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Report on the technical review of the third biennial report of Ireland

Developed country Parties were requested by decision 2/CP.17 to submit their third biennial report to the secretariat by 1 January 2018. This report presents the results of the technical review of the third biennial report 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".

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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
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
GDP	gross domestic product
GHG	greenhouse gas
HFC	hydrofluorocarbon
IPPU	industrial processes and product use
LEG	Least Developed Countries Expert Group
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
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
OECD	Organisation for Economic Co-operation and Development
OECD DAC	OECD Development Assistance Committee
PaMs	policies and measures
PFC	perfluorocarbon
SF_6	sulfur hexafluoride
UNFCCC	United Nations Framework Convention on Climate Change
UNFCCC reporting guidelines on BRs	"UNFCCC biennial reporting guidelines for developed country Parties"
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'
WOM	'without measures'

I. Introduction and summary

A. Introduction

1. This is a report on the in-country technical review of the BR3[1] of Ireland. The review was organized 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 IV: UNFCCC guidelines for the technical review of biennial reports from Parties included in Annex I to the Convention" (annex to decision 13/CP.20).

2. In accordance with the same decision, 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 BR3 of Ireland in accordance with the UNFCCC reporting guidelines on BRs (annex I to decision 2/CP.17).

1. Timeliness

5. The BR3 was submitted on 30 March 2018, after the deadline of 1 January 2018 mandated by decision 2/CP.17. As Ireland submitted its BR3 as an annex to the NC7, the references included in this report will therefore refer to the NC7. The CTF tables were submitted on 30 March 2018. Ireland resubmitted the CTF tables on 21 November 2018 in response to the findings made by the ERT during the review.

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 BR3 mostly adheres to the UNFCCC reporting guidelines on BRs.

[1] The BR submission comprises the text of the report and the CTF tables, which are both subject to the technical review.

Table 1
Summary of completeness and transparency of mandatory information reported by Ireland in its third biennial report

Section of BR	*Completeness*	*Transparency*	*Reference to description of recommendations*
GHG emissions and trends	Mostly complete	Transparent	Issue 1 in table 3
Assumptions, conditions and methodologies related to the attainment of the quantified economy-wide emission reduction target	Complete	Transparent	NA
Progress in achievement of targets	Mostly complete	Mostly transparent	Issues 1 and 2 in table 5
Provision of support to developing country Parties	Partially complete	Transparent	Issues 1, 2 and 3 in table 11; issue 2 in table 14; issue 1 in table 15 and issue 1 in table 16

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.

II. Technical review of the information reported in the third biennial report

A. Information on greenhouse gas emissions and removals related to the quantified economy-wide emission reduction target

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

(a) Technical assessment of the reported information

8. 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 2 illustrates the emission trends by sector and by gas for Ireland.

Table 2
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

[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*
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
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.

9. 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. 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.

10. 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 BR3.

11. In brief, Ireland's national inventory arrangements were established in accordance with the Environmental Protection Agency Act 1992, which requires that all data and materials are made available to comply with Ireland's reporting obligations and commitments. The EPA Office of Environmental Sustainability is the designated inventory agency and EPA is also designated as the single national entity with overall responsibility for the annual GHG inventory. Ireland outlined its national inventory arrangements; however, it did not provide information on changes in the national inventory arrangements since its BR2.

(b) Assessment of adherence to the reporting guidelines

12. The ERT assessed the information reported in the BR3 of Ireland and identified an issue relating to completeness and adherence to the UNFCCC reporting guidelines on BRs. The finding is described in table 3.

Table 3
Findings on greenhouse gas emissions and trends from the review of the third biennial report of Ireland

No.	*Reporting requirement, issue type and assessment*	*Description of the finding with recommendation or encouragement*
1	Reporting requirement specified in paragraph 3 Issue type: completeness Assessment: recommendation	Ireland provided in its BR3 summary information on national inventory Arrangements; however, it did not report on changes in the national institutional arrangements since its last BR. During the review, Ireland explained that there are no changes other than the Office of Climate, Licensing, Research and Resource Use of EPA, which has overall responsibility for the national GHG inventory in Ireland's national system, was renamed the Office of Environmental Sustainability on 1 January 2016. The ERT recommends that, in its next BR, Ireland report on any changes in the national institutional arrangements since its last BR or report that there are no changes.

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

B. Assumptions, conditions and methodologies related to the quantified economy-wide emission reduction target and related assumptions, conditions and methodologies

1. Technical assessment of the reported information

13. For Ireland the Convention entered into force on 21 March 1994. Under the Convention Ireland committed to contributing to the achievement of the joint EU economy-wide emission reduction target of 20 per cent below the 1990 level by 2020. The EU offered to move to a 30 per cent reduction target on the condition that other developed countries commit to a comparable target and developing countries contribute according to their responsibilities and respective capabilities under a new global climate change agreement.

14. The target for the EU and its member States is formalized in the EU 2020 climate and energy package. The legislative package regulates emissions of CO_2, CH_4, N_2O, HFCs, PFCs and SF_6 using global warming potential values from the AR4 to aggregate the GHG emissions of the EU until 2020. Emissions and removals from the LULUCF sector are not included in the quantified economy-wide emission reduction target under the Convention. The EU generally allows its member States to use units from the Kyoto Protocol mechanisms as well as new market mechanisms for compliance purposes, subject to a number of restrictions in terms of origin and type of project and up to an established limit. Companies can make use of such units to fulfil their requirements under the EU ETS.

15. The EU 2020 climate and energy package includes the EU ETS and the ESD (see chapter II.C.1 below). The EU ETS covers mainly point emissions sources in the energy, industry and aviation sectors. An EU-wide emissions cap has been put in place for the period 2013–2020 with the goal of reducing emissions by 21 per cent below the 2005 level by 2020. Emissions from non-ETS sectors are regulated through member State specific targets that add up to a reduction at the EU level of 10 per cent below the 2005 level by 2020.

16. Under the ESD, Ireland has a target of reducing its total emissions to 20 per cent below the 2005 level by 2020 for non-ETS sectors. National emission targets for non-ETS sectors for 2020 have been translated into binding quantified AEAs for the period 2013–2020. Ireland's AEAs change following a linear path from 46,891.93 kt CO_2 eq in 2013 to 37,651.32 kt CO_2 eq for 2020.[3]

17. The ERT noted that Ireland's target of 20 per cent below the 2005 level by 2020 for non-ETS sectors is jointly (with Denmark and Luxembourg) the most demanding 2020 reduction target allocated to EU member States under the ESD and can be compared to an EU average reduction of 10 per cent. During the review, Ireland informed the ERT that the non-ETS target for Ireland for 2030 could be 30 per cent, based on the proposal by the European Commission on the non-ETS targets for individual member States, and this would require a substantial increase in Ireland's PaMs.

18. In Ireland's first CTF submission, it initially included NF_3 and reported the base year for F-gases as 1995 in describing its target in CTF table 2(b). During the review, Ireland explained that NF_3 is not included in the target and that this was not correctly reflected in the CTF table. It also confirmed that the base year for F-gases is 1990, consistent with the EU target under the Convention. Ireland resubmitted the CTF tables with the necessary corrections.

2. Assessment of adherence to the reporting guidelines

19. The ERT assessed the information reported in the BR3 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.

C. Progress made towards the achievement of the quantified economy-wide emission reduction target

1. Mitigation actions and their effects

(a) Technical assessment of the reported information

20. 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.

21. Ireland provided information on a set of PaMs similar to those previously reported, with a few exceptions. There were a number of actions included in the BR2 but not included in the BR3 and no explanation was provided as to why they had been removed from the report. During the review, Ireland explained that the information reported in BR3 CTF table 3 reflected a more realistic outlook in terms of progress and the trajectory towards achieving the 2020 renewable energy and energy efficiency targets, on the basis of an assessment made at the time of preparing the related emission projections and PaMs reporting. This assessment

[3] European Commission decision 2017/1471 of 10 August 2017 amending decision 2013/162/EU of 26 March 2013 to revise member States' AEAs for the period from 2017 to 2020.

determined an expected shortfall in the implementation of planned measures based on the progress and the remaining time frame to 2020; therefore, some of the planned measures were not reported in BR3 CTF table 3. A further measure was not included because it was not being funded.

22. Ireland did not report on its self-assessment of compliance with its emission reduction target and national rules for taking action against non-compliance. During the review, Ireland explained that according to the latest projections of GHG emissions, published by EPA on 31 May 2018, emissions from those sectors of the economy covered by Ireland's 2020 ESD target could be between 0 per cent and 1 per cent below the 2005 level by 2020, in the context that Ireland's ESD target is that emissions in 2020 should be 20 per cent below the 2005 level. According to the new projections, Ireland 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 did not intend to use units from market-based mechanisms under the Convention towards its national target for that period. Ireland further informed the ERT that owing to the surplus credits it has accumulated for these compliance years, it will not need to purchase credits to cover any shortfall for the 2016 or 2017 period. However, it is estimated that 2019 will be the first compliance year for which Ireland will have to use market-based mechanisms in order to comply with its emission target under the ESD.

23. The key overarching 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.

24. 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 certain 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).

25. 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.

26. 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.

27. During the review, Ireland highlighted the domestic mitigation actions that are under development, such as the renewable electricity support scheme, the renewable heat incentive, 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 4 provides a summary of the reported information on the PaMs of Ireland, a full list of PaMs reported by Ireland is included in its BR3.

Table 4
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.

28. 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 strategy was approved by Government in November 2018.

(b) Policies and measures in the energy sector

29. **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.

30. 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 by2025.

31. **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.

32. **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).

33. **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,[4] Ireland's Building Regulations are among the best in terms of building energy efficiency codes.

34. **Transport sector**. 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, 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

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

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.

35. **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.

36. 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

37. **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. 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.

38. **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.

39. 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.

40. 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.

41. **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[5]). 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.

42. **Waste management**. Ireland has a hierarchy that gives the highest priority to waste prevention followed by preparing for reuse, recycling, energy recovery, with disposal to landfill as the least preferred option. An 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; 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) Response measures

43. Ireland did not report on the assessment of the economic and social consequences of response measures in its BR3. During the review, Ireland explained that chapter 15 of the Annual Greenhouse Gas Inventory of the European Union[6] outlines the wide-ranging impact assessment system which accompanies all new policy initiatives. 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 EU's NC6 and NC7 as the process whereby adverse social, environmental and economic impacts on developing country parties are minimized. 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.

(e) Assessment of adherence to the reporting guidelines

44. The ERT assessed the information reported in the BR3 of Ireland and identified issues relating to completeness, transparency and adherence to the UNFCCC reporting guidelines on BRs. The findings are described in table 5.

Table 5
Findings on the mitigation actions and their effects from the review of the third biennial report of Ireland

No.	*Reporting requirement, issue type and assessment*	*Description of the finding with recommendation or encouragement*
1	Reporting requirement specified in CTF table 3 Issue type: transparency Assessment: recommendation	The ERT noted that for some mitigation actions in CTF table 3, the status of implementation was reported as "planned", but the start year of implementation was before the submission year. This is true for electric vehicle deployment (2011), reduction in natural gas combusted at compressor stations for national gas pipeline transport (2016) and directive 2009/28/EC (2016). 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 recommends that Ireland improve the transparency of its reporting by providing clear definitions of the status of the PaMs or by, for example, following the definitions provided in footnote 1 of the UNFCCC reporting guidelines on NCs as a guide.

[5] See https://www.agriculture.gov.ie/nfi/nfithirdcycle2017/nationalforestinventorypublications2017/.
[6] See https://www.eea.europa.eu/publications/european-union-greenhouse-gas-inventory-2018.

No.	*Reporting requirement, issue type and assessment*	*Description of the finding with recommendation or encouragement*
2	Reporting requirement specified in paragraph 7 Issue type: completeness Assessment: recommendation	Ireland did not report information on changes in its domestic institutional arrangements, including institutional, legal, administrative and procedural arrangements used for domestic compliance, monitoring, reporting, archiving of information and evaluation of the progress towards its economy-wide emission reduction target. During the review, Ireland informed the ERT that the institutional arrangements include EPA monitoring progress towards meeting the Party's ESD target 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 has been established to evaluate the 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 recommends that Ireland provide information on changes in its domestic institutional arrangements, including institutional, legal, administrative and procedural arrangements used for domestic compliance, monitoring, reporting, archiving of information and evaluation of the progress towards its economy-wide emission reduction target.
3	Reporting requirement specified in paragraph 8 Issue type: completeness Assessment: encouragement	Ireland did not provide detailed information on the assessment of the economic and social consequences of response measures in its BR3. The ERT noted that information on response measures was included in the BR2. During the review, Ireland reported that response measures are addressed in the annual GHG inventory of the European Union and that Ireland ensures that the approach outlined in its BR2 continues to apply. The ERT encourages Ireland to provide, to the extent possible, detailed information on the assessment of the economic and social consequences of response measures, or to provide the relevant references in its next BR.
4	Reporting requirement specified in paragraph 24 Issue type: completeness Assessment: encouragement	Ireland did not report on its domestic arrangements established for the process of the self-assessment of compliance with its emission reduction target and national rules for taking action against non-compliance, to the extent possible. During the review, Ireland informed the ERT that it is estimated that 2019 will be the first compliance year for which Ireland will have to use market-based mechanisms in order to comply with its emission target under the ESD. The ERT encourages Ireland to report on its domestic arrangements established for the process self-assessment of compliance with its emission reduction target and national rules for taking action against non-compliance, to the extent possible.

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

2. Estimates of emission reductions and removals and the use of units from market-based mechanisms and land use, land-use change and forestry

(a) Technical assessment of the reported information

45. For 2014 Ireland reported in CTF table 4 annual total GHG emissions excluding LULUCF of 57,757.90 kt CO_2 eq, which is 3.0 per cent above the 1990 level. In 2014 emissions from non-ETS sectors relating to the target under the ESD amounted to 41,663.02 kt CO_2 eq.

46. For 2015 Ireland reported in CTF table 4 annual total GHG emissions excluding LULUCF of 59,878.20 kt CO_2 eq, which is 6.7 per cent above the 1990 level. In 2015 emissions from non-ETS sectors relating to the target under the ESD amounted to 43,037.17 kt CO_2 eq.

47. On its use of units from LULUCF activities, Ireland reported blank cells in CTF tables 4 and 4(a) for 2014 and 2015. Table 6 illustrates Ireland's total GHG emissions, the contribution of LULUCF and the use of units from market-based mechanisms to achieve its target.

Table 6
Summary of information on the use of units from market-based mechanisms and land use, land-use change and forestry by Ireland to achieve its target

Year	*Emissions excluding LULUCF (kt CO_2 eq)*	*Contribution of LULUCF (kt CO_2 eq)[a]*	*Emissions including contribution of LULUCF (kt CO_2 eq)*	*Use of units from market-based mechanisms (kt CO_2 eq)*
1990	56 102.80	NA	56 102.80	NA
2010	61 691.90	NA	61 691.90	NA
2011	57 567.40	NA	57 567.40	NA
2012	58 124.00	NA	58 124.00	NA
2013	57 922.50	NA	57 922.50	NA
2014	57 757.90	NA	57 757.90	NA
2015	59 878.20	NA	59 878.20	NA

Sources: Ireland's BR3 and CTF tables 1, 4, 4(a)I, 4(a)II and 4(b).
[a] The EU's unconditional commitment to reduce GHG emissions by 20 per cent below the 1990 level by 2020 does not include emissions/removals from LULUCF.

48. In assessing the progress towards the achievement of the 2020 target, the ERT noted that Ireland's emission reduction target for non-ETS sectors is 20 per cent below the 2005 level (see para. 16 above). The progress in achieving this target is based on an assessment of progress in achieving AEAs according to the ESD.

49. On the basis of the results of the projections under the WEM and WAM scenarios (see para. 64 below), the ERT noted that Ireland may face challenges in the achievement of its emission reduction target, which is 20 per cent below the 2005 level by 2020, and would need to further strengthen mitigation actions. Ireland did not provide further information on planned PaMs that could help to close the gap by 2020. In addition, there are annual emission limits for the period 2013–2020 for the non-ETS sectors to ensure a gradual move towards the 2020 target. Any overachievement of the binding emission limit in a particular year can be banked and used towards compliance in a future year. Under the WEM scenario, Ireland is projected to cumulatively exceed its obligations by 13.7 Mt CO_2 eq over the period 2013–2020. Under the WAM scenario, Ireland is projected to cumulatively exceed its obligations by 11.5 Mt CO_2 eq over the period 2013–2020. This takes into account the overachievement of the annual limits in the period 2013–2015 which is banked and used in the years 2016–2020. Ireland is not expected to exceed its annual obligations until 2019.

(b) Assessment of adherence to the reporting guidelines

50. The ERT assessed the information reported in the BR3 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.

3. Projections overview, methodology and results

(a) Technical assessment of the reported information

51. 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.

52. 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 combined report of the NC7 and BR3 for Ireland indicate that the scenarios were prepared according to the UNFCCC reporting guidelines on BRs. Ireland did not report a WOM scenario in its BR3.

53. 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.

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

55. 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 combined NC7 and BR3, 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

56. 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 BR2; 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 BR2. 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.

57. 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[7] 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.

58. 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 CTF table 5.

59. Ireland provided information in its NC7 report and in CTF table 5 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

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

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.

60. Ireland did not report the main differences in the assumptions, methods employed and results between projections in the NC7 and those in the previous report 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 BR2 and BR3 for the waste sector and the industrial processes sector. Ireland also provided additional information regarding the main drivers and the differences between the BR2 and the BR3. 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) 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.

61. Ireland also provided information on its sensitivity analyses. Sensitivity analyses were conducted for a number of important assumptions, such as population trend, housing stock, energy prices, economic development indicators and carbon tax. 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.

62. As a result of the sensitivity analyses performed by Ireland and presented in the BR3, 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.

(c) Results of projections

63. 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 7 and the figure below.

Table 7
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 (%)*
Quantified economy-wide emission reduction target under the Convention[b]	NA	NA	NA
Inventory data 1990[c]	56 102.76	NA	NA

	GHG emissions (kt CO_2 eq per year)	*Changes in relation to base-year[a] level (%)*	*Changes in relation to 1990 level (%)*
Inventory data 2015[c]	59 878.22	6.7	6.7
WEM projections for 2020[d]	61 561.48	9.7	9.7
WAM projections for 2020[d]	59 096.34	5.3	5.3
WEM projections for 2030[d]	66 494.97	18.5	18.5
WAM projections for 2030[d]	62 892.25	12.1	12.1

Note: The projections are for GHG emissions without LULUCF.

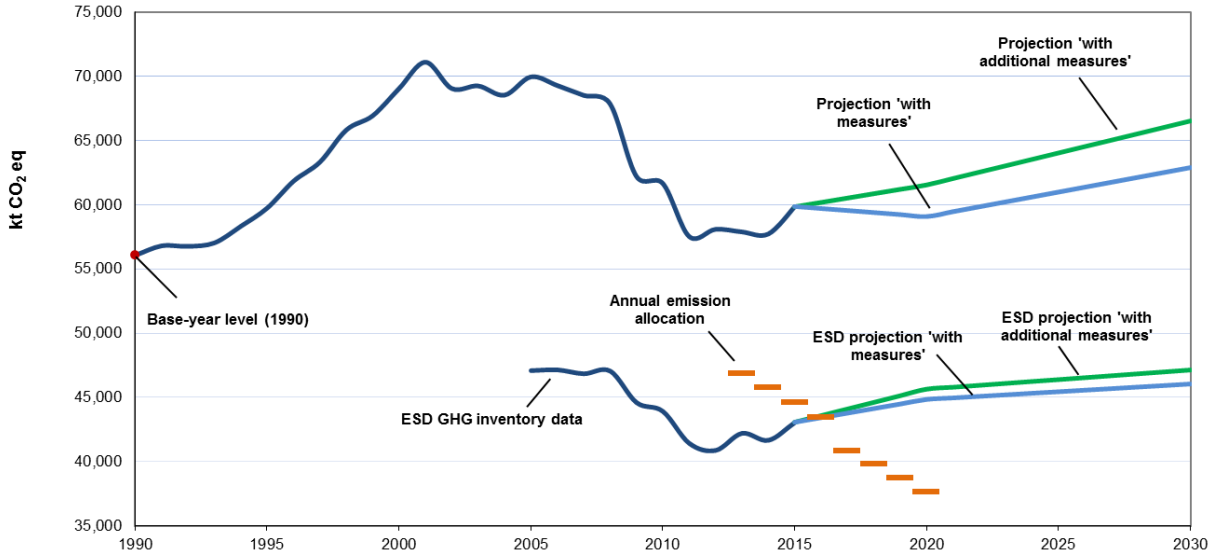
[a] "Base year" in this column refers to the base year used for the target under the Kyoto Protocol, while for the target under the Convention it refers to the base year used for that target.

[b] The 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.

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

[d] 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.

64. 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. 49 above) since Ireland will not meet its part of the target according to the projections provided in the BR3.

65. Ireland's target for non-ETS sectors is to reduce its total emissions by 20 per cent below the 2005 level by 2020 (see paras. 16 and 17 above). 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 (see para. 49 above).

66. Ireland presented the WEM and WAM scenarios by sector for 2020 and 2030, as summarized in table 8.

Table 8
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.

67. 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.

68. 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.

69. 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.

70. 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.

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

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

	GHG emissions and removals (kt CO_2 eq)					*Change (%)*			
		2020		*2030*		*1990–2020*		*1990–2030*	
Gas	*1990*	*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.

72. 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.

73. 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.

74. 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.

75. 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.

76. The ERT noted that in the BR2, under the WEM scenario, Ireland projected increases in total GHG emissions excluding LULUCF of 7.0 and 13.0 per cent above the 1990 level in 2020 and 2030, respectively. As shown in table 8 above, in the BR3 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 slight increase in projected GHG emissions for 2020 and 2030 under the WEM scenario between the BR2 and the BR3. This increase is mainly due to the new projection estimates for the energy industries sector, where a reduction in emissions was projected (9,780.40 kt CO_2 eq and 8,255.00 kt CO_2 eq in 2020 and 2030 in the BR2, respectively, compared with 10,239.06 kt CO_2 eq and 12,847.89 kt CO_2 eq in 2020 and 2030 in the BR3, respectively).

77. The ERT noted that in the BR2, under the WAM scenario, Ireland projected total GHG emission reductions excluding LULUCF of 3.2 and 4.4 per cent below the 1990 level in 2020 and 2030, respectively. As shown in table 8 above, in the BR3 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 represents an important change (increase) in projected GHG emissions for 2020 and 2030 under the WAM scenario between the BR2 and the BR3.

(d) Assessment of adherence to the reporting guidelines

78. The ERT assessed the information reported in the BR3 of Ireland and identified issues relating to completeness. The findings are described in table 10.

Table 10
Findings on greenhouse gas emission projections reported in the third biennial report 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 BR3. 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 BR.
2	Reporting requirement[a] specified in paragraph 37 Issue type: completeness Assessment: encouragement	Ireland did not present diagrams illustrating the WEM projections by sector and by gas in its BR3. The ERT noted that this is not in accordance with the UNFCCC reporting guidelines on NCs. 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 BR illustrating the WEM projections by sector and by gas.
3	Reporting requirement[a] specified in paragraph 35 Issue type: completeness Assessment: encouragement	Ireland did not report projections of the indirect GHGs carbon monoxide, nitrogen oxides and non-methane volatile organic compounds, or sulfur oxides in its BR3. 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 BR3, but that it intends to include them in its next BR. The ERT encourages Ireland to improve the completeness of its reporting by including in its next BR projections for carbon monoxide, nitrogen oxides, non-methane volatile organic compounds and sulfur oxides.

No.	*Reporting requirement, issue type and assessment*	*Description of the finding with recommendation or encouragement*
4	Reporting requirement[a] specified in paragraph 44 Issue type: completeness Assessment: encouragement	Although Ireland provided the methodology for its FAPRI model in its BR3, 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 BR 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 combined NC7 and BR3 report 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 BR on the main differences in the assumptions, methods employed and results 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 and the UNFCCC reporting guidelines on BRs.

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

D. Provision of financial, technological and capacity-building support to developing country Parties

1. Approach and methodologies used to track support provided to non-Annex I Parties

(a) Technical assessment of the reported information

79. In the BR3 Ireland reported information on the provision of financial, technological and capacity-building support required under the Convention.

80. 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. Ireland predominantly provides climate finance through bilateral grants in key partner countries such as the least developed countries in sub-Saharan Africa and South-East Asia. The BR3 does not include information on the national approach to tracking the provision of support, indicators, delivery mechanisms used and allocation channels tracked.

81. During the review, Ireland clarified that it used the OECD DAC Rio Marker methodology to identify and score disbursements with climate relevance. In accordance with the methodology, projects received scores depending on if the project had a principal, significant or no contribution to climate objectives. Multilateral flows have been addressed following the guidance from OECD DAC ENVIRONET, with contributions to multilateral climate funds counted in their totality as climate-specific contributions. Core contributions were not included even when the agency is active in the climate field.

82. Ireland did not describe the methodology and underlying assumptions used for collecting and reporting information on financial support. During the review, Ireland explained that tracking of contributions was carried out by staff in embassies using OECD DAC Rio Markers and other environmental markers. These were cross-checked by the

Regional Climate Change adviser, based in Africa. The methodology used for preparing information on international climate support is reflected in the document "UNFCCC Reporting and Climate Finance Mapping 2016–2017".

(b) Assessment of adherence to the reporting guidelines

83. The ERT assessed the information reported in the BR3 of Ireland and identified issues relating to completeness. The findings are described in table 11.

Table 11
Findings on the approach and methodologies used to track support provided to non-Annex I Parties from the review of the third biennial report of Ireland

No.	*Reporting requirement, issue type and assessment*	*Description of the finding with recommendation or encouragement*
1	Reporting requirement specified in paragraph 13	Ireland did not report in its BR3 information on how the provision of financial, technological and capacity-building support to non-Annex I Parties is new and additional.
	Issue type: completeness	During the review, Ireland explained that all public climate finance provided by Ireland annually is considered to be new and additional.
	Assessment: recommendation	The ERT reiterates the recommendation made in the previous review report that in its next BR submission Ireland include information to show how its support is new and additional.
2	Reporting requirement specified in paragraph 14	Ireland did not provide a description in its BR3 of its national approach for tracking the provision of financial, technological and capacity-building support to non-Annex I Parties and the indicators and delivery mechanisms used and allocation channels tracked.
	Issue type: completeness	During the review, Ireland explained that tracking of support was done using the OECD DAC Rio Marker methodology and the guidance from OECD DAC ENVIRONET.
	Assessment: recommendation	The ERT recommends that in its next BR submission Ireland provide a description of its national approach for tracking the provision of financial, technological and capacity-building support and that the description include information on indicators and delivery mechanisms used and allocation channels tracked.
3	Reporting requirement specified in paragraph 15	Ireland did not report in its BR3 the underlying assumptions and methodologies used to produce information on finance.
	Issue type: completeness	During the review, Ireland provided information on assumptions and the methodology used to produce information on finance, including tracking of contributions, which was undertaken using OECD DAC Rio Markers and other environmental markers.
	Assessment: recommendation	The ERT recommends that Ireland report the underlying assumptions and methodologies used to produce information on finance in its next BR submission.

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

2. Financial resources

(a) Technical assessment of the reported information

84. 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.

85. Ireland provided details on financial support it has provided; however, it did not clarify how this support is understood as "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.

86. 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.

87. 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.

88. 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 to the Least Developed Countries Fund, providing USD 17.5 million since 2003, and explained that it addresses adaptation needs through the design and implementation of national adaptation plans and national adaptation programmes of action. Ireland outlined in its BR3 that it contributes to the Adaptation Fund, although the BR3 does not show these contributions. During the review, Ireland clarified that its first contribution to the Adaptation Fund (EUR 300,000) occurred in 2017 and, as such, it is not yet shown in its BR3.

89. 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 12 includes some of the information reported by Ireland on its provision of financial support.

Table 12
Summary of information on provision of financial support by Ireland in 2015–2016
(Millions of United States dollars)

	Year of disbursement	
Allocation channel of public financial support	*2015*	*2016*
Official development assistance	718.32	802.59
Climate-specific contributions through multilateral channels, including:		
Global Environment Facility	0	0
Least Developed Countries Fund	1.11	1.11
Special Climate Change Fund	NA	NA

Allocation channel of public financial support	*Year of disbursement* 2015	2016
Adaptation Fund	NA	NA
Green Climate Fund	NA	2.21
Trust Fund for Supplementary Activities	0.22	0.55
Financial institutions, including regional development banks	NA	NA
United Nations bodies	0.54	0.55
Other		
Climate-specific contributions through bilateral, regional and other channels	38.04	53.87
Other		

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

90. Ireland reported on its climate-specific public financial support, totalling USD 39,915.09 million in 2015 and USD 58,292.04 million in 2016, an increase of 46 per cent in the period. With regard to future financial pledges aimed at enhancing the implementation of the Convention by developing countries, Ireland has made a commitment to maintain public climate finance support of EUR 175 million from 2016 to 2020, to increase its contributions to the Least Developed Countries Fund, to commence contributions to the Green Climate Fund and to explore avenues to mobilize private climate finance. During the review, Ireland highlighted that its contribution to the Least Developed Countries Fund is one of the longest and most consistent from Annex I countries. The great majority of support (92.4 per cent in 2016) was provided through bilateral channels. Most of the bilateral and multilateral support was allocated for adaptation or cross-cutting activities (75.9 per cent and 21.8 per cent, respectively, in 2016). Ethiopia and Malawi have been the major beneficiaries of the financial bilateral support in 2016 (46.0 per cent and 24.8 per cent, respectively). Ireland highlighted information on financial support from the public sector provided through multilateral and bilateral channels and the allocation of that support, by priority, is presented in table 13.

Table 13
Summary of information on channels of financial support used in 2015–2016 by Ireland
(Millions of United States dollars)

Allocation channel of public financial support	*Year of disbursement* 2015	2016	*Difference*	*Change (%)*	*Share (%)* 2015	2016
Support through bilateral and multilateral channels allocated for:						
Mitigation	2 190.74	1 360.62	–830.12	–37.9	5.5	2.3
Adaptation	26 843.72	44 212.39	17 368.67	64.7	67.3	75.9
Cross-cutting	10 880.63	12 719.03	1 838.40	16.9	27.2	21.8
Other						
Total	**39 915.09**	**58 292.04**	**18 376.95**	**46.0**	**100.0**	**100.0**
Detailed information by type of channel						
Multilateral channels	1 872.51	4 424.78	2 552.27	136.3		
Mitigation	0	0	0	0	0	0
Adaptation	1 872.51	2 212.39	339.88	18.2	100.0	50.0

Allocation channel of public financial support	*Year of disbursement*			*Share (%)*		
	2015	*2016*	*Difference*	*Change (%)*	*2015*	*2016*
Cross-cutting		2 212.39	2 212.39			50.0
Other						
Total	**1 872.51**	**4 424.78**	**2 552.27**	**136.3**	**100.0**	**100.0**
Bilateral channels						
Mitigation	2 190.74	1 360.62	–830.12	–37.8	5.8	2.5
Adaptation	24 971.22	42 000.00	17 028.78	68.2	65.6	78.0
Cross-cutting	10 880.63	10 506.64	–373.99	–3.4	28.6	19.5
Other						
Total	**38 042.58**	**53 867.26**	**15 824.02**	**41.6**	**100.0**	**100.0**
Multilateral compared with bilateral channels						
Multilateral	1 872.51	4 424.78	2 552.27	136.3	4.7	7.6
Bilateral	38 042.58	53 867.26	15 824.68	41.6	95.3	92.4
Total	**39 915.09**	**58 292.04**	**18 376.95**	**46.0**	**100.0**	**100.0**

Source: CTF tables 7, 7(a) and 7(b) of the BR3 of Ireland (version 4.0).

91. The BR3 includes detailed information on the climate-specific financial support provided through multilateral, bilateral and regional channels in 2015 and 2016. More specifically, Ireland contributed through multilateral channels, as reported in the BR3 and in CTF table 7(a), USD 1,872.51 and 4,424.78 million for 2015 and 2016, respectively. The contributions were made to specialized multilateral climate change funds, such as the Least Developed Countries Fund and the Trust Fund for Supplementary Activities. Ireland reported its contributions through bilateral channels in CTF table 7(b) by recipient, type of support, source of funding and financial instrument, with the projects aggregated by country and sector. During the review, Ireland resubmitted the BR3 CTF tables listing all projects individually.

92. The BR3 and CTF table 7(b) also include detailed information on the total financial support provided through bilateral channels (USD 38,042.58 and 53,867.26 million in 2015 and 2016, respectively).

93. The BR3 provides information on the types of support provided. In terms of the focus of public financial support, as reported in CTF table 7 for 2015, the shares of the total public financial support allocated for mitigation, adaptation and cross-cutting projects were 5.5, 67.3 and 27.2 per cent, respectively. From the total contribution, 4.7 per cent of the total public financial support was allocated through multilateral channels and 95.3 per cent through bilateral, regional and other channels. In 2016, the shares of total public financial support allocated for mitigation, adaptation, cross-cutting projects were 2.3, 75.9 and 21.8 per cent, respectively. Furthermore, 7.6 per cent of the total public financial support was allocated through multilateral channels and 92.4 per cent through bilateral, regional and other channels.

94. The ERT noted that in both 2015 and 2016 the total climate-specific financial contributions made through multilateral channels were identified as cross-cutting or not assigned to a specific sector, as reported in CTF table 7(a). The ERT also noted that a greater share of contributions made through bilateral channels was directed to the agriculture sector (36.5 per cent in 2015 and 36.8 per cent in 2016).

95. CTF tables 7(a) and 7(b) include information on the types of financial instrument used in the provision of assistance to developing countries. The ERT noted that grants accounted for the totality of the public financial support provided in 2015 and 2016.

96. Ireland did not report in its BR3 on private financial flows leveraged by bilateral climate finance towards mitigation and adaptation activities in non-Annex I Parties, or on PaMs that promote the scaling up of private investment in mitigation and adaptation activities in developing country Parties. During the review, Ireland informed the ERT that systems to

enable the tracking of private climate finance flows had not been introduced at the time of compiling the BR3 and work in this regard is ongoing.

97. During the review, Ireland informed the ERT that there were a number of initiatives pursued in relation to private finance in Ireland, including the launch of the United Nations Environment Programme Financial Centres for Sustainability (FC4S) in Dublin during 2018 and Ireland's Department of Finance "IFS 2020 Action Plan 2018",[8] which supports initiatives to drive investment towards sustainable finance, and is committed to working with Sustainable Nation Ireland exploring linkages between private climate finance and the role that can be played by multilateral development banks. Ireland added that it will launch a number of initiatives during 2019 to progress these policy areas further, and expects to complete its analysis of issues relating to the mobilization and reporting of private sector finance over the same time period.

(b) Assessment of adherence to the reporting guidelines

98. The ERT assessed the information reported in the BR3 of Ireland and identified issues relating to completeness. The findings are described in table 14.

Table 14
Findings on financial resources from the review of the third biennial report of Ireland

No.	*Reporting requirement, issue type and assessment*	*Description of the finding with recommendation or encouragement*
1	Reporting requirement specified in CTF table 7 Issue type: transparency Assessment: encouragement	Ireland did not report the conversion rates to USD used or the source of the conversion rate in its CTF tables 7, 7(a) and 7(b). During the review, Ireland provided the information on the conversion rates used and the source of the conversion rate. Ireland resubmitted the BR3 CTF tables during the review; however, it did not include in the tables the information on the conversion rates used. The ERT encourages Ireland to provide in its next BR submission the information on the conversion rates used and the source of conversion rates used for providing the public financial support in USD in CTF tables 7, 7(a) and 7(b).
2	Reporting requirement specified in paragraph 16 Issue type: completeness Assessment: recommendation	Ireland did not describe in its BR3 how it seeks to ensure that the resources it provides effectively address the needs of non-Annex I Parties with regard to climate change adaptation and mitigation. During the review, Ireland provided information on how the strategies of assistance are crafted in close consultation with key government and non-government stakeholders in the countries and are specifically tailored to meet countries' needs. The ERT recommends that in its next BR Ireland describe, to the extent possible, how it seeks to ensure that the resources it provides effectively address the needs of non-Annex I Parties with regard to climate change adaptation and mitigation.
4	Reporting requirement specified in paragraph 19 Issue type: completeness Assessment: encouragement	Ireland did not report in its BR3 on private financial flows leveraged by bilateral climate finance towards mitigation and adaptation activities in non-Annex I Parties, or on PaMs that promote the scaling up of private investment in mitigation and adaptation activities in developing country Parties. During the review, Ireland explained that systems to enable the tracking of private climate finance flows had not been introduced at the time of writing Ireland's BR3 but that work in this regard is ongoing, including a number of initiatives. The ERT encourages Ireland to report, in its next BR, to the extent possible, on private financial flows leveraged by bilateral climate finance towards mitigation and adaptation activities in non-Annex I Parties.
5	Reporting requirement specified in paragraph 19	Ireland did not report in its BR3 on PaMs that promote the scaling up of private investment in mitigation and adaptation activities in developing country Parties.

[8] Available at https://www.finance.gov.ie/wp-content/uploads/2018/01/180130-IFS2020-Action-Plan-2018.pdf.

No.	*Reporting requirement, issue type and assessment*	*Description of the finding with recommendation or encouragement*
	Issue type: completeness	During the review, Ireland explained that systems to enable the tracking of private climate finance flows had not been introduced at the time of writing Ireland's BR3 but that work in this regard is ongoing.
	Assessment: encouragement	The ERT encourages Ireland to report, in its next BR, on PaMs that promote the scaling up of private investment in mitigation and adaptation activities in developing country Parties.

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

3. Technology development and transfer

(a) Technical assessment of the reported information

99. 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.

100. The ERT took note of the information provided in CTF table 8 on recipient countries, target areas, measures and focus sectors of technology transfer programmes. Ireland highlighted a number of key activities focused on technology development and transfer, including in Ethiopia, where Ireland has a mitigation project to support rural livelihoods through promoting and disseminating cookstoves and an adaptation project to disseminate improved agricultural technologies. In Malawi, Ireland supported a community adaptation project to respond to extreme weather events through an early warning system and response measures. Ireland also reported a project supporting rural communities in Ethiopia to be climate smart through the promotion and dissemination of off-grid photovoltaic lighting. A number of Ireland's technology transfer programmes also have significant capacity-building activities such as building community resilience and strengthening farmers' capacity to adopt adaptive technologies.

101. The ERT noted that Ireland did not report on measures taken to promote, facilitate and finance the transfer and deployment of climate-friendly technologies or any success and failure stories in relation to technology transfer. During the review, Ireland provided further information on its transfer of technology support, outlining that although Ireland has produced numerous innovators 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.

102. During the review, Ireland provided some success and failure stories related to its support for technology transfer. Ireland highlighted that over the period between 2013 and 2016 it supported an Irish technology innovation centre with the development of a prototype thermoelectric generator. This generator could generate supplementary energy when attached to a clean cookstove to power a basic domestic lighting system. Ireland worked with NGO partners to pilot and roll out the project 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 cookstoves by 2020.

103. 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

104. The ERT assessed the information reported in the BR3 of Ireland and identified issues relating to completeness, transparency and adherence to the UNFCCC reporting guidelines on BRs. The findings are described in table 15.

Table 15
Findings on technology development and transfer from the review of the third biennial report of Ireland

No.	*Reporting requirement, issue type and assessment*	*Description of the finding with recommendation or encouragement*
1	Reporting requirement specified in paragraph 21 Issue type: completeness Assessment: recommendation	Ireland did not report overall information on measures taken to promote, facilitate and finance the transfer of, access to and deployment of climate-friendly technologies for the benefit of non-Annex I Parties, and for the support of the development and enhancement of endogenous capacities and technologies of non-Annex I Parties I in its BR3. It only provided examples of projects that include a transfer of technology component in CTF table 8. 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 in its next BR submission Ireland report on measures taken to promote, facilitate and finance the transfer of, access to and deployment of climate-friendly technologies for the benefit of non-Annex I Parties, and for the support of the development and enhancement of endogenous capacities and technologies of non-Annex I Parties.
2	Reporting requirement specified in paragraph 21 Issue type: completeness Assessment: encouragement	Ireland did not report in its BR3 success and failure stories when reporting on its transfer of technology activities. During the review, Ireland provided information on success and failure stories 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 encourages Ireland, when reporting transfer of technology activities, to provide success and failure stories in its next BR submission, to improve the completeness of its reporting.

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

4. Capacity-building

(a) Technical assessment of the reported information

105. In CTF table 9 Ireland supplied information on how it has provided capacity-building support for mitigation, adaptation and technology. Ireland described individual measures and activities related to capacity-building support in tabular format. Ireland also highlighted that capacity-building is a key part of the financial support provided to developing countries. In this respect, Ireland reported that the capacity-building elements are mostly associated with adaptation and agricultural projects. Examples include improving smallholder food security in Ethiopia through improving the nutrition and resilience of vulnerable communities through the introduction of climate smart agricultural technologies to smallholder farmers; and poverty and vulnerability reduction projects in Zambia which promote conservation

agricultural practices, drought-resilient crops, water conservation and the identification and adoption of climate-resilient agricultural technologies.

106. The majority of Ireland's finance, technology and capacity-building support is associated with adaptation in least developed countries and this is showcased in the activities that Ireland reported on its climate-related capacity development activities. Agriculture is highlighted as a key sector for Ireland's capacity-building activities. However, Ireland did not report on how these activities have responded to the existing and emerging capacity-building needs of non-Annex I Parties.

107. During the review, Ireland clarified that it is an active participant in negotiations on the development of national adaptation plans, as well as the activities of the LEG and that Ireland is also a member of the NDC-Partnership. Ireland highlighted that these areas of focused engagement provide it with a clear picture of where the major capacity-building gaps are, especially as they relate to adaptation in the poorest countries. In addition, Ireland informed the ERT that its work in key partner countries is strongly aligned to the capacity needs as articulated by partner governments and that, as most of its capacity development efforts are targeted at those countries, there is a degree of assurance to the robustness and effectiveness of Ireland's approach to addressing the capacity-building needs of developing countries.

108. During the review, Ireland highlighted that the vast majority of Ireland's climate finance includes a capacity-building component; for example, on building skills and systems at the community level for climate resilience (in agriculture), strengthening the capacity of government systems to deliver better resilience outcomes (through technical input to the design or implementation of social protection programmes), or support for building national capacity to plan and implement adaptation plans (e.g. through Ireland's support to the climate work of the International Institute for Environment and Development, the World Resources Institute, the United Nations International Strategy for Disaster Reduction, the LEG, and others).

109. During the review, Ireland also highlighted its climate and development learning platform as another element of its capacity development support. Recently, Ireland has focused on making the platform more interactive and making the content relevant to Irish Aid partners – both government partners and delivery partners in the countries. The purpose of the platform is to better integrate climate risk into development planning and programmes and to support capacity-building for the least developed countries.

(b) Assessment of adherence to the reporting guidelines

110. The ERT assessed the information reported in the BR3 of Ireland and identified issues relating to completeness, transparency and adherence to the UNFCCC reporting guidelines on BRs. The findings are described in table 16.

Table 16
Findings on capacity-building from the review of the third biennial report of Ireland

No.	*Reporting requirement, issue type and assessment*	*Description of the finding with recommendation or encouragement*
1	Reporting requirement specified in paragraph 23	Ireland reported information on the capacity-building support it has provided to non-Annex I Parties in its BR3, but it did not report on how this support responds to the existing and emerging capacity-building needs identified by non-Annex I Parties.
	Issue type: completeness Assessment: recommendation	During the review, Ireland provided information on its active participation in negotiations on the development of national adaptation plans, as well as the activities of the LEG, and explained that Ireland is also a member of the NDC-Partnership. In addition, Ireland informed the ERT that its work in key partner countries is strongly aligned to the capacity needs as articulated by partner governments. The ERT recommends that Ireland, to the extent possible, provide in its next BR information on how the capacity-building provided responds to the existing and emerging capacity-building needs identified by non-Annex I Parties.

No.	*Reporting requirement, issue type and assessment*	*Description of the finding with recommendation or encouragement*
2	Reporting requirement specified in paragraph 23 Issue type: transparency Assessment: encouragement	Ireland reported information in tables on the capacity-building support it has provided to non-Annex I Parties in its BR3, but it did not report information in textual form, as had been provided in the BR2. During the review, Ireland explained that the vast majority of its climate finance includes a capacity-building component, and that even though capacity development is not a marker that Ireland applies systematically to its finance streams, it is estimated that in 2016 financial capacity development support was approximately EUR 31 million. The ERT encourages Ireland to include in its next BR information related to capacity-building also in textual format, for example on good implementation practices.

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

III. Conclusions and recommendations

111. The ERT conducted a technical review of the information reported in the BR3 and CTF tables of Ireland in accordance with the UNFCCC reporting guidelines on BRs. The ERT concludes that the reported information mostly adheres to the UNFCCC reporting guidelines on BRs and provides an overview of emissions and removals related to Ireland's quantified economy-wide emission reduction target; assumptions, conditions and methodologies related to the attainment of the target; progress made by Ireland in achieving its target; and Ireland's provision of support to developing country Parties.

112. 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 in GHG emissions seen in 2015 continued in 2016 and was due to economic growth.

113. Under the Convention, Ireland committed to contributing to the achievement of the joint EU quantified economy-wide emission reduction target of a 20 per cent reduction in emissions below the 1990 level by 2020. The target covers all sectors and CO_2, CH_4, N_2O, HFCs, PFCs and SF_6, expressed using global warming potential values from the AR4. Emissions and removals from the LULUCF sector are not included. The EU generally allows its member States to use units from the Kyoto Protocol mechanisms and new market mechanisms for compliance purposes up to an established limit and subject to a number of restrictions on the origin and the type of project. Companies can make use of such units to fulfil their requirements under the EU ETS.

114. Under the ESD, Ireland has a target of reducing its total emissions by 20 per cent below the 2005 level by 2020 for non-ETS sectors. The 2015–2020 linear progression in Ireland's AEAs (its national emission target for non-ETS sectors) is 46,891.93 to 37,651.32 kt CO_2 eq.

115. 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. 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.

116. For 2015 Ireland reported in CTF table 4 total GHG emissions excluding LULUCF of 59,878.20 kt CO_2 eq. Ireland did not report on its use of units from market-based mechanisms to achieve its target.

117. 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.

118. The ERT noted that Ireland faces challenges in making progress towards its emission reduction target. On the basis of the results of the projections for 2020 under the WEM and WAM scenarios, the ERT noted that Ireland may face challenges in achieving its target even if all additional PaMs are implemented by 2020, including further strengthening existing PaMs. In this regard, Ireland indicated in the BR3 that it plans to use units from market-based mechanisms in order to achieve its emission reduction target.

119. 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. Ireland also highlighted that capacity-building is a key part of the financial support provided to developing countries and is mostly associated with adaptation and agricultural projects.

120. In the course of the review, the ERT formulated the following recommendations for Ireland to improve its adherence to the UNFCCC reporting guidelines on BRs in its next BR:

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

(i) Reporting on any changes to the national institutional arrangements (see issue 1 in table 3);

(ii) Providing information on changes in its domestic institutional arrangements, including institutional, legal, administrative and procedural arrangements used for domestic compliance, monitoring, reporting, archiving of information and evaluation of the progress towards its economy-wide emission reduction target (see issue 2 in table 5);

(iii) Providing information to show how its support is new and additional (see issue 1 in table 11);

(iv) Providing a description of its national approach for tracking the provision of financial, technological and capacity-building support and that the description include information on indicators and delivery mechanisms used and allocation channels tracked (see issue 2 in table 11);

(v) Describing the underlying assumptions and methodology used to produce information on finance (see issue 3 in table 11);

(vi) Describing how it seeks to ensure that the resources it provides effectively address the needs of non-Annex I Parties with regard to climate change adaptation and mitigation (see issue 2 in table 14);

(vii) Providing information on measures taken to promote, facilitate and finance the transfer of, access to and deployment of climate-friendly technologies for the benefit of non-Annex I Parties, and for the support of the development and enhancement of endogenous capacities and technologies of non-Annex I Parties (see issue 1 in table 15);

(viii) Providing information on how the capacity-building provided responds to the existing and emerging capacity-building needs identified by non-Annex I Parties (see issue 1 in table 16);

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

Providing clear definitions of the status of the PaMs (see issue 1 in table 5);

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

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 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 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.

"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.

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.