COMPLIANCE COMMITTEE **CC/ERT/2019/14**
5 September 2019

Report of the technical review of the seventh national communication of Ireland

Note by the secretariat

The report of the technical review of the seventh national communication of Ireland was published on 13 March 2019. For purposes of rule 10, paragraph 2, of the rules of procedure of the Compliance Committee (annex to decision 4/CMP.2, as amended by decisions 4/CMP.4 and 8/CMP.9), the report is considered received by the secretariat on the same date. This report, FCCC/IDR.7/IRL, contained in the annex to this note, is being forwarded to the Compliance Committee in accordance with section VI, paragraph 3, of the annex to decision 27/CMP.1.

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Framework Convention on Climate Change

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Report on the technical review of the seventh national communication of Ireland

Parties included in Annex I to the Convention were requested by decision 9/CP.16 to submit their seventh national communication to the secretariat by 1 January 2018. According to decision 15/CMP.1, Parties included in Annex I to the Convention that are also Parties to the Kyoto Protocol are required to include in their national communications supplementary information under Article 7, paragraph 2, of the Kyoto Protocol. This report presents the results of the technical review of the seventh national communication and relevant supplementary information under the Kyoto Protocol of Ireland, conducted by an expert review team in accordance with the "Guidelines for the technical review of information reported under the Convention related to greenhouse gas inventories, biennial reports and national communications by Parties included in Annex I to the Convention" and the "Guidelines for review under Article 8 of the Kyoto Protocol".

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Abbreviations and acronyms

AEA	annual emission allocation
AR4	Fourth Assessment Report of the Intergovernmental Panel on Climate Change
BR	biennial report
CH_4	methane
CO_2	carbon dioxide
CO_2 eq	carbon dioxide equivalent
CRF	common reporting format
CTF	common tabular format
DCCAE	Department of Communications, Climate Action and Environment
EPA	Environmental Protection Agency
ERT	expert review team
ESD	effort-sharing decision
ESRI	Economic and Social Research Institute
EU	European Union
EU ETS	European Union Emissions Trading System
FAPRI	Food and Agriculture Policy Research Institute
F-gas	fluorinated gas
GCOS	Global Climate Observing System
GDP	gross domestic product
GHG	greenhouse gas
HFC	hydrofluorocarbon
ICAO	International Civil Aviation Organization
IMO	International Maritime Organization
IPPU	industrial processes and product use
LULUCF	land use, land-use change and forestry
NA	not applicable
NC	national communication
NE	not estimated
NF_3	nitrogen trifluoride
NGO	non-governmental organization
NIR	national inventory report
NO	not occurring
non-Annex I Party	Party not included in Annex I to the Convention
non-ETS sectors	sectors not covered by the European Union Emissions Trading System
N_2O	nitrous oxide
PaMs	policies and measures
PFC	perfluorocarbon
reporting guidelines for supplementary information	"Guidelines for the preparation of the information required under Article 7 of the Kyoto Protocol. Part II: Reporting of supplementary information under Article 7, paragraph 2"
SF_6	sulfur hexafluoride
UNFCCC	United Nations Framework Convention on Climate Change
UNFCCC reporting guidelines on NCs	"Guidelines for the preparation of national communications by Parties included in Annex I to the Convention, Part II: UNFCCC reporting guidelines on national communications"
WAM	'with additional measures'
WEM	'with measures'

WMO	World Meteorological Organization
WOM	'without measures'

I. Introduction and summary

A. Introduction

1. This is a report on the in-country technical review of the NC7 of Ireland. The review was coordinated by the secretariat in accordance with the "Guidelines for the technical review of information reported under the Convention related to greenhouse gas inventories, biennial reports and national communications by Parties included in Annex I to the Convention", particularly "Part V: UNFCCC guidelines for the technical review of national communications from Parties included in Annex I to the Convention" (annex to decision 13/CP.20), and the "Guidelines for review under Article 8 of the Kyoto Protocol" (annex to decision 22/CMP.1 and annex I to decision 4/CMP.11).[1]

2. In accordance with the same decisions, a draft version of this report was transmitted to the Government of Ireland, which provided comments that were considered and incorporated, with revisions, into this final version of the report.

3. The review was conducted from 5 to 10 November 2018 in Dublin by the following team of nominated experts from the UNFCCC roster of experts: Ms. Laura Dawidowski (Argentina), Mr. Takeshi Enoki (Japan), Mr. Newton Paciornik (Brazil), Ms. Detelina Petrova (Bulgaria) and Mr. Jose Manuel Ramírez Garcia (Spain). Ms. Dawidowski and Mr. Enoki were the lead reviewers. The review was coordinated by Ms. Veronica Colerio and Ms. Kirsten Macey (UNFCCC secretariat).

B. Summary

4. The ERT conducted a technical review of the information reported in the NC7 of Ireland in accordance with the UNFCCC reporting guidelines on NCs (decision 4/CP.5) and the reporting guidelines for supplementary information, in particular the supplementary information required under Article 7, paragraph 2, and on the minimization of adverse impacts under Article 3, paragraph 14, of the Kyoto Protocol (annex to decision 15/CMP.1 and annex III to decision 3/CMP.11).

1. Timeliness

5. The NC7 was submitted on 30 March 2018, after the deadline of 1 January 2018 mandated by decision 9/CP.16.

6. Ireland informed the secretariat on 7 December 2017 about its difficulties with making a timely submission. In accordance with decision 13/CP.20 and decision 22/CMP.1 a Party should inform the secretariat thereof by the due date of the submission, in order to facilitate the arrangements of the review process. The ERT noted with great concern the delay in the submission and recommended that Ireland make its next submission on time. As the submission was not made within six weeks after the due date (by 15 February 2018), the delay was brought to the attention of the Conference of the Parties serving as the meeting of the Parties to the Kyoto Protocol and the Compliance Committee and made public.

2. Completeness, transparency of reporting and adherence to the reporting guidelines

7. Issues and gaps identified by the ERT related to the reported information are presented in table 1. The information reported by Ireland in its NC7, including the supplementary information under the Kyoto Protocol, mostly adheres to the UNFCCC reporting guidelines on NCs.

[1] At the time of the publication of this report, Ireland had submitted its instrument of acceptance of the Doha Amendment; however, the Amendment had not yet entered into force. The implementation of the provisions of the Doha Amendment is therefore considered in this report in the context of decision 1/CMP.8, paragraph 6, pending the entry into force of the Amendment.

Table 1
Assessment of completeness and transparency of mandatory information reported by Ireland in its seventh national communication, including supplementary information under the Kyoto Protocol

Section of NC	*Completeness*	*Transparency*	*Reference to description of recommendations*	*Supplementary information under the Kyoto Protocol*	*Completeness*	*Transparency*	*Reference to description of recommendations*
Executive summary	Complete	Transparent	NA	National system	Complete	Transparent	NA
National circumstances	Complete	Transparent	NA	National registry	Complete	Transparent	NA
GHG inventory	Complete	Transparent	NA	Supplementarity relating to the mechanisms pursuant to Articles 6, 12 and 17	Complete	Transparent	NA
PaMs	Complete	Transparent	NA	PaMs in accordance with Article 2	Mostly	Transparent	Issues 4 and 5 in table 7
Projections and the total effect of PaMs	Complete	Mostly transparent	Issue 1 in table 13	Domestic and regional programmes and/or arrangements and procedures	Mostly complete	Transparent	Issue 1 in table 5
Vulnerability assessment, climate change impacts and adaptation measures	Complete	Transparent	NA	Information under Article 10[a]	Complete	Transparent	NA
Financial resources and transfer of technology	Partially complete	Mostly transparent	Issues 1 and 2 in table 15; issues 1, 2, 3 and 4 in table 16	Financial resources	Complete	Transparent	
Research and systematic observation	Complete	Transparent	NA	Minimization of adverse impacts in accordance with Article 3, paragraph 14	Complete	Transparent	NA

Section of NC	*Completeness*	*Transparency*	*Reference to description of recommendations*	*Supplementary information under the Kyoto Protocol*	*Completeness*	*Transparency*	*Reference to description of recommendations*
Education, training and public awareness	Complete	Transparent	NA				

Note: A list of recommendations pertaining to the completeness and transparency issues identified in this table is included in chapter III below. The assessment of completeness and transparency by the ERT in this table is based only on the "shall" reporting requirements.

[a] The assessment refers to information provided by Ireland on the provisions contained in Article 4, paragraphs 3, 5 and 7, of the Convention reported under Article 10 of the Kyoto Protocol, which is relevant only to Parties included in Annex II to the Convention. Assessment of the information provided by Ireland on the other provisions of Article 10 of the Kyoto Protocol is provided under the relevant substantive headings under the Convention, for example research and systematic observation.

3. Summary of reviewed supplementary information under the Kyoto Protocol

8. The supplementary information under Article 7, paragraph 2, of the Kyoto Protocol is incorporated in different sections of the NC7, and the supplementary information under Article 7, paragraph 1, of the Kyoto Protocol is reported in the NIR of the 2018 annual submission. Table 2 provides references to where the information is reported. The technical assessment of the information reported under Article 7, paragraphs 1 and 2, of the Kyoto Protocol is contained in the relevant sections of this report.

Table 2
Overview of supplementary information under the Kyoto Protocol reported by Ireland

Supplementary information	*Reference to the section of NC7*
National registry	Chapter 3.4
National system	Chapter 3.2 and annex A.3
Supplementarity relating to the mechanisms pursuant to Articles 6, 12 and 17	Chapter 5.9
PaMs in accordance with Article 2	Chapter 4
Domestic and regional programmes and/or legislative arrangements and enforcement and administrative procedures	Chapters 4 and 6
Information under Article 10	Chapters 3, 4, 6, 7, 8 and 9
Financial resources	Chapter 7
Minimization of adverse impacts in accordance with Article 3, paragraph 14	Reported in chapter 15 in the NIR of the Party's 2018 annual submission

II. Technical review of the information reported in the seventh national communication, including the supplementary information under the Kyoto Protocol

A. Information on national circumstances and greenhouse gas emissions and removals

1. National circumstances relevant to greenhouse gas emissions and removals

(a) Technical assessment of the reported information

9. The national circumstances of Ireland explain the relationship between its historical and future emission trends and the climate change policy agenda. The changing nature of those circumstances defines the factors that affect the climate policy development and implementation of the Convention. The NC7 contains key data on population, geography and land use, climate, economic developments, energy, the residential sector, transport, the buildings sector, industry and waste.

10. The ERT noted that during the period 1990–2016 Ireland's population and GDP per capita increased by 35.8 and 184.1 per cent respectively, while GHG emissions per GDP unit and GHG emissions per capita decreased by 71.3 and 18.3 per cent, respectively. This indicates that Ireland made significant progress in decoupling GHG emissions from economic growth. Table 3 illustrates the national circumstances of Ireland by providing some indicators relevant to emissions and removals.

Table 3
Indicators relevant to greenhouse gas emissions and removals for Ireland for the period 1990–2016

						Change (%)	
Indicator	*1990*	*2000*	*2010*	*2015*	*2016*	*1990–2016*	*2015–2016*
GDP per capita (thousands 2011 USD using purchasing power parity)	22.12	40.82	45.66	60.94	62.83	184.1	3.1
GHG emissions without LULUCF per capita (t CO_2 eq)	15.79	18.02	13.43	12.71	12.89	–18.3	1.5
GHG emissions without LULUCF per GDP unit (kg CO_2 eq per 2011 USD using purchasing power parity)	0.71	0.44	0.29	0.21	0.21	–71.3	–1.6

Sources: (1) GHG emission data: Ireland's 2018 GHG inventory submission, version 3; (2) population and GDP, World Bank.

Note: The ratios per capita and per GDP unit are calculated relative to GHG emissions without LULUCF; the ratios are calculated using the exact (not rounded) values and may therefore differ from a ratio calculated with the rounded numbers provided in the table.

(b) Assessment of adherence to the reporting guidelines

11. The ERT assessed the information reported in the NC7 of Ireland and recognized that the reporting is complete, transparent and adhering to the UNFCCC reporting guidelines on NCs. There were no issues raised during the review relating to the topics discussed in this chapter of the review report.

2. Information on greenhouse gas inventory arrangements, emissions, removals and trends

(a) Technical assessment of the reported information

12. Total GHG emissions[2] excluding emissions and removals from LULUCF increased by 10.9 per cent between 1990 and 2016, whereas total GHG emissions including net emissions or removals from LULUCF increased by 7.4 per cent over the same period. Table 4 illustrates the emission trends by sector and by gas for Ireland.

Table 4
Greenhouse gas emissions by sector and by gas for Ireland for the period 1990–2016

	GHG emissions (kt CO_2 eq)					Change (%)		Share (%)	
Sector	*1990*	*2000*	*2010*	*2015*	*2016*	*1990–2016*	*2015–2016*	*1990*	*2016*
1. Energy	31 119.71	42 529.18	40 392.09	36 584.15	37 920.08	21.9	3.7	56.1	61.6
A1. Energy industries	11 223.13	16,116.30	13 378.89	11 801.52	12 515.42	11.5	6.0	20.2	20.3
A2. Manufacturing industries and construction	3 961.75	5 642.37	4 476.47	4 484.01	4 554.61	15.0	1.6	7.1	7.4
A3. Transport	5 136.71	10 792.04	11 529.22	11 813.15	12 293.95	139.3	4.1	9.3	20.0

[2] In this report, the term "total GHG emissions" refers to the aggregated national GHG emissions expressed in terms of CO_2 eq excluding LULUCF, unless otherwise specified. Values in this paragraph are calculated based on the 2018 annual submission, version 3.

	GHG emissions (kt CO_2 eq)					*Change (%)*		*Share (%)*	
Sector	*1990*	*2000*	*2010*	*2015*	*2016*	*1990–2016*	*2015–2016*	*1990*	*2016*
A4. and A5. Other	10 586.27	9 849.74	10 948.61	8 442.35	8 514.82	–19.6	0.9	19.1	13.8
B. Fugitive emissions from fuels	211.85	128.73	58.91	43.12	41.28	–80.5	–4.3	0.4	0.1
C. CO_2 transport and storage	NO	NO	NO	NO	NO	NA	NA	NA	NA
2. IPPU	3 309.41	4 743.83	2 476.27	3 149.21	3 417.20	3.3	8.5	6.0	5.6
3. Agriculture	19 514.36	19 792.58	17 865.25	18 743.88	19 250.82	–1.4	2.7	35.2	31.3
4. LULUCF	6 398.52	6 311.43	5 034.37	5 071.37	4 944.87	–22.7	–2.5	NA	NA
5. Waste	1 546.80	1 489.09	498.90	949.25	957.72	–38.1	0.9	2.8	1.6
Gas[a]									
CO_2	32 877.94	45 193.95	41 679.52	38 443.65	39 928.12	21.4	3.9	59.2	64.9
CH_4	14 867.80	14 386.85	12 048.94	13 323.00	13 705.37	–7.8	2.9	26.8	22.3
N_2O	7 709.33	8 018.54	6 492.38	6 517.79	6 645.04	–13.8	2.0	13.9	10.8
HFCs	1.23	456.66	932.01	1 076.11	1 189.68	96 301.4	10.6	0.0	1.9
PFCs	0.12	397.76	46.58	20.50	37.36	31 090.6	82.3	0.0	0.1
SF_6	33.88	51.76	33.09	44.49	39.30	16.0	–11.7	0.1	0.1
NF_3	NO	49.17	NO	0.96	0.96	NA	0.0	NA	0.0
Total GHG emissions without LULUCF	**55 490.29**	**68 554.68**	**61 232.52**	**59 426.50**	**61 545.82**	**10.9**	**3.6**	**100.0**	**100.0**
Total GHG emissions with LULUCF	**61 888.81**	**74 866.12**	**66 266.89**	**64 497.86**	**66 490.69**	**7.4**	**3.1**	**NA**	**NA**

Source: GHG emission data: Ireland's 2018 annual submission, version 3.
[a] Emissions by gas without LULUCF and without indirect CO_2.

13. The increase in total emissions between 1990 and 2016 was driven mainly by an increase of 21.4 per cent in CO_2 emissions. Emissions of CH_4 and N_2O decreased by 7.8 and 13.8 per cent, respectively. CO_2 emissions accounted for 59.2 per cent of the total GHG emissions without LULUCF in 1990 and 64.9 per cent in 2016, while CH_4 emissions accounted for 26.8 per cent in 1990 and 22.3 per cent in 2016 and N_2O emissions accounted for 13.9 per cent in 1990 and 10.8 per cent in 2016. Emissions of F-gases accounted for about 0.1 per cent of total GHG emissions without LULUCF in 1990 and 2.1 per cent in 2016, although the change between 1990 and 2016 is significant (e.g. HFCs increased by 96,301.4 per cent). A major part of the increase in total GHG emissions without LULUCF occurred between 1990 and 2001, when emissions increased by 27.1 per cent from 55,490.29 kt CO_2 eq to peak at 70,555.06 kt CO_2 eq following a period of unprecedented economic growth. Emissions started to decrease from 2002 to 2004 owing to the closure of ammonia and nitric acid production plants and the continued decline in cattle populations and fertilizer use, which peaked again slightly in 2005. The global economic downturn caused a major decrease in emissions in 2009–2011. The increase seen in 2015 continued in 2016 and was due to economic growth.

14. Between 1990 and 2016, GHG emissions from the energy sector increased owing mainly to rising emissions from fuel combustion in the energy sector, with emissions from energy industries accounting for 20.3 per cent (12,515.42 kt CO_2 eq) of total GHG emissions in 2016,

and emissions from transport increasing and accounting for 20 per cent (12,293.95 kt CO_2 eq) of total GHG emissions in 2016. GHG emissions from the energy sector are the largest source of Ireland's emissions, accounting for 61.6 per cent in 2016. Energy use in the residential sector decreased by 19.7 per cent in the period 1990–2016 owing to energy efficiency and behavioural changes combined with a switch from coal and peat to less carbon-intensive fuels (natural gas and oil) and renewables. During this time, the number of households increased from approximately 1.0 million to 1.76 million. Since 2000 Ireland had been importing approximately 90 per cent of its energy needs, at an estimated cost of EUR 4.6 billion in 2015. During 2016, this fell to around EUR 3.4 billion owing mainly to reduced gas imports as a result of the commencement of gas production from the Corrib gas field, with a corresponding reduction in dependency on fuel importation. Indigenous production of energy from renewable sources has also been increasing steadily, to the point where it has grown by a factor of three since 2005, driven mainly by an increase in generating electricity by wind power.

15. The agriculture sector remained the next largest source of emissions in 2016, accounting for 31.3 per cent (19,250.82 kt CO_2 eq) of total GHG emissions, although emissions from agriculture decreased by 1.4 per cent between 1990 and 2016 mainly owing to a 1.0 per cent decrease in CH_4 emissions from enteric fermentation and a 4.3 per cent decrease in N_2O emissions from agricultural soils. The IPPU and waste sectors had relatively small emissions, accounting for 5.6 and 1.6 per cent of total GHG emissions in 2016, respectively.

16. The summary information provided on GHG emission trends for the period 1990–2015 was consistent with the information reported in the 2017 national GHG inventory submission. Summary information, including trend tables for emissions in CO_2 eq (given in the CRF tables), is provided in an annex to the NC7.

17. To reflect the most recently available data, Ireland's 2018 annual inventory submission (version 3) has been used as the basis for discussion in chapter II.A of this review report. The ERT noted that the 2018 inventory information had not been subjected to a technical review at the time of the review week and is different from the 2017 inventory submission used by Ireland for the NC7.

(b) Assessment of adherence to the reporting guidelines

18. The ERT assessed the information reported in the NC7 of Ireland and recognized that the reporting is complete, transparent and adhering to the UNFCCC reporting guidelines on NCs. No issues relating to the topics discussed in this chapter of the review report were raised during the review.

3. National system for the estimation of anthropogenic emissions by sources and removals by sinks

(a) Technical assessment of the reported information

19. Ireland provided in the NC7 a description of how its national system for the estimation of anthropogenic emissions by sources and removals by sinks of all GHGs not controlled by the Montreal Protocol is performing the general and specific functions defined in the annex to decision 19/CMP.1. The description includes all the elements mandated by paragraph 30 of the annex to decision 15/CMP.1. The ERT took note of the review of the national system reflected in the report on the individual review of the 2016 annual submission of Ireland.

(b) Assessment of adherence to the reporting guidelines

20. The ERT assessed the information reported in the NC7 of Ireland and recognized that the reporting is complete and transparent. No issues relating to the topics discussed in this chapter of the review report were raised during the review.

4. National registry

(a) Technical assessment of the reported information

21. In the NC7 Ireland provided information on how its national registry performs the functions in accordance with the annex to decision 13/CMP.1 and the annex to decision 5/CMP.1 and complies with the requirements of the technical standards for data exchange between registry systems. The ERT took note of the review of the changes to the national registry reflected in the NC7, including the name and contact information of the registry administrator; a description of how the registry conforms between other registry systems; an overview of security measures; and publicly listed information.

(b) Assessment of adherence to the reporting guidelines

22. The ERT assessed the information reported in the NC7 of Ireland and recognized that the reporting is complete and transparent. No issues relating to the topics discussed in this chapter of the review report were raised during the review.

B. Information on policies and measures and institutional arrangements

1. Domestic and regional programmes and/or legislative arrangements and procedures related to the Kyoto Protocol

(a) Technical assessment of the reported information

23. For the second commitment period of the Kyoto Protocol, from 2013 to 2020, Ireland committed to contributing to the joint EU effort to reduce GHG emissions by 20 per cent below the base-year level (1990). Ireland provided information on its domestic and regional programmes and/or legislative arrangements and procedures related to the Kyoto Protocol.

24. Ireland's Climate Action and Low Carbon Development Act 2015 provides the statutory basis for the national transition objective: the goal of progressively pursuing a low-carbon, climate-resilient and environmentally sustainable economy by 2050. To enable Ireland to achieve this objective, the Act provides the legislative framework for the development and submission to Government for approval of national mitigation plans and national adaptation frameworks. This includes the institutional and governance framework for the development of these plans on a regular basis, together with independent advisory and accountability arrangements.

25. The overall responsibility for climate change policymaking lies with DCCAE, and a number of national institutions are involved in the implementation of the policy. EPA has overall responsibility for the national GHG inventory in Ireland's national system, which was established in 2007. EPA has also been assigned responsibilities with regard to the reporting of information relating to Ireland's compliance with its Kyoto Protocol commitments. A number of other departments support the implementation of climate change policies and GHG mitigation measures, procedures and mechanisms including the Department of Agriculture, Food and the Marine, the Department of Transport, Tourism and Sport, the Department of Housing, Planning and Local Government, the Department of Business, Enterprise and Innovation, the Department of Finance, the Department of Public Expenditure and Reform, and the Sustainable Energy Authority of Ireland.

26. For the second commitment period of the Kyoto Protocol (2013–2020), as an EU member State Ireland is committed to fulfilling the joint target of the 28 EU member States and Iceland to reduce GHG emissions by 20 per cent below the 1990 level by 2020. Under EU decision 406/2009/EC, EU member States are obligated to meet this target via the EU 2020 climate and energy package. The target set for Ireland is for emissions to be 20 per cent below the 2005 level by 2020.

27. At the domestic level, Ireland's policies have been underlined by the National Policy Position on Climate Action and Low Carbon Development, which provides a high-level policy direction for the adoption and implementation by Government of plans to enable the country to

pursue the transition to a low-carbon, climate-resilient and environmentally sustainable economy by 2050. Furthermore, Ireland's first National Mitigation Plan, under the Climate Action and Low Carbon Development Act 2015, was published in July 2017, and represents an initial step to set the country on the pathway to achieve the level of decarbonization required in order to achieve the national transition objective. The plan contains a series of mitigation measures covering GHG emissions in the electricity generation, built environment, transport, and agriculture and land use sectors.

28. Ireland established a National Dialogue on Climate Action in 2017 with the primary objective of ensuring an inclusive process of engagement and consensus-building across society towards enabling the transformation to a low-carbon and climate-resilient future. The dialogue seeks to create awareness, engagement and motivation to act (at the local, regional and national level) in relation to the challenges presented by climate change and to establish, on a long-term basis, appropriate networks for people to meet periodically to consider evidence-based inputs on the economic, social, behavioural, environmental and public aspects of climate and energy policy.

29. Ireland's National Spatial Strategy, published in 2002 and covering the period to 2020, aimed to improve the balance of social, economic and physical development across Ireland by providing a framework for planning at the national, regional and local level. The National Spatial Strategy was superseded in February 2018 by the launch by the Irish Government of Project Ireland 2040. This overarching policy initiative consists of a national planning framework which sets out a spatial strategy for the country, and a national infrastructure investment programme, the National Development Plan 2018–2027. Project Ireland 2040 includes as a national strategic outcome the transition to a low-carbon and climate-resilient society, in line with Ireland's National Policy Position, and sets out a planned EUR 21.8 billion investment over the 2018–2027 period. This will seek to reduce Ireland's carbon emissions over the period to 2030 and to ensure that Ireland is on a sustainable trajectory towards securing the National Policy Position. Project Ireland 2040 adopts a cross-sectoral approach encompassing taxation measures, expenditure, regulation and behavioural change, targeting emissions from the transport, energy, and agriculture and land use sectors while also recognizing the need to invest in climate resilience, including substantial investment in flood relief schemes to minimize the impact of river and coastal flooding.

30. The ERT noted that the legislative arrangements in place are publicly accessible though the website of DCCAE, which give the public access to all information related to the first National Mitigation Plan and the National Dialogue on Climate Action, including plans and actions implemented at the national and regional level. The ERT took note of the Party's effort in making all the information related to this action publicly accessible, including the public consultation.

31. Ireland has national legislative arrangements in place that seek to ensure that the implementation of activities under Article 3, paragraph 3, forest management under Article 3, paragraph 4, and any elected activities under Article 3, paragraph 4, of the Kyoto Protocol also contribute to the conservation of biodiversity and the sustainable use of natural resources. The national legislative arrangements were outlined in Ireland's NC7. During the review, Ireland explained that it has legislation that provides powers to the Department of Agriculture, Food and the Marine to regulate the establishment of new forests and the management of existing forests, including harvesting and road building, through a consent and licensing system. This provides the legislative framework for implementing policies guided by the principles of sustainable forest management, including the conservation of biodiversity. Additional measures are included in specific support schemes, such as the afforestation grant and premium scheme, to ensure the sustainability of forest design and management practices.

32. In addition, Ireland has already developed non-statutory sectoral plans in line with the non-statutory National Climate Change Adaptation Framework. The primary objective of the plan "Adaptation Planning – Developing Resilience to Climate Change in the Irish Agriculture and Forest Sector" published by the Department of Agriculture, Food and the Marine is to outline a joined-up approach to adaptation planning within the agriculture and forest sector. The objectives of this plan constitute a first step for the sector in terms of adaptation to climate change in Ireland, by building resilience and reducing the vulnerability of the sector.

33. Ireland reported on a number of national legislative arrangements in its NC7; however, it did not provide any information on the enforcement and administrative procedures related to the Kyoto Protocol. The ERT noted that there was limited information on many of the Kyoto Protocol elements in Ireland's NC7 and that there was no clear structure for reporting the Kyoto Protocol information, making it difficult for the ERT to determine if Ireland had met the reporting requirements.

(b) Assessment of adherence to the reporting guidelines

34. The ERT assessed the information reported in the NC7 of Ireland and identified an issue relating to completeness. The finding is described in table 5.

Table 5
Findings on domestic and regional programmes and/or legislative arrangements and procedures related to the Kyoto Protocol from the review of the seventh national communication of Ireland

No.	*Reporting requirement, issue type and assessment*	*Description of the finding with recommendation or encouragement*
1	Reporting requirement specified in paragraph 37	Ireland reported on a number of national legislative arrangements in its NC7; however, it did not provide clear information on its enforcement and administrative procedures related to the Kyoto Protocol.
	Issue type: completeness	During the review, Ireland provided information on the major legislative framework governing the processes by which Ireland complies with its obligations under the Kyoto Protocol and stated that it will address this gap in future reports.
	Assessment: recommendation	The ERT recommends that Ireland provide in its next NC a description of its enforcement and administrative procedures relating to compliance with commitments under the Kyoto Protocol.

Note: Paragraph number listed under reporting requirement refers to the relevant paragraph of the reporting guidelines for supplementary information. The reporting on the requirements not included in this table is considered to be complete and transparent.

2. Policies and measures, including those in accordance with Article 2 of the Kyoto Protocol

(a) Technical assessment of the reported information

35. Ireland provided information on its package of PaMs implemented, adopted and planned, by sector and by gas, in order to fulfil its commitments under the Convention and its Kyoto Protocol. Ireland reported on its policy context and the legal arrangements put in place to implement its commitments, including its Climate Action and Low Carbon Development Act 2015. This Act requires that Ireland prepare national mitigation plans, with the first one published in July 2017, setting out Ireland's approach to reducing its GHG emissions, building on PaMs in place and providing a framework to develop and implement additional measures. However, Ireland did not provide a description of the way it monitors and evaluates the progress of its PaMs or a description of its institutional arrangements.

36. Ireland highlighted in its NC7 that it gave priority to implementing the PaMs that make the most significant contribution to its emission reduction efforts. Ireland provided information on how it believes its PaMs are modifying longer-term trends in anthropogenic GHG emissions and removals in accordance with the objective of the Convention. Ireland reported on how it periodically updates its PaMs to reduce greater levels of emissions.

37. Although the management of the majority of its PaMs takes place at the national level, reflecting the limited role of regional and local government in Ireland, during the review Ireland highlighted that a number of mitigation PaMs have been adopted or implemented at the local or regional level in Ireland. For instance, in 2018 DCCAE announced funding to establish and develop four local authority climate action regional offices. The offices are a key objective of both the National Climate Change Adaptation Framework and the National Mitigation Plan. These offices will provide a coordinated response to climate change, in terms of both mitigation and adaptation.

38. During the review, Ireland highlighted that its National Planning Framework, published in 2018, also envisages a strong role for regional and local government. The framework

coordinates key areas such as housing, jobs, health, transport, environment, energy and communications into an overall coherent strategy. It has statutory backing and provides the overarching strategy from which other, more detailed plans, including city and county development plans and regional strategies, take their lead.

39. The key overarching related cross-sectoral policy in the EU is the 2020 climate and energy package, adopted in 2009, which includes the revised EU ETS and the ESD. The package is supplemented by renewable energy and energy efficiency legislation and legislative proposals on the 2020 targets for CO_2 emissions from cars and vans, the carbon capture and storage directive, and the general programmes for environmental conservation, namely the 7th Environment Action Programme and the clean air policy package.

40. In operation since 2005, the EU ETS is a cap-and-trade system that covers all significant energy-intensive installations (mainly large point emissions sources such as power plants and industrial facilities), which produce 40–45 per cent of the GHG emissions of the EU. It is expected that the EU ETS will guarantee that the 2020 target (a 21 per cent emission reduction below the 2005 level) will be achieved for sectors under the scheme. The third phase of the EU ETS started in 2013 and the system now includes aircraft operations (since 2012) as well as N_2O emissions from chemical industries, PFC emissions from aluminium production and CO_2 emissions from some industrial processes that were not covered in the earlier phases of the EU ETS (since 2013).

41. The ESD became operational in 2013 and covers sectors outside the EU ETS, including transport (excluding domestic and international aviation, and international maritime transport), residential and commercial buildings, agriculture and waste, together accounting for 55–60 per cent of the GHG emissions of the EU. The aim of the ESD is to decrease non-ETS sector GHG emissions in the EU by 10 per cent below the 2005 level by 2020 and it includes binding annual targets for each member State for 2013–2020.

42. Ireland introduced national-level policies to achieve its targets under the ESD and domestic emission reduction targets. The key actions are included in the National Mitigation Plan, published in July 2017, which represents an initial step to set the country on the pathway to achieve the level of decarbonization required in order to achieve the national objective of transitioning to a competitive, low-carbon, climate-resilient and environmentally sustainable economy by 2050. The National Mitigation Plan is published under the Climate Action and Low Carbon Development Act 2015, which provides the statutory basis for this national transition objective. In a broader context, the national policy framework is provided by the National Policy Position on Climate Action and Low Carbon Development, adopted in 2014, which includes a specific long-term vision for an aggregate reduction in CO_2 emissions of at least 80 per cent compared with the 1990 level by 2050 in the electricity generation, built environment and transport sectors; and an approach to carbon neutrality in the agriculture and land use sector, including forestry, which does not compromise capacity for sustainable food production. The mitigation effect of the renewable energy feed-in tariff scheme (REFIT 2), amounting to 7,890 kt CO_2 eq (cumulative GHG emission reductions from 2017 to 2020), is the most significant action included in the National Mitigation Plan. Other policies that have delivered significant emission reductions are the EU regulation on efficiency improvements of carbon emissions and fuel consumption of vehicles and the national biofuels obligation scheme on low carbon fuels.

43. During the review, Ireland highlighted the domestic mitigation actions that are under development, such as the renewable electricity support scheme, the support scheme for renewable heat, smart metering, minimal thermal standards in rental properties, further public transport investment, support and incentives for modal shift, further low-emission vehicle incentivization, and forest cover expansion post 2020. Among the mitigation actions that provide a foundation for significant additional actions, the following action is critical for Ireland to attain its 2020 emission reduction target: the energy efficiency obligation scheme. Table 6 provides a summary of the reported information on the PaMs of Ireland. A full list of PaMs reported by Ireland is included in its NC7.

Table 6
Summary of information on policies and measures reported by Ireland

Sector	*Key PaMs*	*Estimate of mitigation impact by 2020 (kt CO_2 eq)*	*Estimate of mitigation impact by 2030 (kt CO_2 eq)*
Policy framework and cross-sectoral measures	Carbon tax	325.56	325.41
	EU ETS	NE	NE
	ESD	NE	NE
Energy			
Transport	Increasing share of renewables (low-carbon fuels/electric cars) in transport	430.59	484.5
Renewable energy	Directive 2009/28/EC on the promotion of the use of energy from renewable sources	1 535.91	1 440.93
Energy efficiency	2002 Building Regulations: Part L – Conservation of Fuel and Energy in Dwellings	443.05	443.06
IPPU	Mobile air conditioning directive (directive 2006/40/EC)	65.87	206.61
Agriculture	Nitrogen fertilizer use efficiency in agriculture	156.79	156.79
LULUCF	Restoring forest cover and the Afforestation Programme	NE	NE
Waste	Landfill directive (directive 1999/31/EC)	80.53	420.83

Note: The estimates of mitigation impact are estimates of emissions of CO_2 or CO_2 eq avoided in a given year as a result of the implementation of mitigation actions.

44. During the review, Ireland informed the ERT that, according to the latest emission projections from May 2018, Ireland is expected to face a cumulative shortfall of its annual emission reduction targets under the ESD for the period 2018–2020. This reflects the Party's constrained investment capacity over the past decade owing to the global economic crisis, as well as the extremely challenging nature of the target itself. The Party further informed the ERT that DCCAE has established an interdepartmental group to evaluate progress towards the ESD target and propose recommendations for the Government on Ireland's ESD compliance strategy; the group comprises officials from DCCAE as well as the Department of Finance, the Department of Public Expenditure and Reform, EPA and the National Treasury Management Agency. The interdepartmental working group considers key strategic issues to the country, as well as minimizing transaction costs associated with the compliance strategy process. Through the work of this interdepartmental group, a memorandum was issued to the Government to seek approval for Ireland's ESD compliance strategy. This was approved by the Government in November 2018.

(b) Policies and measures in the energy sector

45. **Energy supply**. Under the EU directive on renewable energy (2009/28/EC), Ireland has a legally binding renewable energy target of 16 per cent of total final energy requirements from renewable energy and a 10 per cent target for the transport sector by 2020. Ireland has also been set non-binding targets for electricity consumption from renewable sources (40 per cent) and renewable heat (12 per cent) by 2020, which forms part of the overall 16 per cent renewable energy target. Ireland reports that PaMs to meet the electricity component of the renewable energy target will have saved 1,535.91 kt CO_2 eq by 2020, while the heat component of the target will have saved 488.30 kt CO_2 eq and the transport component 193.82 kt CO_2 eq by 2020.

46. Ireland has reported on a measure to switch to less carbon-intensive fuels, specifically, Ireland has committed to ending the use of coal in electricity generation by 2025. Although the

mitigation impact is not estimated for 2020, Ireland reports an estimated reduction of 587.06 kt CO_2 eq by 2025.

47. **Renewable energy sources**. A number of PaMs to support renewable energy and heat have been adopted by Ireland, such as the new renewable electricity support scheme, the offshore renewable energy development plan and grid connection management (DS3, Enduring Connection Policy). For renewable heat, support schemes are being introduced, such as the installation grants for heat pumps and operational support for biomass boilers and anaerobic digestion. The ERT noted that even with the PaMs in place, Ireland is projected to be short of the target of a 16 per cent share for renewables by 2020 because of the many challenges faced in promoting renewable energy, particularly for heat, such as the dispersed settlement pattern of Ireland, high oil use and some solid fuel use for home heating, and almost no use of district heating in the country. However, energy production from renewable sources has grown by a factor of four since 2005, driven mostly by increased wind generation.

48. **Energy efficiency**. Ireland reports several PaMs regarding energy efficiency in industry and buildings, which overlap with other PaMs described in the respective sections below. Ireland also reports PaMs for energy efficiency in power generation, which includes a PaM promoting and prioritizing energy efficiency in investment decisions for new generation plants, which is projected to reduce emissions by 827.13 kt CO_2 eq by 2020. The ERT noted that many of the PaMs for energy efficiency were educational instruments, such as the PaMs targeting the public sector (e.g. the PaM on public sector retrofit, which provides a range of funded services including advice, mentoring and training to participating public sector bodies, and the "small and medium-sized enterprises programme", which aims to increase energy efficiency in small and medium-sized enterprises through providing advice, mentoring and training).

49. **Residential and commercial sectors**. The Building Regulations in Ireland comprise 12 parts (classified as Parts A to M), one of which sets energy performance requirements for buildings. Specifically, "Part L – Conservation of Fuel and Energy in Dwellings" has set the energy and CO_2 emissions requirements for new and existing buildings since 2002. The regulations have been updated several times, resulting in improvements in air-tightness, advanced fabric, energy efficiency and the share of renewable energy used in buildings. The most recent update will include a nearly zero-energy dwellings standard for all new buildings occupied after 31 December 2020. The ERT noted that according to *A Comparative Analysis of Building Energy Efficiency Policies for New Buildings* published by the Global Buildings Performance Network Report,[3] Ireland's Building Regulations are among the best in terms of building energy efficiency codes.

50. **Transport sector**. In the NC7, Ireland describes a number of successful measures that have been introduced in the transport sector including the following: sustained investment in the public and sustainable transport networks to increase capacity and promote modal shift; implementation of EU regulations limiting tail pipe emissions; redesigning the vehicle registration tax and motor tax regimes to promote low carbon emitting vehicles; incentives to encourage the use of alternative fuels and technologies; and the introduction of a biofuel obligation scheme. Of all transport measures reported in the NC7, encouraging the use of alternative fuels and technologies is projected to reduce the most emissions, amounting to a saving of approximately 430 kt CO_2 eq by 2020. A Low Emission Vehicle Taskforce was established in 2016 which includes all relevant government departments, agencies and national bodies, and it has consulted widely with industry, stakeholders and representative groups to accelerate the shift to low-emission vehicles in two phases: the first phase focusing exclusively on electric vehicles and the second phase covering all other low-emission vehicles.

51. The NC7 does not include information on how Ireland promotes and implements the decisions of ICAO and IMO to limit emissions from aviation and marine bunker fuels. The ERT notes that promoting and implementing the decisions of ICAO and IMO is performed by Ireland as part of its commitment as an EU member State. The EU has integrated air transport activities into the EU ETS since 2012 and has introduced a monitoring, reporting and verification system for CO_2 emissions from shipping.

[3] See http://www.gbpn.org/reports/comparative-analysis-building-energy-efficiency-policies-new-buildings.

52. During the review, Ireland provided information on its activities associated with ICAO and IMO. Ireland highlighted that it has actively participated in limiting and reducing GHG emissions in the aviation and maritime sectors through its work in the negotiations and securing of worldwide agreements at ICAO (Carbon Offsetting and Reduction Scheme for International Aviation) and at IMO (Initial IMO Strategy on reduction of GHG emissions from ships) and has signed up as a member State participant to both agreements. Furthermore, Ireland developed a State Action Plan on Aviation Emissions Reduction for the period 2015–2019 which outlines actions at the national and supra-national level to mitigate impacts of aviation emissions. Ireland is currently updating the State Action Plan to submit to ICAO by the end of 2018.

53. In addition, Ireland is a member of the Shipping High Ambition Coalition, made up of a number of EU member States and other countries promoting ambitious targets for reducing maritime GHG emissions within the IMO Marine Environment Protection Committee. Ireland participates actively in that committee's working group on maritime GHG emissions and has developed a programme of follow-up actions to the Initial IMO Strategy on reduction of GHG emissions from ships.

54. **Industrial sector**. Industrial energy demand accounted for 24 per cent of total primary energy consumption in 2016. Ireland's industry sector energy intensity has decreased by 82 per cent since 1990, with the economic value of industrial output increasing by 707 per cent between 1990 and 2016, while energy consumption increased by just 42 per cent. Fossil fuels remain the dominant energy source and accounted for 56 per cent of energy use in industry in 2016 and grew by 6.9 per cent over the period 1990–2016. The ERT noted that coal and oil consumption in industry have fallen over the period 1990–2016 by 49 per cent and 30 per cent respectively, whereas overall fossil fuel use has grown owing to the 113 per cent increase in natural gas use. This change in fuel mix resulted in lower emissions from fuel use in industry.

55. To reduce emissions in the industrial sector, Ireland provides a number of State-funded subsidies for businesses to improve energy efficiency and decarbonize their activities. The Accelerated Capital Allowance scheme introduced in the Finance Act 2008 provides for a system of accelerated capital allowances for the purchase of energy-efficient capital assets. This scheme enables businesses to write off the entire cost of a specified set of energy-efficient products in the first year of purchase. Additionally, a targeted approach aimed at a network of the largest industrial energy users has identified best practice on energy management and energy cost reduction. The largest industrial energy users in Ireland (almost 200 large energy users), account for 19 per cent of total primary energy requirement and 55 per cent of industrial energy requirement.

(c) Policies and measures in other sectors

56. **Industrial processes**. The IPPU sector in Ireland includes mainly the production of cement and lime, and the use of F-gases. Emissions from cement and lime production are mainly covered by the EU ETS (see para. 40 above). The mobile air conditioning directive (directive 2006/40/EC) lays down the requirements for approval of vehicles regarding emissions from and the safe functioning of air-conditioning systems fitted in vehicles, as well as provision for retrofitting and refilling those systems.

57. **Agriculture**. The EU common agricultural policy supports the Irish agriculture sector through a combination of direct payments to farmers (the green direct payment scheme and cross compliance), financial assistance towards investment in rural development and environmental protection (targeted agricultural modernization schemes and agri-environment options scheme) and market support measures. For example, under the agri-environment options scheme, 20,000 farmers are paid to take actions to reduce the use of fertilizers and to protect and enhance soil carbon levels (e.g. actions such as minimum tillage and use of new technologies for slurry spreading). During the review, Ireland explained that there is ongoing work to reform the common agricultural policy by including more targeted, results and performance-based support and by targeting 40 per cent of its budget to climate change measures.

58. Decoupling livestock numbers from GHG emissions is a big challenge for Ireland. Ireland has in place several research programmes to address this challenge. The Agriculture and Food Development Authority has a programme that aims at improving fertility levels in dairy herds.

Further research programmes include animal diet research on measures to reduce CH_4 emissions per animal, such as increasing the level of oil in the diet.

59. One measure mentioned by the Party for this sector is nitrogen fertilizer use efficiency in agriculture, which is underpinned by strong regulation and a whole territory approach to implementation of the EU nitrates directive (directive 91/676/EEC). Furthermore, the agriculture sector aims to use urea inhibitors in conjunction with nitrogen fertilizers to reduce gaseous losses of nitrogen fertilizers.

60. **LULUCF**. The Forestry Programme 2014–2020 (specifically, the restoring forest cover and afforestation programme) includes a set of measures to encourage private landowners to plant forests in order to achieve a forest cover of 18 per cent over the long term (forest cover in Ireland was 11 per cent in 2017). The programme covers the cost of afforestation as well as an annual forest premium to land owners to compensate for income foregone as a result of converting farm land to forest. New forestry legislation, the Forestry Act 2014 and Forestry Regulations 2017, came into force in 2017; the Forestry Regulations help to ensure that deforestation is very limited.

61. **Waste management**. Ireland's national and regional waste management policies prioritize waste prevention followed, in preferential order, by preparing for reuse, recycling and energy recovery, with disposal to landfill as the least preferred option, in line with the "Waste hierarchy" set out in Article 4 of the EU waste framework directive (directive 2008/98/EC). Another important policy in this sector is the National Waste Prevention Programme, in operation since 2004. Its current cycle (2014–2020) is called "Towards a resource efficient Ireland" and includes a number of prevention activities targeted at different actors, such as the Green Business initiative, the Stop Food Waste programme, the Packaging Waste Prevention programme and LiveGreen. For the purposes of waste management planning, Ireland is now divided into three regions: Southern, Eastern-Midlands and Connacht-Ulster. Waste management plans for the three regions were published in May 2015 for the period 2015–2021 and include three overarching strategic targets: a 1 per cent reduction per year in the quantity of household waste generated per capita; a recycling rate of 50 per cent of managed municipal waste by 2020; and a reduction to 0 per cent for the direct disposal of residual municipal solid waste to landfill.

(d) Minimization of adverse impacts in accordance with Article 2 and Article 3, paragraph 14, of the Kyoto Protocol

62. In the NC7 Ireland did not report information on how it strives to implement PaMs under Article 2 of the Kyoto Protocol in such a way as to minimize adverse effects, including the adverse effects of climate change and effects on international trade and social, environmental and economic impacts on other Parties, especially developing country Parties.

63. During the review, Ireland provided information outlining a wide-ranging impact assessment system that accompanies all new policy initiatives in the EU and which is included in chapter 15 of the Annual Greenhouse Gas Inventory of the European Union.[4] Measures regarding climate change mitigation and affecting adaptation needs are identified as "measures known to have impacts on developing countries". This procedure is referred to in the NC6 and NC7 of the European Union as the process whereby adverse social, environmental and economic impacts on developing country parties are minimized. As an EU member State, Ireland's commitments under the Kyoto Protocol are implemented under decision 2005/166/EC, governing joint fulfilment under Article 4 of the Kyoto Protocol, and decision 280/2004/EC, which covers specific emissions monitoring and reporting requirements. As outlined in Ireland's BR2, the approach adopted by the EU provides a framework in which member States such as Ireland can ensure that such impacts are minimized.

64. The ERT noted that Ireland reported in its 2017 and 2018 annual inventory submissions further information on how it strives to implement its commitments under Article 3, paragraph 14, of the Kyoto Protocol in such a way as to minimize adverse social, environmental and economic impacts on developing country Parties.

[4] See https://www.eea.europa.eu/publications/european-union-greenhouse-gas-inventory-2018.

(e) Assessment of adherence to the reporting guidelines

65. The ERT assessed the information reported in the NC7 of Ireland and identified issues relating to completeness and adherence to the UNFCCC reporting guidelines on NCs. The findings are described in table 7.

Table 7
Findings on policies and measures, including those in accordance with Article 2 of the Kyoto Protocol, from the review of the seventh national communication of Ireland

No.	*Reporting requirement, issue type and assessment*	*Description of the finding with recommendation or encouragement*
1	Reporting requirement[a] specified in paragraph 14 Issue type: transparency Assessment: encouragement	According to the UNFCCC reporting guidelines on NCs, Parties may report on adopted PaMs and those in the planning stage but should clearly distinguish these from implemented PaMs. In its NC7, for some PaMs such as electric vehicle deployment (2011), reduction in natural gas combusted at compressor stations for national gas pipeline transport (2016) and directive 2009/28/EC (2016), Ireland reported the status of implementation as planned but the start year of implementation was reported as before the submission date of the NC. During the review, Ireland explained that it defines planned actions as actions that have yet to be fully implemented in Ireland, implemented actions as actions that have been fully implemented, and adopted actions as those adopted but yet to be implemented. The ERT encourages Ireland to improve the transparency of its reporting by following the definitions for implemented, adopted and planned PaMs provided in footnote 1 of the UNFCCC reporting guidelines on NCs, or describe the different definitions used and the rationale for reporting differently.
2	Reporting requirement[a] specified in paragraph 15 Issue type: completeness Assessment: encouragement	Ireland reported in its NC7 on national mitigation policies underpinned by the Climate Act 2015. However, PaMs planned, adopted and/or implemented by government at the regional and local level were not reported. During the review, Ireland explained that although the management of the majority of its PaMs takes place at the national level reflecting the limited role of regional and local government in Ireland, a number of mitigation PaMs have been adopted or implemented at the local or regional level in Ireland. The ERT encourages Ireland to report in its next NC the PaMs planned, adopted and/or implemented at the State, provincial, regional and local level.
3	Reporting requirement[a] specified in paragraph 21 Issue type: completeness Assessment: encouragement	Ireland did not report in its NC7 a description of the way in which progress with PaMs to mitigate GHG emissions is monitored and evaluated over time. Further, institutional arrangements for monitoring GHG mitigation policy is also not reported in this context. During the review, Ireland informed the ERT that EPA monitors the progress towards meeting Ireland's targets under the ESD by producing GHG inventories and projections on an annual basis that are evaluated under the EU Monitoring Mechanism Regulation. Ireland further informed the ERT that an interdepartmental group was established to evaluate progress towards the ESD target and propose recommendations for the Government on Ireland's ESD compliance strategy, which is to be approved before the end of 2018. The ERT encourages Ireland to provide a description of the way in which progress with PaMs to mitigate GHG emissions is monitored and evaluated over time and to also report on the institutional arrangements for monitoring GHG mitigation policy in this context.
4	Reporting requirement[b] specified in paragraph 36 Issue type: completeness	Ireland did not provide information on how it strives to implement PaMs under Article 2 of the Kyoto Protocol in such a way as to minimize adverse effects, including the adverse effects of climate change, effects on international trade, and social, environmental and economic impacts on other Parties, especially developing

No.	Reporting requirement, issue type and assessment	Description of the finding with recommendation or encouragement
	Assessment: recommendation	country Parties and in particular those identified in Article 4, paragraphs 8 and 9, of the Convention, taking into account Article 3 of the Convention. During the review, Ireland explained that the approach adopted by the EU provides a framework in which Member States like Ireland can ensure a that such impacts are minimized. The ERT recommends that Ireland report on how it strives to implement PaMs under Article 2 of the Kyoto Protocol in such a way as to minimize adverse effects, including the adverse effects of climate change, effects on international trade, and social, environmental and economic impacts on other Parties; or provide the relevant references in its next NC.
5	Reporting requirement[b] specified in paragraph 35 Issue type: completeness Assessment: recommendation	With respect to aviation and marine bunker fuels, Ireland did not report on the steps it has taken to promote and/or implement any decisions by ICAO and IMO in order to limit or reduce emissions of GHGs not controlled by the Montreal Protocol from aviation and marine bunker fuels. During the review, Ireland provided further information on its work in preparing action plans and promoting ambitious targets with both ICAO and IMO. The ERT recommends that in its next NC Ireland report on the steps it has taken to promote and/or implement any decisions by ICAO and IMO in order to limit or reduce emissions of GHGs not controlled by the Montreal Protocol from aviation and marine bunker fuels.

Note: The reporting on the requirements not included in this table is considered to be complete, transparent and adhering to the UNFCCC reporting guidelines on NCs.

[a] Paragraph number listed under reporting requirement refers to the relevant paragraph of the UNFCCC reporting guidelines on NCs.

[b] Paragraph number listed under reporting requirement refers to the relevant paragraph of the reporting guidelines for supplementary information.

C. Projections and the total effect of policies and measures, including information on supplementarity relating to the mechanisms pursuant to Articles 6, 12 and 17 of the Kyoto Protocol

1. Projections overview, methodology and results

(a) Technical assessment of the reported information

66. Ireland reported updated projections for 2020 and 2035 relative to actual inventory data for 2015 under the WEM scenario. The WEM scenario reported by Ireland includes implemented and adopted PaMs until 2015.

67. In addition to the WEM scenario, Ireland reported the WAM scenario. The WEM scenario assumes a business as usual scenario, based on measures already put in place at the end of 2015. It assumes that no additional PaMs beyond these are implemented. The WAM scenario assumes implementation of the WEM scenario along with additional policy measures being brought forward for 2020, particularly in relation to the Irish Government's renewable energy and energy efficiency targets. In respect of 2017, this scenario takes account of an expected shortfall in achieving the energy efficiency targets and renewable energy targets for electricity, transport and heat as set out in Ireland's National Renewable Energy Action Plan and National Energy Efficiency Action Plan. The scenario descriptions provided in the NC7 indicate that the scenarios were prepared according to the UNFCCC reporting guidelines on NCs. Ireland did not report a WOM scenario in its NC7.

68. The projections are presented on a sectoral basis, using the same sectoral categories as those used in the reporting on mitigation actions, and on a gas-by-gas basis for CO_2, CH_4, N_2O, PFCs, HFCs and SF_6 (treating PFCs and HFCs collectively in each case) as well as NF_3 for 1990–2035. The projections are also provided in an aggregated format for each sector as well as for a Party total using global warming potential values from the AR4.

69. Ireland did not report emission projections for indirect GHGs such as carbon monoxide, nitrogen oxides, non-methane volatile organic compounds or sulfur oxides.

70. Emission projections related to fuel sold to ships and aircraft engaged in international transport were reported separately and were not included in the totals. In the NC7 Ireland reported that emissions from international aviation are estimated based on forecast landing and take-off forecast supplied to the inventory agency. Emissions from international maritime transport have been assumed to equal the 2015 level for each projected year.

(b) Methodology, assumptions and changes since the previous submission

71. The methodology used for the preparation of the projections is broadly the same as that used for the preparation of the emission projections for the NC6; however, there have been some recent improvements. Ireland reported supporting information further explaining the methodologies used. The main difference is in the energy sector, where Ireland has changed the model used. The projections for the energy sector have been prepared using an updated macroeconomic model called COSMO (Core Structural Model of the economy), instead of the model HERMES used for the NC6. During the review, Ireland pointed out that the reason for this change, which has produced an update in the projections for the energy sector, is that ESRI has decided to retire the HERMES model. For the projections that underpinned the energy-related emission projections in the NC7 an interim model between the HERMES energy modelling module and COSMO was created. The process included ESRI calibrating the HERMES energy sub-model adapted for the COSMO macroeconomic model outputs based on agreed input assumptions on fuel price and renewable energy capacity. ESRI is now moving to a new model (the Ireland Environment, Energy and Economy model (I3E)) which is being launched later in 2018: further changes to the energy projections are therefore expected in the next NC.

72. The FAPRI-Ireland model was used for preparing agricultural forecast data to underpin the emission projections, which is linked to the FAPRI world modelling system[5] and so takes account of and contributes to the projections for prices obtained and quantities traded on the world markets. The 2015 submission under the EU Monitoring Mechanism Regulation was the first time that Ireland reported projections for the LULUCF sector. The approach taken in estimating GHG emissions and removals from the sector uses the approach used for the national GHG inventory in conjunction with a projected land use and land-use change matrix. The projections of emissions from the waste sector assume that Ireland will meet the relevant targets for the disposal of biodegradable municipal waste under EU directive 1999/31/EC on the landfill of waste.

73. To prepare its projections, Ireland provided information on the key underlying assumptions and values of variables such as GDP, gross national product, personal energy consumption, oil, coal, gas and peat prices, the EU ETS carbon price, carbon tax, housing stock and population growth for the periods 2016–2020, 2021–2025, 2026–2030 and 2031–2035. These variables and assumptions were reported in the NC7.

74. Ireland provided information in its NC7 on the key variables and assumptions used in the preparation of the projection scenarios, except for the waste sector, where there was no information on this. During the review, Ireland provided additional supporting information on the selection of key variables for the waste sector through the document "Ireland's National Greenhouse Gas Emission Projections 2017 – Methodological approach", which includes a detailed description, not solely for the waste sector but for all the sectors, related to the key variables and assumptions used for the preparation of the projections.

75. Ireland did not report the main differences in the assumptions, methods employed and results between projections in the NC7 and those in the NC6 for all the sectors, only for the energy industries and agriculture sectors. During the review, Ireland provided more detailed information through the document "Ireland's National Greenhouse Gas Emission Projections 2017 – Methodological approach". Ireland provided additional information during the review for the transport sector. Ireland provided key assumptions underpinning the energy forecasts for the NC6 and NC7 for the waste sector and the industrial processes sector. Ireland also provided

[5] See https://www.fapri.missouri.edu/.

additional information regarding the main drivers and the differences between the NC6 and the NC7. For example, a review of the waste sector emissions undertaken in 2016 resulted in the methodology for the estimated emission projections for solid waste disposal being simplified and one national model (Excel-based) being used to prepare the associated projections for the NC7. There were also significant changes in projected activity data to reflect the change in waste sector activity (e.g. the reduction in the amount of municipal solid waste going to landfill). For example, in 2008, there were 31 active landfills accepting municipal solid waste compared to 5 active landfills in 2018.

76. Ireland also provided information on its sensitivity analyses. Sensitivity analyses were conducted for a number of important assumptions, such as housing stock, energy prices and economic development indicators. In comparison with the key assumptions used for the emission projections there are a number of differences in the assumptions used for the sensitivity analyses, including higher fuel prices, which will lead to a decrease in emissions in some sectors (transport); lower economic growth, with an annual decrease in GDP of 0.7 per cent in the period 2016–2020; and reduced economic growth in annual average growth in personal consumption. For emissions under the EU ETS, the overall total emission levels are higher in the sensitivity scenario, which is mainly driven by the energy industries sector for the years 2020, 2025 and 2030.

77. As a result of the sensitivity analyses performed by Ireland and presented in the NC7, emission levels in the total non-ETS emissions under the sensitivity scenario are approximately 8 per cent, 12 per cent, 13 per cent and 14 per cent lower in 2020, 2025, 2030 and 2035, respectively, than emissions in the WEM scenario. Reductions in emissions are particularly notable in the manufacturing industries and construction, transport, and commercial/institutional sectors. For the agriculture sector, the sensitivity analysis undertaken assumes a 10 per cent reduction in the national herd (dairy and other cattle) in the WEM scenario, resulting in an emission reduction of approximately 7.5 per cent. For the waste sector, the management of an additional 350,000 t of municipal waste per annum in solid waste disposal sites results in a 7 per cent, 13.6 per cent, 18.9 per cent and 23.4 per cent increase in emissions from the waste sector in 2020, 2025, 2030 and 2035, respectively.

2. Results of projections

78. The projected emission levels under different scenarios and information on the Kyoto Protocol targets and the quantified economy-wide emission reduction target are presented in table 8 and the figure below.

Table 8
Summary of greenhouse gas emission projections for Ireland

	GHG emissions ($kt CO_2$ eq per year)	*Changes in relation to base-year[a] level (%)*	*Changes in relation to 1990 level (%)*
Kyoto Protocol base year[b]	56 425.83	NA	NA
Quantified emission limitation or reduction commitment under the Kyoto Protocol (2013–2020)[c]	42 939.99	NA	NA
Quantified economy-wide emission reduction target under the Convention[d]	NA	NA	NA
Inventory data 1990[e]	56 102.76	NA	NA
Inventory data 2015[e]	59 878.22	6.7	6.7
WOM projections for 2020[f]	NE	NE	NE
WEM projections for 2020[f]	61 561.48	9.7	9.7
WAM projections for 2020[f]	59 096.34	5.3	5.3
WOM projections for 2030[f]	NE	NE	NE
WEM projections for 2030[f]	66 494.97	18.5	18.5

	GHG emissions (kt CO_2 eq per year)	*Changes in relation to base-year[a] level (%)*	*Changes in relation to 1990 level (%)*
WAM projections for 2030[f]	62 892.25	12.1	12.1

Note: The projections are for GHG emissions without LULUCF.

[a] "Base year" in this column refers to the base year used for the target under the Kyoto Protocol, while for the target under the Convention it refers to the base year used for that target.

[b] The Kyoto Protocol base-year level of emissions is provided in the initial review report, contained in document FCCC/IRR/2016/IRL.

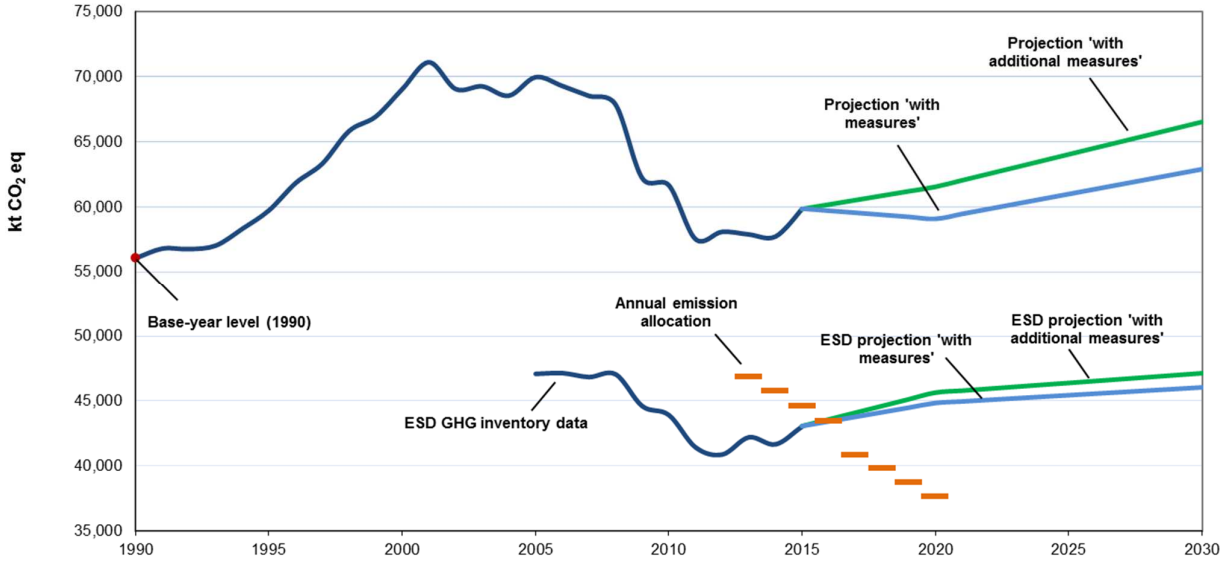
[c] The Kyoto Protocol target for the second commitment period (2013–2020) is a joint target of the EU and its 28 member States and Iceland. The target is to reduce emissions by 20 per cent compared with the base-year (1990) level by 2020. The target for non-ETS sectors is 20 per cent for Ireland under the ESD. The value presented in this line is based on annex II to European Commission decision 2013/162/EU and as adjusted by Commission implementing decision 2013/634/EU that established the assigned amount for the EU member States and divided by eight years to calculate the annual emission level.

[d] The quantified economy-wide emission reduction target under the Convention is a joint target of the EU and its 28 member States. The target is to reduce emissions by 20 per cent compared with the base-year (1990) level by 2020.

[e] From Ireland's BR3 CTF table 6.

[f] From Ireland's NC7.

Greenhouse gas emission projections reported by Ireland



Sources: (1) data for the years 1990–2015: Ireland's 2017 annual inventory submission; total GHG emissions excluding LULUCF; (2) data for the years 2016–2030: Ireland's NC7 and BR3; total GHG emissions excluding LULUCF.

79. Ireland's Kyoto Protocol target for the second commitment period (2013–2020) is a joint target for the EU and its 28 member States and Iceland. The target is to reduce emissions by 20.0 per cent in the period 2013–2020 compared with the Kyoto Protocol base-year level. Under the Convention, Ireland's target is also a joint target for the EU and its 28 member States: a 20.0 per cent reduction by 2020 compared with the 1990 level. The EU targets are split into the EU ETS (which is an EU-wide target, and it is expected that the market mechanism of the EU ETS will guarantee that emissions from sectors under this scheme will achieve the 2020 target) and the ESD for sectors not covered by the EU ETS (see paras. 39 and 40 above). Ireland's ESD target is that emissions in 2020 should be 20 per cent below the 2005 level.

80. Ireland's total GHG emissions excluding LULUCF in 2020 and 2030 are projected to be 61,561.48 and 66,494.97 kt CO_2 eq, respectively, under the WEM scenario, which represents an increase of 9.7 and 18.5 per cent, respectively, above the 1990 level. Under the WAM scenario, emissions in 2020 and 2030 are projected to be higher than those in 1990 by 5.3 and 12.1 per cent and amount to around 59,096.34 and 62,892.25 kt CO_2 eq, respectively. The 2020 projections suggest that Ireland has more work to do to contribute to the achievement of the EU

target under the Convention (see para. 79 above) since Ireland will not meet its part of the target according to the projections provided in the NC7.

81. Ireland's target for non-ETS sectors is to reduce its total emissions by 20 per cent below the 2005 level by 2020. Ireland's AEAs, which correspond to its national emission target for non-ETS sectors, change linearly from 46,891.93 kt CO_2 eq in 2013 to 37,651.32 kt CO_2 eq for 2020. According to the projections under the WEM scenario, emissions from non-ETS sectors are estimated to reach 45,635.55 kt CO_2 eq by 2020. Under the WAM scenario, Ireland's emissions from non-ETS sectors in 2020 are projected to be 44,827.62 kt CO_2 eq. The projected level of emissions under the WEM and WAM scenarios is 21.2 and 19.0 per cent, respectively, above the AEAs for 2020. The ERT noted that this suggests that Ireland may face challenges in meeting its target for the non-ETS sectors under the WEM and WAM scenarios.

82. Ireland presented the WEM and WAM scenarios by sector for 2020 and 2030, as summarized in table 9.

Table 9
Summary of greenhouse gas emission projections for Ireland presented by sector

	GHG emissions and removals (kt CO_2 eq)					*Change (%)*			
		2020		*2030*		*1990–2020*		*1990–2030*	
Sector	*1990*	*WEM*	*WAM*	*WEM*	*WAM*	*WEM*	*WAM*	*WEM*	*WAM*
Energy (not including transport)	25 983	24 249	22 147	27 738	24 523	–6.7	–14.8	6.8	–5.6
Transport	5 135	13 279	13 072	14 933	14 702	158.6	154.5	190.8	186.3
Industry/industrial processes	3 272	3 245	3 245	3 721	3 721	–0.8	–0.8	13.7	13.7
Agriculture	20 145	20 167	20 010	19 603	19 447	0.1	–0.7	–2.7	–3.5
LULUCF	5 797	4 637	4 637	7 550	7 550	–20.0	–20.0	30.2	30.2
Waste	1 567	623	623	500	500	–60.3	–60.3	–68.1	–68.1
Total GHG emissions without LULUCF	**56 103**	**61 561**	**59 096**	**66 495**	**62 892**	**9.7**	**5.3**	**18.5**	**12.1**

Source: Ireland's BR3 CTF table 6.

83. According to the projections reported for 2020 under the WEM scenario, the most significant emission reductions are expected to occur in the energy sector (excluding transport), amounting to projected reductions of 1,734.00 kt CO_2 eq (6.7 per cent) between 1990 and 2020. The second largest reduction is projected to occur in the LULUCF sector, amounting to 1,160.00 kt CO_2 eq (20.0 per cent) between 1990 and 2020. The waste and industrial processes sectors are projected to reduce emissions by 944.00 kt CO_2 eq (60.3 per cent) and 27.00 kt CO_2 eq (0.8 per cent) between 1990 and 2020, respectively, whereas the transport and agriculture sectors are projected to increase emissions by 8,144.00 kt CO_2 eq (158.6 per cent) and 22.00 kt CO_2 eq (0.1 per cent) between 1990 and 2020, respectively.

84. According to the projections reported for 2020 under the WAM scenario, the most significant emission reductions are expected to occur in the energy sector (excluding transport), amounting to projected reductions of 3,836.00 kt CO_2 eq (14.8 per cent) between 1990 and 2020. The second largest reduction is projected to occur in the LULUCF sector, amounting to 1,160.00 kt CO_2 eq (20.0 per cent) between 1990 and 2020. The waste and agriculture sectors are projected to reduce emissions by 944.00 kt CO_2 eq (60.3 per cent) and 135.00 kt CO_2 eq (0.7 per cent) between 1990 and 2020, respectively, and the industrial processes sector has the lowest projected reduction, amounting to 27.00 kt CO_2 eq (0.8 per cent) between 1990 and 2020. However, the transport sector is projected to increase emissions by 7,937.00 kt CO_2 eq (154.5 per cent) between

1990 and 2020; for the LULUCF, industrial processes and waste sectors there are no differences between the WEM and the WAM scenarios.

85. According to the projections reported for 2030 under the WEM scenario, the most significant emission reductions are expected to occur in the waste sector, amounting to projected reductions of 1,067.00 kt CO_2 eq (68.1 per cent) between 1990 and 2030. The second largest reduction is projected to occur in the agriculture sector, amounting to 542.00 kt CO_2 eq (2.7 per cent) between 1990 and 2030. The other sectors are projected to increase emissions. The energy sector is projected to increase emissions by 1,755.00 kt CO_2 eq (6.8 per cent) between 1990 and 2030, the transport sector by 9,798.00 kt CO_2 eq (190.8 per cent) between 1990 and 2030, the LULUCF sector by 1,753.00 kt CO_2 eq (30.2 per cent) between 1990 and 2030, and the industrial processes sector by 449.00 kt CO_2 eq (13.7 per cent) between 1990 and 2030.

86. According to the projections reported for 2030 under the WAM scenario, the most significant emission reductions are expected to occur in the energy sector (excluding transport), amounting to projected reductions of 1,460.00 kt CO_2 eq (5.6 per cent) between 1990 and 2030. The second largest reduction is projected to occur in the waste sector, amounting to 1,067.00 kt CO_2 eq (68.1 per cent) between 1990 and 2030. The agriculture sector has the lowest projected reduction in 2030, amounting to 698.00 kt CO_2 eq (3.5 per cent) between 1990 and 2030. The other sectors are projected to increase emissions: the transport sector by 9,567.00 kt CO_2 eq (186.3 per cent) between 1990 and 2030; the LULUCF sector by 1,753.00 kt CO_2 eq (30.2 per cent) between 1990 and 2030; and the industrial processes sector by 449.00 kt CO_2 eq (13.7 per cent) between 1990 and 2030.

87. Ireland presented the WEM and WAM scenarios by gas for 2020 and 2030, as summarized in table 10.

Table 10
Summary of greenhouse gas emission projections for Ireland presented by gas

	GHG emissions and removals (kt CO_2 eq)					*Change (%)*			
	1990	*2020*		*2030*		*1990–2020*		*1990–2030*	
Gas		*WEM*	*WAM*	*WEM*	*WAM*	*WEM*	*WAM*	*WEM*	*WAM*
CO_2	32 841	39 713	37 380	45 481	42 002	20.9	13.8	38.5	27.9
CH_4	14 803	13 239	13 257	12 617	12 631	–10.6	–10.4	–14.8	–14.7
N_2O	8 423	7 694	7 543	7 675	7 538	–8.7	–10.4	–8.9	–10.5
HFCs	1	839	839	630	630	68 089.4	68 089.4	51 084.6	51 084.6
PFCs	0	25	25	33	33	20 425.0	20 425.0	27 258.3	27 258.3
SF_6	34	51	51	58	58	51.0	51.0	70.4	70.4
NF_3	NO	1	1	2	2	–	–	–	–
Total GHG emissions without LULUCF	**56 103**	**61 561**	**59 096**	**66 495**	**62 892**	**9.7**	**5.3**	**18.5**	**12.1**

Source: Ireland's BR3 CTF table 6.

88. For 2020 under the WEM scenario, the most significant reductions are projected for CH_4 emissions: 1,564.00 kt CO_2 eq (10.6 per cent) between 1990 and 2020. Reductions are also projected for N_2O of 729.00 kt CO_2 eq (8.7 per cent) between 1990 and 2020. Emissions of CO_2 and HFCs are expected to increase by 6,872.00 kt CO_2 eq (20.9 per cent) and by 838.00 kt CO_2 eq (68,089.4 per cent) between 1990 and 2020, respectively.

89. For 2020 under the WAM scenario, the most significant reductions are projected for CH_4 emissions: 1,546.00 kt CO_2 eq (10.4 per cent) between 1990 and 2020. Reductions are also

projected for N_2O of 880.00 kt CO_2 eq (10.4 per cent) between 1990 and 2020. Emissions of CO_2 and HFCs are expected to increase by 4,539.00 kt CO_2 eq (13.8 per cent) and by 838.00 kt CO_2 eq (68,089.4 per cent) between 1990 and 2020, respectively.

90. For 2030 under the WEM scenario, the most significant reductions are projected for CH_4 emissions: 2,186.00 kt CO_2 eq (14.8 per cent) between 1990 and 2030. Reductions are also projected for N_2O of 748.00 kt CO_2 eq (8.9 per cent) between 1990 and 2030. Emissions of CO_2 and HFCs are expected to increase by 12,640.00 kt CO_2 eq (38.5 per cent) and by 629.00 kt CO_2 eq (51,084.6 per cent) between 1990 and 2030, respectively.

91. For 2030 under the WAM scenario, the most significant reductions are projected for CH_4 emissions: 2,172.00 kt CO_2 eq (14.7 per cent) between 1990 and 2030. Reductions are also projected for N_2O of 885.00 kt CO_2 eq (10.5 per cent) between 1990 and 2030. Emissions of CO_2 and HFCs are expected to increase by 9,161.00 kt CO_2 eq (27.9 per cent) and by 629.00 kt CO_2 eq (51,084.6 per cent) between 1990 and 2030, respectively.

92. The ERT noted that in the NC6, under the WEM scenario, Ireland projected increases in total GHG emissions excluding LULUCF of 13.7 and 21.4 per cent above the 1990 level in 2020 and 2030, respectively. As shown in table 10 above, in the NC7 under the WEM scenario, Ireland projected increases in total GHG emissions excluding LULUCF of 9.7 and 18.5 per cent above the 1990 level in 2020 and 2030, respectively. This represents a significant decrease in projected GHG emissions for 2020 and 2030 under the WEM scenario between the NC6 and the NC7.

93. Furthermore, the ERT noted that in the NC6, under the WAM scenario, Ireland projected total GHG emission reductions excluding LULUCF of 5.0 and 1.7 per cent below the 1990 level in 2020 and 2030, respectively. As shown in table 10 above, in the NC7 under the WAM scenario, Ireland projected increases in total GHG emissions excluding LULUCF of 5.3 and 12.1 per cent above the 1990 level in 2020 and 2030, respectively. This shows a similar level of projected GHG emissions for 2020 and 2030 under the WAM scenario between the NC6 and the NC7.

Assessment of adherence to the reporting guidelines

94. The ERT assessed the information reported in the NC7 of Ireland and identified issues relating to completeness and transparency. The findings are described in table 11.

Table 11
Findings on greenhouse gas emission projections reported in the seventh national communication of Ireland

No.	*Reporting requirement, issue type and assessment*	*Description of the finding with recommendation or encouragement*
1	Reporting requirement[a] specified in paragraph 28 Issue type: completeness Assessment: encouragement	Ireland did not report 'without measures' projections in its NC7. During the review, Ireland explained that it has not developed a 'without measures' scenario. The ERT encourages Ireland to improve the completeness of its reporting by reporting the 'without measures' projections in its next NC.
2	Reporting requirement[a] specified in paragraph 38 Issue type: completeness Assessment: encouragement	Ireland did not present diagrams illustrating the WEM projections by sector and by gas in its NC. During the review, Ireland provided the ERT with a diagram illustrating the WEM projections by sector and by gas. The ERT encourages Ireland to improve the completeness of its reporting by presenting diagrams in its next NC illustrating the WEM projections by sector and by gas.
3	Reporting requirement[a] specified in paragraph 35	Ireland did not report projections of the indirect GHGs carbon monoxide, nitrogen oxides and non-methane volatile organic compounds, or sulfur oxides in its NC.

No.	*Reporting requirement, issue type and assessment*	*Description of the finding with recommendation or encouragement*
	Issue type: completeness Assessment: encouragement	During the review, Ireland explained that it has not estimated projections for carbon monoxide, nitrogen oxides, non-methane volatile organic compounds and sulfur oxides for the NC7, but that it will consider including projections for these gases in the next NC based on available information at the time of preparing the next NC. The ERT encourages Ireland to improve the completeness of its reporting by including in its next NC projections for carbon monoxide, nitrogen oxides, non-methane volatile organic compounds and sulfur oxides.
4	Reporting requirement[a] specified in paragraph 44 Issue type: completeness Assessment: encouragement	Although Ireland provided the methodology for its FAPRI model in its NC, it did not provide a reference for more detailed information for the model used for the agriculture projections. During the review, Ireland provided more detailed information regarding the model. This information was provided in a tabular format, containing the model version and its status, a URL to the model description, details of the gases modelled, and the model's original intended field of application, strengths and weaknesses, among other information. The ERT encourages Ireland to improve the completeness of its reporting by providing in its next NC the reference for more detailed information for the FAPRI model.
5	Reporting requirement[a] specified in paragraph 45 Issue type: transparency Assessment: encouragement	Ireland did not report the main differences in the assumptions, methods employed, and results between the projections in the NC7 and those in the NC6 for all the sectors, only for the energy industries and agriculture sectors. During the review, Ireland provided more detailed information. For the transport sector, Ireland provided the key assumptions underpinning the energy forecasts for its NC6 and NC7. For the waste sector and the industrial processes sector, Ireland also provided additional information regarding the main drivers and the differences between its NC6 and NC7. The ERT encourages Ireland to improve the transparency of its reporting by reporting in its next NC on the main differences in the assumptions, methods employed and results between the projections in the current NC and those in earlier NCs for all the sectors.

Note: The reporting on the requirements not included in this table is considered to be complete, transparent and adhering to the UNFCCC reporting guidelines on NCs.

[a] Paragraph number listed under reporting requirement refers to the relevant paragraph of the UNFCCC reporting guidelines on NCs.

3. Assessment of the total effect of policies and measures

(a) Technical assessment of the reported information

95. In the NC7 Ireland presented an estimate of the total effect of its implemented and adopted PaMs, except for the LULUCF sector, in accordance with the WEM scenario. Ireland also presented the total effect of its additional quantified PaMs under the WAM scenario compared with the WEM scenario. Information is presented in terms of GHG emissions avoided or sequestered (on a CO_2 eq basis), in 2020, 2025, 2030 and 2035, by sector where the activities are occurring. Ireland also presented relevant information on factors and activities for each sector for 1990–2035.

96. Ireland reported that the total estimated effect of its adopted, implemented and planned PaMs is 9,799.06 kt CO_2 eq in 2020 and 11,492.07 kt CO_2 eq in 2030. According to the information reported in the NC7, PaMs implemented and planned in the energy sector (excluding transport) will deliver the largest emission reductions in 2020 (8,327.73 kt CO_2 eq), followed by PaMs implemented and planned in the transport sector (1,168.23 kt CO_2 eq). According to the information reported in the NC7, PaMs implemented and planned in the energy sector (excluding transport) will deliver the largest emission reductions in 2030 (9,460.83 kt CO_2 eq), followed by PaMs implemented and planned in the transport sector (1,247.04 kt CO_2 eq).

97. Table 12 provides an overview of the total effect of PaMs as reported by Ireland.

Table 12
Projected effects of Ireland's planned, implemented and adopted policies and measures by 2020 and 2030

	2020		*2030*	
Sector	*Effect of implemented and adopted measures (kt CO_2 eq)*	*Effect of planned measures (kt CO_2 eq)*	*Effect of implemented and adopted measures (kt CO_2 eq)*	*Effect of planned measures (kt CO_2 eq)*
Energy (without transport)	6 226.43	2 101.30	6 246.63	3 214.20
Transport	961.40	206.83	1 015.60	231.44
Industrial processes	65.80	0	206.60	0
Agriculture	0	156.80	0	156.80
Land-use change and forestry	NE	NE	NE	NE
Waste management	80.50	0	420.80	0
Total	**7 334.13**	**2 464.93**	**7 889.63**	**3 602.44**

Source: Ireland's NC7 and BR3.
Note: The total effect of implemented and adopted PaMs is defined as the WEM scenario; the total effect of planned PaMs is defined as the WAM scenario. Ireland did not report a WOM scenario

(b) Assessment of adherence to the reporting guidelines

98. The ERT assessed the information reported in the NC7 of Ireland and identified an issue relating to transparency. The finding is described in table 13.

Table 13
Findings on the assessment of the total effect of policies and measures from the review of the seventh national communication of Ireland

No.	*Reporting requirement, issue type and assessment*	*Description of the finding with recommendation or encouragement*
1	Reporting requirement specified in paragraph 39 Issue type: transparency	Ireland did not report the estimated and expected total effect of implemented and adopted PaMs for the LULUCF sector in its NC7. During the review, Ireland clarified that sufficient information is not currently available for reporting on the total effect of implemented and adopted PaMs for the LULUCF sector.
	Assessment: recommendation	The ERT recommends that Ireland include the information related to the estimated and expected total effect of implemented and adopted PaMs for the LULUCF sector or provide clear explanations why this may not be possible due to Ireland's national circumstances.

Note: Paragraph number listed under reporting requirement refers to the relevant paragraph of the UNFCCC reporting guidelines on NCs. The reporting on the requirements not included in this table is considered to be complete, transparent and adhering to the UNFCCC reporting guidelines on NCs.

4. Supplementarity relating to the mechanisms pursuant to Articles 6, 12 and 17 of the Kyoto Protocol

(a) Technical assessment of the reported information

99. In the NC7, Ireland provided information on how its use of the mechanisms under Articles 6, 12 and 17 of the Kyoto Protocol is supplemental to domestic action. The ERT noted that in CTF table 2(f), Ireland states that it has not required any market-based mechanisms to meet its Kyoto Protocol target at the time of reporting but expects to do so by the end of the second commitment period (2013–2020).

100. During the review, Ireland explained that it is projected to cumulatively exceed its obligations by between 16.3 Mt CO_2 eq and 17 Mt CO_2 eq over the period 2013–2020. Ireland has been in compliance with its annual emission targets for the 2013–2015 (inclusive) period and, owing to the surplus credits it has accumulated for these compliance years, will not need to purchase credits to cover any shortfall for the 2016 or 2017 period. However, it is estimated that 2018 will be the first year for which Ireland will have to use market-based mechanisms in order to comply with its emission target under the ESD.

101. Ireland reported that, in accordance with its obligations under the first commitment period of the Kyoto Protocol, Ireland's Carbon Fund Act 2007 designated the National Treasury Management Agency as the Irish Government's purchasing agent. An assessment of the cross-sectoral measures in place at that time under the National Climate Change Strategy 2007 suggested that Ireland would require the use of flexible mechanisms including the purchase of Kyoto Protocol units in order to comply with its targets. Therefore, Ireland invested in three funds created by the World Bank and the European Bank for Reconstruction and Development to purchase credits. The subsequent economic downturn, however, significantly reduced the requirement for these units. Ireland's compliance strategy therefore undertook the purchase and cancellation of a number of units generated by these funds during the 2008–2012 compliance period and Ireland currently holds approximately 5.3 million units in its national registry. These units may be eligible for compliance under the ESD in future years.

(b) Assessment of adherence to the reporting guidelines

102. The ERT assessed the information reported in the NC7 of Ireland and recognized that the reporting is complete, transparent and adhering to the reporting guidelines for supplementary information. No issues relating to the topics discussed in this chapter of the review report were raised during the review.

D. Provision of financial and technological support to developing country Parties, including information under Articles 10 and 11 of the Kyoto Protocol

1. Financial resources, including under Article 11 of the Kyoto Protocol

(a) Technical assessment of the reported information

103. Ireland reported information on the provision of financial support required under the Convention and its Kyoto Protocol, including on financial support provided, allocation channels and annual contributions.

104. Ireland did not indicate how financial resources have been determined as being "new and additional". During the review, Ireland explained that its approach to budgeting for public funding carries no assumption that funding made available in any given year will be again available in a subsequent year. Consequently, with the exception of a small number of heavily caveated multiannual budgeting arrangements through Irish Aid, all public climate finance provided by Ireland annually is considered to be new and additional. Even in respect of multiannual budgeting arrangements, support is conditional on the availability of funding in subsequent years.

105. Ireland reported the financial support that it has provided to non-Annex I Parties, distinguishing between support for mitigation and adaptation activities and recognizing the capacity-building elements of such support. However, it did not explain how it tracks finance for adaptation and mitigation.

106. Ireland described how its resources assisted non-Annex I Parties to mitigate and adapt to the adverse effects of climate change, facilitate economic and social response measures, and contribute to technology development and transfer and capacity-building related to mitigation and adaptation. For example, Ireland's bilateral aid in 2016 illustrates the continued support for a number of least developed countries in sub-Saharan Africa and South-East Asia where the aid focuses on sustainable food and nutrition security, in particular climate-resilient agriculture; improved natural resource management; disaster risk reduction; improving efficient and

sustainable energy at the household level; and gender equality. In Zambia, Ireland provides support to improve crop productivity and climate-resilient agricultural practices, with a particular focus on women and vulnerable groups in Zambia's Northern Province.

107. However, Ireland did not describe how its resources address the adaptation and mitigation needs identified by non-Annex I Parties. During the review, Ireland informed the ERT that the vast majority of Irish climate support is targeted through bilateral programmes to key partner countries in sub-Saharan Africa and South-East Asia with which Ireland has maintained a long and rich diplomatic and assistance relationship. During the review, Ireland also highlighted that country strategy papers are periodically issued establishing frameworks to determine the focus of Irish Aid assistance, including on climate change, and that these strategies are crafted in close consultation with key government and non-government stakeholders in the countries, and are specifically tailored to meet countries' needs. Ireland added that it remains a strong advocate of the Paris Principles of Aid Effectiveness, with country ownership being a key principle.

108. Ireland reported information on the assistance that it has provided to developing country Parties that are particularly vulnerable to the adverse effects of climate change to help them to meet the costs of adaptation to those adverse effects. Ireland illustrated this by reference to its continuous support for a number of least developed countries in sub-Saharan Africa and South-East Asia. Ireland reported in its NC7 that it contributes to the Adaptation Fund and, during the review, Ireland clarified that its first contribution to the Adaptation Fund (EUR 300,000) occurred in 2017.

109. With regard to the most recent financial contributions aimed at enhancing the implementation of the Convention by developing countries, Ireland reported that its climate finance has been allocated with priority given to decreasing vulnerability and supporting adaptation to the adverse impacts of climate change. The aid is focused largely on the areas of sustainable food production and nutrition security, and particularly on climate-resilient agriculture, improved natural resource management, disaster risk reduction and improving efficient and sustainable energy at the household level. Table 14 includes some of the information reported by Ireland on its provision of financial support.

Table 14
Summary of information on provision of financial support by Ireland in 2013–2016
(Millions of United States dollars)

Allocation channel of public financial support	*Year of disbursement*			
	2013	*2014*	*2015*	*2016*
Official development assistance	845.85	815.78	718.32	802.59
Climate-specific contributions through multilateral channels, including:				
Global Environment Facility	0	0	0	0
Least Developed Countries Fund	0.27	1.20	1.11	1.11
Special Climate Change Fund	NA	NA	NA	NA
Adaptation Fund	NA	NA	NA	NA
Green Climate Fund	NA	NA	NA	2.20
Trust Fund for Supplementary Activities	0.06	0.13	0.22	0.55
Financial institutions, including regional development banks	NA	NA	NA	NA
United Nations bodies	0.47	0.98	0.54	0.55
Other				

Allocation channel of public financial support	*Year of disbursement*			
	2013	*2014*	*2015*	*2016*
Climate-specific contributions through bilateral, regional and other channels	44.55	42.43	38.04	53.87
Other				

Sources: (1) Query Wizard for International Development Statistics, available at http://stats.oecd.org/qwids/; (2) BR3 CTF tables.

(b) Assessment of adherence to the reporting guidelines

110. The ERT assessed the information reported in the NC7 of Ireland and identified issues relating to completeness and adherence to the UNFCCC reporting guidelines on NCs. The findings are described in table 15.

Table 15
Findings on financial resources, including under Article 11 of the Kyoto Protocol, from the review of the seventh national communication of Ireland

No.	*Reporting requirement, issue type and assessment*	*Description of the finding with recommendation or encouragement*
1	Reporting requirement[a] specified in paragraph 51 Issue type: completeness Assessment: recommendation	Ireland did not indicate in its NC7 what "new and additional" resources it has provided and how it has determined such resources as being new and additional. During the review, Ireland explained that all public climate finance provided by Ireland annually is considered to be new and additional. The ERT reiterated the recommendation made in the previous review report that in its next NC submission Ireland indicate what "new and additional" resources it has provided and how it has determined such resources as being new and additional.
2	Reporting requirement[a] specified in paragraph 53 Issue type: transparency Assessment: recommendation	Ireland reported in table 7.2 of the NC7 its contributions to multilateral institutions and programmes for the period 2013 to 2016. The UNFCCC reporting guidelines on NCs require Parties to provide any information on financial resources related to the implementation of the Convention. Ireland included in this table support allocated to both climate-specific financing as well as core/general financing. During the review, Ireland explained that the information in table 7.2 of the NC7 relates to "Multilateral institutions and programmes, including Regional Development Banks" and represents the total contribution made to those agencies in those years and that this is inclusive of any climate-specific element. Ireland does not currently have information on the exact proportions that constitute climate-specific funding in the years in question. The ERT recommends that Ireland include in its next NC submission information on any financial resources as they relate to the implementation of the Convention provided through bilateral, regional and other multilateral channels.

Note: The reporting on the requirements not included in this table is considered to be complete, transparent and adhering to the UNFCCC reporting guidelines on NCs.

[a] Paragraph number listed under reporting requirement refers to the relevant paragraph of the UNFCCC reporting guidelines on NCs.

2. Technology development and transfer, including information under Article 10 of the Kyoto Protocol

(a) Technical assessment of the reported information

111. Ireland provided information on steps, measures and activities related to technology transfer, access and deployment benefiting developing countries, including information on activities undertaken by the public and private sectors.

112. Ireland did not provide information in its NC7 on steps taken to promote, facilitate and finance the transfer of technology to developing countries and to build their capacity in order to facilitate implementation of Article 10 of the Kyoto Protocol. During the review, Ireland

provided further information on its transfer of technology support, outlining that although Ireland has produced numerous innovations in the past and is an advanced economy, it does not have a long history of substantial investment in research and development. Consequently, Ireland often supports developing countries in addressing climate technology issues and implementing climate technology activities via financing mechanisms, rather than by 'hard transfer' of climate technologies from Ireland to developing countries. While Ireland has few stand-alone 'technology transfer' projects per se, funding for climate-related activities often includes technology-related components. Ireland's expertise in the agriculture area in particular has enabled it to support the achievement of better functioning climate-resilient food systems and markets, which are accessible to and benefit poor people.

113. During the review, Ireland provided some success and failure stories related to its support for technology transfer. Ireland highlighted that over the period 2015–2017 it supported Trinity College Dublin with the development of a prototype thermoelectric generator. This generator could generate supplementary energy when attached to a clean cookstove to power a basic lighting system in the home. Working with NGO partners United Purpose, the model was piloted and rolled out in rural communities in Malawi. This project was regarded as an important development to meet the most basic energy needs of the poorest and most climate-vulnerable communities. However, although the social impact of the project was proven, the model developed proved to be too sophisticated for local maintenance to be possible, and the costs of replacement were not affordable for the vast majority of the target group. The technology continues to be developed, and Irish Aid continues to support innovation in cooking technology in Malawi, as part of the Government of Malawi's commitment to the roll-out of two million clean cookstoves by 2020.

114. Ireland also supports the Climate Change, Agriculture and Food Security programme under the Consultative Group on International Agricultural Research. One of the pillar programmes is Climate Change, Agriculture and Food Security. This supports operational research and capacity development in climate-resilient agriculture, using "Climate Smart Villages" as testing grounds for new agricultural techniques and technologies, for other types of testing and as a means of testing climate services that can help build agricultural resilience, and diagnostic/capacity development work at the national level to help governments implement agriculture adaptation plans.

(b) Assessment of adherence to the reporting guidelines

115. The ERT assessed the information reported in the NC7 of Ireland and identified issues relating to completeness, transparency and adherence to the UNFCCC reporting guidelines on NCs. The findings are described in table 16.

Table 16
Findings on technology development and transfer, including information under Article 10 of the Kyoto Protocol, from the review of the seventh national communication of Ireland

No.	*Reporting requirement, issue type and assessment*	*Description of the finding with recommendation or encouragement*
1	Reporting requirement[a] specified in paragraph 54	Ireland reported on projects that have a technology transfer component in its NC7 but it did not clearly distinguish between activities undertaken by the public sector and those undertaken by the private sector.
	Issue type: completeness	During the review, Ireland corrected the information that attributed the implementation of all projects included in CTF table 8 to public entities, differentiating between projects implemented by multilateral agencies and NGOs.
	Assessment: recommendation	The ERT recommends that in its next NC submission Ireland, when reporting details of measures related to the promotion, facilitation and financing of the transfer of, or access to environmentally sound technologies, clearly distinguish between activities undertaken by the public sector and those undertaken by the private sector.
2	Reporting requirement[a] specified in paragraph 55	Ireland did not report success and failure stories of its technology transfer activities in its NC7.

No.	*Reporting requirement, issue type and assessment*	*Description of the finding with recommendation or encouragement*
	Issue type: completeness Assessment: recommendation	During the review, Ireland provided information on some of its support for the transfer of technology that included successes and failures such as on a project to support innovation in cooking technology in Malawi where the model developed proved to be too sophisticated for local maintenance to be possible. The ERT recommends that, where feasible, Ireland, in its next NC submission report activities related to technology transfer, including success and failure stories, using table 6 of the UNFCCC reporting guidelines on NCs.
3	Reporting requirement[a] specified in paragraph 56 Issue type: completeness Assessment: recommendation	Ireland did not report information on steps taken to promote, facilitate and finance transfer of technology, and to support the development and enhancement of endogenous capacities and technologies of developing countries in its NC7. It only provided examples of projects that include a transfer of technology component. During the review, Ireland provided information on steps, measures and activities related to technology transfer. Ireland explained that it has few stand-alone 'technology transfer' projects per se, but funding for climate-related activities often includes technology-related components. The ERT reiterates the recommendation made in the previous review report that Ireland, in its next NC, report on the steps taken by the Government to promote, facilitate and finance the transfer of technology, and to support the development and enhancement of endogenous capacities and technologies of developing countries.
4	Reporting requirement[b] specified in paragraph 40 Issue type: completeness Assessment: recommendation	Ireland did not report on the steps it has taken to promote, facilitate and finance the transfer of technology to developing countries and to build their capacity in its NC7, in accordance with the reporting guidelines for supplementary information. During the review, Ireland provided information on steps, measures and activities related to technology transfer. Ireland explained that it has few stand-alone 'technology transfer' projects per se, but funding for climate-related activities often includes technology-related components. The ERT recommends that Ireland report on the steps it has taken to promote, facilitate and finance the transfer of technology to developing countries and to build their capacity, taking into account Article 4, paragraphs 3, 5, and 7, of the Convention in order to facilitate the implementation of Article 10 of the Kyoto Protocol.

Note: The reporting on the requirements not included in this table is considered to be complete, transparent and adhering to the UNFCCC reporting guidelines on NCs.

[a] Paragraph number listed under reporting requirement refers to the relevant paragraphs of the UNFCCC reporting guidelines on NCs.

[b] Paragraph number listed under reporting requirement refers to the relevant paragraph of the reporting guidelines for supplementary information.

E. Vulnerability assessment, climate change impacts and adaptation measures

1. Technical assessment of the reported information

116. In the NC7 Ireland provided the required information on the expected impacts of climate change in the country; the adaptation policies covering regional, sectoral and cross-sectoral vulnerabilities and considerations; and an outline of the action taken to implement Article 4, paragraph 1(b) and (e), of the Convention with regard to adaptation. Ireland provided a description of climate change vulnerability and impacts on agriculture and forestry, coastal zones, transport and electricity gas networks infrastructures, and highlighted the adaptation response actions taken and planned at different levels of government.

117. Ireland reported progress in identifying key climate impacts, identifying the vulnerabilities for Ireland, providing recommendations on how key sectors and vulnerable areas could increase their resilience to climate change and developing a tool for climate adaptation at the coastal zones.

118. Ireland has developed a coherent adaptation framework. Since the promulgation of the Climate Action and Low Carbon Development Act in 2015, the non-statutory National Climate Change Adaptation Framework (published in 2012), has been replaced by the National Adaptation Framework, which was approved by the Government in December 2017. Under this framework, key sectors and local authorities are required to develop their own adaptation strategies, supported by DCCAE through the development of sectoral and local planning guidelines for climate change adaptation. Among all the sectors defined by Ireland in the National Adaptation Framework there are sectoral plans prepared for flood risk management, agriculture, forestry, transport, electricity and gas networks. Table 17 summarizes the information on vulnerability and adaptation to climate change presented in the NC7 of Ireland.

Table 17
Summary of information on vulnerability and adaptation to climate change reported by Ireland

Vulnerable area	*Examples/comments/adaptation measures reported*
Agriculture and forestry	*Vulnerability:* Extreme precipitation, storms, heat waves, drought, increased temperatures, the extension of the growing season, the reduction of moisture in soils, and wildfires will affect all aspects of the agriculture and forestry sector. *Adaptation:* A risk assessment and risk warning systems have been implemented. The Windblow Taskforce was established to manage extreme events related with storms; longer-term actions focusing on building resilience and reducing vulnerabilities to future events have also been implemented, such as the recent establishment of the River Shannon Co-ordination Group and the ongoing development of a Flood Forecasting Service. Cross-agency action is also in place in relation to a number of factors, such as the continual promotion of farm safety with the Health and Safety weather warnings which are in place. A knowledge transfer scheme has also been implemented in rural areas.
Coastal zones and flooding	*Vulnerability*: It is likely that climate change will have a considerable impact on flood risk in Ireland. Sea level rise is already being observed and is projected to continue to rise in the future, increasing risk to coastal communities and assets, and threatening coastal squeeze of inter-tidal habitats where hard defences exist. It is projected that the number of heavy rainfall days per year may increase, which could lead to an increase in both fluvial and pluvial (urban storm water) flood risk, although there is considerable uncertainty associated with projections of short duration, intense rainfall changes owing to the climate model scale and temporal and spatial downscaling issues. The projected wetter winters, particularly in the west of the country, could give rise to increased groundwater flood risk associated with turloughs (disappearing lakes in limestone areas). *Adaptation*: A Flood Risk Management Climate Change Adaptation Plan has been prepared by the Office of Public Works of Ireland. Specific actions include assessing additional hydrometric monitoring requirements and the existing and potential future standard of protection of embankments and flood relief schemes, and identifying appropriate adaptation options. These actions are supported by the future scenario flood maps produced under the CFRAM Programme.
Infrastructure and economy	*Vulnerability*: Sea level rise and extreme weather events are projected to disrupt most natural and managed systems and regions. In particular, systemic risks due to extreme weather events are expected, leading to an increase in the risk for key infrastructure networks and critical services such as electricity, water supply, transport and health and emergency services. *Adaptation*: Sectoral adaptation plans for transport and electricity gas networks' infrastructures have been developed by the Ministry for Transport, Tourism and Sport and by DCCAE. The measures include effective integration with other sectors in planning and development; introducing new infrastructure to be positioned in areas less likely to be affected by climate change; creating awareness within sectors of the need to adapt; building capacity and confidence within sectors; engaging stakeholders on adaptation; and identifying information sources and knowledge gaps.

119. Ireland provided information on international adaptation activities, undertaken under the Department of Foreign Affairs and Trade through Irish Aid, the main goal of which is to support

adaptation activities in developing countries. Ireland contributes to the Least Developed Countries Expert Group and the Least Developed Countries Fund for the design of national adaptation plans in developing countries in sub-Saharan Africa.

2. Assessment of adherence to the reporting guidelines

120. The ERT assessed the information reported in the NC7 of Ireland and recognized that the reporting is complete, transparent and adhering to the UNFCCC reporting guidelines on NCs. No issues relating to the topics discussed in this chapter of the review report were raised during the review.

F. Research and systematic observation

1. Technical assessment of the reported information

121. Ireland provided information on its general policy and funding relating to research and systematic observation and both domestic and international activities, including contributions to the World Climate Programme and GCOS. The ERT noted that Ireland did not include in the NC7 information on the identification of opportunities for and barriers to free and open international exchange of data and information and on action taken to overcome such barriers. During the review, Ireland provided information about the free availability of the atmospheric observations and model results. The meteorological service, Met Éireann, declared an Open Data Policy in 2016 under which all observation and model data are available for free use and reuse. A web platform has been established to allow for the downloading of observational data, while model data are provided via an "ftp server" or on request. In addition to the usual WMO channels, data are also made available through the Climate Ireland Platform and the European Climate and Assessment Dataset. Climate model projection data are also made available through the Irish Centre for High-End Computing.

122. Ireland has implemented and planned international and domestic policies and programmes on climate change research, systematic observation and climate modelling that aim to advance capabilities to predict and observe the physical, chemical, biological and human components of the Earth's system over space and time. Funding for national and international research activities in Ireland is provided by DCCAE, but also by the Sustainable Energy Authority, the Department of Agriculture, Food and Marine and the Department of Housing, Planning and Local Government. Some Irish institutions participate in research projects under the EU Horizon 2020 Research and Innovation programme and in Joint Programming Initiatives Climate ERA NET for climate services.

123. EPA is mandated by DCCAE to manage and allocate resources under the EPA Research Programme 2014–2020, which has a climate change research strategy focused on: (1) advanced analysis of GHG emissions and removals, enabling improved policy development and decision-making; (2) providing research-based information in support of risk and vulnerability analysis and adaptation actions; (3) achieving the 2020 targets and identifying solutions for achieving societal and economic low-carbon transformation to 2050; (4) identifying the pathways for achieving the highest air quality standards, including emission abatement options, and advance integrated assessment of air pollution short-life climate forcers and other wider environmental issues; and (5) developing a platform for advance observation systems and models.

124. In terms of activities related to systematic observation, Ireland reported on national plans, programmes and support for ground- and space-based climate observing systems, including satellite and non-satellite climate observation. Monitoring activities on systematic observation and GCOS in Ireland are closely integrated in the international programme, including atmospheric, ocean and terrestrial climate observation systems. A National GCOS Committee has been established following publication of the GCOS 2016 Implementation Plan.

125. EPA, Met Éireann and the Irish Centre for High-End Computing are contributing to the scientific development of a global climate model by performing test runs and tuning and improving the accuracy and usefulness of the predictions by running at a higher spatial resolution over Ireland and Europe. During the review, Ireland provided additional information showing the use of these results in some governmental climate change reports, and by national researchers

working in climate impact studies of agriculture, river flooding, groundwater, endangered species, biodiversity, built environment and renewable energies.

126. The NC7 reflects actions taken to support capacity-building and the establishment and maintenance of observation systems and related data and monitoring systems in developing countries. Ireland provided funding for scientists from developing countries working on global climate change research. Ireland has provided EUR 400,000 to WMO to support a food security initiative under the Global Framework for Climate Services initiative. The goal of the project is to strengthen the operational resources of the National Meteorology Agency of Ethiopia to further provide weather information and services to rural farmers and strengthen early warning systems for weather and climate risk management in the agriculture sector. The main purpose is for smallholder farmers to be able to access, interpret and use climate information and related agro-advisory information to improve farm-level planning and decision-making. The first phase of this project has shown an increase in crop yields of up to 34 per cent for some of the farmers who used the climate information provided.

2. Assessment of adherence to the reporting guidelines

127. The ERT assessed the information reported in the NC7 of Ireland and identified an issue relating to completeness and adherence to the UNFCCC reporting guidelines on NCs. The finding is described in table 18.

Table 18
Findings on research and systematic observation from the review of the seventh national communication of Ireland

No.	*Reporting requirement, issue type and assessment*	*Description of the finding with recommendation or encouragement*
1	Reporting requirement specified in paragraph 62 Issue type: completeness Assessment: encouragement	Ireland did not identify in its NC7 the barriers to free and open exchange of data or on action taken to overcome these barriers. During the review, Ireland presented further clarifying information on actions taken by Met Éireann, where all observation and modelling data are available for free use through the 2016 Open Data Policy. The ERT encourages Ireland to identify the opportunities for and barriers to free and open international exchange of data and information and report on action taken to overcome barriers in the next NC submission.

Note: Paragraph number listed under reporting requirement refers to the relevant paragraph of the UNFCCC reporting guidelines on NCs. The reporting on the requirements not included in this table is considered to be complete, transparent and adhering to the UNFCCC reporting guidelines on NCs.

G. Education, training and public awareness

1. Technical assessment of the reported information

128. In the NC7 Ireland provided information on its actions relating to education, training and public awareness at the domestic and international level. Ireland provided information on the general policy on education, training and public awareness; primary, secondary and higher education; public information campaigns; training programmes; education materials; resource or information centres; the involvement of the public and NGOs; and its participation in international activities.

129. The National Strategy on Education for Sustainable Development 2014–2020, published in June 2014, provides the framework to promote education for sustainable development in formal and informal sectors of education by, for example, integrating sustainable development, where appropriate, into all new curricula developed by the National Council for Curriculum and Assessment. The Green Schools Programme, introduced in Ireland in 1997, is an international environmental education programme that promotes school-level action for the environment and aims to instil a strong sense of environmental responsibility in students that spreads beyond the classrooms into the wider community. The programme has a participation rate of more than 93 per cent of the schools in Ireland and is run by the environmental NGO An Taisce in partnership

with local authorities. The programme was also introduced at the tertiary education level, as the Green-campus programme, where students who have participated in the Green Schools Programme reached tertiary education and requested authorities to incorporate environmental education into the study plans. The Sustainable Energy Authority of Ireland also holds educational activities, such as workshops, resources for teachers and students, and competitions such as the One Good Idea competition.

130. The National Dialogue on Climate Action, funded by DCCAE, provides information on how to transition to a low-carbon and climate-resilient society by engaging the public through expert lectures, local gatherings and moderated debates. EPA is one of the main actors for raising public awareness and manages several activities, including a climate change website; a television series (Eco-Eye); climate change research reports; State of the Environment Reports; EPA climate ambassadors who are trained and will improve climate change awareness in their own communities; the Climate Lecture series; the EPA/Irish Farmers Organisation "Smart Farming" programme which provides access to tools and case studies for management options that can be applied at farm scale; and the National Waste Prevention Programme, the major emphasis of which is on prompting behavioural change.

2. Assessment of adherence to the reporting guidelines

131. The ERT assessed the information reported in the NC7 of Ireland and identified an issue relating to completeness and adherence to the UNFCCC reporting guidelines on NCs. The finding is described in table 19.

Table 19
Findings on education, training and public awareness from the review of the seventh national communication of Ireland

No.	*Reporting requirement, issue type and assessment*	*Description of the finding with recommendation or encouragement*
1	Reporting requirement specified in paragraph 65 Issue type: completeness Assessment: encouragement	Ireland did not report in its NC7 the extent of public participation in the preparation or domestic review of the NCs. During the review, Ireland explained that the public did not participate in the preparation or domestic review of the NC7, because public consultation is mainly done for future policy plans and programmes, in which civil society is engaged. Furthermore, Ireland explained that it has fully ratified, in 2012, the Convention on access to information, public participation in decision-making and access to justice in environmental matters of the United Nations Economic Commission for Europe. The ERT encourages Ireland to report in its next NC the extent of public participation in the preparation or domestic review of NCs, for example by providing the information provided during the current review.

Note: Paragraph number listed under reporting requirement refers to the relevant paragraph of the UNFCCC reporting guidelines on NCs. The reporting on the requirements not included in this table is considered to be complete, transparent and adhering to the UNFCCC reporting guidelines on NCs.

III. Conclusions and recommendations

132. The ERT conducted a technical review of the information reported in the NC7 of Ireland in accordance with the UNFCCC reporting guidelines on NCs. The ERT concludes that the reported information mostly adheres to the UNFCCC reporting guidelines on NCs and that the NC7 provides an overview of the national climate policy of Ireland.

133. The information provided in the NC7 includes most of the elements of the supplementary information under Article 7 of the Kyoto Protocol, with the exception of information on domestic and regional programmes and/or legislative arrangements and enforcement and administrative procedures. Supplementary information under Article 7, paragraph 1, of the Kyoto Protocol on the minimization of adverse impacts in accordance with Article 3, paragraph 14, of the Kyoto Protocol was provided by Ireland in its 2018 annual submission.

134. Ireland's total GHG emissions excluding LULUCF covered by its quantified economy-wide emission reduction target were estimated to be 10.9 per cent above its 1990 level, whereas total GHG emissions including LULUCF were 7.4 per cent above its 1990 level in 2016. Emission increases were driven by strong economic and population growth and the continued reliance on fossil fuels for primary energy supply. Those factors outweighed emission reductions owing to the economic downturn, which caused a major decrease in emissions in 2009–2011. The increase seen in 2015 continued in 2016 and was due to economic growth.

135. Ireland's main policy framework relating to energy and climate change is the National Policy Position on Climate Action and Low Carbon Development. This provides a high-level policy direction for the adoption and implementation by Government of plans to enable the State to pursue the transition to a low-carbon, climate-resilient and environmentally sustainable economy. Key legislation supporting Ireland's climate change goals includes the Climate Action and Low Carbon Development Act 2015, which provides the statutory basis for the national transition objective. Under this Act, Ireland prepares national mitigation plans which contain a series of mitigation measures in the electricity, built environment, transport and agriculture sectors. Ireland also has a National Spatial Strategy, which is a planning framework that aims to improve the balance of social, economic and physical developments across Ireland. In addition, Ireland has a bioeconomy policy statement and bioeconomy implementation group with the aim of developing a coherent cross-sectoral approach highlighting the circular and sustainable use of bio-based materials, the goals of which are closely aligned with actions to tackle climate change and ensure sustainable economic development. The mitigation actions with the most significant mitigation impact are the carbon tax, the EU renewable energy directive, the transport policy to increase the share of renewables (low-carbon fuels/electric cars) and the 2002 Building Regulations.

136. The GHG emission projections provided by Ireland include those under the WEM and WAM scenarios. In the two scenarios, emissions are projected to be 9.7 and 5.3 per cent above the 1990 level in 2020, respectively. According to the projections under the WEM scenario, emissions from non-ETS sectors are estimated to reach 45,635.55 kt CO_2 eq by 2020. Under the WAM scenario, Ireland's emissions from non-ETS sectors in 2020 are projected to be 44,827.62 kt CO_2 eq. The projected level of emissions under the WEM and WAM scenarios are 21.2 and 19.0 per cent, respectively, above the AEAs for 2020. On the basis of the reported information, the ERT concludes that Ireland may face challenges in achieving its target for non-ETS sectors.

137. The projections indicate that Ireland may not be on track to meet its Kyoto Protocol target for the second commitment period (ESD contribution equivalent to a 20 per cent decrease compared with the 2005 level by 2020), under the WEM and WAM scenarios.

138. The NC7 contains information on how Ireland's use of the mechanisms under Articles 6, 12 and 17 of the Kyoto Protocol is supplemental to domestic action. Ireland states that it does not require any market-based mechanisms to meet its Kyoto Protocol target at the time of reporting but expects to do so by the end of the 2013–2020 commitment period.

139. Ireland continued to provide climate financing to developing countries in line with its climate finance programmes such as the Least Developed Countries Fund and the Trust Fund for Supplementary Activities. It has made a commitment to maintain public climate finance support of EUR 175 million from 2016 to 2020. It has increased its contributions by 28.5 per cent since the NC6, and its public financial support in 2015 and 2016 totalled USD 39,915.09 and 58,282.04 million per year, respectively. For those years, Ireland's support provided for adaptation action was higher than its support provided for mitigation. The biggest share of financial support went to projects in the agriculture sector. While Ireland does not have a long history of substantial investment in research and development through climate finance, it supports developing countries in addressing climate technology issues and implementing climate technology activities. Ireland's expertise in the agriculture area has enabled it to support the achievement of better functioning climate-resilient food systems and markets, which are accessible to and benefit poor people.

140. Ireland replaced its 2012 National Climate Change Adaptation Framework with a National Adaptation Framework, approved in 2018. This framework requires key sectors and local authorities to develop their own adaptation strategies before the end of September 2019.

Sectoral adaptation plans have been prepared previously under the non-statutory 2012 National Climate Change Adaptation Framework for flood risk management, agriculture, forestry, transport, and electric and gas networks. These will be updated in line with the requirements of the new National Adaptation Framework and the Climate Act and Low Carbon Development Act 2015. Ireland also provided information on its international adaptation activities undertaken through Irish Aid by the Department of Foreign Affairs and Trade.

141. Ireland provided information on its general policy and funding relating to research and systematic observation and both domestic and international activities, including contributions to the World Climate Programme and the GCOS. Ireland also provided information about the free availability of the atmospheric observations and model results. Ireland has implemented and planned international and domestic policies and programmes on climate change research, systematic observation and climate modelling that aim to advance capabilities to predict and observe the physical, chemical, biological and human components of the Earth's system over space and time.

142. Ireland provided information on its actions relating to education, training and public awareness at the domestic and international level. Ireland has a National Strategy on Education for Sustainable Development 2014–2020, which provides the framework to promote education for sustainable development in formal and informal sectors of education. The successful Green Schools Programme, introduced in Ireland in 1997, is an international environmental education programme that promotes school-level action for the environment and aims to instil a strong sense of environmental responsibility in students that spreads beyond the classrooms into the wider community. Ireland also has a national dialogue on climate action, which provides information on how to transition to a low-carbon and climate-resilient society, by engaging the public through expert lectures, local gatherings and moderated debates.

143. In the course of the review, the ERT formulated the following recommendations for Ireland to improve its adherence to the UNFCCC reporting guidelines on NCs and its reporting of supplementary information under the Kyoto Protocol:[6]

(a) To improve the completeness of its reporting by:

(i) Providing a description of its enforcement and administrative procedures relating to compliance with commitments under the Kyoto Protocol (see issue 1 in table 5);

(ii) Reporting on how it strives to implement PaMs under Article 2 of the Kyoto Protocol in such a way as to minimize adverse effects, including the adverse effects of climate change, effects on international trade, and social, environmental and economic impacts on other Parties (see issue 4 in table 7);

(iii) Reporting on the steps it has taken to promote and/or implement any decisions by ICAO and IMO (see issue 5 in table 7);

(iv) Indicating what "new and additional" resources it has provided and how it has determined such resources as being new and additional (see issue 1 in table 15);

(v) Reporting in its next NC on the steps taken by the Government to promote, facilitate and finance the transfer of technology, and to support the development and enhancement of endogenous capacities and technologies of developing countries (see issue 3 in table 16);

(vi) Distinguishing between activities undertaken by the public sector and those undertaken by the private sector when reporting on projects with a technology transfer component (see issue 1 in table 16);

(vii) Providing information on success and failure stories from technology transfer activities (see issue 2 in table 16);

(viii) Reporting on steps it has taken to promote, facilitate and finance the transfer of technology to developing countries and to build their capacity (see issue 4 in table 16);

(b) To improve the transparency of its reporting by:

[6] The recommendations are given in full in the relevant sections of this report.

(i) Including the information related to the estimated and expected total effect of implemented and adopted PaMs for the LULUCF sector (see issue 1 in table 13);

(ii) Including information on any financial resources as they relate to the implementation of the Convention provided through bilateral, regional and other multilateral channels (see issue 2 in table 15);

(c) To improve the timeliness of its reporting by submitting its next NC on time (see para. 6 above).

IV. Questions of implementation

144. During the review the ERT assessed the NC7, including the supplementary information provided under Article 7, paragraph 2, of the Kyoto Protocol, and the information on the minimization of adverse impacts in accordance with Article 3, paragraph 14, of the Kyoto Protocol with regard to timeliness, completeness and transparency. No question of implementation was raised by the ERT during the review.

Annex

Documents and information used during the review

A. Reference documents

2017 GHG inventory submission of Ireland. Available at https://unfccc.int/process/transparency-and-reporting/reporting-and-review-under-the-convention/greenhouse-gas-inventories-annex-i-parties/submissions/national-inventory-submissions-2017.

2018 GHG inventory submission of Ireland. Available at https://unfccc.int/process-and-meetings/transparency-and-reporting/reporting-and-review-under-the-convention/greenhouse-gas-inventories-annex-i-parties/national-inventory-submissions-2018.

BR3 of Ireland. Available at https://unfccc.int/sites/default/files/resource/63014825_Ireland-NC7-BR3-1-Seventh%20National%20Communication%20Ireland.pdf.

BR3 CTF tables of Ireland. Available at https://unfccc.int/sites/default/files/resource/64908125_Ireland-BR3-2-irl_2018_v4.0.xlsx.

"Guidelines for the preparation of national communications by Parties included in Annex I to the Convention, Part I: UNFCCC reporting guidelines on annual greenhouse gas inventories". Annex to decision 24/CP.19. Available at http://unfccc.int/resource/docs/2013/cop19/eng/10a03.pdf.

"Guidelines for the preparation of national communications by Parties included in Annex I to the Convention, Part II: UNFCCC reporting guidelines on national communications". FCCC/CP/1999/7. Available at http://unfccc.int/resource/docs/cop5/07.pdf.

"Guidelines for the preparation of the information required under Article 7 of the Kyoto Protocol". Annex to decision 15/CMP.1. Available at http://unfccc.int/resource/docs/2005/cmp1/eng/08a02.pdf.

"Guidelines for the preparation of the information required under Article 7 of the Kyoto Protocol". Annex III to decision 3/CMP.11. Available at http://unfccc.int/resource/docs/2015/cmp11/eng/08a01.pdf.

"Guidelines for review under Article 8 of the Kyoto Protocol". Annex to decision 22/CMP.1. Available at http://unfccc.int/resource/docs/2005/cmp1/eng/08a03.pdf.

"Guidelines for the technical review of information reported under the Convention related to greenhouse gas inventories, biennial reports and national communications by Parties included in Annex I to the Convention". Annex to decision 13/CP.20. Available at http://unfccc.int/resource/docs/2014/cop20/eng/10a03.pdf.

NC7 of Ireland. Available at https://cop23.unfccc.int/sites/default/files/resource/63014825_Ireland-NC7-BR3-1-Seventh%20National%20Communication%20Ireland.pdf.

Report on the individual review of the annual submission of Ireland submitted in 2016. FCCC/ARR/2016/IRL. Available at https://unfccc.int/sites/default/files/resource/docs/2017/arr/irl.pdf.

Report on the review of the report to facilitate the calculation of the assigned amount for the second commitment period of the Kyoto Protocol of Ireland. FCCC/IRR/2016/IRL. Available at https://unfccc.int/sites/default/files/resource/docs/2017/irr/irl.pdf.

Report of the technical review of the second biennial report of Ireland. FCCC/TRR.2/IRL. Available at https://unfccc.int/sites/default/files/resource/docs/2016/trr/irl.pdf.

Report on the technical review of the sixth national communication of Ireland. FCCC/IDR.6/IRL. Available at https://unfccc.int/sites/default/files/resource/docs/2014/idr/irl06.pdf.

Revisions to the guidelines for review under Article 8 of the Kyoto Protocol. Annex I to decision 4/CMP.11. Available at http://unfccc.int/resource/docs/2015/cmp11/eng/08a01.pdf.

"UNFCCC biennial reporting guidelines for developed country Parties". FCCC/SBSTA/2014/INF.6. Annex I to decision 2/CP.17. Available at http://unfccc.int/resource/docs/2011/cop17/eng/09a01.pdf.

Compilation of economy-wide emission reduction targets to be implemented by Parties included in Annex I to the Convention. Available at: https://unfccc.int/topics/mitigation/workstreams/pre-2020-ambition/compilation-of-economy-wide-emission-reduction-targets-to-be-implemented-by-parties-included-in-annex-i-to-the-convention.

B. Additional information provided by Ireland

Responses to questions during the review were received from Mr. Colin O'Hehir (DCCAE), including additional material. The following documents[1] were provided by Ireland:

Ireland. 2017. National Mitigation Plan. Available at: https://www.dccae.gov.ie/documents/National%20Mitigation%20Plan%202017.pdf.

FAPRI-Ireland Partial Equilibrium Commodity Model: https://www.teagasc.ie/media/website/publications/2008/5525.pdf Ireland. 2013. Ireland's National Greenhouse Gas Emission Projections 2013 – Methodological approach. Available at: https://cdr.eionet.europa.eu/ie/eu/ghgmm/envuvhu5a/GHG_Projections_Methodology_for_MM_2013_IE.pdf.

Ireland's National Greenhouse Gas Emission Projections 2017 – Methodological approach. Available at: https://cdr.eionet.europa.eu/ie/eu/mmr/art04-13-14_lcds_pams_projections/projections/envwotdlg/IE_GHG_Projections_Technical_and_Methodological_Approach_April_2017.pdf/manage_document.

https://www.seai.ie/resources/publications/Energy-in-Ireland-1990-2016-Full-report.pdf.

Department of Agriculture, Food and the Marine. 2017. National Climate Change Adaptation Framework (DECLG, 2012) Adaptation Planning – Developing Resilience to Climate Change in the Irish Agriculture and Forest Sector (). https://www.agriculture.gov.ie/media/migration/ruralenvironment/climatechange/ApprovedAdaptationPlanning040817.pdf

Sustainable Energy Authority of Ireland (modelling process used for the energy projections). Available at: https://www.seai.ie/resources/publications/Irelands_Energy_Projections.pdf.

UNFCCC Reporting and Climate Finance Mapping 2016–2017, DFAT Contract: CIRL 1189, October 2017.

[1] Reproduced as received from the Party.