Objective of measure</b>	A BER is an indication of the energy performance of a dwelling on a scale of A (most efficient) to G (least efficient) arrived at following an energy audit. By providing purchasers/renters with such information it promotes more awareness and understanding of energy efficiency. All dwellings offered for sale or rent must display their BER rating. The scheme is operated by SEAI on a cost-neutral basis. From early 2018 BER Certificates and reports will be enhanced to provide more detailed information to owners/buyers/occupants on how much more comfortable and cost effective the home could be if specific energy efficiency measures were undertaken. The new BER documentation will also feature the emissions levels associated with the dwelling more prominently to help raise awareness of these emissions and how they could be managed.
<b>Current Status (new, existing, in development)</b>	Existing Measure
<b>Period during which measure will be in place</b>	Already in place – but to be enhanced from 2018.
<b>Cumulative GHG reductions 2017-2020</b>	This is a support measure – its impacts are reflected in other quantified measures
<b>Cumulative GHG reductions 2017-2030</b>	This is a support measure – its impacts are reflected in other quantified measures
<b>Estimated Savings (Tonnes of CO<sub>2</sub>)</b>	This is a support measure – its impacts are reflected in other quantified measures
<b>Funding narrative</b>	The scheme is operated by SEAI on a cost-neutral basis.
<b>Qualitative statement on impacts</b>	Raises awareness of energy efficiency, providing a basis to differentiate and value properties having regard to energy performance. New certificates will heighten awareness of emissions associated with dwellings and potential to reduce them.

**Sector: Built Environment**

**Measure BE12: Energy Audits for larger Businesses**

<b>Sector</b>	Built Environment
<b>Programme/Scheme</b>	<b>Energy Audits for larger Businesses</b>
<b>Measure Title</b>	Energy Audits for larger Businesses
<b>Type of measure</b>	Regulation
<b>Objective of measure</b>	Some 600 large businesses (Larger than SME) and some public sector bodies are required to undertake these audits.
<b>Current Status (new, existing, in development)</b>	Existing – introduced in 2015 as a mandatory requirement.
<b>Period during which measure will be in place</b>	2015 onwards
<b>Cumulative GHG reductions 2017-2020</b>	-
<b>Cumulative GHG reductions 2017-2030</b>	-
<b>Estimated Savings (Tonnes of CO<sub>2</sub>)</b>	The current obligation on companies is to undertake an audit. New monitoring arrangements to be put in place from 2018 should then enable estimates of energy efficiency and emissions impacts.
<b>Funding narrative</b>	Any measures taken would be primarily be funded by the companies themselves with some potential support from existing SEAI schemes.
<b>Qualitative statement on impacts</b>	Improved energy efficiency in commercial sector contributes to overall improved business efficiency and enhanced competitiveness.

**Sector: Built Environment**

**Measure BE13: Energy Efficient Obligation Scheme**

<b>Sector</b>	Built Environment
<b>Programme/Scheme</b>	<b>Energy Efficiency Obligation Scheme</b>
<b>Measure Title</b>	Energy Efficiency Obligation Scheme
<b>Type of measure</b>	Regulation
<b>Objective of measure</b>	<p>Energy suppliers expected to deliver annual energy savings of 0.75% of their final energy sales to consumers.</p> <p>Energy suppliers need to work collaboratively with customers to identify potential savings and to make the investments to deliver those savings or they face a fine. This results in increased levels of renovation in domestic and non-domestic markets.</p>
<b>Current Status (new, existing, in development)</b>	Existing Measure (NEEAP)
<b>Period during which measure will be in place</b>	2014 onwards
<b>Cumulative GHG reductions 2017-2020</b>	-
<b>Cumulative GHG reductions 2017-2030</b>	-
<b>Estimated Savings (Tonnes of CO<sub>2</sub>)</b>	The obligated parties target for 2016 was 550GWh. The target was exceeded with 759GWh achieved. 173 kt CO <sub>2</sub> in 2016
<b>Funding narrative</b>	Cost is met by the Energy Suppliers – some may be passed on to consumers.
<b>Qualitative statement on impacts</b>	Fulfilment of obligation by Energy Suppliers.

**Sector: Built Environment**

**Measure BE14: Large Industry Energy Network**

<b>Sector</b>	Built Environment
<b>Programme/Scheme</b>	<b>Large Industry Energy Network</b> (LIEN Programme )
<b>Measure Title</b>	Large Industry Energy Network (LIEN Programme)
<b>Type of measure</b>	Economic Instrument - Fiscal Incentive
<b>Objective of measure</b>	The Large Industry Energy Network (LIEN) is a well-established networking and support programme for large business energy users supported by SEAI. LIEN is a voluntary grouping of companies, facilitated by the SEAI, that work together to develop and maintain robust energy management.
<b>Current Status (new, existing, in development)</b>	Existing Measure (NEEAP)
<b>Period during which measure will be in place</b>	2000 onwards
<b>Cumulative GHG reductions 2017-2020</b>	Anticipated savings: 541 kt CO <sub>2</sub> (2020)
<b>Cumulative GHG reductions 2017-2030</b>	-
<b>Estimated Savings (Tonnes of CO<sub>2</sub>)</b>	Final energy savings: 1686 GWh (achieved 2016). 500kt CO <sub>2</sub> (achieved 2016)
<b>Funding narrative</b>	SEAI is resourced to provide this support.
<b>Qualitative statement on impacts</b>	Energy savings worth of €25 million were reported by the network in 2016.

\* figure based on latest data available.

**Sector: Built Environment**

**Measure BE15: SEAI SME Programme**

<b>Sector</b>	Built Environment
<b>Programme/Scheme</b>	<p><b>SEAI SME Programmes</b></p> <p>2016 SME programmes:</p> <ul style="list-style-type: none"> <li>• Best Practice Supports.</li> <li>• Small Business training.</li> <li>• Energy MAP training.</li> </ul> <p>2017 SME Pilot programmes</p> <ul style="list-style-type: none"> <li>• SME lighting programme.</li> <li>• Dairy programme.</li> </ul>
<b>Measure Title</b>	SEAI SME Programme
<b>Type of measure</b>	Support – Education and Training with some grant support.
<b>Objective of measure</b>	Encourage and Support SMEs to undertake energy efficiency measures.
<b>Current Status (new, existing, in development)</b>	Existing and New. SME supports existing - the pilots are new for 2017.
<b>Period during which measure will be in place</b>	2008 onwards – with additional pilot measures added in 2017.
<b>Cumulative GHG reductions 2017-2020</b>	-
<b>Cumulative GHG reductions 2017-2030</b>	-
<b>Estimated Savings (Tonnes of CO<sub>2</sub>)</b>	<p>SEAI delivered free assessments to 116 SME’s and also six “Emap” training courses in 2016 and were also involved in a pilot scheme for the retail sector in collaboration with DEJI / BEI. This entailed custom designed assessments for small retail stores and training courses.</p> <p>Final energy savings for 2016 arising from SEAI SME programme: 157 GWh.</p> <p>Anticipated Savings: <b>70kt</b> CO<sub>2</sub> SEAI to review impact in early 2018.</p> <p><u>2017</u></p> <p><u>Dairy Sector :</u></p> <p>The Dairy Sector project is a collaboration between SEAI and Teagasc. This supports installation of variable speed drive technology in milking parlours, as well as Vacuum Pumps, and smart meters. The subvention level is 50%. 50 applications processed with a total grant amount of €210,118.</p> <p><b>Savings: Dairy 1.0kt</b> CO<sub>2</sub> (Please note this is only a pilot</p>

	<p>programme launched in 2017).</p> <p><u>SME Smart Lighting Scheme 2017:</u></p> <p>55 SME's are benefitting from the scheme. Current commitment on grant funding is €580,000. Estimated savings of 6,100 MWh Primary Energy saved annually.</p> <p>Savings: Lighting 1.34kt CO<sub>2</sub> (Please note this is only a pilot programme launched in 2017).</p>
<b>Funding narrative</b>	SEAI support to SMEs is provided using a mix of current funding for SEAI staff support as well as capital funding for relevant grant elements.
<b>Qualitative statement on impacts</b>	Improved energy efficiency and competitiveness

\* figure based on latest data available.

**Sector: Built Environment**  
**Measure BE16: Qualibuild**

<b>Sector</b>	Built Environment
<b>Programme/Scheme</b>	<b>Qualibuild</b>
<b>Measure Title</b>	Qualibuild
<b>Type of measure</b>	Education and Training
<b>Objective of measure</b>	To promote the up to date skills and knowledge in the construction sector to deliver a high standard of build and best practice in energy efficiency. This initiative is run by the Green Building Council.
<b>Current Status (new, existing, in development)</b>	Existing Measure
<b>Period during which measure will be in place</b>	Already in place
<b>Cumulative GHG reductions 2017-2020</b>	N/A – the impacts will result in improved energy efficiency largely captured elsewhere.
<b>Cumulative GHG reductions 2017-2030</b>	N/A – the impacts will result in improved energy efficiency largely captured elsewhere.
<b>Estimated Savings (Tonnes of CO<sub>2</sub>)</b>	N/A – the impacts will result in improved energy efficiency largely captured elsewhere.
<b>Funding narrative</b>	N/A
<b>Qualitative statement on impacts</b>	Improved energy efficiency outcomes and more people choosing energy efficiency options.

**Sector: Built Environment**

**Measure BE17: Schools Technical Bureau**

<b>Sector</b>	Built Environment
<b>Programme/Scheme</b>	<b>Schools Technical Bureau and Energy in Education programme</b>
<b>Measure Title</b>	Schools Technical Bureau
<b>Type of measure</b>	Education and Training with funding support
<b>Objective of measure</b>	<p>Provision of tailored advice, training and support by SEAI to enable schools and the Department of Education and Skills to identify and take advantage of opportunities to reduce energy use and improve energy performance when making facilities upgrades to schools including through maintenance, summer works and capital programmes.</p> <p>In 2017, a new €4.5m capital fund (shared between DCCAE and DES) was established to build a schools retrofit programme. 10 schools were retrofitted in 2017, with the funding scheme expected to grow from 2018.</p>
<b>Current Status (new, existing, in development)</b>	Existing (Energy in Education) New (Schools retrofit Pilot)
<b>Period during which measure will be in place</b>	Since 2009 – Energy in Education From 2017 – Schools Retrofit Pilot
<b>Cumulative GHG reductions 2017-2020</b>	4 kt CO <sub>2</sub> eq.
<b>Cumulative GHG reductions 2017-2030</b>	22 kt CO <sub>2</sub> eq.
<b>Estimated Savings (Tonnes of CO<sub>2</sub>)</b>	<p>Energy in Education 0.5 kt CO<sub>2</sub> per annum average by 2020</p> <p>Schools Retrofit N/A for 2016 as measure was introduced in 2017 0.3 kt CO<sub>2</sub> savings in 2017, expected to increase from 2018</p>
<b>Funding narrative</b>	<p>The Energy in Education programme in 2017 saw 44 schools undertake energy management training and delivered anticipated energy savings of 0.25GWh TPER. The Schools Retrofit Project saw 10 schools undertake medium to deep energy retrofit, saving 1.3GWh TPER and reducing energy costs by 36% on average.</p> <p>Funding for 2017: Total budget allocation : €4,500,000 (shared cost between DCCAE and DES)</p>
<b>Qualitative statement on impacts</b>	<ul style="list-style-type: none"> <li>• Low cost behavioural energy savings in schools</li> <li>• Contribute to jobs in ESCOS (energy service companies)</li> <li>• Demonstrator effect potential</li> </ul>



**Sector: Built Environment**

**Measure BE18: Behavioural Economics Unit**

<b>Sector</b>	Built Environment
<b>Programme/Scheme</b>	<b>Behavioural Economics Unit</b>
<b>Measure Title</b>	Behavioural Economics Unit
<b>Type of measure</b>	Education and Training
<b>Objective of measure</b>	To better understand the important role that behavioural economics and psychology plays in decision making and to encourage and facilitate more people choosing energy efficient and sustainable options, the SEAI established a dedicated Behavioural Economics Unit in 2017, to provide input to policy development and coordinate with the use of this discipline across wider government policy formation. The unit will trial and test interventions including how best to communicate effectively with target groups to achieve the desired outcomes and will assess impacts.
<b>Current Status (new, existing, in development)</b>	New from 2017
<b>Period during which measure will be in place</b>	From 2017
<b>Cumulative GHG reductions 2017-2020</b>	15 kt CO <sub>2</sub> eq.
<b>Cumulative GHG reductions 2017-2030</b>	77 kt CO <sub>2</sub> eq.
<b>Estimated Savings (Tonnes of CO<sub>2</sub>)</b>	N/A for 2016 as measure was introduced in 2017
<b>Funding narrative</b>	Current funding to SEAI.
<b>Qualitative statement on impacts</b>	<ul style="list-style-type: none"> <li>• Improved uptake across other energy efficiency built environment measures,</li> <li>• Demonstrator effect,</li> <li>• Competiveness benefit.</li> </ul>

**Sector: Built Environment**

**Measure BE19: Support Network for Delivery of Public Sector Energy Efficiency Targets**

<b>Sector</b>	Built Environment
<b>Programme/Scheme</b>	<b>Support Network for Delivery of Public Sector Energy Efficiency Targets</b>
<b>Measure Title</b>	Support Network for Delivery of Public Sector Energy Efficiency Targets
<b>Type of measure</b>	Education and Training with some support from grants
<b>Objective of measure</b>	The SEAI supports public sector bodies to achieve their 33% energy efficiency target through technical assistance. From 2017 these supports, which include the Monitoring & Reporting System have been enhanced in support of the new Public Sector Energy Efficiency Strategy and the energy management and governance process the strategy establishes.
<b>Current Status (new, existing, in development)</b>	Existing Measure – enhanced in 2017
<b>Period during which measure will be in place</b>	Already in place.
<b>Cumulative GHG reductions 2017-2020</b>	
<b>Cumulative GHG reductions 2017-2030</b>	
<b>Estimated Savings (Tonnes of CO<sub>2</sub>)</b>	The most recent published monitoring report from SEAI – covering the period to end <u>2015</u> shows that the reporting public sector bodies between them delivered almost 21% energy efficient from their baselines. This amounts to €154 million in avoided energy spend and represents a total achievement of 548Kt CO <sub>2</sub> eq. Some of this emissions savings may be attributable to other initiatives in place and should not be considered as wholly attributable to SEAI supports. The next report will be published in November 2017 and is expected to show CO <sub>2</sub> savings for 2016 just over 500Kt
<b>Funding narrative</b>	Current funding to facilitate SEAI staff supports.
<b>Qualitative statement on impacts</b>	Reduced public sector energy spend, Contributes to Public Sector Reform Demonstrator effect - example to commercial and sector, citizens and communities. Jobs in ESCOS (energy service companies)

**Sector: Built Environment**

**Measure: Excellence in Energy Efficiency Design (EXEED)**

<b>Sector</b>	Built Environment
<b>Programme/Scheme</b>	Programme
<b>Measure Title</b>	<b>EXEED - Excellence in Energy Efficiency Design</b> (measure not included in NMP)
<b>Type of measure</b>	Economic Instrument – Grant Support
<b>Objective of measure</b>	The EXEED Certified Program was developed by the SEAI as a mechanism to independently certify assets as Energy Efficient Design entities. The objective is to apply a standardised framework for energy efficient design and management of assets in order to identify and implement opportunities for optimum energy performance and energy management over the life of an asset.
<b>Current Status (new, existing, in development)</b>	Existing
<b>Period during which measure will be in place</b>	Already in place – to be scaled up from 2018
<b>Cumulative GHG reductions 2017-2020</b>	-
<b>Cumulative GHG reductions 2017-2030</b>	-
<b>Estimated Savings (Tonnes of CO<sub>2</sub>)</b>	Results achieved over the 2016-17 period involving 45 projects show average energy efficiencies of 28% being achieved. CO <sub>2</sub> impacts TBD.
<b>Funding narrative</b>	<p>The EXEED Grant Scheme provides grant support of up to €250,000. The grant level may be extended by 20% for small enterprises and 10% for medium enterprises.</p> <p>For 2016, EXEED supported 24 project with grant assistance of €1.885m which resulted in 2.62 GWh of efficiency gains. The programme will see an increase in investment from €2.6m in 2017 to €10m for 2018.</p>
<b>Qualitative statement on impacts</b>	Based on the 28% improvements in efficiency already achieved by EXEED participants, the increase in investment outlined above should deliver a very significant energy efficiency and carbon emissions reduction.

**Sector: Built Environment**  
**Measure: Building Control**

<b>Sector</b>	Built Environment
<b>Programme/Scheme</b>	<b>Building Control</b>
<b>Measure Title</b>	Building Control (measure not included in NMP)
<b>Type of measure</b>	Regulation
<b>Objective of measure</b>	Implementation of Building Control Amendment regulations in March 2014
<b>Current Status (new, existing, in development)</b>	Existing Measure
<b>Period during which measure will be in place</b>	2014 onwards
<b>Cumulative GHG reductions 2017-2020</b>	This is a quality assurance process that helps achieve forecasted savings from Building Regulations measures
<b>Cumulative GHG reductions 2017-2030</b>	This is a quality assurance process that helps achieve forecasted savings in Building Regulations measures.
<b>Estimated Savings (Tonnes of CO<sub>2</sub>)</b>	Building Control Regulations ensure estimated savings are achieved for new buildings and helps address potential performance gaps
<b>Funding narrative</b>	Cost to industry.
<b>Qualitative statement on impacts</b>	The Building Control Amendment Regulations will help ensure that works are carried out to requirements specified in Part L of the Building Regulations Conservation of Fuel and Energy.

## Appendix 4 - Transport Sectoral Mitigation Transition Statement

### Sector: Transport

#### Measure T1: Public Transport Investment

<b>Sector</b>	Transport
<b>Programme/Scheme</b>	
<b>Measure Title</b>	Public Transport Investment
<b>Type of measure</b>	Fiscal Supports
<b>Objective of measure</b>	The quality, capacity, cost and accessibility of public transport are critically important in the context of delivering a sustainable transport sector. Transport climate emission reduction efforts must be reinforced by continued investment in public transport capacity increases and quality improvements to secure high levels of modal shift.
<b>Current Status (new, existing, in development)</b>	Ongoing
<b>Period during which measure will be in place</b>	2016-2022
<b>Cumulative greenhouse gas reductions 2016-2020</b>	Not Available
<b>Cumulative greenhouse gas reductions 2016-2030</b>	Not Available
<b>Funding narrative</b>	The allocation of capital funding for public transport under the Government's Capital Plan Building on Recovery Infrastructure and Capital Investment 2016-2021 is €3.6 billion. In 2016 €355m was invested in public transport and sustainable transport infrastructure and €249m was allocated to fund the operation of public transport and rural services.
<b>Qualitative statement on impacts</b>	Funding for capacity enhancements to the public transport system in 2016 included the reopening of the Phoenix Park Tunnel for passenger services, linking the Kildare/Cork line directly to the city centre expanding the rail capacity for weekday commuters. Furthermore, on-going projects, such as the <i>Luas Cross City</i> and <i>10-minute-DART</i> , will help manage some of the increasing demand on the transport network in the near future; both projects will operate on electricity. In the medium and longer term funding is provided for the completion of the <i>City Centre Re-</i>

	<p><i>signalling Programme</i> and the construction of a new <i>Central Traffic Control Centre</i> for the commuter and intercity rail network which will improve national rail movement and enable major transport projects, such as the expansion of the DART line to Balbriggan, to proceed.</p>
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**Sector: Transport**

**Measure T2: Smarter Travel Initiative Investment**

<b>Sector</b>	Transport
<b>Programme/Scheme</b>	
<b>Measure Title</b>	Smarter Travel Initiative Investment
<b>Type of measure</b>	Fiscal Supports
<b>Objective of measure</b>	DTTAS is focused on the promotion of sustainable means of transport – walking, cycling and public transport – through the provision of funding for infrastructure as well as funding for behavioural change programmes to encourage the use of more sustainable transport modes.
<b>Current Status (new, existing, in development)</b>	Ongoing
<b>Period during which measure will be in place</b>	2016-2021
<b>Cumulative greenhouse gas reductions 2016-2020</b>	Not Available
<b>Cumulative greenhouse gas reductions 2016-2030</b>	Not Available
<b>Funding narrative</b>	Smarter Travel Initiative is allocated €100m funding under the Capital Plan Building on Recovery: Infrastructure and Capital Investment 2016-2021. €13.5 m was spent on for smarter travel projects and greenways in 2016.
<b>Qualitative statement on impacts</b>	Encouraging public transport use and modal shift is central to our national efforts to combat climate change and improve air quality. Ireland is highly dependent on the private car, accounting for 74% of all journeys taken. Promotion and supply of realistic and sustainable alternatives to reduce this dominance are underway. According to the Canal Cordon Report 2016, 134,559 people travel into Dublin city centre at peak time using bus, train, Luas, walking or cycling. This is up from 132,188 in 2015. By contrast, the numbers of people entering the city centre by car is down from 67,755 in 2015 to 67,442 in 2016. The gap between people using sustainable and non-sustainable modes of transport continues to grow. Sustainable journeys accounted for 67% of journeys in 2016, compared to 66% in 2015.

**Sector: Transport**

**Measure T3: Low Emission Vehicle (LEV) Incentivisation**

<b>Sector</b>	Transport
<b>Programme/Scheme</b>	
<b>Measure Title</b>	Low Emission Vehicle (LEV) Incentivisation.
<b>Type of measure</b>	Fiscal Supports
<b>Objective of measure</b>	Maintain a grant scheme for electric vehicles. Support levels to be reviewed annually.
<b>Current Status (new, existing, in development)</b>	Existing and in development
<b>Period during which measure will be in place</b>	2008-2020
<b>Cumulative greenhouse gas reductions 2016-2020</b>	TBD
<b>Cumulative greenhouse gas reductions 2016-2030</b>	TBD
<b>Funding narrative</b>	<p>Since 2011, the SEAI has been providing grants of up to €5,000 to incentivise consumers to purchase a battery electric vehicle (BEV) or a plug-in hybrid electric vehicle (PHEV). By the 31st December 2016, 1,705 electric vehicles were SEAI grant aided. In addition to the grant scheme, such vehicles qualify for VRT relief of between €2,500 and €5,000 depending on the type of low emission technology being used. This provides a maximum combined subsidy (grant plus VRT relief) of €10,000 in the case of a BEV and €7,500 for a PHEV.</p> <p>A tax incentive for companies paying corporation tax is also in place in the form of accelerated capital allowance for energy efficient equipment. Since 2008, this attractive scheme has allowed companies to write off 100% of the purchase value of qualifying energy efficient equipment against their profit in the year of purchase. The scheme supports the purchase of BEVs, PHEVs, hybrid vehicles and the associated charging equipment.</p>
<b>Qualitative statement on impacts</b>	Despite generous supports in place, the uptake of EVs has been slower than expected. However, it is likely that technological advancements, improving battery ranges, reducing purchase costs and better vehicle choice will influence buying future patterns. A Low



	<p>Emitting Vehicle Taskforce was established in 2016 to consider measures and options to accelerate the take-up of low carbon technologies, especially electric vehicles (EVs). The Taskforce is considering, inter alia, grant schemes, tolling and parking initiatives, charging infrastructure, public procurement and necessary regulations.</p>
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**Sector: Transport**

**Measure T4: Vehicle Registration Tax and Annual Motor Tax rebalancing**

<b>Sector</b>	Transport
<b>Programme/Scheme</b>	
<b>Measure Title</b>	Taxation Policy: Vehicle Registration Tax and Annual Motor Tax rebalancing
<b>Type of measure</b>	Regulatory, Education, Fiscal
<b>Objective of measure</b>	Increase the number of passenger cars with lower CO <sub>2</sub> emissions
<b>Current Status (new, existing, in development)</b>	Existing
<b>Period during which measure will be in place</b>	2008-2030
<b>Cumulative greenhouse gas reductions 2016-2020</b>	722kt
<b>Cumulative greenhouse gas reductions 2016-2030</b>	2,444kt
<b>Funding narrative</b>	N/A
<b>Qualitative statement on impacts</b>	<p>Irish vehicles registration and motor taxation systems were changed in July 2008 to be based on CO<sub>2</sub> emissions rather than engine size. The tax changes, which applied to vehicles purchased in 2008 or later, had an immediate and substantial positive effect in changing buyer behaviour encouraging the take up of low CO<sub>2</sub> emission vehicles. Initially, vehicles were categorised into seven graduating bands, A to G, with those choosing to purchase lower-emission vehicles paying less in VRT and motor tax. Since January 2013, a revised banding structure was introduced for both motor tax and VRT, splitting the lowest CO<sub>2</sub> Band 'A' (1 - 120g/km) into four new bands and Band 'B' (121 - 140g/km) into two new bands. A zero emissions band for electric vehicles was also introduced for motor tax purposes only. There has been a marked change in the proportion of new cars purchased within the lower emission bands; new private cars sold in the A emission band rose from just 1.5% in 2007 to 78% in 2016. Cars with CO<sub>2</sub> emissions of 140 g/km or higher now comprise just 4% of new car purchases.</p> <p>Rebalancing the motor tax and VRT regimes has ensured that technological improvements are impacting more rapidly on the composition of the car and van fleet compared to an alternative taxation system based on engine size. The net effect has been to accelerate the reduction of carbon emissions within the national fleet and significant fuel and energy savings over the lifetime of each vehicle. This measure has been considered a very effective means of influencing purchasing decisions by motorists in favour of more fuel efficient vehicles.</p>

**Sector: Transport**

**Measure T5: Public Transport Efficiency**

<b>Sector</b>	Transport
<b>Programme/Scheme</b>	
<b>Measure Title</b>	Public Transport Efficiency
<b>Type of measure</b>	Policy / Voluntary / Education / Information
<b>Objective of measure</b>	Modal shift to public transport or non-motorized transport; improved behaviour; improved transport infrastructure
<b>Current Status (new, existing, in development)</b>	Existing
<b>Period during which measure will be in place</b>	2009-2030
<b>Cumulative greenhouse gas reductions 2016-2020</b>	163kt
<b>Cumulative greenhouse gas reductions 2016-2030</b>	578kt
<b>Funding narrative</b>	N/A
<b>Qualitative statement on impacts</b>	<p>The aim of the measure is to promote efficiency in the public transport system through: procurement of energy efficient vehicles; eco-driving; behaviour change programmes; adopting technological measures such as traction control software and implementing train configuration changes.</p> <p>A number of energy efficiency actions are underway in the public transport fleets such as the sole procurement of all new public transport vehicles to the highest EURO class standard available. Service providers/operators continue to improve energy efficiency through adopting various technological solutions and instigating driver behaviour change programmes. There are co-benefits of improving energy efficiency including increased fuel economy, consequential emission reductions and enhanced air quality. Examples include train configuration changes by Irish Rail and eco-driving initiatives by Dublin Bus and Bus Éireann. Collectively, these measures will greatly enhance the capacity of the public transport system and will provide viable alternatives to private car use.</p>

**Sector: Transport****Measure T6: Biofuel Obligation Scheme**

<b>Sector</b>	Transport
<b>Programme/Scheme</b>	Biofuel Obligation Scheme
<b>Measure Title</b>	Biofuel Obligation Scheme
<b>Type of measure</b>	Regulatory, Economic
<b>Objective of measure</b>	Low carbon fuels
<b>Current Status (new, existing, in development)</b>	Existing
<b>Period during which measure will be in place</b>	2009-2030
<b>Cumulative greenhouse gas reductions 2016-2020</b>	1666kt
<b>Cumulative greenhouse gas reductions 2016-2030</b>	6,448kt
<b>Funding narrative</b>	N/A
<b>Qualitative statement on impacts</b>	<p>Under the Renewable Energy Directive mandatory national targets have been established for the use of energy from renewable sources for all Member States. Ireland's target for the share of its gross final consumption of energy to come from renewable sources by 2020 is 16%; the share of energy from renewable sources for transport must be at least 10%. To assist in meeting this requirement Ireland introduced a Biofuels Obligation Scheme to ensure that a proportion of the transport fuel used in the State consists of environmentally sustainable biofuels. Broadly the approach is that the bio- and fossil- fuels are blended together and made available to consumers at the pump. The existing scheme places an obligation on suppliers of road transport fuels to ensure that a proportion of the fuels they place on the market here are produced from renewable sources. The Biofuels Obligation rate has increased over time from a share of 4.166% in 2010 to 8.695% (by volume) from 2017.</p>

**Sector: Transport****Measure T7: National Policy Framework on Alternative Fuels Infrastructure for Transport**

<b>Sector</b>	Transport
<b>Programme/Scheme</b>	
<b>Measure Title</b>	National Policy Framework on Alternative Fuels Infrastructure for Transport
<b>Type of measure</b>	Policy/Regulations
<b>Objective of measure</b>	To help reduce oil dependency in transport and associated harmful effects, the EU Commission has developed a sustainable alternative fuels infrastructure strategy. Ireland's National Policy Framework, published in May 2017, addresses such infrastructure requirements as EV charging points and natural gas refuelling stations.
<b>Current Status (new, existing, in development)</b>	Ongoing
<b>Period during which measure will be in place</b>	2017-2030
<b>Cumulative greenhouse gas reductions 2016-2020</b>	Not Available
<b>Cumulative greenhouse gas reductions 2016-2030</b>	Not Available
<b>Funding narrative</b>	
<b>Qualitative statement on impacts</b>	No progress to report in 2016; National Policy Framework was published in May 2017. A cornerstone of the Framework is Ireland's ambition that by 2030 all new cars and vans sold in Ireland will be zero-emissions capable.

**Sector: Transport****Measure T8: Review of Public Transport**

<b>Sector</b>	Transport
<b>Programme/Scheme</b>	
<b>Measure Title</b>	Review of Public Transport
<b>Type of measure</b>	Policy/Regulations
<b>Objective of measure</b>	The Programme for a Partnership Government commits to a review of public transport policy to ensure services are sustainable into the future and are meeting the needs of a modern economy. This measure reflects the Government commitment to adopting a dynamic approach to managing the needs and evolution of the transport system over time.
<b>Current Status (new, existing, in development)</b>	In development
<b>Period during which measure will be in place</b>	2018
<b>Cumulative greenhouse gas reductions 2017-2020</b>	Not Available
<b>Cumulative greenhouse gas reductions 2017-2030</b>	Not Available
<b>Funding narrative</b>	
<b>Qualitative statement on impacts</b>	

**Sector: Transport****Measure T9: Review of Active Travel Policy**

<b>Sector</b>	Transport
<b>Programme/Scheme</b>	
<b>Measure Title</b>	Review of Active Travel Policy
<b>Type of measure</b>	Policy/Regulations
<b>Objective of measure</b>	Ensuring the development of a strong cycling culture in Ireland. The Framework set a target that 10% of all journeys will be made by bicycle by 2020. In addition, a Greenways Strategy is being prepared and will guide investment in Greenways in the coming years.
<b>Current Status (new, existing, in development)</b>	Existing
<b>Period during which measure will be in place</b>	2009-2017
<b>Cumulative greenhouse gas reductions 2017-2020</b>	Not Available
<b>Cumulative greenhouse gas reductions 2017-2030</b>	Not Available
<b>Funding narrative</b>	
<b>Qualitative statement on impacts</b>	

**Sector: Transport****Measure T10: National Intelligent Transport Systems (ITS) Strategy**

<b>Sector</b>	Transport
<b>Programme/Scheme</b>	
<b>Measure Title</b>	National Intelligent Transport Systems (ITS) Strategy
<b>Type of measure</b>	Policy/Regulations
<b>Objective of measure</b>	Intelligent transport systems (ITS) can enhance the efficiency of transport infrastructure, traffic management and mobility; in turn this can lead to reduced congestion and fuel use in the transport network. DTTAS is currently drafting a comprehensive national strategy on ITS.
<b>Current Status (new, existing, in development)</b>	In development
<b>Period during which measure will be in place</b>	2018
<b>Cumulative greenhouse gas reductions 2017-2020</b>	Not Available
<b>Cumulative greenhouse gas reductions 2017-2030</b>	Not Available
<b>Funding narrative</b>	N/A
<b>Qualitative statement on impacts</b>	N/A



**Sector: Transport****Measure T11: National Planning Framework**

<b>Sector</b>	Transport
<b>Programme/Scheme</b>	
<b>Measure Title</b>	National Planning Framework
<b>Type of measure</b>	Policy/Regulations
<b>Objective of measure</b>	To provide a Framework for national planning, drawing on relevant Government policies and investment on national and regional developments. Amongst a number of strategic goals, the Framework aims to ensure better integration of land use and transport planning policy in order to reduce commuter travel demand and support more efficient patterns of development and travel. Investment in social, educational, health and employment spheres will all impact on the development of an integrated, efficient and sustainable transport system. Recognising these interactions and setting a longer-term path will help to deliver more sustainable transport over time.
<b>Current Status (new, existing, in development)</b>	In development
<b>Period during which measure will be in place</b>	2017
<b>Cumulative greenhouse gas reductions 2017-2020</b>	Not Available
<b>Cumulative greenhouse gas reductions 2017-2030</b>	Not Available
<b>Funding narrative</b>	N/A
<b>Qualitative statement on impacts</b>	N/A

**Sector: Transport****Measure T12: Aviation Efficiency**

<b>Sector</b>	Transport
<b>Programme/Scheme</b>	
<b>Measure Title</b>	Aviation Efficiency
<b>Type of measure</b>	Voluntary
<b>Objective of measure</b>	Policy/Regulation
<b>Current Status (new, existing, in development)</b>	Existing
<b>Period during which measure will be in place</b>	2008-2030
<b>Cumulative greenhouse gas reductions 2016-2020</b>	266kt
<b>Cumulative greenhouse gas reductions 2016-2030</b>	931kt
<b>Funding narrative</b>	N/A
<b>Qualitative statement on impacts</b>	The Irish and UK National Supervisory Authorities (NSAs) created the UK-Ireland Functional Airspace Block in 2008 to help reduce fragmentation of air navigation service provision across Europe and improve efficiencies. In the first four years of the FAB operation, it delivered savings of 232,000 tonnes of CO <sub>2</sub> from 73,000 tonnes of fuel.

**Sector: Transport**

**Measure T13: Improved fuel economy of the private car fleet (EU Regulation)**

<b>Sector</b>	Transport
<b>Programme/Scheme</b>	
<b>Measure Title</b>	EU CO <sub>2</sub> Car/Van Regulation
<b>Type of measure</b>	Regulatory
<b>Objective of measure</b>	Efficiency improvements of vehicles
<b>Current Status (new, existing, in development)</b>	Existing
<b>Period during which measure will be in place</b>	2009-2030
<b>Cumulative greenhouse gas reductions 2016-2020</b>	1,026kt
<b>Cumulative greenhouse gas reductions 2016-2030</b>	3,297kt
<b>Funding narrative</b>	N/A
<b>Qualitative statement on impacts</b>	<p>The EU, through Regulations (EC) 443/2009 and (EC) 333/2014, mandated an improvement in average new car efficiency to 130 g CO<sub>2</sub>/km by 2015 with a target of 95 g CO<sub>2</sub>/km for 2020. Similar targets have been set for new light commercial vehicle fleets with a requirement that new vans registered in the EU do not emit more than an average of 175g CO<sub>2</sub>/km by 2017 and that by 2021 the average emissions fall to a target of 147g CO<sub>2</sub>/km ((EC) 510/2011 and (EU) 253/2014). The successful implementation of these regulations in the short to medium term is fundamental in moving the transport sector towards decarbonisation, particularly up to 2030.</p> <p>This measure has greatly increased the availability of lower emission vehicles in the Irish market. New cars entering the fleet are now approximately 25% more energy efficient than they were in 2007. Emissions from new cars sold in Ireland fell from 164g CO<sub>2</sub>/km in 2007 to c. 116g CO<sub>2</sub>/km by 2015. Ireland is ahead of both the EU target of 130g CO<sub>2</sub>/km and the average emissions from new car sales in many other EU Member States.</p>

**Sector: Transport****Measure T14: Public Sector Energy Efficiency Strategy**

<b>Sector</b>	Transport
<b>Programme/Scheme</b>	
<b>Measure Title</b>	Public Sector Energy Efficiency Strategy
<b>Type of measure</b>	Policy/Regulations
<b>Objective of measure</b>	The Public Sector Energy Efficiency Strategy was published in January 2017 and notes the importance of public sector fleets for testing new technologies and facilitating or accelerating their market uptake. Use of new technologies and alternative fuels will not only improve the environmental performance of the sector but will also increase fuel efficiency of the fleet. Beyond fleet measures, there is also scope for the promotion of energy efficient measures through modal shift with a focus on travel choices made by public servants.
<b>Current Status (new, existing, in development)</b>	In development
<b>Period during which measure will be in place</b>	2018 onwards
<b>Cumulative greenhouse gas reductions 2017-2020</b>	Not Available
<b>Cumulative greenhouse gas reductions 2017-2030</b>	Not Available
<b>Funding narrative</b>	N/A
<b>Qualitative statement on impacts</b>	N/A

**Sector: Transport****Measure T15: Research and Development**

<b>Sector</b>	Transport
<b>Programme/Scheme</b>	
<b>Measure Title</b>	Research and Development
<b>Type of measure</b>	Research and Development
<b>Objective of measure</b>	Research and technological developments within climate change mitigation are advancing at a fast pace. The Climate Change Unit of DTTAS is supported by a number of bodies to analytically review on an ongoing basis the emerging evidence including: the Department's Strategic Research and Analysis Unit, the academic sector, as well as State Agencies such as SEAI. Departmental and agency analytical/evaluation capacity are kept under review and proposals to scale up such capacity are being considered to meet the substantial technical demands of monitoring and managing sector performance, evolution and planning.
<b>Current Status (new, existing, in development)</b>	In development
<b>Period during which measure will be in place</b>	2018-2020
<b>Cumulative greenhouse gas reductions 2017-2020</b>	Not Available
<b>Cumulative greenhouse gas reductions 2017-2030</b>	Not Available
<b>Funding narrative</b>	N/A
<b>Qualitative statement on impacts</b>	N/A

## Appendix 5 - Agriculture Forestry & Land Use Sectoral Mitigation Transition Statement

### Measure AF1A: Cross Compliance and Green Direct Payment (Pillar I)

<b>Sector</b>	Agriculture, Forestry and Land Use
<b>Programme/Scheme</b>	CAP Pillar I <b>(AF1)</b>
<b>Measure Title</b>	Pillar I measures include Basic Farm Payment and Cross Compliance, including GAEC and Greening <b>(AF1)</b> .
<b>Type of measure</b>	<i>Economic Instrument - Direct Investment</i>
<b>Objective of measure</b>	Cross compliance as per EU regulations to include food safety, animal health and welfare and plant health. Compulsory Green Direct Payment will reward farmers for respecting 3 obligatory agricultural practices: maintenance of permanent grassland, ecological focus areas and crop diversification.
<b>Current Status (new, existing, in development)</b>	Existing
<b>Period during which measure will be in place</b>	2015-2020
<b>Cumulative greenhouse gas reductions 2017-2020</b>	Not Available
<b>Cumulative greenhouse gas reductions 2017-2030</b>	Not Available
<b>Funding narrative</b>	CAP Pillar I is 100% EU funded
<b>Qualitative statement on impacts</b>	<p>Good farming practices supported by CAP Pillar 1 contribute to the protection of the carbon pool stored in Irish farmland.</p> <p>In addition there are cross-cutting benefits for climate change adaptation, water quality, biodiversity, etc.</p>

**Sector: Agriculture, Forestry and Land Use**

**Measure AFA2 (A-F): Rural Development Programme 2014-2020 (Pillar II)**

<b>Sector</b>	Agriculture, Forestry and Land Use
<b>Programme/Scheme</b>	Pillar II – RDP 2014-2020 <b>(AF2A - F)</b>
<b>Measure Title</b>	<p>Ireland’s Rural Development Programme funds actions under all of the six EU Rural Development priorities – with a particular emphasis on restoring, preserving and enhancing eco systems related to agriculture as well as resource efficiency and climate.</p> <p>It includes a number measures targeted towards environmental benefits, including:</p> <p>Beef Data and Genomics Programme (AF2A),          Knowledge Transfer Programme (AF2B),          Green Low Carbon Agri-Environment Scheme (GLAS) (AF2C),          Targeted Agricultural Modernisation Scheme (TAMS) II (AF2E),          Organic Farming Scheme (AF2F).</p>
<b>Type of measure</b>	Economic Instrument - Direct Investment
<b>Objective of measure</b>	<p>Beef Data and Genomics Programme (AF2A) Lower the intensity of greenhouse gas emissions by improving the quality and efficiency of the national beef herd</p> <p>Knowledge Transfer Programme (AF2B) To bring the latest innovative sustainability research and practices direct to farmers.</p> <p>Green Low Carbon Agri-Environment Scheme (GLAS) (AF2C) Incentivises agricultural production methods to address issues of climate change, water quality and biodiversity loss. The scheme supports low carbon agriculture through a range of cross-cutting measures, and promotes the delivery of targeted environmental advice and best practice at farm level.</p> <p>Targeted Agricultural Modernisation Scheme (TAMS) II (AF2E) Supports capital investment in a number of target areas which will promote, among other things, sustainability (e.g. low emissions slurry spreading equipment, farm nutrient storage, and renewable energy and energy efficiency).</p> <p>Organic Farming Scheme (AF2F) Promotes organic agriculture as an alternative farming system, contributing to improving soil quality, and mitigation</p>

	and adaptation to climate change.
<b>Current Status (new, existing, in development)</b>	Existing
<b>Period during which measure will be in place</b>	Ongoing
<b>Cumulative greenhouse gas reductions 2017-2020</b>	1,454kt CO <sub>2</sub> e for RDP measures
<b>Cumulative greenhouse gas reductions 2017-2030</b>	10,054kt CO <sub>2</sub> e for RDP measures
<b>Funding narrative</b>	RDP is co-funded by the EU and exchequer. It supports rural development measures which include those that are beneficial for the environment and climate change. Payments to farmers are intended to compensate for costs of participation, income foregone, etc.
<b>Qualitative statement on impacts</b>	There are overarching benefits for rural environment, such as mitigate climate change, preserve habitats and species and maintain water quality. Good farming practices supported by the RDP contribute to the protection of the carbon pool stored in Irish farmland. In addition by influencing change and improving sustainability at farm level this can increase farm viability leading to quality of life improvements. Positive impact on rural livelihoods in terms of jobs



**Sector: Agriculture, Forestry and Land Use**

**Measure AF3: Smart Farming Programme**

<b>Sector</b>	Agriculture, Forestry and Land Use
<b>Programme/Scheme</b>	Smart Farming (AF3)
<b>Measure Title</b>	Smart Farming (AF3)
<b>Type of measure</b>	Education and Training
<b>Objective of measure</b>	Developed by the EPA and the IFA to support the measurement, monitoring and Improvement of environmental performance of individual farms.
<b>Current Status (new, existing, in development)</b>	Existing
<b>Period during which measure will be in place</b>	Ongoing
<b>Cumulative greenhouse gas reductions 2017-2020</b>	Not Available
<b>Cumulative greenhouse gas reductions 2017-2030</b>	Not Available
<b>Funding narrative</b>	N/A
<b>Qualitative statement on impacts</b>	<p>Cross-cutting benefits for climate change adaptation, water quality, biodiversity, etc.</p> <p>Case study carried out on 50 farms with average greenhouse gas saving of 7-10%. Those 50 farms have reached out to 1,000 through discussion groups.</p>

**Sector: Agriculture, Forestry and Land Use**

**Measure AF4 and AF7: BETTER Farms Programme**

<b>Sector</b>	Agriculture, Forestry and Land Use
<b>Programme/Scheme</b>	Business, Environment and Technology through Training Extension and Research BETTER Farms Programme (AF4 and AF7)
<b>Measure Title</b>	Business, Environment and Technology through Training Extension and Research BETTER Farms Programme (AF4 and AF7)
<b>Type of measure</b>	Research-Demonstration
<b>Objective of measure</b>	<p>Channel research knowledge and outputs to practising farmers via discussion group networks and farming media. In particular in the areas of animal breeding, grassland management (including soil fertility) and herd health; all of which promote resource efficiency.</p> <p>Improve environmental performance of individual farms.</p>
<b>Current Status (new, existing, in development)</b>	Existing
<b>Period during which measure will be in place</b>	Ongoing
<b>Cumulative greenhouse gas reductions 2017-2020</b>	Not Available
<b>Cumulative greenhouse gas reductions 2017-2030</b>	Not Available
<b>Funding narrative</b>	BETTER Farms Programme funded by Teagasc & IFJ
<b>Qualitative statement on impacts</b>	Improve environmental performance of individual farms. By influencing change and improving sustainability at farm level this can increase farm viability leading to quality of life improvements.

**Sector: Agriculture, Forestry and Land Use**

**Measure AF5: Pasture Profit Index**

<b>Sector</b>	Agriculture, Forestry and Land Use
<b>Programme/Scheme</b>	Pasture Profit Index (AF5)
<b>Measure Title</b>	Pasture Profit Index (AF5)
<b>Type of measure</b>	Education and Training
<b>Objective of measure</b>	<p>Improve variety selection when re-seeding.</p> <p>By increasing the quantity of grass available for in situ grazing by livestock and reducing the need for external concentrate inputs it provides climate mitigation co-benefits.</p>
<b>Current Status (new, existing, in development)</b>	Existing
<b>Period during which measure will be in place</b>	Ongoing
<b>Cumulative greenhouse gas reductions 2017-2020</b>	Not Available
<b>Cumulative greenhouse gas reductions 2017-2030</b>	Not Available
<b>Funding narrative</b>	Supported by DAFM, Teagasc & FBD
<b>Qualitative statement on impacts</b>	By influencing change and improving sustainability at farm level this can increase farm viability leading to quality of life improvements. Will have adaptation benefits as the index supports the use of grass suitable to the Irish climate.

**Sector: Agriculture, Forestry and Land Use**

**Measure AF6: Animal By-Products**

<b>Sector</b>	Agriculture, Forestry and Land Use
<b>Programme/Scheme</b>	Animal by-products (AF6)
<b>Measure Title</b>	Animal by-products (AF6)
<b>Type of measure</b>	Education and Training
<b>Objective of measure</b>	Encourage increased use of ABP for production of renewable energy.
<b>Current Status (new, existing, in development)</b>	Existing
<b>Period during which measure will be in place</b>	Ongoing
<b>Cumulative greenhouse gas reductions 2017-2020</b>	Not Available
<b>Cumulative greenhouse gas reductions 2017-2030</b>	Not Available
<b>Funding narrative</b>	N/A
<b>Qualitative statement on impacts</b>	Lead to displacement of fossil fuels by using ABP as biomass with resulting greenhouse gas benefits.

**Sector: Agriculture, Forestry and Land Use**

**Measure AF8: Origin Green**

<b>Sector</b>	Agriculture, Forestry and Land Use
<b>Programme/Scheme</b>	Origin Green (AF8)
<b>Measure Title</b>	Origin Green (AF8)
<b>Type of measure</b>	Education and Training
<b>Objective of measure</b>	Operates on a national scale, uniting government, the private sector and food producers in a common vision to improve the environmental performance of individual farms and food producers. Year on year improvements with certain agronomic traits delivering greenhouse gas efficiencies.
<b>Current Status (new, existing, in development)</b>	Existing
<b>Period during which measure will be in place</b>	Ongoing
<b>Cumulative greenhouse gas reductions 2017-2020</b>	Not Available
<b>Cumulative greenhouse gas reductions 2017-2030</b>	Not Available
<b>Funding narrative</b>	Funded by Bord Bia
<b>Qualitative statement on impacts</b>	Delivering greenhouse gas efficiencies. Also, by influencing change and improving sustainability at farm level this can increase farm viability leading to quality of life improvements.

**Sector: Agriculture, Forestry and Land Use**

**Measure AF9: The Carbon Navigator**

<b>Sector</b>	Agriculture, Forestry and Land Use
<b>Programme/Scheme</b>	Carbon Navigator (AF9)
<b>Measure Title</b>	Carbon Navigator (AF9)
<b>Type of measure</b>	Education and Training
<b>Objective of measure</b>	Reduction in participating farms' carbon footprint.
<b>Current Status (new, existing, in development)</b>	Existing
<b>Period during which measure will be in place</b>	Ongoing
<b>Cumulative greenhouse gas reductions 2017-2020</b>	Not Available
<b>Cumulative greenhouse gas reductions 2017-2030</b>	Not Available
<b>Funding narrative</b>	Supported by DAFM, Bord Bia & Teagasc
<b>Qualitative statement on impacts</b>	Cross-cutting benefits for climate change adaptation, water quality, biodiversity, etc.

**Sector: Agriculture, Forestry and Land Use**

**Measure AF10: Forestry Programme Measures**

<b>Sector</b>	Agriculture, Forestry and Land Use
<b>Programme/Scheme</b>	Forestry Programme 2014-2020
<b>Measure Title</b>	<p>Forestry Programme Measures</p> <ul style="list-style-type: none"> <li>• Afforestation</li> <li>• Forest Roads</li> <li>• Woodland Improvement</li> <li>• Reconstitution of forest</li> <li>• Native Woodland Conservation</li> <li>• Neighbourwood</li> <li>• Forestry technology</li> <li>• Forest Genetic Reproductive Material</li> <li>• Forest management plans</li> </ul> <p>See below for description of the above measures.</p>
<b>Type of measure</b>	Grants and/or annual premiums for establishment and development of forests, woodlands, forest roads, etc.
<b>Objective of measure</b>	Forest Programme - Increase level of forest cover; Increase supply of forest based biomass to bridge expected supply gap by 2020 and beyond; Increase wood mobilisation by supporting private forest holders in actively managing their forests; Enhance the environmental and social benefits of new and existing forests.
<b>Current Status (new, existing, in development)</b>	Part of Forest Programme 2014-2020
<b>Period during which measure will be in place</b>	2014-2020, however, forest payments to continue to 2035 (15 year premiums)
<b>Cumulative greenhouse gas reductions 2017-2020</b>	This is not relevant for the ESD up to 2020 as removals from forests are not included in EU targets. Forests are included under the Second Commitment period of the Kyoto Protocol (2013-2020). Based on the rules applying for the second commitment period the level of net sequestration from afforestation and deforestation since 1990 is estimated as 30 Mt CO <sub>2</sub> total over the 8-year period. In general, given the long term nature of forestry the greenhouse gas reductions arising are from the trees already planted. The Afforestation Programme measure included in the NMP will deliver greenhouse gas reductions

	in the long term.
<b>Cumulative greenhouse gas reductions 2017-2030</b>	Net afforestation (taking deforestation into account) since 1990 and up to 2020 will contribute to the 2021 to 2030 carbon sink at an anticipated rate of 2.2 Mt CO <sub>2</sub> /year, based on the rules and modalities in the current ESR and LULUCF Proposals.
<b>Funding narrative</b>	The total cost of the Forestry Programme is estimated at €262 million for the period 2015–2020. This excludes historic premium liabilities and refers to new investment. The figure also excludes the annual premium liability relating to commitments made under this programme which will continue to 2030. The programme target is 43,410ha of afforestation. The cost to the State of afforestation from 1990 to 2030 is estimated to be €3.5 bn.
<b>Qualitative statement on impacts</b>	<p>Expansion of forest cover will increase the availability of roundwood for long-lived wood products and renewable energy purposes.</p> <p>National economic and rural development benefits from harvesting and processing of wood, increasing and sustaining wood processing sector. Public leisure and health benefits also arise from forest recreation. Riparian forests have a role in reducing nutrient flows to water courses and improving percolation of rainfall through the soil, thereby attenuating flood peaks.</p>



## Appendix 6 - Sectoral Adaptation Measures

Department/Sector	Overview 2016/2017	Compliance with EU and international agreements
<p>Agriculture, Food and the Marine – Agriculture and Forest sectors</p>	<p>Agriculture and Forestry 15 submissions were received in response to the non-statutory public consultation which took place over the period 24th November 2016 to 27th January 2017. These submissions were analysed and the document was updated as appropriate.</p> <p>The updated document Adaptation Planning - Developing Resilience to Climate Change in the Irish Agriculture and Forest Sector was published on the DAFM website on the 4 August 2017. A Strategic Environmental Assessment (SEA) Screening Report and an Appropriate Assessment (AA) Screening Report were published on the website at the same time.</p> <p>The aim of the document was to identify and discuss adaptation challenges that need to be considered regarding developing resilience to the effects of climate change within the agriculture and forest sector.</p> <p>The objectives were as follows:</p> <ul style="list-style-type: none"> <li>• To analyse the changes that have already occurred to Ireland’s climate and the vulnerabilities which are currently in place in the sector.</li> <li>• To identify the projected changes to Ireland’s climate and analyse the potential impacts and vulnerabilities which could occur within the sector.</li> <li>• Set out adaptation options which would build resilience and reduce the vulnerability of the sector.</li> <li>• Establish steps to monitor the implementation of these options.</li> </ul> <p>The published document outlines a joined up approach to adaptation planning within the agriculture and forestry sector.</p> <p>It is a first step towards reducing vulnerability and building resilience in the</p>	<p>In relation to the sectoral adaptation plans, obligations would likely relate to the SEA and Habitats Directives. At all stages of development of the sectoral adaptation plans during 2015, DAFM were cognisant of the obligations under the Directives outlined in section 2 of the 2015 Act.</p>

	<p>agriculture and forest sector.</p> <p>Marine</p> <p>A first marine sector adaptation plan is also being drafted which will illustrate, through a range of analysis and representative case studies, the challenges posed to Ireland’s marine sector by climate change.</p> <ul style="list-style-type: none"> <li>• The plan will set out the first steps to be taken to address adaptation challenges to ensure the resilience of the sector in a changing climate.</li> </ul>	
<p>Communications, Climate Action and Environment – Energy sector</p>	<p>A draft <a href="#">Adaptation Plan for Electricity and Gas Networks Sector</a> (Energy) was published for public consultation on 25 August 2017. The plan examines the impacts of climate change and weather related events, both past and projected, on the energy networks (gas and electricity). The plan can be viewed as a first step towards reducing vulnerability and building resilience in the sector. Its aim is to stimulate thinking from the public and interested stakeholders on the very important area of climate change adaptation in the energy networks sector. The plan outlines areas of vulnerability now and sets out the steps that can be taken and measures put in place to avoid or minimise future adverse impacts within the sector and also outlines methods to exploit opportunities, and in turn, a monitoring and review plan will also be put in place.</p> <p>This was prepared under the non-statutory 2012 National Climate Change Adaptation Framework. Following approval of the National Adaptation Framework the preparation of a statutory sectoral adaptation plan will take place in accordance with the requirements of the Climate Action and Low Carbon Development Act 2015.</p>	<p>Ireland is fully compliant with the obligations set down in Regulation 994/2010 concerning measures to safeguard the security of gas supply. The Commission for Energy Regulation (CER) prepares biennial Risk Assessments, Preventive Action Plans and Emergency Plans. In compliance with SI. 336/2013, CER reports annually to the Minister outlining how it is fulfilling its regulatory obligations in line with Regulation 994/2010.</p>
<p>Transport, Tourism and Sport – Transport sector</p>	<p>A Sectoral Adaptation Plan for the Transport sector <a href="#">Developing Resilience To Climate Change in the Irish Transport Sector</a> was completed in 2017. The plan is a high level plan that seeks to identify vulnerabilities at a national level across the transport system. The plan, which aims to set policy on adaptation strategies for</p>	<p>DTTAS carried out a preliminary screening of the Plan to determine if a Strategic Environmental Assessment (SEA) was required, taking into account the relevant criteria set out in Schedule 1 of S.I. 435 of 2004.</p>

	<p>transport, will help to build adaptive capacity within the sector’s administrative structures and assist organisations to better understand the implications of climate change for Ireland and how it may impact on transport infrastructure and services at a national, regional and local level</p> <p>DTTAS established and undertook consultation with a team of key Transport stakeholders from key Transport stakeholders in Road; Rail; Aviation; Ports; and Bus Services in developing an initial Adaptation Plan for the Transport Sector. This team identified current and potential climate change-related impacts, the consequences of these impacts for Transport services and infrastructure and the capacity of stakeholders to respond. An Adaptation Plan for the Transport Sector has been developed with input both from these key stakeholders and from the EPA in line with EU guidelines for adaptation planning. The Plan outlines initial research and analysis on the likely effects of climate change on the Irish Transport Sector and proposes actions to develop climate resilience within the sector.</p> <p>DTTAS has actively engaged with DCCAE in the development of the National Adaptation Framework arising from the Climate Action and Low Carbon Development Act, 2015, which will place adaptation planning on a statutory footing. DTTAS considers adaptation planning to be an iterative process and this sectoral Plan is seen as an important step towards the preparation of future statutory Adaptation Plans. It is anticipated that the Adaptation Plan will be published in Q4 2017. A preliminary draft of the Plan was published on DTTAS’ website for non-statutory public consultation in December 2016 for a period of 6 weeks and received 12 responses.</p>	<p>The outcome of this screening process is that the specific content of this adaptation plan for the transport sector will not, in and of itself, have a significant effect on the environment, therefore SEA is not required. This outcome has been published on the Department’s website. This first Adaptation Plan is a high-level plan and does not consider specific locations nor propose specific projects or measures. This does not preclude the inclusion in later Adaptation Plans for the Transport Sector of more detailed adaptation approaches and measures should this be deemed necessary through the associated SEA and AA process.</p>
<p>OPW – Flood Risk Management Sector</p>	<p>Work began on sectoral adaptation plan for flood risk management in 2013 and a draft plan was published for consultation in May 2015. Final plan was approved on</p>	<p>Does not arise at this stage.</p>

	<p>10 December 2015. Plan will be reviewed and amended in due course in accordance with the requirements of the Climate Action and Low Carbon Development Act 2015.</p> <p>The <a href="#">Office of Public Works' flood defence sectoral adaptation plan</a> outlines existing flood risk and flood risk management practice in Ireland and summarises existing science on climate change and the current state of knowledge for impacts on flooding and flood risk in Ireland. It defines the policy for adaptation in the flood risk management sector and sets out a series of actions to enhance the understanding of the potential impacts of climate change on flooding and flood risk and to embed adaptation into flood risk management practice. The plan also identifies how changing flood risk should be taken into account in spatial planning and other sectors and sets out what is required for the monitoring, review and evaluation of the plan.</p>	
<p>Department of Health – Health sector</p>	<p>Building an adaptation team - an initial team from the DOH and HSE drafted a preliminary draft Health Sector policy planning document.</p> <p>Assessing the adaptation baseline includes: -</p> <p>Baseline climate epidemiology – this involves developing appropriate methodology for attribution of conditions to weather and climate changes to measure and monitor same, through health surveillance and investigation.</p> <p>Vulnerability assessment of infrastructure and services - occurring through Severe Weather planning process. This provides for HSE vulnerability assessment for all types of severe weather and all services provided by the HSE and will form the basis for the bulk of vulnerability assessment in the sector. The planning is service and geographically based and overlaps with business continuity planning in many cases. There has been review and improvement of at least one plan as to how it operated during a prolonged flooding incident.</p> <p>Assessing future climate risk - current</p>	<p>Does not arise at this stage.</p>

	<p>weather and climate related risks are being assessed. Future risk assessment may largely depend on the results of the vulnerability assessment but also on the adaptation actions of other sectors, as health impact is an endpoint of the effects of climate change on other sectors.</p> <p>Identifying, assessing and prioritising adaptation options - adaptation options that are already required for to manage current risks are being implemented</p> <p>Mainstreaming, monitoring and reviewing-mainstreaming of vulnerability assessment is partially underway as above. Ongoing business continuity planning meets some of the requirements.</p> <p>As other sectors produce draft adaptation plans and put them out for consultation, the health sector is assessing the plans from a health perspective, and providing feedback on the health impacts that need to be addressed in these plans</p>	
<p>Department of Housing, Planning &amp; Local Government and Irish Water – Water Sector.</p>	<p>The Irish Water Climate Change Policy was agreed in early 2015. The main impacts of climate change for Irish Water are likely to be increased rainfall and storm intensity resulting in:</p> <ul style="list-style-type: none"> <li>- Pluvial, Fluvial and coastal flooding damaging our assets and impacting on raw water quality.</li> <li>- Sewer flooding and increased combined sewer overflow spills leading to flooding of properties and causing negative environmental impacts in receiving waters.</li> <li>- Threat to security of water supply and wastewater collection arising from flooding impacting on our operations</li> </ul> <p>Reduced rainfall and drought resulting in:</p> <ul style="list-style-type: none"> <li>- Lower river flows reducing the availability of water for abstraction and dilution capacity available for wastewater treatment</li> <li>- Reduced capacity to supply treated water and increased demand for water</li> <li>- Changes in water quality classification</li> <li>- Impacting on water and</li> </ul>	<p>Irish Water’s Climate Change Adaptation and Mitigations Strategy (CCAMS) will be progressed in line with relevant statutory obligations as outlined in section 2 of the Climate Action and Low Carbon Development Act 2015. The strategy will be reviewed against the requirement of existing or future obligations of the State under the law of the European Union, including the “SEA Directive” and the “Habitats Directive”.</p>

	<p>wastewater treatment costs</p> <ul style="list-style-type: none"> <li>- Increases in water temperature affecting treatability and assimilative capacity of waters.</li> </ul> <p>Adaptation measures will entail a vulnerability assessment of assets to the impacts of climate change and the development and implementation of measures to reduce our impacts and ensure climate resilience into the future. Adaptation Priorities for Irish Water are:</p> <ul style="list-style-type: none"> <li>- Assessment of the immediate risks arising from flooding and other weather-related incidents such as drought on our assets and operations and implementation of appropriate measures to reduce this risk in a structured manner.</li> <li>- Developing an understanding of how climate change will impact on water availability, treatment processes, water and wastewater networks to inform the development and implementation of measures to improve the resilience of services.</li> <li>- Ensuring that future capital investment projects are climate change proofed.</li> </ul> <p>Irish Water has begun addressing these priorities including collaboration with ICARUS (Irish Climate Analysis and Research Units), Maynooth University, on the identification of climate sensitive catchments. Irish Water are currently developing a Climate Change Adaptation and Mitigation Strategy (CCAMS) document. Implementation of the strategy will involve collaboration across our business and with external parties to ensure effective implementation.</p>	
<p>Department of Housing, Planning &amp; Local Government - Emergency Planning Sector</p>	<p>The emergency management sector does not sit readily as a standalone policy area within the remit of any one government department or agency. The approach, therefore, follows the 'lead government department' principle, supported by relevant sectors, as appropriate. The departments concerned liaise and co-ordinate with each other in relation to cross-cutting issues that arise during the</p>	<p>Not applicable.</p>

	course of the development of their individual sectoral adaptation plans and must sustain, within those plans, an emergency planning objective of enhancing crisis response capabilities and intensifying focus to include response tactics as well as adaptation strategies in order to deal with the effects of climate change.	
Biodiversity Sector- Department of Culture Heritage and the Gaeltacht (National Parks and Wildlife Service)	An early draft of a Biodiversity Sectoral Adaptation Plan has been completed and with the aim to present to an adaptation team before end 2017.	Does not arise at this stage.
Built and Archaeological Heritage Sector - Department of Culture Heritage and the Gaeltacht	Built and Archaeological Heritage Sections within DCHG are working together to further develop a Climate Change Adaptation Sectoral Plan. This will assist in building resilience to ensure our unique and irreplaceable built historical environment (including historic structures, designed landscapes, coastal and maritime heritage, archaeological sites and monuments) stand protected against future threats. Such protection will be assisted by assessment, monitoring and targeted protective maintenance and repair measures so as to guarantee the important social and economic contribution of our historic environment to the wellbeing of the State. Ensuring the availability of the necessary skills and materials to protect, repair and adapt our heritage will be critical. A Background Study on an Adaptation Sectoral Plan was completed in July 2017. This Study has assessed various approaches to understanding the potential impacts of climate change on the built and archaeological environment, outlines the likely impacts illustrates risks through an assessment of reported damage and considers the implications of climate change impacts for management. The report will form the basis of a reconvened stakeholder meeting in early 2018.	Does not arise at this stage.

## Appendix 7 – EPA Greenhouse Gas Emissions Inventory Report 2016



### EPA Headquarters

PO Box 3000  
Johnstown Castle Estate  
County Wexford, Ireland  
T +353 53 9160600  
LoCall 1890 33 55 99

[www.epa.ie](http://www.epa.ie)

**27 November 2017**

## IRELAND'S PROVISIONAL greenhouse gas EMISSIONS IN 2016

### KEY HIGHLIGHTS

- The EPA has produced provisional estimates of greenhouse gas emissions for the period 1990 - 2016.
- For 2016, total national greenhouse gas emissions are estimated to be 61.19 million tonnes carbon dioxide equivalent (Mt CO<sup>2</sup>eq). This is 3.5% higher (2.06 Mt CO<sup>2</sup>eq) than emissions in 2015 and returns greenhouse gas emissions to 2009 levels.
- In 2016, emissions in the European Union's Emissions Trading Sector<sup>22</sup> (ETS) sector increased by 5.4% or 0.90 Mt CO<sup>2</sup>eq and non-ETS emissions increased by 2.7% or 1.15 Mt CO<sup>2</sup>eq.
- In the last 2 years, national total emissions have increased by 7.3% or 4.16 Mt CO<sup>2</sup>eq. In the same period, emissions in the ETS sector have increased by 11.2% or 1.78 Mt CO<sup>2</sup>eq and in the non-ETS sector by 5.8% or 2.38 Mt CO<sup>2</sup>eq.
- *Agriculture* emissions increased by 2.7% or 0.52 Mt CO<sup>2</sup>eq in 2016. The most significant drivers for the increased emissions in 2016 are higher dairy cow numbers (+6.2%) with an increase in milk production of 4.0%.
- Greenhouse gas emissions from the *Transport* sector increased by 3.7% or 0.44 Mt CO<sup>2</sup>eq in 2016. This is the fourth successive year of increases in transport emissions. In road transport in 2016, gasoline use continued to decrease by 6.7% while diesel use increased by 8.0% and biofuels use decreased by 8.0%.
- *Agriculture* and *Transport* accounted for 73.3% of total non-ETS emissions in 2016.

<sup>22</sup> [The European Union's Emissions Trading Scheme](#)



- Emissions in the *Energy Industries* sector show an increase of 6.1% or 0.72 Mt CO<sup>2</sup>eq which is attributable to an increase in natural gas use for electricity generation by 27.7% and reductions of 6.5% and 15.6% respectively for electricity generated from wind and hydro renewables. This is reflected in a 3.8% increase in the emissions intensity of power generation in 2016 (483 g CO<sup>2</sup>/kWh) compared with 2015 (465 g CO<sup>2</sup>/kWh). Renewables now account for 25.6% of electricity generated in 2016 (down from 27.3% in 2015). Ireland exported 2.4% of electricity generated in 2016.
- Emissions from the *Manufacturing Combustion*<sup>23</sup> sector decreased by 0.02 Mt CO<sup>2</sup>eq or 0.4% in 2016. There were minor decreases in combustion emissions for all sub sectors except cement which increased by 3.5% in 2016.
- The *Industrial Processes* sector emissions increased by 7.1% or 0.14 Mt CO<sup>2</sup>eq, mainly from increased cement production. Cement process emissions increased by 8.6% in 2016.
- Greenhouse gas emissions from the *Residential* sector remained almost unchanged with a small increase of 0.1% or 0.01 Mt CO<sup>2</sup>eq.
- Emissions from the *Waste* sector decreased by 1.2% or 0.01 Mt CO<sup>2</sup>eq in 2016.
- These figures indicate that Ireland will be in compliance with its 2016 annual limit set under the EU's Effort Sharing Decision (ESD), 406/2009/EC<sup>24</sup>. However, the EPA's latest projections indicate that Ireland will exceed its annual targets in 2017.
- Ireland's National Policy position is to reduce CO<sup>2</sup> emissions in 2050 by 80% on 1990 levels across the Energy Generation, Built Environment and Transport sectors, with a goal of Climate neutrality in the Agriculture and Land-Use sector. The 2016 emissions for all these sectors are heading in the wrong direction, making achievement of our long-term goals ever more difficult.

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<sup>23</sup> Manufacturing Combustion; includes combustion of fuels in Industry and Construction, both in ETS and non-ETS

<sup>24</sup> [EU Effort Sharing Decision 406/2009/EC](#)

## Introduction

The EPA is responsible for compiling the inventories of greenhouse gas emissions for Ireland and for reporting the data to the relevant European and international institutions. As such, Ireland's legal reporting obligations require that we submit data for the period 1990-2016 in January, March and April 2018 to the European Commission and the UNFCCC.

The provisional estimates of Ireland's greenhouse gas figures for the years 1990-2016, based on the SEAI's final energy balances released in September 2017 and are estimated using methodologies employed in the inventory in accordance with UNFCCC reporting guidelines and the latest available input data. In addition, verified emissions data from installations covered by the ETS are included. These estimates are, at this stage, provisional estimates of Ireland's greenhouse gas figures for the years 1990-2016 which will be further refined as methods and activity data are updated during the QC checking before official submission to the European Commission on January 15<sup>th</sup> 2018.

The 2016 estimates are given below, followed by an account of how these differ from the 2015 estimates. The longer-term trends in greenhouse gas emissions and their significance in relation to Ireland's target under the EU's Effort Sharing Decision on the effort of Member States to reduce their greenhouse gas emissions to meet the Community's greenhouse gas emission reduction commitments up to 2020 are also assessed.

## Ireland's Greenhouse gas Emissions in 2016

For 2016, total national greenhouse gas emissions are estimated to be 61.19 million tonnes carbon dioxide equivalent (Mt CO<sub>2</sub> eq) which is 3.5 % higher (or 2.06 Mt CO<sub>2</sub> eq) than emissions in 2015 (59.13 Mt CO<sub>2</sub> eq) and follows the 3.7% increase in emissions reported for 2015. Emission reductions have been recorded in 7 of the last 10 years, however the last two years have seen large increases in emissions. In the last 2 years, national total emissions have increased by 7.3% or 4.16 Mt CO<sub>2</sub>eq. In the same period, emissions in the ETS sector have increased by 11.2% or 1.78 Mt CO<sub>2</sub>eq and in the non-ETS sector by 5.8% or 2.38 Mt CO<sub>2</sub>eq. We are now seeing strong evidence that emissions are once again increasing in line with economic and employment growth, particularly in the *Energy Industries, Agriculture and Transport* sectors.

The inter-annual change in total greenhouse gas emissions is presented in Figure 1 and sectoral emissions in Figures 2 and 3. Detailed sectoral data are shown in Table 3.

*Agriculture* remains the single largest contributor to the overall emissions at 32.0% of the total. *Energy Industries* and *Transport* are the second and third largest contributors at 20.5% and 20.0% respectively. *Residential* and *Manufacturing Combustion* emissions account for 9.9% and 7.4 % respectively. These five sectors accounted for almost 90% of national total emissions in 2016. The remainder is made up by the *Industrial Processes* at 3.5%, *F-Gases* at 2.1%, *Waste* at 1.5%, *Commercial Services* at 1.6% and *Public Services* at 1.4%. Figure 2 shows the contributions from each of the sectors in 1990 and 2016.

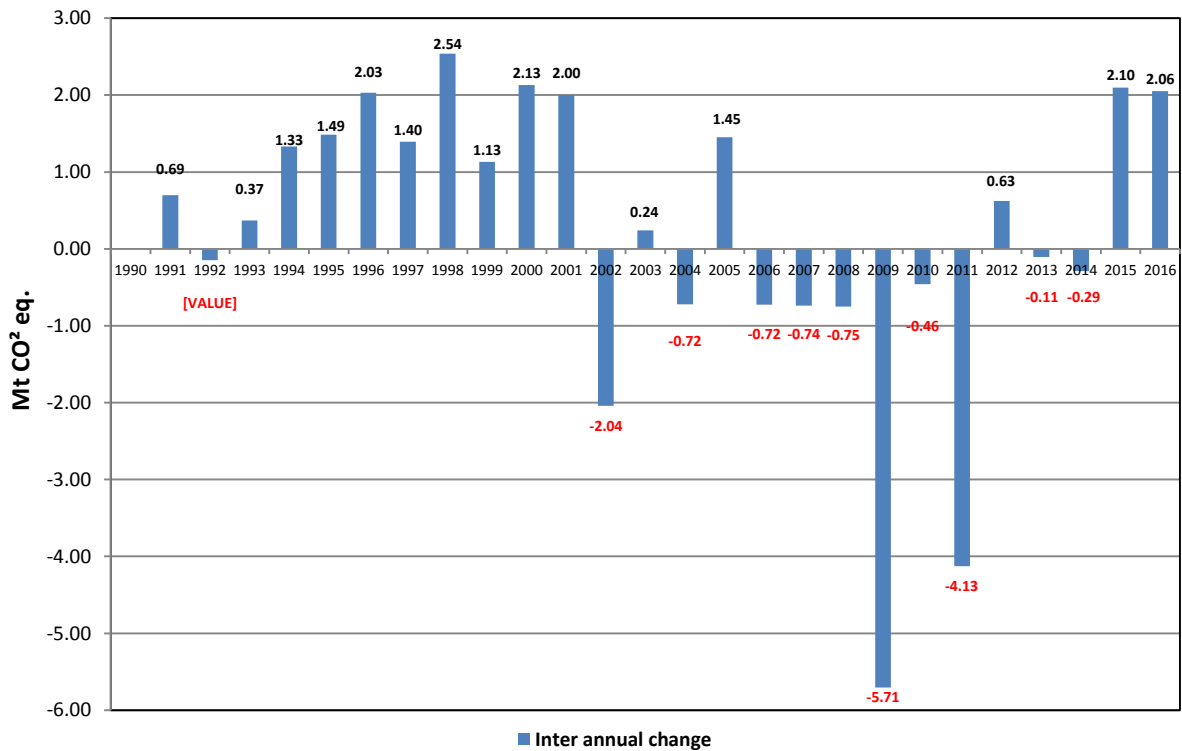


Figure 1. Inter annual changes in greenhouse gas emissions 1990-2016

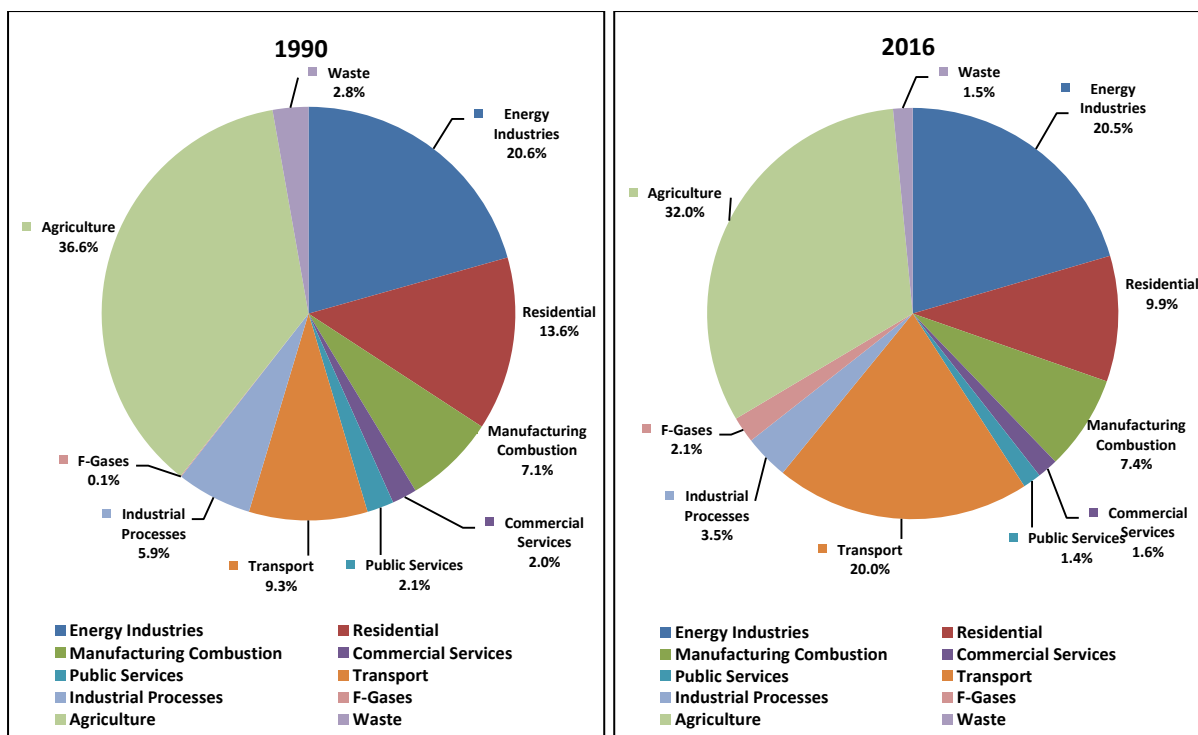


Figure 2. Greenhouse gas Emissions in 1990 and 2016 by Sector

## Changes in Emissions from Sectors between 2015 and 2016

An overview of changes in emissions since the previous year is presented in Table 1.

Table 1. Provisional greenhouse gas emissions for 2015 and 2016 for Ireland

Mt CO <sub>2</sub> eq	2015	2016	% Change
Agriculture	19.063	19.583	2.7%
Energy Industries	11.803	12.525	6.1%
Transport	11.812	12.255	3.7%
Residential	6.041	6.047	0.1%
Manufacturing Combustion	4.575	4.555	-0.4%
Industrial Processes	2.003	2.146	7.1%
F-Gases	1.142	1.258	10.2%
Commercial Services	0.935	0.999	6.8%
Waste	0.951	0.939	-1.2%
Public Services	0.806	0.881	9.3%
<b>Total</b>	<b>59.132</b>	<b>61.188</b>	<b>3.5%</b>

*Agriculture* emissions increased by 2.7% or 0.52 Mt CO<sub>2</sub>eq in 2016 following an increase in 2015 of 1.5%. The most significant drivers for the increased emissions in 2016 are higher dairy cow numbers (+6.2%) with an increase in milk production of 4.4%. In the 5-year period 2012-2016, dairy cow numbers have increased by 22% and corresponding milk production by 27%. This reflects national plans to expand milk production under Food Wise 2025 and the removal of the milk quota in 2015. In 2016, there were also increased CO<sub>2</sub> emissions from liming (+8.4%) and urea (+26.5%) application. Other cattle and pig numbers increased by 3.0% and 3.7% respectively. Total fossil fuel consumption in agriculture/forestry/fishing activities increased by 5.0% in 2016.

*Transport* emissions increased by 3.7% in 2016 or 0.44 Mt CO<sub>2</sub>eq. This is the fourth successive year of increases in transport emissions following five consecutive years of decreases since 2007. In road transport in 2016, gasoline use continued to decrease by 6.7% while diesel use increased by 8.0% and biofuels use decreased by 8.0%. Looking at the underlying drivers, the number of passenger diesel cars increased by 11.9% in 2016 while the number of passenger petrol cars decreased by 5.7%, commercial vehicle numbers increased by 3.5% and employment continued to grow with 3.3% growth recorded between Q4 2015 and Q4 2016.

Sectoral emissions in the *Energy Industries* sector show an increase of 6.1% which is attributable to an increase in natural gas use for electricity generation by 27.7% and reductions of 6.5% and 15.6% respectively for electricity generated from wind and hydro renewables. This is reflected in a 3.8% increase in the emissions intensity of power generation in 2016 (483 g CO<sub>2</sub>/kWh) compared with 2015 (465 g CO<sub>2</sub>/kWh). Renewables now account for 25.6% of electricity generated in 2016 (down from 27.3% in 2015). Ireland exported 2.4% of electricity generated in 2016. In 2016, total final consumption of electricity increased by 2%.

Emissions in the *Residential* sector are almost unchanged with a small increase of 0.1% or 0.01 Mt of CO<sub>2</sub>eq. in 2016. Within the different fuels used in household space and water heating, kerosene use increased by 5.2%, gasoil by 5.0% and natural gas by 1.4%, whereas coal and peat use continued to decline by 13.3% and 1.9% respectively in 2016.

Emissions from the *Manufacturing Combustion* sector decreased by 0.4% or 0.02 Mt CO<sub>2</sub>eq in 2016. There were minor decreases in combustion emissions for all sub sectors except cement which increased in 2016. However, increased emissions from companies within the ETS were evident in the food and drink and cement sectors, with emissions increasing by 4.5% and 3.5% respectively. These increases were offset by reductions in other sectors, most notably, a reduction of 5.1% in emissions from non-ferrous metals industry.

Emissions from the *Industrial Processes* sector continue to increase by 7.1% (0.14 Mt CO<sup>2</sup>eq) in 2016 following a 10.2% increase in 2015, mainly from increased cement production. Total process emissions from the mineral products subsector (including cement) increased by 7.5%. These emissions are included in the ETS sector and contribute significantly to the ETS sector increase in 2016.

In 2016, total emissions (combustion and process) from the cement sector increased by 6.8% and amount to 2.72 Mt CO<sup>2</sup>eq, or 4.4% of national total emissions. Cement sector emissions have now increased by 79% since 2011.

Emissions from *Commercial Services* and *Public Services* increased by 6.8% and 9.3% respectively, with increases of 15.4% in natural gas use in both sectors in 2016. These increases were offset somewhat by increases in biomass/biogas use of 54% and 33% respectively.

Emissions from the *Waste* sector decreased by 1.2% in 2016, with decreases in sub categories; landfills (-0.7%) and incineration and open burning (-17.6%). Overall emissions decreased by 0.01 Mt CO<sup>2</sup>eq.

## Long-term Changes in Sectoral Emissions 1990 – 2016

The trend in emissions from 1990 to 2016 is shown in Figures 3 and 4 and Table 3. The share of CO<sup>2</sup> in total greenhouse gas emissions has increased to 65.2% of total greenhouse gas emissions in 2016 compared to 59.3% in 1990. In contrast, CH<sub>4</sub> and N<sub>2</sub>O emissions, primarily from the agriculture sector, have fallen from 40.6% of total greenhouse gas emissions in 1990 to 32.8% in 2016. Emissions from F-gases account for 2.1% of the total in 2016.

Between 1990 and 2016, *Transport* shows the greatest overall increase at 138.6%, with road transport increasing by 145.4%. Emissions increased by 3.7% in 2016, the fourth year of increases in *Transport* emissions following 5 consecutive years of decreases since 2007. However, *Transport* emissions have decreased by 14.8% below peak levels in 2007 primarily due to the economic downturn, improving vehicle standards due to the changes in vehicle registration tax and the increase use in biofuels. The increase up to 2007 can be attributed to general economic prosperity, increasing population with a high reliance on private car travel as well as rapidly increasing road freight transport.

*Energy Industries* (mainly electricity generation) shows an increase in emissions of 9.5% over the period 1990 – 2016. Over the time series, CO<sup>2</sup> emissions from electricity generation have increased by 9.7% whereas total electricity consumption has increased by 115.5%. Emissions from electricity generation increased from 1990 to 2001 by 54.2% and have decreased by 28.5% between 2001 and 2016. This decrease reflects the improvement in efficiency of modern gas fired power plants replacing older peat and oil fired plants and the increased share of renewables, primarily, wind power.

Emissions from *Agriculture* reached a peak in 1998 and have decreased to below their 1990 level since 2002, reflecting long-term decline in livestock populations and in fertiliser use due to the Common Agricultural Policy. Emissions from *Agriculture* in 2016 are now 3.5% below their 1990 levels but have increased for 4 out of the last 5 years, 2012, 2013, 2015 and 2016. The fluctuations in *Agriculture* emissions are underpinned by higher animal numbers; in the 4-year period 2012-2016, dairy cow numbers have increased by 22% and corresponding milk production by 27%. This reflects national plans to expand milk production under Food Wise 2025 and the removal of the milk quota in 2015.

Increased housing stock drove the gradual upward trend in the emissions from the *Residential* sector after 1998 following a sharp reduction in the early 1990s that resulted from fuel switching to reach a peak in 2010. The 2016 emissions in this sector are almost unchanged on 2015 levels and are 19.6% lower than their 1990 level whereas the housing stock has increased by 74.5% in the same period. Winter heating demand is the most important variable determining emissions from this sector.

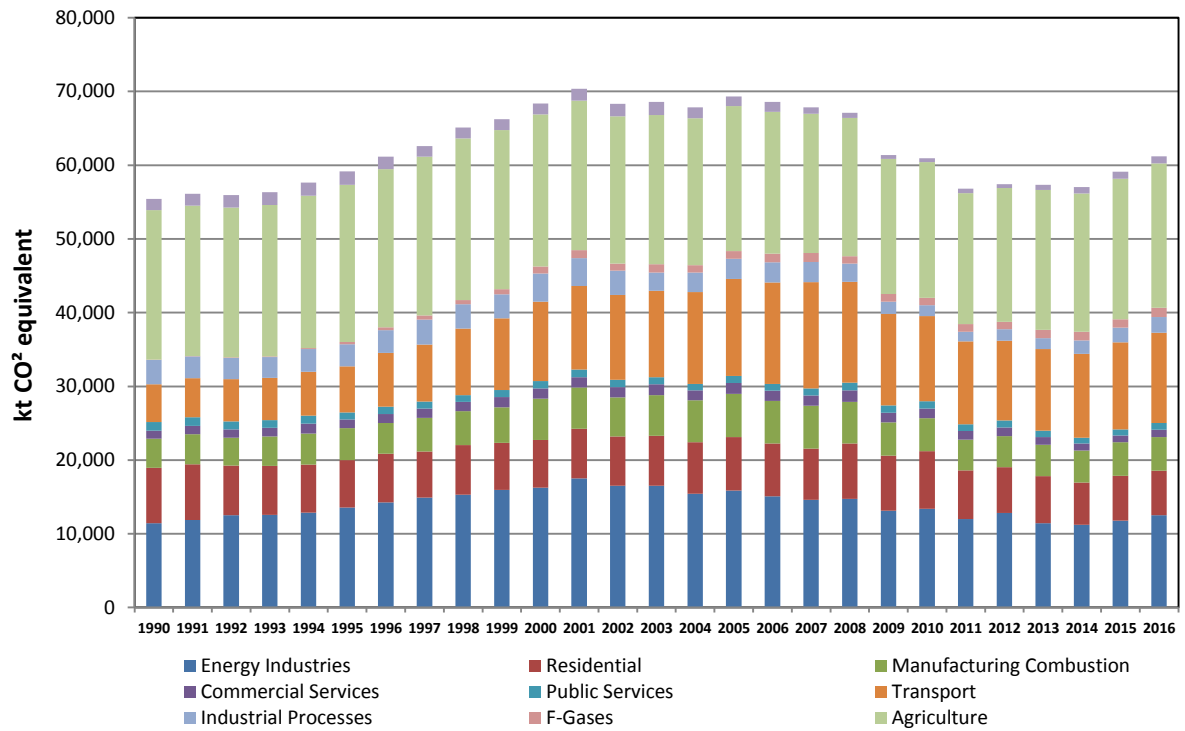


Figure 3. greenhouse gas emissions by sector 1990-2016

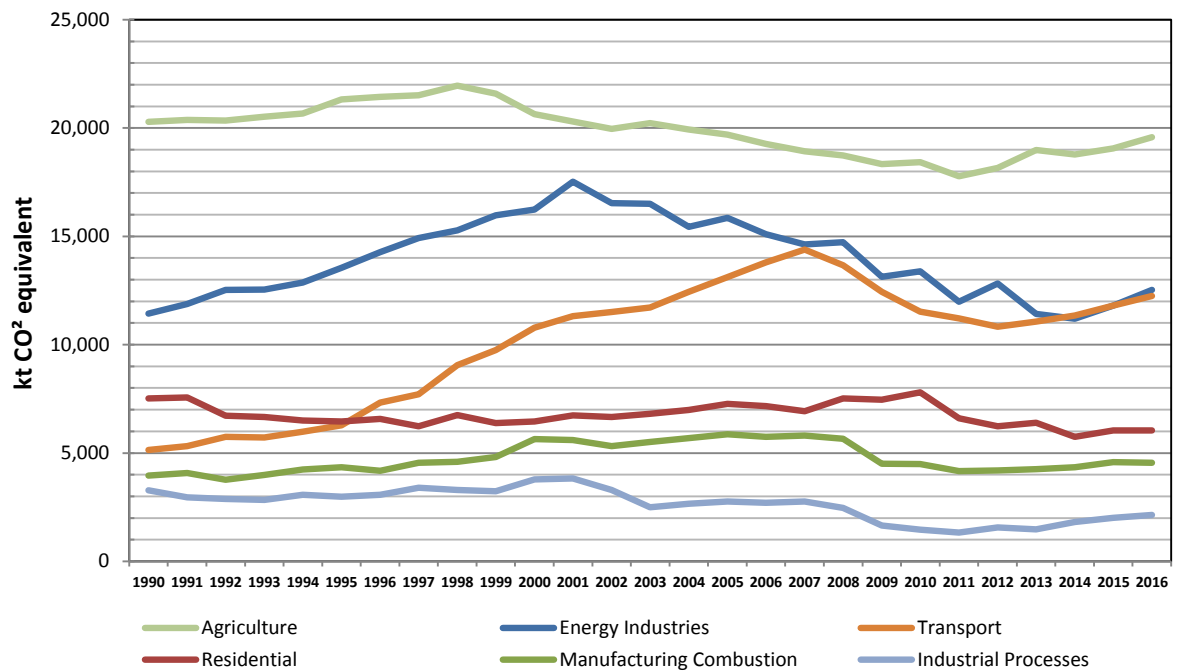


Figure 4. Trend in emissions for largest sectors 1990-2016



## Note on the outcome recent research in Agriculture to the national inventory

The provisional estimates of emissions 1990-2016 provided here include significant changes to the agriculture sector following the outcome of recent research as part of the Agricultural greenhouse gas Research Initiative for Ireland (AGRI-I, <http://www.agri-i.ie/>) funded by the DAFM Research Stimulus Fund conducted by Teagasc, Agri-Food and Biosciences Institute (AFBI) Northern Ireland, Queens University Belfast and Reading University. The estimates differ from those submitted to the EU and UNFCCC for 1990-2015 earlier this year. This research investigated the nitrous oxide (N<sub>2</sub>O) emission factors (EFs) for nitrogen fertiliser use and N<sub>2</sub>O EFs for dung and urine deposited by grazing cattle on soils and was carried out between 2011 and 2015.

The outcome of this research changed the EFs used in the national inventory as follows;

- Synthetic fertiliser N<sub>2</sub>O EF has increased from 1% loss (default in 2006 IPCC Guidelines) to 1.24% loss on average
- Dung and Urine by grazing cattle on soils N<sub>2</sub>O EF has decreased from a 2% loss (default in 2006 IPCC Guidelines) to 0.86% loss on average.

The above sources accounted for almost 88% of the total level of uncertainty in Ireland's greenhouse gas emission inventory in 2015 and therefore this research was targeted to significantly improve the understanding of the level of emissions in the national inventory and reduce overall uncertainty.

The net impact of these EF changes together with new nitrogen excretion rates for other cattle (non-dairy cattle) was to reduce overall N<sub>2</sub>O emissions from agriculture by 11.5% or a reduction of 0.79 Mt CO<sub>2</sub> eq per annum from 1990-2015. However, some of the reduction in N<sub>2</sub>O emissions was offset by improving the methodology used in estimating CH<sub>4</sub> emissions from manure management for swine and sheep, which increased emissions by on average 92 kt CO<sub>2</sub> eq per annum. **Overall, agriculture emissions are now 3.6% or 0.71 Mt CO<sub>2</sub> eq per annum lower for all years from 1990-2015.**

## Compliance with EU and international commitments

The greenhouse gas emission inventory for 2016 is the fourth year that compliance under the European Union's Effort Sharing Decision (Decision 406/2009/EC) will be assessed. This Decision sets 2020 targets for sectors outside of the Emissions Trading Scheme (known as non-ETS sector emissions) and annual binding limits for the period 2013-2020. Ireland's target is to reduce non-ETS emissions by 20% by 2020 compared with 2005 levels.

The final inventory review for 2013 and 2014 data was completed in August 2016 and the review for 2015 data was completed in April 2017 following submission of official data in March 2017 to the European Commission. Ireland has currently 10.38 Mt CO<sup>2</sup> eq additional annual emission allowances (AEAs) compared with greenhouse gas emissions for the period 2013 to 2015, see Table 2 and Figure 5. ESD registry compliance with respect to 2013 and 2014 was completed in 2017. ESD registry compliance for 2015 will be completed early in 2018.

Ireland's annual limit for 2016 is 43.50 Mt CO<sup>2</sup> eq. Ireland's provisional 2016 greenhouse gas emissions for non-ETS sectors are 43.44 Mt CO<sup>2</sup> eq, 55.3 kt CO<sup>2</sup> eq less than the annual limit for 2016. This value is the national total emissions less emissions covered by the EU's emissions trading scheme for stationary and aviation operators. Agriculture and Transport accounted for 73.3% of total non-ETS emissions in 2016. This indicates that Ireland will be in compliance with its 2016 Effort Sharing Decision annual limit.

The revision to the national inventory for the *Agriculture* sector will provide additional headroom, approximately 3.5 Mt CO<sup>2</sup>eq (5 x 0.70 Mt CO<sup>2</sup>eq per annum), for Ireland to meet its annual limits for the 5-year period 2016-2020. However, under Article 20 of the [MMR No. 525/2013](#)<sup>25</sup>, during the comprehensive review of the inventory data for 1990-2020 to take place in 2022, the Commission will take into account the effects of all inventory recalculations during the period 2013 to 2020 when proposing the targets for emission reductions or limitations for each Member State for the period after 2020. In this way, no Member State will benefit or be disadvantaged, from recalculations to inventories during the period 2013 to 2020.

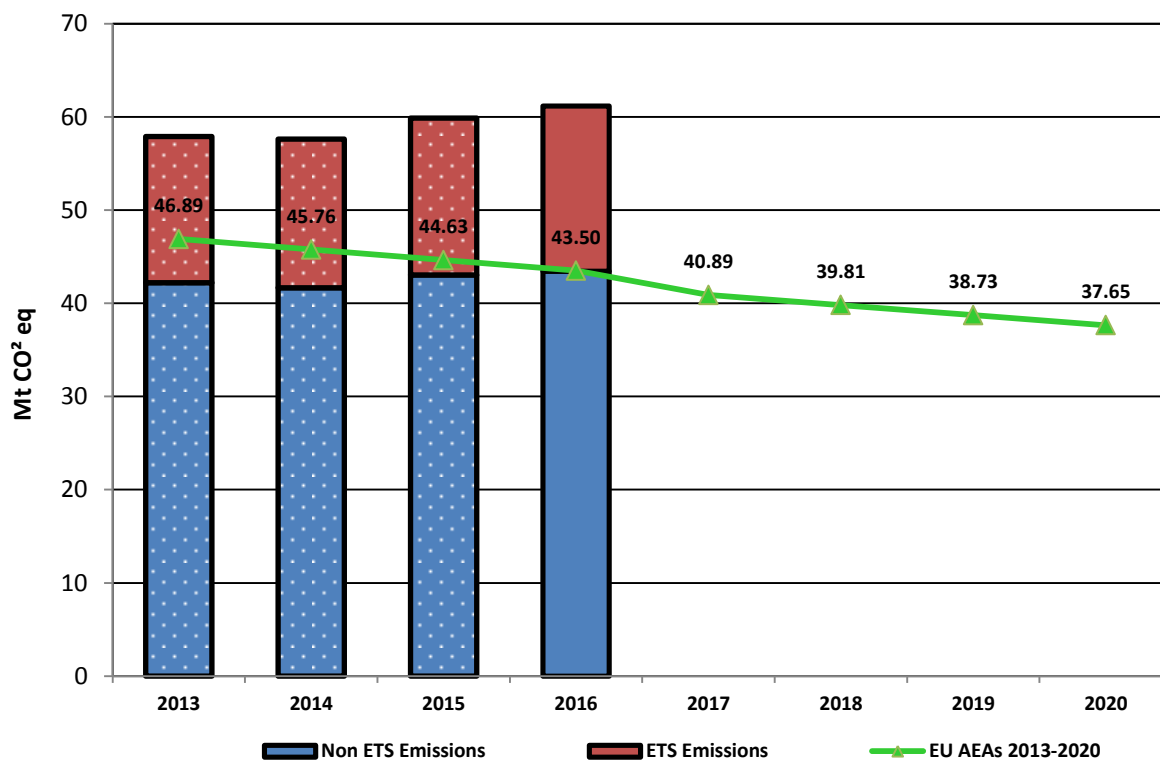
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<sup>25</sup> REGULATION (EU) No 525/2013 OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 21 May 2013 on a mechanism for monitoring and reporting greenhouse gas emissions and for reporting other information at national and Union level relevant to climate change and repealing Decision No 280/2004/EC

**Table 2. Compliance with EU ESD Targets 2013-2020**

	2013	2014	2015	2016	2017	2018	2019	2020		
<b>A</b>	Total greenhouse gas emissions without LULUCF	57,903.4	57,626.0	59,878.2	61,188.0				kt CO <sup>2</sup> eq	
<b>B</b>	NF <sub>3</sub> emissions	0.9	1.0	1.0	1.0				kt CO <sup>2</sup> eq	
<b>C</b>	Total greenhouse gas emissions without LULUCF and without NF <sub>3</sub> emissions	57,902.5	57,625.1	59,877.3	61,187.1				kt CO <sup>2</sup> eq	
<b>D</b>	Total verified emissions from stationary installations under Directive 2003/87/EC	15,685.7	15,952.7	16,829.7	17,733.8				kt CO <sup>2</sup> eq	
<b>E</b>	CO <sup>2</sup> emissions from 1.A.3.a civil aviation	10.0	9.4	10.4	9.7				kt CO <sup>2</sup> eq	
<b>F</b>	<b>Total ESD emissions (=C-D-E)</b>	42,206.8	41,663.0	43,037.2	43,443.6				kt CO <sup>2</sup> eq	
<b>G</b>	<b>EU ESD Targets</b>	46,891.9	45,760.9	44,629.9	43,498.9	40,885.1	39,807.1	38,729.2	37,651.3	kt CO <sup>2</sup> eq
	<b>Distance to target (=F-G)</b>	-4,685.1	-4,097.9	-1,592.7	-55.3					

**Note:** Shaded cells show data that has been reviewed, and compliance agreed, by the European Commission under Article 19 of the MMR No. 525/2013



**Figure 5. ESD Targets 2013-2020**

**Table 3. Ireland's greenhouse gas Emissions by Sector 1990-2016 (kilotonnes CO<sup>2</sup> equivalent)**

Sector	1990	1995	2000	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	Annual change	kt CO <sup>2</sup>
Energy Industries	11434.98	13553.17	16245.03	15858.06	15103.65	14624.58	14730.24	13135.54	13385.81	11989.19	12823.80	11413.94	11197.24	11803.22	12524.89	6.1%	721.68
Public electricity and heat production	10953.92	13132.91	15754.35	15244.75	14527.04	14055.76	14155.13	12610.63	12895.10	11556.54	12356.28	10952.93	10771.89	11328.27	12074.39	6.6%	746.12
Petroleum refining	168.67	181.27	274.80	411.87	377.14	360.80	367.48	315.39	310.47	285.42	313.55	294.55	279.50	358.72	313.59	-12.6%	-45.13
Solid fuels and other energy industries	100.54	69.44	87.15	110.10	120.22	114.13	124.11	145.54	121.32	93.26	104.84	122.71	97.68	73.11	95.64	30.8%	22.54
Fugitive emissions	211.85	169.54	128.73	91.34	79.25	93.89	83.52	63.99	58.91	53.97	49.14	43.76	48.18	43.12	41.27	-4.3%	-1.85
Residential	7523.66	6452.05	6462.60	7271.95	7157.48	6928.53	7521.57	7467.04	7800.95	6609.75	6232.39	6395.37	5745.61	6041.34	6046.81	0.1%	5.48
Manufacturing Combustion	3961.75	4347.62	5642.37	5870.71	5752.70	5811.69	5654.19	4505.24	4497.09	4159.66	4192.80	4252.42	4335.21	4575.48	4555.18	-0.4%	-20.29
Commercial Services	1083.49	1165.57	1374.71	1475.69	1380.08	1414.82	1547.67	1297.82	1296.57	1194.97	1184.39	1066.17	956.98	935.40	999.34	6.8%	63.95
Public Services	1160.65	936.34	989.43	952.53	912.74	958.76	1052.75	1001.79	1021.03	913.57	930.82	871.10	815.51	806.00	880.83	9.3%	74.82
Transport	5135.48	6271.71	10788.98	13121.30	13801.50	14388.11	13660.61	12441.37	11528.46	11219.54	10835.82	11065.56	11347.38	11811.16	12248.80	3.7%	442.78
Domestic aviation	51.71	48.86	74.41	65.37	77.29	71.48	67.18	55.20	40.97	19.33	11.50	10.18	9.52	10.51	9.80	-6.7%	-0.71
Road transportation	4787.51	5890.59	10369.53	12558.47	13187.69	13842.30	13086.07	11897.96	10985.09	10735.34	10365.67	10594.17	10841.00	11313.64	11750.53	3.9%	436.89
Railways	148.87	124.51	137.65	136.58	136.58	147.71	156.54	137.36	136.31	136.52	131.93	131.38	120.53	122.83	125.10	1.8%	2.27
Domestic navigation	85.77	92.10	152.65	211.19	250.13	197.53	204.73	199.52	200.12	173.73	183.60	179.59	224.81	221.73	266.46	20.2%	44.72
Other transportation	62.86	118.75	57.80	153.28	153.24	132.01	147.46	152.51	166.74	155.31	143.81	150.58	151.18	143.34	102.95	-28.2%	-40.40
Industrial Processes	3273.40	2989.74	3786.43	2758.70	2705.83	2765.39	2470.22	1655.13	1461.67	1331.66	1558.00	1473.64	1816.91	2002.90	2145.56	7.1%	142.66
Mineral industry	1116.73	1084.18	1908.78	2552.80	2538.74	2582.80	2303.11	1486.14	1300.01	1168.75	1393.44	1301.70	1650.45	1830.36	1968.40	7.5%	138.04
Chemical industry	1985.55	1754.44	1663.30	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO		
Metal industry	26.08	24.80	28.80	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO		
Non-energy products from fuels and solvent use	113.70	94.13	151.67	168.95	129.25	143.46	127.02	128.46	120.94	122.01	123.57	130.88	125.25	131.09	134.58	2.7%	3.49
Other product manufacture and use	31.34	32.20	33.88	36.96	37.84	39.12	40.10	40.53	40.72	40.90	40.99	41.06	41.21	41.44	42.57	2.7%	1.13
F-Gases	35.23	284.29	955.35	1019.88	1178.13	1174.56	1036.58	1037.89	1011.69	1016.48	996.33	1122.77	1182.87	1142.06	1258.27	10.2%	116.21
Agriculture	20286.49	21321.84	20637.40	19688.87	19266.23	18932.82	18734.77	18331.43	18425.43	17776.03	18156.86	18987.72	18778.13	19063.08	19583.48	2.7%	520.40
Enteric fermentation	11356.97	11480.10	11260.82	10843.14	10789.48	10586.99	10539.09	10370.00	10162.10	10045.18	10379.27	10532.74	10655.91	10923.72	11247.27	3.0%	323.55
Manure management	1904.53	1937.12	1917.43	1881.76	1845.93	1809.51	1798.39	1775.00	1739.75	1736.20	1813.88	1832.21	1840.16	1877.35	1943.29	3.5%	65.94
Agricultural soils	5807.01	6203.67	6027.51	5570.76	5302.75	5147.45	5061.48	4944.64	5220.81	4816.62	4955.22	5411.14	5266.08	5261.14	5331.01	1.3%	69.87
Liming	355.04	494.60	366.38	266.73	254.86	376.77	262.21	307.32	427.93	360.68	229.40	515.69	382.32	392.51	425.60	8.4%	33.09
Urea application	44.47	39.68	42.25	27.90	29.55	23.36	30.76	40.93	45.16	32.32	21.32	21.66	25.09	28.31	35.80	26.5%	7.49
Agriculture/Forestry fuel combustion	730.62	1008.11	909.76	953.63	914.19	868.02	939.19	796.63	753.49	721.93	687.92	596.55	534.52	514.94	540.70	5.0%	25.76
Fishing	87.85	158.55	113.24	144.94	129.47	120.74	103.65	96.92	76.18	63.10	69.85	77.73	74.06	65.11	59.79	-8.2%	-5.32
Waste	1546.80	1823.02	1489.09	1290.68	1326.40	848.51	687.39	515.21	498.90	589.88	514.57	671.40	853.28	950.60	938.82	-1.2%	-11.78
Landfills	1318.08	1592.76	1268.16	1007.00	1049.30	615.99	463.84	284.80	278.65	381.56	302.79	460.97	648.10	742.15	737.13	-0.7%	-5.03
Biological treatment of solid waste	0.00	0.00	0.00	13.77	13.70	12.48	16.44	21.07	20.99	22.91	22.41	22.73	19.30	20.66	19.87	-3.9%	-0.80
Incineration and open burning of waste	92.48	94.43	75.83	131.19	128.31	83.69	62.64	64.11	54.80	42.45	45.60	43.57	39.65	40.15	33.08	-17.6%	-7.07
Wastewater treatment and discharge	136.24	135.83	145.10	138.72	135.09	136.34	144.46	145.22	144.46	142.96	143.77	144.13	146.24	147.63	148.75	0.8%	1.11
National Total	55443.17	59148.43	68374.46	69311.95	68588.17	67850.67	67097.38	61389.65	60928.37	56801.44	57426.46	57320.43	57028.78	59132.12	61188.01	3.5%	2055.90

## Notes

**Units:** 1 Mt = 1,000 kilotonnes

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

**F-gases:** These gases comprise HFCs (Hydrofluorocarbons), PFCs (Perfluorocarbons), SF<sub>6</sub> (Sulphur Hexafluoride) and NF<sub>3</sub> (Nitrogen Trifluoride). They are much more potent than the naturally occurring greenhouse gas emissions (carbon dioxide, methane and nitrous oxide).

**GWPs:**

Industrial designation or common name	Chemical formula	GWP for 100-year time horizon
		IPCC 4 <sup>th</sup> assessment report (AR4)
Carbon dioxide	CO <sup>2</sup>	1
Methane	CH <sub>4</sub>	25
Nitrous oxide	N <sub>2</sub> O	298
Hydrofluorocarbons	HFCs	12 to 14,800
Perfluorinated compounds	PFCs	7,390 to >17,340
Sulphur hexafluoride	SF <sub>6</sub>	22,800
Nitrogen trifluoride	NF <sub>3</sub>	17,200

**Ireland's greenhouse gas Sectors:** include the following ten sectors for analysis;

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

**Uncertainty Analysis:**

The EPA uses a method described by the 2006 IPCC guidelines to assess uncertainty in the emissions inventory data. This method estimates uncertainties for the entire inventory in a particular year and the uncertainty in the trend over time by combining the uncertainties in activity data and emission factors for each source category. The estimated uncertainty on the level of emissions in 2015 is 10.0% and the trend uncertainty over the period 1990-2015 is 2.8%. The most significant contributors to the level of uncertainty are methane emissions from livestock and nitrous oxide emissions from agricultural soils.

## Appendix 8 – EPA Greenhouse Gas Emissions Projections Report 2017



### Greenhouse gas Emission Projections to 2020 – April 2017

#### Overview of Ireland's Greenhouse gas Emission Projections

This report provides an assessment of Ireland's progress towards achieving its emission reduction targets set down under the EU Effort Sharing Decision (Decision No 406/2009/EC) for the years 2013-2020 and a longer term assessment based on current projections.

Ireland's 2020 target is to achieve a 20% reduction of non-Emission Trading Scheme (non-ETS) sector emissions (i.e. agriculture, transport, the built environment, waste and non-energy intensive industry) on 2005 levels with annual limits set for each year over the period 2013-2020.

The EPA has produced two scenarios in preparing greenhouse gas emission projections; a *With Existing Measures* scenario and a *With Additional Measures* scenario.

For 2017 projections, the *With Additional Measures* scenario takes into account an expected shortfall in achieving full energy efficiency targets and renewable targets for electricity, transport and heat as set out in the National Energy Efficiency Action Plan and National Renewable Energy Action Plan.

To assess progress towards achieving reduction targets out to 2020 the EPA is using legislative limits (for the period 2013-2016) and estimated annual limits (for the period 2017-2020) which will possibly be included in a European Commission proposal that takes into account methodological changes underpinning greenhouse gas emission inventories.

For 2020 it is estimated that non-ETS sector emissions are projected to be 4% - 6% below 2005 levels by 2020. This compares to the target of 20% below 2005 levels by 2020.

To determine compliance under the Effort Sharing Decision, any overachievement of the binding emission limit in a particular year (in the period 2013 to 2020) can be banked and used towards

compliance in a future year. Under both scenarios Ireland is expected to exceed the annual limit in 2016.

Under the With Existing Measures scenario, Ireland is projected to cumulatively exceed its obligations by 13.7 Mt of CO<sup>2</sup>eq over the period 2013-2020. Under the With Additional Measures scenario, Ireland is projected to cumulatively exceed its obligations by 11.5 Mt of CO<sup>2</sup>eq over the period 2013-2020. This takes into account the overachievement of the annual limits in the period 2013-2015 which is banked and used in the years 2016-2020. Using this mechanism Ireland is projected to cumulatively exceed its obligations in 2019.

Agriculture and transport dominate non-ETS sector emissions; emission trends from these sectors will be key determinants in terms of meeting targets with both projected to increase in the period to 2020.

There will be new obligations (as yet undefined) for the years 2021-2030. Based on current emission projections, it is estimated that by 2030 total non-ETS emissions will be 1%-3% below 2005 levels. The estimates of greenhouse gas emissions to 2035 assume a continuation of the effect of policies and measures that are in place in 2020.

## Introduction

The Environmental Protection Agency (EPA) produces greenhouse gas emission projections on an annual basis for all sectors of the economy in collaboration with relevant State and other bodies. These projections are compiled to meet EU reporting obligations (Monitoring Mechanism Regulation No 525/2013<sup>26</sup>) and also to inform national policy development. These projections update those published in March 2016<sup>27</sup> by the EPA.

Much of the discussion in this document focuses on emissions up to 2020 and Ireland's projected compliance under the EU 2020 targets. The document also provides information on the EU and national policy position context and emission projections beyond 2020.

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<sup>26</sup> Regulation (EU) No 525/2013 of the European Parliament and of the Council of 21 May 2013 on a mechanism for monitoring and reporting greenhouse gas emissions and for reporting other information at national and Union level relevant to climate change and repealing Decision No. 280/2004/EC

<sup>27</sup> <http://www.epa.ie/pubs/reports/air/airemissions/irelandsgreenhousegasemissionsto2020anupdate.html>



## 1. Approach

Greenhouse gas emissions were projected to 2035<sup>28</sup> using two scenarios: a *With Existing Measures* scenario and a *With Additional Measures* scenario.

The *With Existing Measures* scenario assumes that no additional policies and measures, beyond those already in place by the end of 2015 (latest national greenhouse gas emission inventory), are implemented.

The *With Additional Measures* scenario assumes implementation of the *With Existing Measures* scenario in addition to, based on current progress, further implementation of Government renewable and energy efficiency targets for 2020, as set out in the National Renewable Energy Action Plan (NREAP) and the National Energy Efficiency Action Plan (NEEAP). For 2017 projections, the *With Additional Measures* scenario takes into account an expected shortfall in achieving full energy efficiency targets and renewable energy targets for electricity, transport and heat as set out in the NEEAP and NREAP.

2017 greenhouse gas emission projections were prepared with data provided by a number of key data providers including:

- Energy Forecasts provided by the Sustainable Energy Authority of Ireland in March 2017
- Agricultural forecasts provided by Teagasc in December 2015

Energy forecasts were prepared by SEAI in conjunction with the Economic and Social Research Institute (ESRI) and University College Cork. The ESRI use macro-economic projections which are produced using the COSMO model<sup>29</sup>. The baseline projections and underlying assumptions are described in Chapter 1 of “Ireland’s Economic Outlook: Perspectives and Policy Challenges”, published on 5<sup>th</sup> December 2016<sup>30</sup>. Projections on the global economic environment, including oil prices, as based in simulations using the NiGEM model (National Institute Global Econometric Model<sup>31</sup>) maintained by the National Institute of Economic and Social Research<sup>32</sup>.

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<sup>28</sup> For 2017 reporting the Monitoring Mechanism Regulation (Regulation (EU)) No. 525/2013) requires Member States to report greenhouse gas emission projections out to 2035

<sup>29</sup> <https://www.esri.ie/projects/modelling-the-irish-economy/>

<sup>30</sup> <http://www.esri.ie/pubs/EO1.pdf>

<sup>31</sup> <https://nimodel.niesr.ac.uk/>

<sup>32</sup> <http://www.niesr.ac.uk/>

Projections from the COSMO model were used to produce projections of the energy demand equation time series variables (i.e. demand equations by fuel and sector). The integration of energy demand into the COSMO model is work that is due to be undertaken in 2017.

For the *With Additional Measures* scenario, the determination of expected progress in the implementation of NREAP and NEEAP targets out to 2020 was coordinated by SEAI and is reflected in the energy forecasts output as provided to the EPA in March 2017.

Forecasted activity data for the agriculture sector (animal numbers, crop areas and fertiliser use) is the same data provided by Teagasc in December 2015 in advance of the preparation of 2016 emission projections. This dataset includes the proposed national herd, crop areas and fertilizer use to meet the overarching objectives of Food Wise 2025<sup>33</sup>.

There are anticipated to be changes to the Effort Sharing annual limits and 2020 targets for Member States, including Ireland, as a result of changes to reporting guidelines and methodologies which were adopted in relation to compiling greenhouse gas emission inventories. Box 1 details these changes and how the EPA is dealing with these anticipated changes to the limits in the presentation of these projections.

Box 1. New methodologies and UNFCCC reporting guidelines –  
Impacts on EU Effort Sharing Annual Limits and 2020 Targets

In accordance with Article 27 of the Monitoring Mechanism Regulation (Regulation (EU) 525/2013) the European Commission was required to examine the impact of the use of the 2006 IPCC Guidelines for National Greenhouse gas Inventories and significant changes brought about by the UNFCCC methodologies by December 2016.

For this year's projections, the EPA is using legislative limits (for the period 2013-2016) and estimated annual limits (for the period 2017-2020) which will possibly be included in a European Commission proposal (following the above Article 27 review) that takes into account methodological changes underpinning greenhouse gas emission inventories. These estimates are provided to give an indication of how Ireland is likely to perform relative to amended EU targets and are subject to a Commission proposal being finalised and adopted.

<sup>33</sup> Food Wise 2025. A 10-year vision for Irish agri-industry. Department of Agriculture, Food and the Marine, 2015. <https://www.agriculture.gov.ie/foodwise2025/>

The EPA also prepares emission projections for the land use and land use change and forestry sector (LULUCF) however the impact of forest sinks is not included in this compliance assessment. This is in line with EU accounting rules which do not allow the use of forest sinks to meet EU 2020 targets. Member States can, however, achieve compliance through a number of other mechanisms which are set out in the EU Effort Sharing Decision (Decision No 406/2009/EC). These include borrowing a quantity of its annual emission allocation i.e. limit from the following year, use of transfers from other Member States and the limited use of international credits from project activities as long as certain criteria are met.

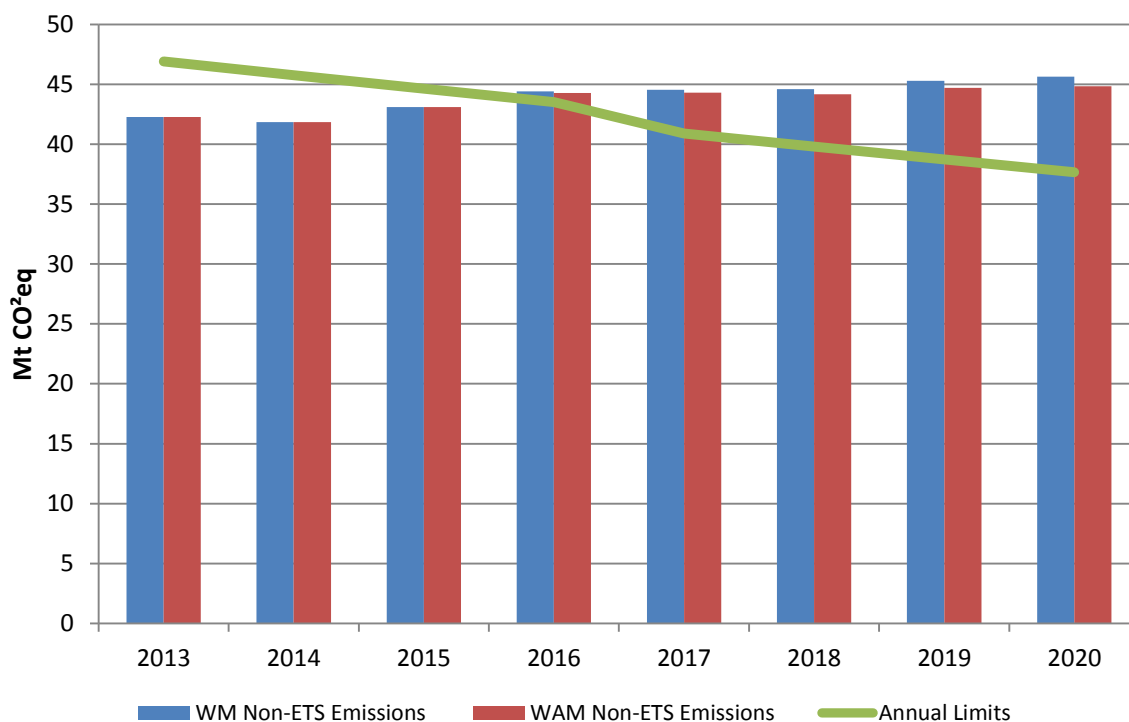
The key macroeconomic assumptions and a more detailed description of the two scenarios are provided in Appendices I-III.

## 2. Projected performance relative to EU 2020 Targets

The EU's Effort Sharing Decision (Decision No 406/2009/EC) set 2020 targets for EU Member States including Ireland. These targets cover greenhouse gas emissions from sectors that are not included in the EU Emissions Trading Scheme. For Ireland these sectors cover agriculture, transport, built environment (residential, commercial/institutional), waste and non-energy intensive industry – collectively referred to as non-ETS sector emissions – and Ireland's target is to achieve a 20% reduction by 2020 on 2005 levels.

In addition, there are annual emission limits for the period 2013-2020 to ensure a gradual move towards the 2020 target. Any overachievement of the binding emission limit in a particular year can be banked and used towards compliance in a future year.

Figure 1 shows projected emission levels for non-ETS sector emissions under the *With Existing Measures* and *With Additional Measures* scenarios. In addition, it shows the annual compliance/non-compliance in relation to the annual emission limits.

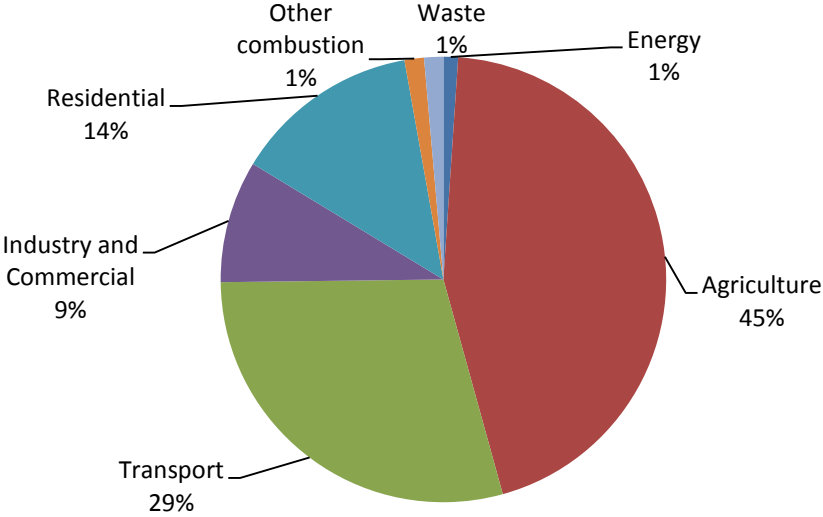


**Figure 1. *With Existing Measures* and *With Additional Measures* greenhouse gas emissions projections and comparison with the reduction pathway required between 2013 and 2020**

The main findings from the projections published in this report are:

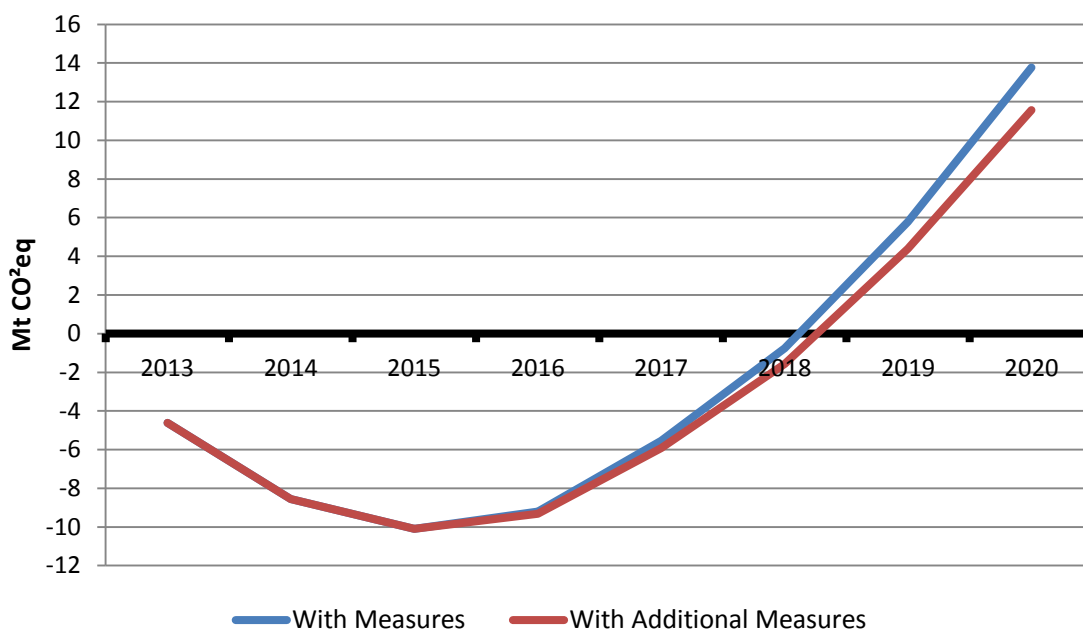
- Ireland’s non-ETS sector emissions are projected to be 4% - 6% below 2005 levels by 2020.
- Agriculture and transport dominate non-ETS sector emissions accounting for approximately 74% of emissions in 2020 under the *With Additional Measures* scenario as shown in Figure 2 below. Emission trends from these sectors will be key determinants in terms of meeting targets.
  - Agriculture emissions are projected to increase by 4% to 5% by 2020 from current levels. This reflects the impact of Food Wise 2025. Fertiliser use efficiency gains are assumed under the *With Additional Measures* scenario.
  - Transport emissions are projected to show strong growth over the period to 2020 with 10% to 12% increase on 2015 levels. This reflects the strong economic growth forecasted over the next period.

Figure 2 presents the percentage share of non-ETS greenhouse gas emissions emissions by sector in 2020 under the *With Additional Measures* scenario.



**Figure 2. Projected sectoral share of non-ETS greenhouse gas emissions in 2020 for the *With Additional Measures* scenario**

- To determine compliance under the Effort Sharing Decision (Decision No 406/2009/EC), any overachievement of the binding emission limit in a particular year can be banked and used towards compliance in a future year. Under both scenarios Ireland is projected to exceed its annual limit in 2016. The overachievement in relation to annual limits over the period 2013-2015 can be used towards compliance.
- Using the above mechanism Ireland is projected to cumulatively exceed its obligations by 13.7 Mt of CO<sup>2</sup>eq over the period 2013-2020 under the *With Existing Measures* scenario. Under the *With Additional Measures* scenario, Ireland is projected to cumulatively exceed its obligations by 11.5 Mt of CO<sup>2</sup>eq over the period 2013-2020. Figure 3 shows the projected cumulative distance to target over the period 2013-2020. Using this mechanism Ireland is projected to cumulatively exceed its obligations in 2019.



**Figure 3. Projected cumulative distance to target for Ireland’s Non-ETS emissions 2013 to 2020**

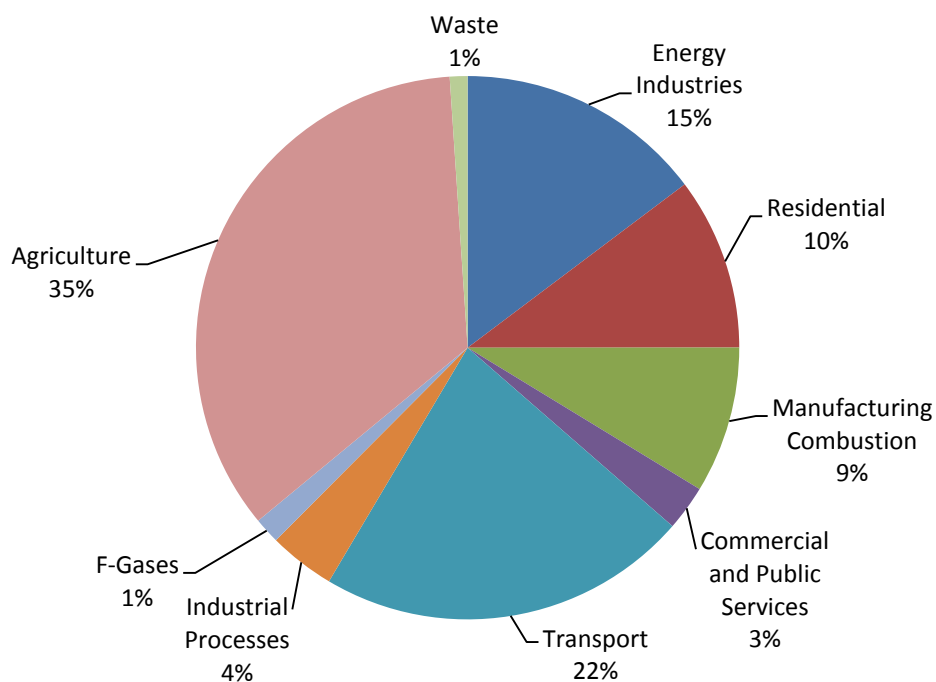
### 3. Sectoral Emissions to 2020

Sectoral emissions in this section of the report are presented in a classification which is largely consistent with the greenhouse gas emissions inventory categories as published in November 2016<sup>34</sup> (see also Appendix 3 for further explanation of the categories). A detailed data file on emissions from these sectors out to 2035 is available<sup>35</sup>.

Figure 4 presents the percentage share of total emissions by sector in 2020 under the *With Additional Measures* scenario.

<sup>34</sup> <http://www.epa.ie/pubs/reports/air/airemissions/ghgemissions/>

<sup>35</sup> <http://www.epa.ie/climate/emissionsinventoriesandprojections/nationalemissionsprojections/>



**Figure 4. Projected sectoral share of total greenhouse gas emissions (includes ETS and non ETS emissions) in 2020 in the *With Additional Measures* scenario**

### Energy Industries

- The majority of emissions from this sector are not covered by the EU Effort Sharing Decision (Decision No 406/2009/EC). This section covers public electricity and heat production, solid fuels and other energy industries, petroleum refining and fugitive emissions. The majority of emissions come from power generation.
- Under the *With Existing Measures* scenario, total energy sector emissions are projected to decrease by 13% over the period 2015 – 2020 to 10.2 Mt CO<sup>2</sup>eq. Renewable electricity generation capacity is dominated by wind but also includes, for example, the operation of a second waste to energy incinerator (Poolbeg) and the continued development of landfill gas electricity generation.
- Under the *With Additional Measures* scenario, total energy sector emissions are projected to decrease by 26% over the period 2015 – 2020 to 8.7 Mt CO<sup>2</sup>eq. it is assumed that for 2020 there is a 37.3 % share of renewable energy in electricity generation (falling short of the full 40% NREAP target) as a result of additional expansion in wind energy, biomass electricity generating capacity in addition to solar photo voltaics.

## Residential

- Under the *With Existing Measures* scenario, emissions from the residential sector are projected to increase by less than 2% to 6.1 Mt CO<sub>2</sub>eq between 2015 and 2020. The following measures are included in the *With Existing Measures* emission projection: SEAI's Greener Homes Scheme, Warmer Homes Scheme, Better Energy Homes Scheme, Energy Supplier Obligation Scheme, Better Energy Communities Scheme, Energy Efficient Boiler Standard, 2002, 2008 and 2011 Building Regulations and the carbon tax on fuels introduced in 2010.
- Under the *With Additional Measures* scenario, emissions are projected to slightly increase by less than 0.5% between 2015 and 2020 to 6 Mt CO<sub>2</sub>eq. Additional measures in this scenario include an increase in renewables in heating and further energy efficiency measures to progress the achievement of the NEEAP target.

## Manufacturing Combustion

- Under the *With Existing Measures* emission projection, emissions from manufacturing combustion are projected to increase by 16.8 % between 2015 and 2020 while final energy demand is projected to increase by 19% over the same period. This scenario takes into account measures such as SEAI Large Industry Programme, Combined Heat and Power deployment, Renewable Heat Scheme and the Carbon Tax measure.
- Under the *With Additional Measures* emission projection, emissions from industrial combustion are projected to increase by 13.3%. Additional measures in this scenario include an increase in renewables in heating and further energy efficiency measures to progress the achievement of the NEEAP target. The projected rate of thermal energy sourced from renewable sources is 9% (across the residential, commercial services and industrial sectors) by 2020 based on current forecasts. This falls short of the full NREAP RES-H 12% target.



## Commercial and Public Services

- Under the *With Existing Measures* scenario, emissions from the commercial and public services sector are projected to increase by 11% to 1.9 Mt CO<sub>2</sub>eq between 2015 and 2020. The impact of the Accelerated Capital Allowance Scheme, Supports for Exemplar Energy Efficient Projects (SEEEP) and Energy Efficiency Retrofit Fund (EERF), SEAI energy agreements such as the Large Industry Network, Combined Heat and Power and supports for energy efficiency improvements are included in this scenario.
- Under the *With Additional Measures* scenario, emissions from the commercial and public services sector are projected to decrease by 8.5% to 1.5 Mt CO<sub>2</sub>eq between 2015 and 2020. Additional measures in this scenario include an increase in renewables in heating and further energy efficiency measures to progress the achievement of the NEEAP target. The projected rate of thermal energy sourced from renewable sources is 9% (across the residential, commercial services and industrial sectors) by 2020 based on current forecasts.

## Transport

- Under the *With Existing Measures* scenario, transport emissions are projected to increase by 12% over the period 2015 – 2020 to 13.2 Mt CO<sub>2</sub>eq. The *With Existing Measures* scenario includes:
  - the impact of VRT and motor tax changes (introduced in 2008), public transport efficiencies (e.g. integrated ticketing) and the carbon tax imposed on fuels since 2010
  - improvements to the fuel economy of private cars
  - a RES-T of 5.5% of transport energy demand is in place by 2020 which is supported by the Biofuel Obligation Scheme 2010<sup>36</sup>.

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<sup>36</sup><http://www.dccae.gov.ie/energy/en-ie/Renewable-Energy/Pages/Biofuels.aspx>

- Under the *With Additional Measures* scenario, transport emissions are projected to increase by 10% over the period 2015 – 2020 to 13 Mt CO<sup>2</sup>eq. In this scenario, it is assumed that:
  - a RES-T of 8% of total transport fuel demand is in place by 2020. This is underpinned by further roll out of the Biofuels Obligation Scheme and the further uptake of electric vehicles (10,000 electric vehicles deployed by 2020). This falls short of the full NREAP RES-T 10 % target.

## Industrial Processes

- Process emission projections were developed for industrial processes, the majority of which come from cement and lime industries. Other sources in this category include non-energy products from fuels and solvent use and other product manufacture. Projected emissions from the cement industries are estimated using projected GDP data. Only one projected scenario was developed for these sectors based on available data.
- Process emissions from industrial processes are projected to increase by 17% from 1.9 Mt of CO<sup>2</sup>eq in 2015 to 2.3 Mt of CO<sup>2</sup>eq in 2020 under both the *With Existing Measures* and *With Additional Measures* scenarios.

## Fluorinated Gases (F-Gases)

- Only one F-gas emission projection outlook is developed based on available data. The relevant source of fluorinated gas emissions in Ireland is production, use and disposal of equipment containing these fluids (e.g. refrigerators, mobile air conditioning systems, metered dose inhalers and electrical switch-gear).
- Fluorinated-gas emissions are projected to decrease by 19.8 % to 915.6 Gg CO<sup>2</sup>eq between 2015 and 2020. The savings associated with the impact of Directive 2006/40/EC<sup>37</sup> are included in this scenario.

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<sup>37</sup> Directive 2006/40/EC Relating to emissions from air-conditioning systems in motor vehicles and amending Council Directive 70/15/EEC

## Agriculture

- Agriculture sector emissions arise from enteric fermentation, manure management and nitrogen & urea application to soils, combustion from agriculture/forestry/fishing. For agriculture emission projections, two scenarios or outlooks for the future are estimated both of which assume achievement of *Food Wise 2025*<sup>38</sup>. The difference between the two scenarios is less than 1% and is attributable to the inclusion of nitrogen fertilizer use efficiencies in the *With Additional Measures* scenario. The data underpinning the projections include forecasted animal numbers, crop areas and projected nitrogen fertiliser application to soils supplied by Teagasc in December 2015.
- Total emissions from agriculture are projected to increase by 5% over the period 2015 – 2020 to 20.8 Mt CO<sub>2</sub>eq under the *With Existing Measures* scenario. The dairy cow herd is projected to increase by 7% on 2015 levels while the beef herd is projected to slightly decrease by less than 0.5% by 2020. Nitrogen fertiliser use is projected to increase by 21% on 2015 levels by 2020 under the *With Existing Measures* scenario and 12% under the *With Additional Measures* scenario.

## Waste

- There is one scenario for greenhouse gas emissions from the waste sector based on available data. The waste sector includes landfill, incineration and open burning of waste, mechanical & biological treatment and wastewater treatment.
- The scenario assumes a continued requirement for landfill as a disposal option for residual waste<sup>39</sup>. Under this scenario it is also assumed that the total municipal solid waste generated increases in line with GNP growth. Ireland has met all Landfill Directive targets for diversion of biodegradable municipal waste (BMW) from landfill to date.

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<sup>38</sup> <https://www.agriculture.gov.ie/foodwise2025/>

<sup>39</sup> Residual waste is defined as the fraction of collected waste remaining after a treatment or diversion step which generally requires further treatment or disposal

- For the waste sector, greenhouse gas emissions are projected to decrease by 36% by 2020 on 2015 levels which are primarily attributable to methane emissions from landfill reducing significantly. This is underpinned by increased recovery (including recycling and energy recovery) of waste materials and adherence to Food Waste Regulations which reduces the organic content of landfilled waste and thus its greenhouse gas production potential.
- It is also assumed that methane capture at landfills increases from the current level of 63% of total methane generated in 2015 to 75% in 2020.

#### 4. Policy context for greenhouse gas emission reductions beyond 2020

##### European: 2030 framework for climate and energy policies

EU leaders agreed a 2030 policy framework in October 2014 that will see a domestic EU greenhouse gas reduction target of at least 40% compared to 1990. To achieve the overall 40% target, the sectors covered by the EU emissions trading system (EU ETS) would have to reduce their emissions by 43% compared to 2005. Emissions from sectors outside the EU ETS would need to be cut by 30% below the 2005 level. This will need to be translated into Member State targets. A new Effort Sharing Regulation which will set out targets for each Member State out to 2030 is currently being developed. 2030 targets for Ireland have not yet been finalised.

## National: National Policy Position and Climate Action and Low Carbon Development Act 2015

Ireland's National Policy Position on Climate change<sup>40</sup> sets out a low-carbon roadmapping process that will be guided by a long-term vision of low-carbon transition based on:

- an aggregate reduction in carbon dioxide (CO<sub>2</sub>) emissions of at least 80% (compared to 1990 levels) by 2050 across the electricity generation, built environment and transport sectors;
- in parallel, an approach to carbon neutrality in the agriculture and land-use sector, including forestry, which does not compromise capacity for sustainable food production.

The Climate Action and Low Carbon Development Act 2015 sets out the national objective of transitioning to a low carbon, climate resilient and environmentally sustainable economy in the period up to and including the year 2050.

The Act provides for the preparation, and approval by the Government, of five-yearly National Low Carbon Transition and Mitigation Plans (or "National Mitigation Plans") which will set out how Ireland's national greenhouse gas emissions are to be reduced. In particular, each successive National Mitigation Plan will specify the policy measures that will be required to be adopted by each relevant Minister of the Government to reduce greenhouse gas emissions in their sectors and to enable a whole-of-Government approach towards achieving the national transition objective. Ireland's first National Mitigation Plan is currently being prepared by the Government and will be published later in 2017.

## Projected Greenhouse gas Emissions to 2035

Based on current emission projections, it is estimated that by 2030<sup>41</sup> total non-ETS emissions will be 1%-3% below 2005 levels. The estimates of greenhouse gas emissions to 2035 assume a continuation of the effect of policies and measures that are in place in 2020. It is recognised that this is a conservative outlook; however, these figures are published to illustrate how emissions might look into the longer-term in the absence of any additional policies and measures. The trend in emission levels under both the *With Existing Measures* and the *With Additional Measures* scenarios are

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<sup>40</sup>

<http://www.housing.gov.ie/sites/default/files/migrated-files/en/Publications/Environment/Atmosphere/FileDownload%2C37827%2Cen.pdf>

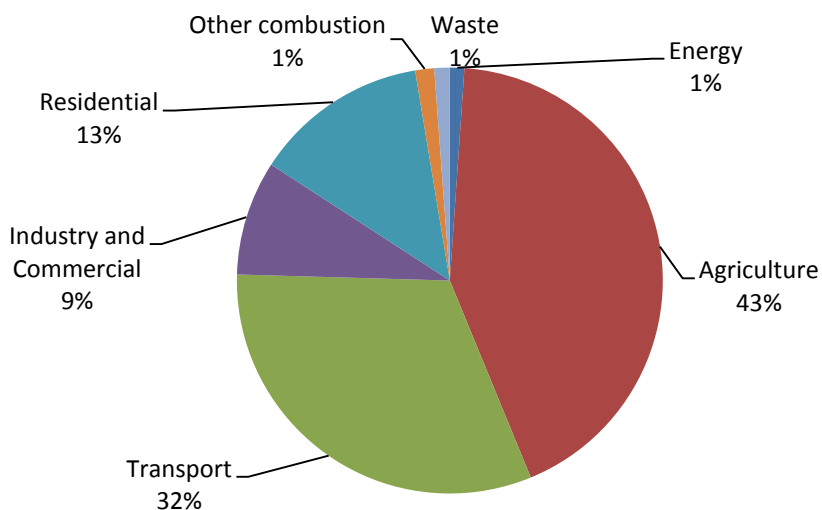
<sup>41</sup> 2030 is referenced here as there will be a new EU Effort Sharing Decision which will include targets out to 2030 (targets have not yet been finalised)

presented for the non-ETS sectors in Figure 5 and also includes the required target pathway to Ireland's 2020 target as a reference.



**Figure 5. *With Existing Measures* and *With Additional Measures* greenhouse gas emissions projections for the non-ETS sectors to 2035**

Figure 6 presents the percentage share of Non ETS emissions by sector in 2030 under the *With Additional Measures* scenario.

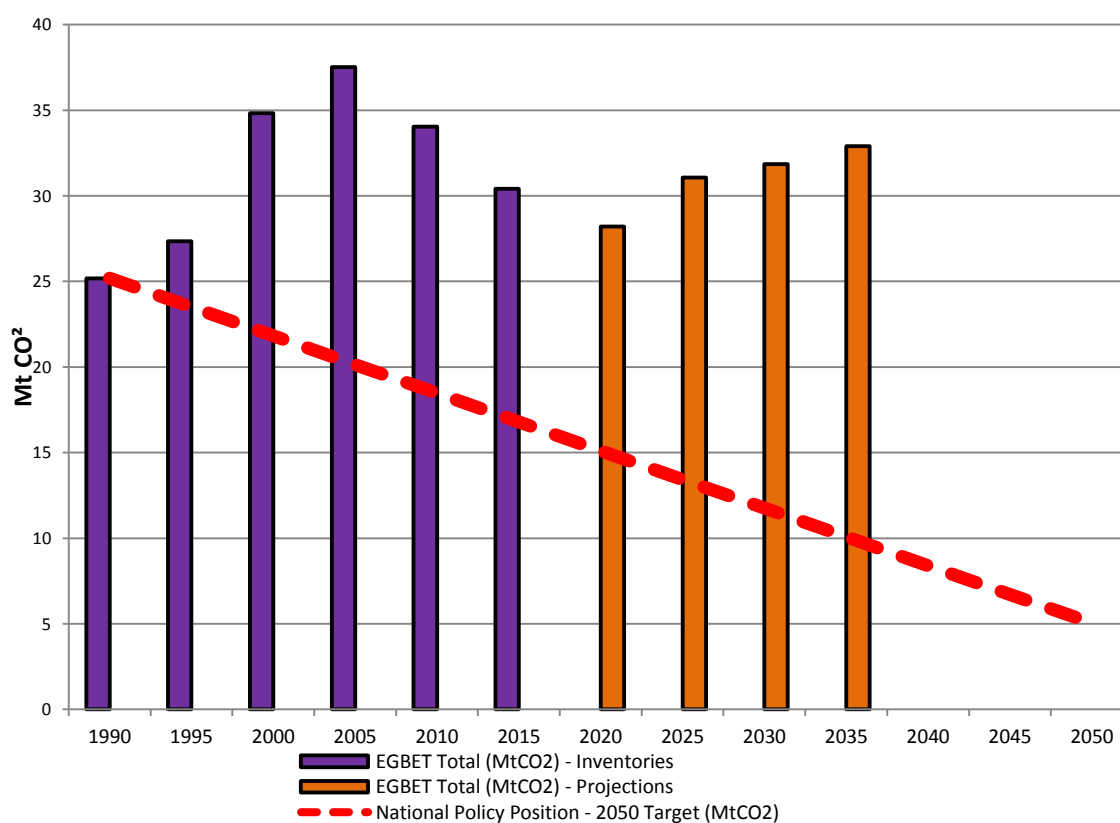


**Figure 6. Projected sectoral share of non-ETS greenhouse gas emissions in 2030 for the *With Additional Measures* scenario**

## 5. Summary of Sectoral emissions beyond 2020

- Over the period 2020 to 2035, emissions from the **Energy Industries** sector (mainly power generation (ETS sector emissions)) are projected to increase by 42% to 14.5 Mt CO<sup>2</sup> eq under the *With Existing Measures Scenario*. Under the *With Additional Measures scenario* the replacement of coal fired electricity generation with natural gas in 2025 is included. Under this scenario, emissions from the energy industries sector are projected to increase by 34% between 2020 and 2035 which is mainly a result of the increase in energy used in electricity generation over this period.
- Under the *With Existing Measures scenario* final **Residential** energy demand in 2035 is projected to be 22.3% above that in 2020, with an associated increase in emissions over the period by 5%. Under the *With Additional Measures scenario*, in 2035, residential sector emissions are projected to be at slightly higher than projected emission levels in 2020.
- In 2035 emissions from **Manufacturing Combustion** are projected to be 16.8% higher than in 2020 under both scenarios. Final energy demand increases by approximately 22% over the same period.
- Under the *With Existing Measures scenario*, it is projected that emissions from the **Commercial and Public services** sector will increase by 24% between 2020 and 2035 with energy demand increasing by 42% over the same period. Between 2020 and 2035 emissions are projected to increase by 19.6% under the *With Additional Measures scenario*.
- Under *With Existing Measures* **Transport** emissions are projected to increase by 11.3% between 2020 and 2035, the main driver being a projected increase of 11% in diesel. With respect to *With Additional Measures scenario* emissions are projected to increase by 11.3% between 2020 and 2035. The RES-T share of 8% for 2020 is largely maintained out to 2035.
- Emissions from **Industrial Processes** are projected to grow by 44.5% between 2020 and 2035 to 3.3 Mt CO<sup>2</sup> eq under both scenarios.
- **Fluorinated-Gas** emissions are projected to decrease by 24.4% between 2020 and 2035.

- Emissions from **Agriculture** are projected to reduce by 2.4% between 2020 and 2035 under both scenarios. For 2035 it is estimated that dairy cow numbers will have increased to 1.4 million head (from 1.36 million head in 2020) and that fertiliser nitrogen use will reduce from 401,000 tonnes in 2020 to 395,000 tonnes in 2035. The beef herd is forecasted to contract by 11% between 2020 and 2035 from 5.6 million head to 4.9 million head.
- **Waste** sector emissions are projected to reduce by 26% between 2020 and 2035 with the biggest reduction coming from landfill (a reduction of 49.8% between 2020 and 2035).



**Figure 7. Historic and projected CO<sub>2</sub> emissions from the electricity generation, built environment and transport (EGBET) sectors**

Figure 7 presents the historic and projected emissions for CO<sub>2</sub> only (under the *With Additional Measures* scenario) from the electricity generation, built environment and transport sectors, in addition to the 2050 target pathway based on the long-term vision of low-carbon transition as set out in Ireland’s National Policy Position.<sup>42</sup>

<sup>42</sup> Please note that presentation of electricity generation, built environment and transport sectors in Figure 7 is based on EPA’s interpretation of the categorisation of the sectors that are included in the national policy document and how they are estimated to align with IPCC reporting categories.



## Appendix I

### Underlying Assumptions

The following are key underlying data underpinning this year's greenhouse gas emission projections:

Energy-related emissions projections are based on energy forecasts provided to the EPA by Sustainable Energy Authority of Ireland (SEAI) in March 2017

The energy forecasts are based on a set of macroeconomic assumptions from the Economic and Social Research Institute

Agriculture emissions projections are based on data from Teagasc's FAPRI-Ireland model which were provided to the EPA in December 2015. The FAPRI-Ireland model is a dynamic, partial equilibrium model which is linked both to the FAPRI-EU and world modelling systems.

A key assumption underpinning the agriculture emissions projections is that the Food Wise 2025 targets will be met.

Table 1.1 outlines the key macroeconomic assumptions that underpin the current projections.

**Table 1.1 Key macroeconomic assumptions underlying the projections**

	2016 – 2020	2021-2025	2026-2030	2031-2035
Average Annual % Growth Rate				
GDP	+3.74%	+3.24%	+2.59%	+2.59%
GNP	+3.42%	+3.32%	+1.97%	+1.97%
Personal Consumption	+2.97%	+2.57%	+1.11%	+1.11%
	<b>2016</b>	<b>2020</b>	<b>2025</b>	<b>2030</b>
Housing Stock ('000)	1,967	2,018	2,112	2,206
Population ('000)	4,674	4,834	5,027	5,209
EUETS: Carbon € <sub>2013</sub> /tCO <sup>2</sup>	9	15	22.5	33.5
Carbon tax € <sub>2013</sub> /tCO <sup>2</sup>	18.3	15	22.5	33.5
Coal \$ <sub>2013</sub> /boe	9.8	9.9	11.6	10.6
Oil \$ <sub>2013</sub> /boe	40.5	56.8	62.8	69.4
Gas \$ <sub>2013</sub> /boe	27.0	20.4	24.6	27.3
Peat €/MWh	25	25	25	25

## Appendix II

### Description of emissions scenarios

Two emissions projections scenarios are presented which show two potential outlooks to 2035 depending on policy development and implementation. These are called

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

The *With Existing Measures* scenario is based primarily on SEAI's *Baseline* energy forecast which incorporates the anticipated impact of policies and measures that were in place (and legislatively provided for) by end of 2015.

The *With Additional Measures* scenario is based on SEAI's *NEEAP/NREAP* energy forecast (which includes existing and planned policies and measures) however this year's energy forecast has been risk adjusted to reflect current progress and the trajectory towards achieving 2020 targets. This includes an expected shortfall in achieving full renewable energy targets. In this regard, by 2020, the *With Additional Measures* scenario assumes Ireland will have achieved:

- 37.3% renewable electricity (RES-E) share (full target is 40%)
- 9% renewable heat (RES-H) share (full target is 12%)
- 8% renewable transport (RES-T) share (full target is 10%)

In terms of the overall 16% Renewable Energy Share (RES) target in 2020, it is expected that 13.2% will be achieved by 2020 based on current progress.

In terms of energy efficiency, approximately 81% of the total NEEAP 2020 energy efficiency savings are expected to be achieved in 2020 based on current progress.

The difference between the *With Existing Measures* and *With Additional Measures* scenario shows the impact of additional policies and measures and renewables penetration which are assumed to further progress the implementation of targets set out in the NEEAP and NREAP based on current progress.

Table 2.1. shows the sectors where the additional measures are assumed to be implemented (under the *With Additional Measures* scenario) and the associated savings or CO<sup>2</sup>eq reduction associated with the implementation of those measures (e.g. increased rate of thermal energy from renewable sources across the residential, commercial services)

**Table 2.1. CO<sup>2</sup>eq savings from additional policies and measures by sector**

<b>CO<sup>2</sup>eq, Gg</b>	<b>2020</b>	<b>2030</b>
<b>Energy – (mainly in EU-ETS)</b>	1,531	2,357
<b>Industry</b>	157	169
<b>Services</b>	338	415
<b>Residential</b>	73	271
<b>Transport</b>	206	231
<b>Agriculture</b>	156	156
<b>Total</b>	<b>2,461</b>	<b>3,599</b>

## Appendix III

**Units:** 1 Mt = 1,000 kilotonnes (kt) = 1000 gigagram (Gg)

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

F-gases: These gases comprise HFCs (Hydrofluorocarbons), PFCs (Perfluorocarbons), SF<sub>6</sub> (Sulphur Hexafluoride) and NF<sub>3</sub> (Nitrogen Trifluoride). They are much more potent than the naturally occurring greenhouse gas emissions (carbon dioxide, methane and nitrous oxide).

Ireland's Greenhouse Gas Sectors: include the following sectors for analysis:

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

**Table 3.2. Historical and projected emissions for the non-ETS and ETS sectors (Mt CO<sub>2</sub>eq) for *With Existing Measures* and *With Additional Measures* scenarios**

		Non-ETS sector	ETS sector	Total	
<b>Historical</b>	<b>2005</b>	47.45	22.44	69.98	
	<b>2006</b>	47.50	21.71	69.31	
	<b>2007</b>	47.19	21.25	68.54	
	<b>2008</b>	47.44	20.38	67.88	
	<b>2009</b>	44.97	17.22	62.24	
	<b>2010</b>	44.29	17.36	61.69	
	<b>2011</b>	41.76	15.78	57.56	
	<b>2012</b>	41.23	16.89	58.12	
	<b>2015</b>	43.04	16.83	59.87	
<i>With Existing Measures Scenario</i>					
<b>Projected</b>	<b>2016</b>	44.42	16.48	60.91	
	<b>2020</b>	45.64	15.91	61.56	
	<b>2025</b>	47.74	17.65	65.39	
	<b>2030</b>	47.14	19.35	66.49	
	<b>2035</b>	47.31	21.90	69.21	
	<i>With Additional Measures Scenario</i>				
	<b>2016</b>	44.31	16.40	60.72	
	<b>2020</b>	44.83	14.26	59.09	
	<b>2025</b>	46.78	15.48	62.27	
	<b>2030</b>	46.04	16.84	62.89	
<b>2035</b>	46.04	18.79	64.84		

**Note: Numbers may not sum exactly due to rounding**