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

Developed country Parties were requested by decision 2/CP.17 to submit their fourth biennial report to the secretariat by 1 January 2020. This report presents the results of the technical review of the fourth 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". The review took place from 27 April to 1 May 2020 remotely.

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Contents

Abbreviations and acronyms

AEA	annual emission allocation
Annex I Party	Party included in Annex I to the Convention
AR	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
ERT	expert review team
ESD	European Union effort-sharing decision
EU	European Union
EU ETS	European Union Emissions Trading System
F-gas	fluorinated gas
GHG	greenhouse gas
GWP	global warming potential
HFC	hydrofluorocarbon
IPPU	industrial processes and product use
LDCF	Least Developed Countries Fund
LEG	Least Developed Countries Expert Group
LULUCF	land use, land-use change and forestry
NA	not applicable
NC	national communication
NDC	nationally determined contribution
NECP	National Energy and Climate Plan
NF_3	nitrogen trifluoride
NO	not occurring
non-Annex I Party	Party not included in Annex I to the Convention
N_2O	nitrous oxide
PaMs	policies and measures
PFC	perfluorocarbon
SF_6	sulfur hexafluoride
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’

I. Introduction and summary

A. Introduction

1. This is a report on the centralized technical review of the BR4[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 together with the review of five other Annex I Parties from 27 April to 1 May 2020 remotely[2] by the following team of nominated experts from the UNFCCC roster of experts: Njangu Lewis Aldo Jr. (Liberia), Fernando Farias (Chile), Sasha Gottlieb (United States of America), Maria Gutiérrez (Mexico), Jolanta Merkeliene (Lithuania), Jacqueline Pham (Australia), Ridhima Sud (India) and Miguel Angel Taboada (Argentina). Mr. Farias and Ms. Pham were the lead reviewers. The review was coordinated by Hajar Benmazhar and James Howland (secretariat).

B. Summary

4. The ERT conducted a technical review of the information reported in the BR4 of Ireland in accordance with the UNFCCC reporting guidelines on BRs (annex I to decision 2/CP.17).

1. Timeliness

5. The BR4 was submitted on 13 February 2020 after the deadline of 1 January 2020 mandated by decision 2/CP.17. The CTF tables were also submitted on 13 February 2020. The CTF tables were resubmitted on 20 May 2020 to address issues raised during the review. The resubmission included changes to information related to the use of market-based mechanisms, gases included in the target, the implementation status of PaMs, estimated impacts of PaMs and the classification of support provided to non-Annex I Parties. Unless otherwise specified, the information and values from the latest submission are used in this report.

6. Ireland informed the secretariat on 16 December 2019 about its difficulties with making a timely submission. In accordance with decision 13/CP.20, a Party should inform the secretariat thereof by the due date of the submission in order to facilitate the arrangement of the review process. The ERT noted with concern the delay in the submission and recommended that Ireland make its next submission on time.

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 BR4 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.

[2] Owing to the circumstances related to the coronavirus disease 2019, the technical review of the BR submitted by Ireland had to be conducted remotely.

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

Section of BR	*Completeness*	*Transparency*	*Reference to description of recommendation(s)*
GHG emissions and removals	Complete	Transparent	–
Quantified economy-wide emission reduction target and related assumptions, conditions and methodologies	Complete	Transparent	–
Progress in achievement of targets	Mostly complete	Mostly transparent	Issue 1 in table 5 Issue 1 in table 9
Provision of support to developing country Parties	Mostly complete	Mostly transparent	Issues 1–2 in table 12

Note: A list of recommendations pertaining to the completeness and transparency issues identified in this table is included in chap. 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 fourth biennial report

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

1. Technical assessment of the reported information

8. Total GHG emissions[3] excluding emissions and removals from LULUCF increased by 9.9 per cent between 1990 and 2018, whereas total GHG emissions including net emissions or removals from LULUCF increased by 8.0 per cent over the same period. Table 2 illustrates the emission trends by sector and by gas for Ireland. Note that information in this paragraph and table 2 is based on Ireland's 2020 annual submission, version 3, which has not yet been subject to review. All emission data in subsequent chapters are based on Ireland's BR4 CTF tables unless otherwise noted. The emissions reported in the 2020 annual submission differ slightly from the data reported in CTF table 1.

9. The increase in total GHG emissions between 1990 and 2018 was driven mainly by rising emissions from fuel consumption in the energy sector, which accounted for the majority of the total national CO_2 emissions in 2018 (60 per cent). Emissions grew steadily between 1990 and the peak in 2001 as a result of the rise in CO_2 emissions in the energy sector resulting from strong economic growth. Between 2002 and 2008, emissions stayed relatively constant; economic growth and increased emissions from road transport and generation of electricity at two new peat-fired power stations were balanced by reductions in emissions due to the closure of ammonia and nitric acid production plants and the continued decline in cattle population due to improved milk output per animal and fertilizer use. The economic downturn led to a major decrease in emissions from 2009 to 2011, after which emissions were relatively constant through 2014. Emissions increased again in 2015 and 2016 owing to higher emissions in almost all sectors, with categories related to energy use, including road transport and enteric fermentation, representing the most significant contributors. In 2017, emissions decreased by 0.9 per cent compared with the 2016 level, mainly as a result of reduced coal consumption in electricity generation, but emissions in the agriculture sector continued to increase. In 2018, emissions were down by 0.1 per cent compared with the 2017 level.

[3] 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.

Table 2
Greenhouse gas emissions by sector and by gas for Ireland for 1990–2018

	GHG emissions (kt CO_2 eq)					*Change (%)*		*Share (%)*	
	1990	*2000*	*2010*	*2017*	*2018*	*1990–2018*	*2017–2018*	*1990*	*2018*
Sector									
1. Energy	31 022.10	42 485.77	40 427.94	36 840.01	36 582.87	17.9	–0.7	55.9	60.0
A1. Energy industries	11 223.13	16 116.30	13 380.24	11 819.84	10 550.40	–6.0	–10.7	20.2	17.3
A2. Manufacturing industries and construction	3 961.75	5 642.37	4 476.47	4 564.73	4 741.39	19.7	3.9	7.1	7.8
A3. Transport	5 146.53	10 796.67	11 545.68	12 026.49	12 224.73	137.5	1.6	9.3	20.1
A4. and A5. Other	10 586.27	9 849.74	10 938.59	8 349.98	8 985.94	–15.1	7.6	19.1	14.7
B. Fugitive emissions from fuels	104.42	80.69	86.96	78.97	80.41	–23.0	1.8	0.2	0.1
C. CO_2 transport and storage	NO	NO	NO	NO	NO	–	–	–	–
2. IPPU	3 309.16	4 558.52	2 577.80	3 623.78	3 508.50	6.0	–3.2	6.0	5.8
3. Agriculture	19 584.98	19 777.21	17 765.62	19 621.92	19 953.07	1.9	1.7	35.3	32.7
4. LULUCF	4 920.64	5 464.68	5 532.52	5 338.17	4 297.69	–12.7	–19.5	NA	NA
5. Waste	1 552.05	1 492.77	506.19	919.16	890.10	–42.6	–3.2	2.8	1.5
6. Other[a]	NO	NO	NO	NO	NO	–	–	–	–
Gas[b]									
CO_2	32 944.33	45 249.00	41 747.93	38 910.19	38 803.39	17.8	–0.3	59.4	63.7
CH_4	14 760.69	14 338.19	12 070.12	13 991.91	13 984.98	–5.3	0.0	26.6	23.0
N_2O	7 728.69	7 958.07	6 345.59	6 748.96	6 953.70	–10.0	3.0	13.9	11.4
HFCs	0.59	270.34	1 034.23	1 266.14	1 100.36	185 772.4	–13.1	0.0	1.8
PFCs	0.12	397.76	46.58	47.20	49.86	41 528.9	5.6	0.0	0.1
SF_6	33.88	51.76	33.09	39.21	40.92	20.8	4.3	0.1	0.1
NF_3	NO	49.17	NO	1.26	1.32		4.8		0.0
Total GHG emissions excluding LULUCF	**55 468.30**	**68 314.28**	**61 277.54**	**61 004.88**	**60 934.54**	**9.9**	**–0.1**	**100.0**	**100.0**
Total GHG emissions including LULUCF	**60 388.94**	**73 778.95**	**66 810.06**	**66 343.05**	**65 232.23**	**8.0**	**–1.7**	**NA**	**NA**

Source: GHG emission data: Ireland's 2020 annual submission, version 3.

[a] Emissions and removals reported under the sector other (sector 6) are not included in the total GHG emissions. Ireland reported that emissions in the category other are not included in its economy-wide emission reduction target.

[b] The Party did not report indirect CO_2 emissions.

10. In brief, Ireland's national inventory arrangements were established in accordance with EU regulation 525/2013. There have been no changes in these arrangements since the BR3. The Environmental Protection Agency of Ireland has overall responsibility for the national GHG inventory in Ireland's national system of recording emissions. In response to a question raised by ERT, Ireland reported that an interdepartmental working group was established in 2018 to evaluate the Party's progress towards its ESD targets and propose recommendations on the Government of Ireland's ESD compliance strategy. The Party's progress towards the ESD targets is tracked annually by the Environmental Protection Agency, which is responsible for compiling the national GHG inventories and reporting the data to the relevant European and international institutions.

2. Assessment of adherence to the reporting guidelines

11. The ERT assessed the information reported in the BR4 of Ireland and recognized that the reporting is complete, transparent and thus adhering to the UNFCCC reporting guidelines on BRs. No issues relating to the topics discussed in this chapter of the review report were raised during the review.

B. Quantified economy-wide emission reduction target and related assumptions, conditions and methodologies

1. Technical assessment of the reported information

12. For Ireland the Convention entered into force on 19 July 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 Party reported a description of the joint EU target, including associated conditions and assumptions, in the BR4 and in CTF tables 2(a–f).

13. 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 GWP 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. Operators and airline operators can use such units to fulfil their requirements under the EU ETS, and member States can use such units for their national ESD targets, within specific limitations.

14. The EU 2020 climate and energy package includes the EU ETS and the ESD (see paras. 25–26 below). The EU ETS covers mainly point emissions sources in the energy, industry and aviation sectors. An EU-wide emission cap has been put in place for 2013–2020 with the goal of reducing emissions by 21 per cent below the 2005 level by 2020. Emissions from ESD 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.

15. The European Commission set out its vision for a climate-neutral EU in November 2018, and in December 2019 presented the European Green Deal as a road map with actions for making the EU economy sustainable. The European Council endorsed in December 2019 the objective of making the EU climate-neutral by 2050. As part of the European Green Deal, the Commission proposed in March 2020 to enshrine the 2050 climate-neutrality target into the first European Climate Law. The European Green Deal calls for increased ambition in the 2030 emission reduction target to at least 50 per cent below the 1990 level. Member States will set out any increased ambition in the update of their NECPs.

16. Ireland has a national target of reducing its emissions under the ESD to 20 per cent below the 2005 level by 2020. This target has been translated into binding quantified AEAs for 2013–2020. Ireland's AEAs change following a path from 46,891.9 kt CO_2 eq in 2013 to 37,651.3 kt CO_2 eq in 2020.[4]

17. In addition, Ireland reported that it has a long-term domestic emission reduction goal of transitioning to a competitive, low-carbon, climate-resilient and environmentally sustainable economy by 2050. Moreover, the Party has a commitment under its Climate Action Plan (see para. 29 below) to enact a 2050 target into law in 2020.

2. Assessment of adherence to the reporting guidelines

18. The ERT assessed the information reported in the BR4 of Ireland and recognized that the reporting is complete, transparent and thus adhering to the UNFCCC reporting guidelines on BRs. No issues relating to the topics discussed in this chapter of the review report were raised during the review.

[4] European Commission decision 2017/1471 amended decision 2013/162/EU to revise member States' AEAs for 2017–2020.

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

1. Mitigation actions and their effects

(a) Technical assessment of the reported information

19. 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. The Party reported on its policy context and legal and institutional arrangements in place for implementing its commitments and monitoring and evaluating the effectiveness of its PaMs.

20. Ireland provided information on a set of PaMs similar to those previously reported, with a few exceptions. In the BR4 the Party reported more planned and adopted PaMs than in the BR3. Ireland also provided information on changes since its previous submission to its institutional, legal, administrative and procedural arrangements used for domestic compliance, monitoring, reporting, archiving of information and evaluation of progress towards its target. Ireland's Climate Action and Low Carbon Development Act 2015 is a key regulatory act that establishes a national framework for achieving a low-carbon, climate-resilient economy by 2050 and provides for the development of periodic national mitigation plans and their submission to the Government for approval. The Climate Action Plan (see para. 29 below) has strengthened governance arrangements for climate policy by establishing, within the Department of the Taoiseach, a Climate Action Delivery Board, which holds responsible designated bodies accountable for delivering climate action. The governance process includes the publication of quarterly reports detailing progress towards targets under the Climate Action Plan, with the first report completed in October 2019.

21. In its reporting on its PaMs, Ireland provided the estimated emission reduction impacts for most of its PaMs. Where estimated impacts were not provided, the Party supplied an explanation.

22. Ireland reported on its self-assessment of compliance with its emission reduction targets and national rules for taking action against non-compliance. Ireland's progress towards its ESD targets is tracked annually by the Environment Protection Agency, which is responsible for compiling the national GHG inventories and reporting the data to the relevant European and international institutions.

23. The key overarching related cross-sectoral policy in the EU is the 2020 climate and energy package, adopted in 2009, which includes the revised EU ETS and the ESD. The package is supplemented by renewable energy and energy efficiency legislation and legislative proposals on the 2020 targets for CO_2 emissions from cars and vans, the carbon capture and storage directive, and the general programmes for environmental conservation, namely the 7th Environment Action Programme and the clean air policy package. The 2030 climate and energy framework, adopted in 2014, includes more ambitious targets that will be updated as part of the European Green Deal.

24. The achievement of the Energy Union objectives and targets is ensured through a combination of Energy Union initiatives and national policies set out in integrated NECPs. The NECPs are periodically updated to reflect changes to EU policy, such as the implementation of the European Green Deal. At the time of this report, Ireland had not finalized its NECP for submission to the European Commission. The Party informed the ERT that considerable work had been undertaken to prepare the NECP, which fully incorporates the country's significantly raised ambition as well as the additional policies set out in the Climate Action Plan. Ireland is working to finalize the NECP as quickly as possible.

25. In operation since 2005, the EU ETS is a cap-and-trade system that covers all significant energy-intensive installations (mainly large point emissions sources such as power plants and industrial facilities), which produce 40–45 per cent of the GHG emissions of the EU. It is expected that the EU ETS will guarantee that the 2020 target (a 21 per cent emission reduction below the 2005 level) will be achieved for sectors under the scheme. The third phase of the EU ETS started in 2013 and the system now includes aircraft operations (since 2012) as well as N_2O emissions from chemical industry, PFC emissions from

aluminium production and CO_2 emissions from some industrial processes that were not covered in the previous phases of the EU ETS (since 2013). Auctioning is the default method for allocating allowances; however, harmonized rules for free allocations, based on benchmark values achieved by the most efficient 10 per cent of installations, are still in place as a safeguard for the international competitiveness of industrial sectors at risk of carbon leakage. For 2030, an emission reduction target of 43 per cent below the 2005 level has been set for the EU ETS.

26. The ESD became operational in 2013 and covers 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 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. The EU effort-sharing regulation, successor to the ESD, was adopted in 2018. It sets national emission reduction targets for 2030 ranging from 0 to 40 per cent below the 2005 level, and trajectories with annual limits for 2021–2030, for all member States, and keeps many of the flexibilities of the ESD.

27. Ireland highlighted the EU-wide mitigation actions that are under development, such as the ambitious EU-wide renewable energy target of 32 per cent by 2030 under the EU renewable energy directive (directive 2018/2001), which recast EU directive 2009/28/EC, which proposed a target of 20 per cent for 2020. The estimated mitigation effects (WAM scenario) of the increase in renewable energy use are emission reductions of 4,511.27 kt CO_2 eq in terms of electricity, 1,050.94 kt CO_2 eq in terms of transport and 304.50 CO_2 eq in terms of heat in 2030.

28. Ireland introduced national-level policies to achieve its targets under the ESD and domestic emission reduction targets. The key policies reported include a carbon tax, which was implemented in 2008; vehicle registration and motor tax rebalancing to align vehicle tax rates with CO_2 emissions; and the home energy upgrade schemes to help homeowners reduce energy use. The mitigation effect of PaMs related to increasing the use of renewable energy is the most significant. Other policies that have delivered significant emission reductions are the large industry programme promoting energy efficiency in enterprises, the public sector programme to retrofit buildings and the amendment of national building regulations to conserve fuel and energy use in dwellings.

29. Ireland reported that its Climate Action Plan was published by the Government in June 2019. An objective of the plan is to enable Ireland to meet its targets as part of the EU to reduce national GHG emissions that are within the scope of the EU effort-sharing regulation by 30 per cent below the 2005 level by 2030 and lay the foundations for achieving net zero carbon emissions by 2050. The plan contains 183 actions, broken down into 619 measures that cover all sectors, with a focus on key areas such as electricity, enterprise, built environment, transport, agriculture, LULUCF, waste and circular economy, the public sector and international action. The plan will be funded through the National Development Plan 2018–2027 and will receive a budget of almost EUR 30 billion for low-carbon and sustainable mobility investments up to 2027. The first progress report shows that a number of significant achievements have been made, including a commitment by the Government to support net zero emissions at the EU level, the introduction of new requirements to ensure that all new homes are nearly zero energy and of new energy efficiency regulations for home renovations, an increase in carbon tax to EUR 26/t and a Government commitment to increase this tax to EUR 80/t by 2030, and the introduction of a new scheme to provide 1,200 on-street public charging points for electric vehicles.

30. Ireland highlighted the domestic mitigation actions that are under development, such as grants for purchasing new electric vehicles, which has been identified as an important step towards achieving targets related to both energy efficiency and renewable energy. Among the mitigation actions that provide a foundation for significant additional action are the replacement of coal in electricity generation with natural gas by 2026, estimated to deliver emission reductions of 2,165.85 kt CO_2 eq in 2030, and the better energy homes scheme (WAM scenario), estimated to deliver emission reductions of 559.76 kt CO_2 eq in 2030. Other important planned actions include increasing the carbon tax (WAM scenario) for ESD sectors, specifically for fuels used for heating and transport, and using nitrification and urease

inhibitors with synthetic nitrogen fertilizer applied in agriculture. Ireland reported two PaMs that have been adopted: the excellence in energy efficiency design programme and the measure to improve energy efficiency through major renovations to dwellings. Table 3 provides a summary of the reported information on the PaMs of Ireland.

Table 3
Summary of information on policies and measures reported by Ireland

Sector	*Key PaMs*	*Estimate of mitigation impact in 2020 (kt CO_2 eq)*	*Estimate of mitigation impact in 2030 (kt CO_2 eq)*
Policy framework and cross-sectoral measures	Carbon tax	355.87	323.87
Energy			
Transport	Increasing the share of renewable energy use in the transport sector	543.94	568.82
	Vehicle registration and motor tax rebalancing	257.03	59.27
Renewable energy	Increasing the share of renewable energy use in electricity generation	4 207.09	5 425.76
Energy efficiency	Large industry programme	506.43	499.75
	Public sector programme	531.10	778.64
	Supplier obligation scheme	709.00	1 779.44
	2002 building regulations (dwellings)	540.01	1 015.74
	2008 building regulations (dwellings)	341.68	1 206.64
IPPU	EU directive on mobile air-conditioning systems	33.17	161.90
Agriculture	Improving the efficiency of nitrogen fertilizer used in agriculture	187.24	187.47
Waste	EU landfill directive	178.77	341.11

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

31. The ERT noted that the reported estimated effects of most of the individual PaMs have changed since the BR3, in many cases significantly. For example, the reported estimated impacts of the Accelerated Capital Allowance scheme for investment in energy-efficient equipment have been reduced by almost half. The Party did not report the general methodology used for estimating the impacts of its individual PaMs in its BR4. The ERT considers that the Party explaining the methodology used for estimating the impacts of PaMs and providing information on significant recalculations in its BR could increase the transparency of the reporting.

32. During the review, Ireland explained that its estimates of the effects of individual PaMs are closely interlinked with its GHG projections. The Party reported that reductions in GHG emissions associated with energy efficiency measures are the result of energy savings, which are determined using up-to-date information and energy projection modelling. The Sustainable Energy Authority of Ireland provides the Environmental Protection Agency with the estimated fuel savings (electricity, oil, gas and solid fuels) associated with the implementation of the energy efficiency measures, which then uses these data and the relevant emission factors to estimate the emission reductions. The impacts of other measures, such as the EU landfill directive, the EU directive on mobile air-conditioning systems and the measure to improve the efficiency of nitrogen fertilizer use, are also estimated using projection data and assumptions (e.g. activity data). The main reason for the changes in the reported effects of PaMs in the BR4 since the BR3 is the different level of implementation of PaMs and changes in the underlying assumptions (e.g. fuel prices) used for emission projections.

(b) Policies and measures in the energy sector

33. **Energy efficiency.** Ireland has set a national energy efficiency target of 20 per cent by 2020, adopted in response to the EU energy efficiency directive (directive 2012/27/EU).

The Party is making progress in this area by, for example, improving building regulations, applying energy management to large industrial installations, increasing vehicle efficiency, improving the efficiency of electricity systems and retrofitting existing buildings. The Climate Action Plan introduced an energy efficiency target of 50 per cent for the public sector by 2030, which had already improved energy efficiency by 27 per cent by 2018.

34. **Energy supply and renewables.** The Party's mitigation actions related to renewable energy are estimated to have the highest effect of all PaMs. Ireland introduced a renewable energy feed-in tariff and support schemes for renewable electricity and heat (non-domestic) to provide support for wind, hydropower and biomass technologies. However, the Party is unlikely to meet its target of a renewable energy share of 16 per cent by 2020, as it had achieved a renewable energy share of 11 per cent by 2018. The Party indicated during the review that it is likely to achieve approximately 80 per cent of the required progress to meet the target owing to PaMs that are expected to lead to an overall renewable energy share of approximately 13 per cent by 2020. The recast EU renewable energy directive set an even more ambitious EU-wide renewable energy target of 32 per cent for 2030. The Party plans to increase its share of renewable energy further through the renewable electricity support scheme, which sets a renewable electricity target of 70 per cent by 2030. Other measures include grants to support investment in heat pumps, closing down coal-fired power plants by 2025 and eliminating peat use at three power plants.

35. **Residential and commercial sectors.** Approximately 400,000 homes in Ireland have been upgraded under energy efficiency schemes. The Climate Action Plan has set a goal of achieving a B2 building energy rating in 500,000 retrofitted homes and replacing oil-fired boilers with heat pumps in 400,000 homes by 2030, partially funded by the revenue from the increased carbon tax. The excellence in energy efficiency design programme is an example of a successful initiative for improving the energy efficiency of businesses, with participating businesses reporting an improvement of 28 per cent on average. The Climate Action Plan also introduced an energy efficiency target of 50 per cent for the public sector by 2030. Further, under the EU directive on the energy performance of buildings, all new buildings in Ireland (public and private) must be nearly zero energy by the end of 2020, which also requires a renewable energy share of 20 per cent in the total energy use of new buildings.

36. **Transport sector.** The measures in this sector are aimed at encouraging the development of low-emission vehicles, promoting the development of alternative fuels and supporting a shift in the modes of transport used. Recent measures to promote electric vehicles include purchase grants, tax exemptions, grants to support installation of home charging points and expanding the nationwide public recharging network. The impact of these initiatives can be seen through the significant rise in sales of electric vehicles in recent years, resulting in nearly 16,000 such vehicles on the road at the end of 2019, more than double the number at the end of 2018. The Climate Action Plan sets an ambitious target of almost one million electric vehicles sold by 2030.

37. The Party reported on its biofuel obligation scheme, which requires fuel suppliers to ensure that biofuels make up at least 11 per cent (by volume) of fuel supplied to the road transport sector. Promoting the use of indigenous biomethane and renewable hydrogen in the transport sector is a core element of the scheme for 2021–2030. Ireland's actions focused on alternative fuels include extending the reduced toll scheme to heavy-duty vehicles that run on alternative fuels, with a purchase grant for such vehicles also expected to be introduced in 2020.

38. **Industrial sector.** The EU ETS is the main measure for reducing emissions in a cost-effective manner in the industrial sector. In Ireland around 100 installations are in operation under the EU ETS, including 75 industrial installations. Sectors covered by the EU ETS account for about 25 per cent of total emissions in Ireland, with emissions having decreased by around 30 per cent compared with the 2005 level. Industries that do not fall within the scope of the EU ETS are subject to emissions pricing through the carbon tax, which provides an economic signal to reduce emissions and participate in mitigation programmes. The Sustainable Energy Authority of Ireland offers support through a dedicated network to large enterprises that have intensive energy demands. This support is provided through mentoring, implementing energy management systems, training and networking with a view to improving energy performance and reducing energy costs.

(c) Policies and measures in other sectors

39. **Industrial processes.** Emissions from industrial processes in Ireland include those from the use of F-gases. The EU F-gas regulation, which lays down the phasing out of F-gases within the EU, and the EU directive on mobile air-conditioning systems, which aims to enforce the use of refrigerants with lower GWP values in mobile air conditioners, are the core EU policy instruments expected to control and reduce F-gas emissions in Ireland. The industrial process sector also includes the mineral products industry (e.g. cement production), which is mostly covered by the EU ETS.

40. **Agriculture.** The agriculture sector plays an important role in Ireland's economy and accounted for 32.2 per cent of the total national GHG emissions in 2017. Emissions from agriculture make up a considerable share of Ireland's total emissions owing in part to the relatively small amount of heavy industry in Ireland. As is the case for all EU member States, PaMs in the agriculture sector, including support for agroenvironmental action, are dependent on the EU common agricultural policy. Measures taken to promote sustainability in the agriculture sector in Ireland, supported by the common agricultural policy, include helping farmers to purchase and use low-emission slurry spreading equipment, assisting the planting of new hedgerows, supporting organic farming and low-input pastures, taking steps such as improving production efficiency through breeding programmes to reduce GHG emissions from dairy and beef cattle, and promoting use of renewable energy and energy efficiency measures.

41. The Party is planning to report on recent climate policy developments in the agriculture sector in the national climate and air road map for the agriculture sector. The draft document published in 2019 proposes priority actions in the agriculture sector aimed at contributing to Ireland's climate, air and energy targets. These actions include enhancing soil fertility and reducing soil nutrient loss (by means of online nutrient management planning, targets for low-emission slurry spreading and promoting the use of protected nitrogen products), improving carbon sequestration by better managing agricultural soils and peatlands, and improving cattle breeding programmes.

42. **LULUCF.** The key measures in the LULUCF sector are related to sustainable management of forests, enhancing forest sinks through the afforestation scheme, regulating fellings and developing the wood processing sector, including by promoting increased use of wood in the economy. Forests and other land uses will play an important role in meeting the Party's EU emission reduction target for 2030. As part of the 2014–2020 national forestry programme, EUR 103 million has been made available for forestry measures in 2020, reflecting the Government's commitment to planting trees covering an average area of 8,000 ha annually, as contained in the Climate Action Plan. The overall aim is to expand Ireland's forest coverage from 11 to 18 per cent. Lastly, the Party plans to improve carbon sequestration by better managing farmed peatlands and accelerating its work to restore peatlands.

43. **Waste management.** The waste sector accounted for 1.5 per cent of the total national GHG emissions in 2017. Reducing waste production is a priority for Ireland, which has adopted ambitious targets for reducing the country's reliance on landfill sites, recycling municipal waste and packaging and reducing food waste on the basis of EU directives. These targets include recycling 70 per cent of packaging waste by 2030 and reducing food waste by 50 per cent by 2030. In line with the EU single-use plastics directive, a variety of single-use plastic products, including polystyrene food containers, cups and drink containers, will be banned in 2021.

(d) Response measures

44. Ireland reported on its assessment of the economic and social consequences of its response measures. The Party presented several initiatives aimed at minimizing adverse impacts. Ireland reported that, as an EU member State, its commitments under the Kyoto Protocol are implemented under EU decision 2005/166/EC, which governs the joint fulfilment of commitments under Article 4 of the Kyoto Protocol, and EU decision 280/2004/EC, which covers specific monitoring and reporting requirements for GHG emissions. An impact assessment of new policy initiatives in the EU helps to identify, and

thus limit at an early stage, any potential adverse social, environmental and economic impacts on various stakeholders. In its BR4, the Party reported initiatives relating to the Public Spending Code, in particular the inclusion of a shadow carbon price in public financing decisions and addressing the distributional impacts of Ireland's carbon tax by allocating 38 per cent of the funds raised by the increased carbon tax to programmes for assisting the most vulnerable to and those disproportionally affected by impacts.

45. During the review, Ireland reported some specific measures undertaken to minimize social, environmental and economic impacts on developing countries, such as (1) progressively reducing or phasing out market imperfections, fiscal incentives, tax and duty exemptions and subsidies in all GHG-emitting sectors, taking into account the need for energy price reforms to reflect market prices and externalities, (2) supporting the technological development of non-energy uses for fossil fuels, and supporting developing country Parties in this regard, (3) helping to develop, distribute and transfer fossil fuel or related technologies that emit fewer GHGs, (4) strengthening the capacity of developing country Parties to improve efficiency in upstream and downstream activities relating to fossil fuels, taking into consideration the need to improve the environmental efficiency of these activities, and (5) helping developing country Parties that are highly dependent on the export and consumption of fossil fuels to diversify their economies.

(e) Assessment of adherence to the reporting guidelines

46. The ERT assessed the information reported in the BR4 of Ireland and recognized that the reporting is complete, transparent and thus adhering to the UNFCCC reporting guidelines on BRs. No issues relating to the topics discussed in this chapter of the review report were raised during the review.

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

47. Ireland reported that it intends to use units from market-based mechanisms under the Kyoto Protocol to meet its commitment under the ESD. Given that the contribution of LULUCF activities is not included in the EU's target under the Convention, reporting of contributions of LULUCF activities is not applicable for Ireland. Table 4 illustrates Ireland's ESD emissions and the use of units from market-based mechanisms to achieve its ESD target.

Table 4
Summary of information on the use of units from market-based mechanisms by Ireland to achieve its target

Year	*ESD emissions (kt CO_2 eq)*	*AEA (kt CO_2 eq)*	*Use of units from market-based mechanisms (kt CO_2 eq)*	*Annual AEA surplus/deficit (kt CO_2 eq)*[a]	*Cumulative AEA surplus/deficit (kt CO_2 eq)*
2013	42 206.8	46 891.9	0	4 685.1	4 685.1
2014	41 663.0	45 760.9	0	4 097.9	8 783.1
2015	43 037.2	44 629.9	0	1 592.7	10 375.8
2016	43 798.2	43 498.9	0	–299.3	10 076.5
2017	43 828.7	40 885.1	0	–2 943.6	7 132.9

Sources: Ireland's BR4 and CTF table 4(b), information provided by the Party during the review and EU transaction log (AEAs).

[a] A positive number (surplus) indicates that ESD emissions were lower than the AEA, while a negative number (deficit) indicates that ESD emissions were greater than the AEA.

48. In assessing the progress towards achieving the 2020 joint EU target, the ERT noted that Ireland's emission reduction target for the ESD is 20 per cent below the base-year level (see para. 16 above). In 2017, Ireland's emissions covered by the ESD were 7.2 per cent (2,943.6 kt CO_2 eq) above the AEA under the ESD. Ireland indicated that it plans to use market-based mechanisms in the future. Taking the use of market-based mechanisms to date

into account, Ireland has a cumulative surplus of 7,132.9 kt CO_2 eq with respect to its AEAs between 2013 and 2017.

49. The ERT noted that Ireland is making progress towards its ESD target by implementing mitigation actions that are delivering some emission reductions. The ERT also noted that Ireland's emissions in 2016 and 2017 were greater than its AEAs for those years and therefore it may face challenges in achieving its ESD target without using market-based mechanisms. During the review, Ireland indicated that it plans to use units from market-based mechanisms (certified emission reductions and emission reduction units) to help it meet its ESD targets. Ireland reported that, as at 21 April 2020, it held 6.2 million ESD-eligible international credits in the national registry, consisting of both certified emission reductions and emission reduction units. During the review, Ireland indicated that under the rules of the ESD it may use up to 12.3 million international credits to comply with its ESD target. As a result, Ireland had planned to purchase an additional 6.1 million international credits, but notes that these volumes may change as a result of the disruption caused by the coronavirus disease 2019.

(b) Assessment of adherence to the reporting guidelines

50. The ERT assessed the information reported in the BR4 of Ireland and identified an issue relating to completeness and thus adherence to the UNFCCC reporting guidelines on BRs. The finding is described in table 5.

Table 5
Findings on estimates of emission reductions and removals and on the use of units from market-based mechanisms and land use, land-use change and forestry from the review of the fourth biennial report of Ireland

No.	*Reporting requirement, issue type and assessment*	*Description of the finding with recommendation*
1	Reporting requirement specified in paragraph 9 Issue type: completeness Assessment: recommendation	Ireland did not report any information on total GHG emissions in CTF table 4 but provided a footnote explaining that the information could be found in CTF table 1s3. During the review, the Party indicated that it did not believe CTF table 4 needed to be completed because the LULUCF sector is not part of its target, and explained that the estimates of emissions reported in CTF table 4 would be the same as those reported in CTF table 1s3. The ERT recommends that Ireland improve the completeness of its reporting by including the data on total GHG emissions in CTF table 4 in its next BR.

Note: Item 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 thus adhering to the UNFCCC reporting guidelines on BRs.

3. Projections overview, methodology and results

(a) Technical assessment of the reported information

51. Ireland reported updated projections for 2020 and 2030 relative to actual inventory data for 2017 under the WEM scenario. The WEM scenario reported by Ireland includes implemented and adopted PaMs in place at the end of 2017.

52. In addition to the WEM scenario, Ireland reported the WAM scenario. The WAM scenario includes further implementation of renewable energy and energy efficiency PaMs, including those set out in the National Renewable Energy Action Plan, the National Energy Efficiency Action Plan, the 2017 National Mitigation Plan and the National Development Plan 2018–2027. The definitions provided by Ireland indicate that the scenarios were prepared according to the UNFCCC reporting guidelines on BRs. Ireland did not report a 'without measures' scenario in its BR4.

53. The projections are presented on a sectoral basis, using different sectoral categories from those used in the reporting of mitigation actions. The projections are also provided 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 2020–2030. The projections are also provided in an aggregated format for each sector and for a Party total using GWP values from the AR4.

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

54. The methodology used for the preparation of the projections is very similar to that used for the preparation of the emission projections for the NC7. Projections for the energy sector were prepared using a variety of models: COSMO, a structural econometric model of the Irish economy for determining macroeconomic parameters; PLEXOS, an integrated energy model for modelling the electricity market in Ireland; the energy scenario tool of the Sustainable Energy Authority of Ireland for modelling all other energy; and the BioHeat model of the Sustainable Energy Authority of Ireland for modelling space and water heating in the residential, commercial, public, industry and agriculture sectors.

55. Emission projections for the agriculture sector were prepared using the FAPRI-Ireland model, a partial equilibrium model that captures dynamic interrelationships among variables affecting supply and demand in the main agriculture subsectors of Ireland. It takes account of interactions among agriculture sectors in regional, EU and world markets. For the LULUCF sector, projected emissions were estimated using a land use and land-use change matrix. Emission projections for the waste sector were prepared using a spreadsheet-based model similar to that used in the preparation of the waste inventory emission estimates. Total municipal solid waste volume is the key driver of the model, which projects CH_4 and CO_2 on the basis of the amount of degradable organic carbon in landfill.

56. To prepare its projections, Ireland relied on key underlying assumptions relating to population and population growth, number of households, growth rates of gross domestic product and the price of oil, coal and gas. The assumptions were updated on the basis of the most recent economic developments known at the time of the preparation of the projections. These variables and assumptions were reported in CTF table 5.

57. Ireland provided information on the changes since the submission of its NC7 in the assumptions, methodologies, models and approaches used for the projection scenarios. The key differences relate to updated sectoral activity data, updated macroeconomic parameters and international energy prices and the inclusion of policies adopted and implemented since its NC7.

58. Ireland provided information on sensitivity analyses of the WEM projections. Sensitivity analyses were conducted for the energy, agriculture and waste projections. For the energy projections, assumptions related to average gross domestic product growth were varied by up to 1 percentage point compared with under the WEM and WAM scenarios. International fuel prices were assumed to be much lower, in some instances less than half. For the agriculture sector, the sensitivity analysis assumed a reduction in the national herd (dairy and other cattle) of 10 per cent, while for the waste sector an additional 350,000 t municipal waste was assumed to go to landfill per year, equating to an increase of almost 130 per cent in 2020 compared with under the WEM scenario.

59. According to the sensitivity analyses outlined by Ireland in its BR4, emission levels under the EU ETS were projected to be 1.6 per cent higher, 10.7 per cent lower, 10.9 per cent lower and 8.1 per cent higher in 2020, 2025, 2030 and 2035, respectively, compared with under the WEM scenario. Owing to substantially lower fuel prices in the sensitivity analysis compared with the baseline WEM scenario, emission levels were projected to increase as a result of increased transport activity and increased output in manufacturing industries and the construction sector. Emissions from electricity generation were lower in the sensitivity analysis, resulting in lower total projected emissions under the EU ETS in 2025 and 2030 compared with the baseline WEM scenario.

60. According to the sensitivity analysis, the resulting total ESD emissions were projected to be 1.7, 5.1, 6.7 and 8.0 per cent higher in 2020, 2025, 2030 and 2035, respectively, compared with under the WEM scenario. Emissions were projected to be higher in almost all sectors, most notably in the manufacturing industries and construction, transport, commercial/institutional and residential sectors, whereas projected emissions in the agriculture sector fell by around 7 per cent. The ERT noted that, as agriculture is the only ESD sector for which the sensitivity analysis explores lower activity levels, this is an expected outcome. A sensitivity analysis that tested an increase in livestock population would be likely to lead to higher projected emissions from the sector.

(c) Results of projections

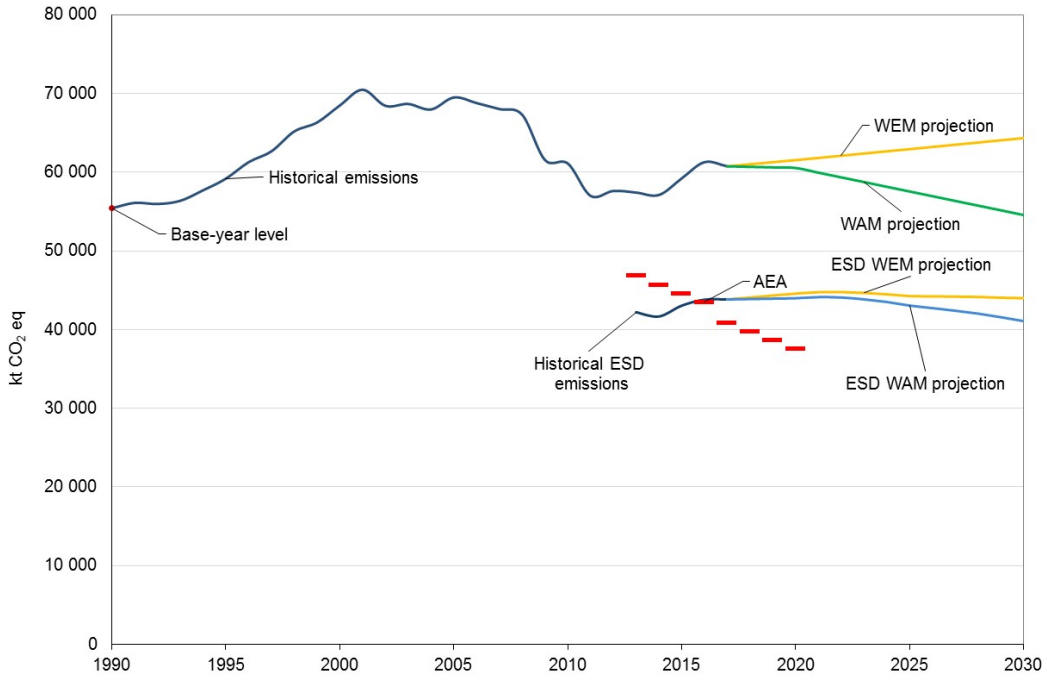
61. The projected emission levels under different scenarios and information on the quantified economy-wide emission reduction target are presented in table 6 and figure 1.

Table 6
Summary of greenhouse gas emission projections for Ireland

	Total GHG emissions		*Emissions under the ESD*	
	GHG emissions (kt CO_2 eq per year)	*Change in relation to 1990 level (%)*	*ESD emissions (kt CO_2 eq per year)*	*Comparison to 2020 AEA (%)*
2020 AEA under the ESD[a]	NA	NA	37 651.3	100.0
Inventory data 1990	55 417.06	–	NA	NA
Inventory data 2017	60 743.73	9.6	43 830.3	116.4
WEM projections for 2020	61 532.48	11.0	44 570.0	118.4
WAM projections for 2020	60 532.91	9.2	43 980.0	116.8
WEM projections for 2030	64 326.66	16.1	43 990.0	NA
WAM projections for 2030	54 555.43	–1.6	41 080.0	NA

Sources: Ireland's BR4 and CTF table 6. Historical and projected ESD emission data were provided by Ireland during the review.
Note: The projections are for GHG emissions excluding LULUCF and excluding indirect CO_2.
[a] The quantified economy-wide emission reduction target under the Convention is a joint target of the EU and its member States. The target is to reduce emissions by 20 per cent compared with the base-year (1990) level by 2020. Ireland's target under the ESD is 20 per cent below the 2005 level by 2020.

Figure 1
Greenhouse gas emission projections reported by Ireland



Sources: EU transaction log (AEAs) and Ireland's BR4 and CTF tables 1 and 6. Historical and projected ESD emission data were provided by Ireland during the review.

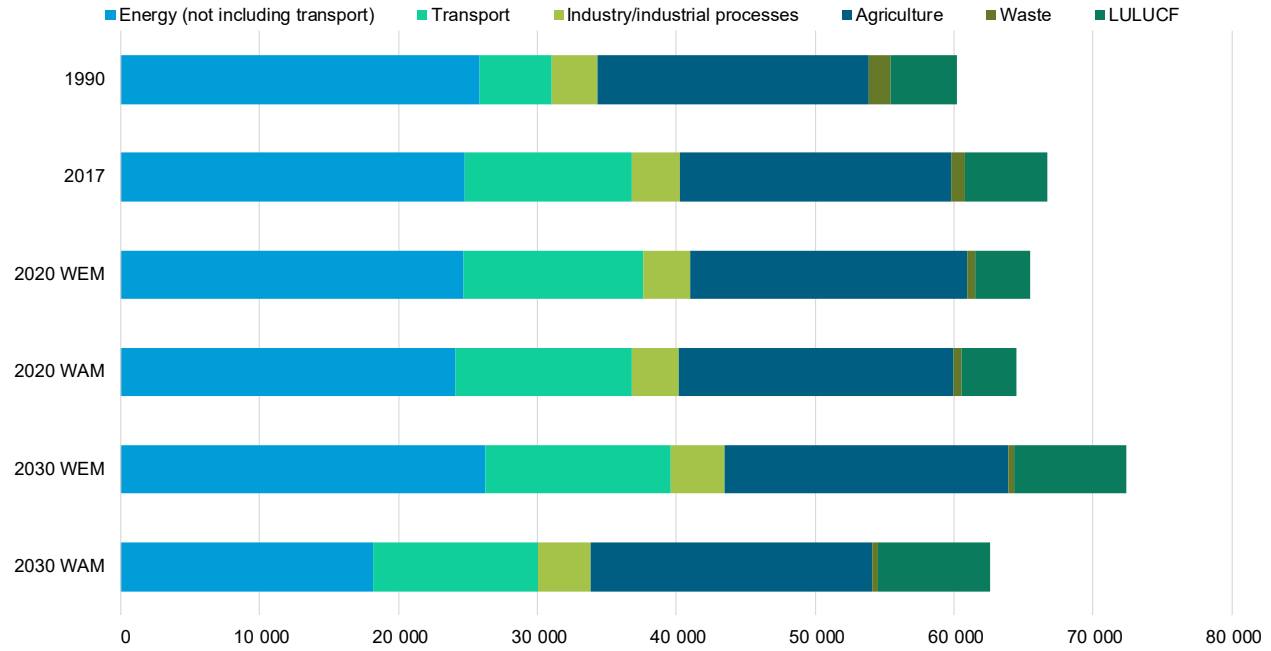
62. Ireland's total GHG emissions excluding LULUCF in 2020 and 2030 are projected under the WEM scenario to increase by 11.0 and 16.1 per cent, respectively, above the 1990 level. Under the WAM scenario, emissions in 2020 and 2030 are projected to be 9.2 per cent higher and 1.6 per cent lower than those in 1990, respectively.

63. Ireland's target under the ESD is to reduce ESD emissions by 20 per cent below the 2005 level by 2020 (see para. 16 above). Ireland's AEAs, which correspond to its national emission target for ESD sectors, change from 46,891.93 kt CO_2 eq in 2013 to 37,651.32 kt CO_2 eq for 2020. During the review, Ireland provided updated ESD emission projections.

The projected level of emissions under the WEM and WAM scenarios is 18.4 and 16.8 per cent, respectively, above the AEAs for 2020. On the basis of the projected ESD emissions and further information provided by Ireland during the review, the ERT noted that the Party's cumulative deficit of AEAs for 2013–2020 could range from 10,316 to 11,286 kt CO_2 eq, which suggests that Ireland may need to use the flexibility allowed under the ESD to meet its target.

64. Ireland presented the WEM and WAM scenarios by sector for 2020 and 2030, as summarized in figure 2 and table 7.

Figure 2
Greenhouse gas emission projections for Ireland presented by sector



Source: Ireland's BR4 CTF table 6.

Table 7
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)	25 876.09	24 704.78	24 122.58	26 287.59	18 196.90	–4.5	–6.8	1.6	–29.7
Transport	5 150.94	12 908.01	12 682.53	13 352.39	11 863.74	150.6	146.2	159.2	130.3
Industry/industrial processes	3 309.41	3 381.38	3 381.38	3 799.64	3 799.64	2.2	2.2	14.8	14.8
Agriculture	19 533.83	19 956.40	19 764.51	20 440.77	20 248.88	2.2	1.2	4.6	3.7
LULUCF	4 767.98	3 959.99	3 959.99	8 056.79	8 056.79	–16.9	–16.9	69.0	69.0
Waste	1 546.80	581.90	581.90	446.27	446.27	–62.4	–62.4	–71.1	–71.1
Total GHG emissions excluding LULUCF	**55 417.06**	**61 532.48**	**60 532.91**	**64 326.66**	**54 555.43**	**11.0**	**9.2**	**16.1**	**–1.6**

Source: Ireland's BR4 CTF table 6.

65. According to the projections reported for 2020 under the WEM scenario, the most significant emission reductions are expected to occur in the energy sector, amounting to projected reductions of 4.5 per cent between 1990 and 2020. Emission reductions are also projected for the waste and LULUCF sectors, amounting to 62.4 and 16.9 per cent,

respectively, between 1990 and 2020. Emissions in all other sectors are projected to increase compared with the 1990 level. The pattern of projected emissions reported for 2030 under the same scenario changes. Emissions in the waste sector are projected to continue to fall, dropping by 71 per cent between 1990 and 2030 owing to increased CH_4 recovery from solid waste disposal. Emissions in all other sectors, including in the energy and LULUCF sectors, are projected to increase owing to growing energy demand and decreasing afforestation rates combined with increased harvesting.

66. If additional measures are considered (i.e. under the WAM scenario), the patterns of emission reductions by 2020 presented by sector remain the same, with emission reductions projected for the energy, LULUCF and waste sectors. The pattern of projected emissions reported for 2030 under the WAM scenario changes slightly. Emissions in the energy sector are projected to fall by 7,679.19 kt CO_2 eq between 1990 and 2030 owing to an increase in the share of renewable energy in electricity generation by 2030 and the replacement of coal with natural gas in electricity generation. Further energy efficiency measures in the manufacturing industries and construction, commercial/institutional/services and residential sectors are also projected to lead to emission reductions. Emissions in the waste sector are projected to fall by the same amount as under the WEM scenario. Emissions in all other sectors are projected to increase.

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

Table 8
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*	
Sector	*1990*	*WEM*	*WAM*	*WEM*	*WAM*	*WEM*	*WAM*	*WEM*	*WAM*
CO_2[a]	32 891.15	39 761.84	38 958.51	42 373.11	32 828.49	20.9	18.4	28.8	–0.2
CH_4	14 760.96	13 887.44	13 886.22	13 974.55	13 966.49	–5.9	–5.9	–5.3	–5.4
N_2O	7 729.72	6 896.23	6 701.21	7 189.44	6 970.89	–10.8	–13.3	–7.0	–9.8
HFCs	1.23	902.04	902.04	689.85	689.85	73 236.6	73 236.6	55 985.4	55 985.4
PFCs	0.12	51.19	51.19	66.67	66.67	42 558.3	42 558.3	55 458.3	55 458.3
SF_6	33.88	32.37	32.37	31.26	31.26	–4.5	–4.5	–7.7	–7.7
NF_3	–	1.37	1.37	1.78	1.78	–	–	–	–
Total GHG emissions without LULUCF	**55 417.06**	**61 532.48**	**60 532.91**	**64 326.66**	**54 555.43**	**11.0**	**9.2**	**16.1**	**–1.6**

Source: Ireland's BR4 CTF table 6.
[a] Ireland did not include indirect CO_2 emissions in its projections.

68. For 2020, the most significant reductions under the WEM scenario are projected for CH_4 and N_2O emissions: 5.9 and 10.8 per cent between 1990 and 2020, respectively. SF_6 emissions are also projected to decline by 4.5 per cent between 1990 and 2020. Emissions are projected to increase for all other direct GHGs.

69. For 2030, the most significant reductions under the WEM scenario are projected for CH_4 and N_2O emissions: 5.3 and 7.0 per cent between 1990 and 2030, respectively. SF_6 emissions are also projected to decrease by 7.7 per cent between 1990 and 2030. Emissions are projected to increase for all other direct GHGs.

70. If additional measures are considered (i.e. under the WAM scenario), the patterns of emission reductions by 2020 presented by gas remain the same. For 2030, the patterns of emission reductions change slightly, with reductions also projected for CO_2 emissions, of 62.66 kt CO_2 eq (0.2 per cent) between 1990 and 2030. This is due to further policy implementation targeting energy emissions, including energy efficiency and renewable energy measures.

(d) Assessment of adherence to the reporting guidelines

71. The ERT assessed the information reported in the BR4 of Ireland and identified issues relating to completeness and thus adherence to the UNFCCC reporting guidelines on BRs. The findings are described in table 9.

Table 9
Findings on greenhouse gas emission projections reported in the fourth 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 34 Issue type: transparency Assessment: recommendation	In the BR4, the sectors used in reporting emission projections differed from those used in the PaMs section. The Party reported projections for energy industries, manufacturing and construction, transport, commercial/institutional/services, residential, fugitive emissions from fuels, IPPU, agriculture, LULUCF and waste, while PaMs were reported for energy, transport, enterprise/industry/industrial processes, agriculture, waste and built environment. During the review, Ireland explained that the inconsistency is due to the fact that the emissions inventory and projections were prepared by the Environmental Protection Agency, following GHG inventory sectors, while the PaMs section of the BR4 was prepared in line with policy documents under the National Mitigation Plan and Climate Action Plan, whereby sectoral mitigation measures are developed and adopted by the responsible Government ministers, and it was not possible to fully align the sectoral categories. The ERT recommends that the Party increase the transparency of its reporting by using the same sectors in the PaMs section and in the emission projections, to the extent possible, in the next BR. The ERT considers that this will facilitate understanding the impacts of the Party's existing and planned PaMs on emissions.
2	Reporting requirement specified in paragraph 35 Issue type: completeness Assessment: encouragement	The Party did not report projections for indirect GHGs such as carbon monoxide, nitrogen oxides and non-methane volatile organic compounds or sulfur oxides in its BR4. In its BR4 and during the review, Ireland explained that the preparation of projections for indirect GHGs is under consideration and that it will consider including such projections in the next BR depending on information available at the time. The ERT reiterates the encouragement from the previous review report for the Party to improve the completeness of its reporting by including projections of indirect GHGs in the next BR.
3	Reporting requirement specified in paragraph 43 Issue type: completeness Assessment: encouragement	The Party provided information for each of the models used for preparing projections in the BR4, including the sector for which the model or approach was used; the type and nature of the model; a description of the model; and its interaction with other models and approaches, where relevant. References were provided to more detailed information on the models and approaches used. The Party did not report on the strengths and weaknesses of the models and approaches in its BR4. During the review, Ireland provided information on the strengths and weaknesses of the PLEXOS and COSMO models. Ireland noted that it would provide a description of the strengths and weaknesses of the FAPRI-Ireland model in its next submission. The ERT encourages the Party to include a summary of the strengths and weaknesses of the models and approaches used in the next BR.

Note: Item listed under reporting requirement refers to the relevant paragraph of the UNFCCC reporting guidelines on NCs, as per para. 11 of the UNFCCC reporting guidelines on BRs. The reporting on the requirements not included in this table is considered to be complete, transparent and thus adhering to the UNFCCC reporting guidelines on NCs and on BRs.

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

1. Technical assessment of the reported information

(a) Approach and methodologies used to track support provided to non-Annex I Parties

72. In its BR4 Ireland reported information on its provision of financial, technological and capacity-building support to non-Annex I Parties.

73. Ireland provided details on how the support it has provided is "new and additional", including how it has determined resources as being "new and additional". As Ireland's budgeting system makes no assumption that funding for a particular area or theme in a given year will also be made available in subsequent years, all public finance for climate change provided on an annual basis is considered "new and additional".

74. Ireland reported the 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. It explained how it tracks finance for adaptation and mitigation using the Rio markers to identify and score disbursements with respect to climate relevance as well as biodiversity, desertification and disaster risk reduction.

75. The BR4 includes information on the national approach to tracking the provision of support, indicators, delivery mechanisms used and allocation channels tracked. Ireland included information on how it continues to refine its approach to tracking climate support and methodologies as compared with what was reported in its NC7. It explains how, for example, the preparation of the figures for 2017 was outsourced to an external consultancy, while the 2018 figures were compiled internally by the Government during 2019, with internal systems currently being reviewed to identify opportunities to improve the process. Moreover, Ireland supported the Adaptation Finance Accountability Initiative of the World Resources Institute, which is working on tracking adaptation finance more effectively.

76. Ireland described in detail the methodology and underlying assumptions used for collecting and reporting information on financial support, including processes, guidelines and indicators. The BR4 describes the mapping methodology used for preparing information on international climate support provided through both bilateral assistance and civil society expenditure. This methodology makes use of the Rio markers and involves the Finance and Climate Units of the Department of Foreign Affairs and Trade, as well as the missions, non-governmental organizations and project partners in the countries receiving assistance. The Rio markers are applied to programmes or projects on the basis of the objective, description, core activities and identified indicators. The BR4 also explains how Ireland uses the Rio markers for multilateral support. The ERT noted that Ireland's reporting on its provision of support to developing country Parties, particularly with regard to its methodology for tracking climate finance, has improved substantially since its BR3.

(b) Financial resources

77. Ireland reported information on its provision of financial support to non-Annex I Parties as required under the Convention, including on financial support provided, committed and pledged, allocation channels and annual contributions.

78. Ireland described how its resources address the adaptation and mitigation needs of non-Annex I Parties. It also described how those resources assist non-Annex I Parties in mitigating GHG emissions and adapting to the adverse effects of climate change and any economic and social consequences of response measures, and contribute to technology development and transfer and capacity-building related to mitigation and adaptation. Ireland develops a three- to five-year country-specific strategy document with each of its bilateral support partners through a consultative process with local government, civil society and private sector actors. These strategies include comprehensive climate risk assessments for each partner country, which were finalized in 2018.

79. 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 on the basis of its new international development policy strategy, entitled "A Better World". This strategy highlights climate action as a priority in the light of the threat that climate change poses to the achievement of the Sustainable Development Goals. Ireland's financing targets focus on gender and climate, climate-responsive social protection measures, food and nutrition security, and disaster risk reduction, and are centred around adaptation in the least developed countries. Table 10 summarizes the information reported by Ireland on its provision of financial support.

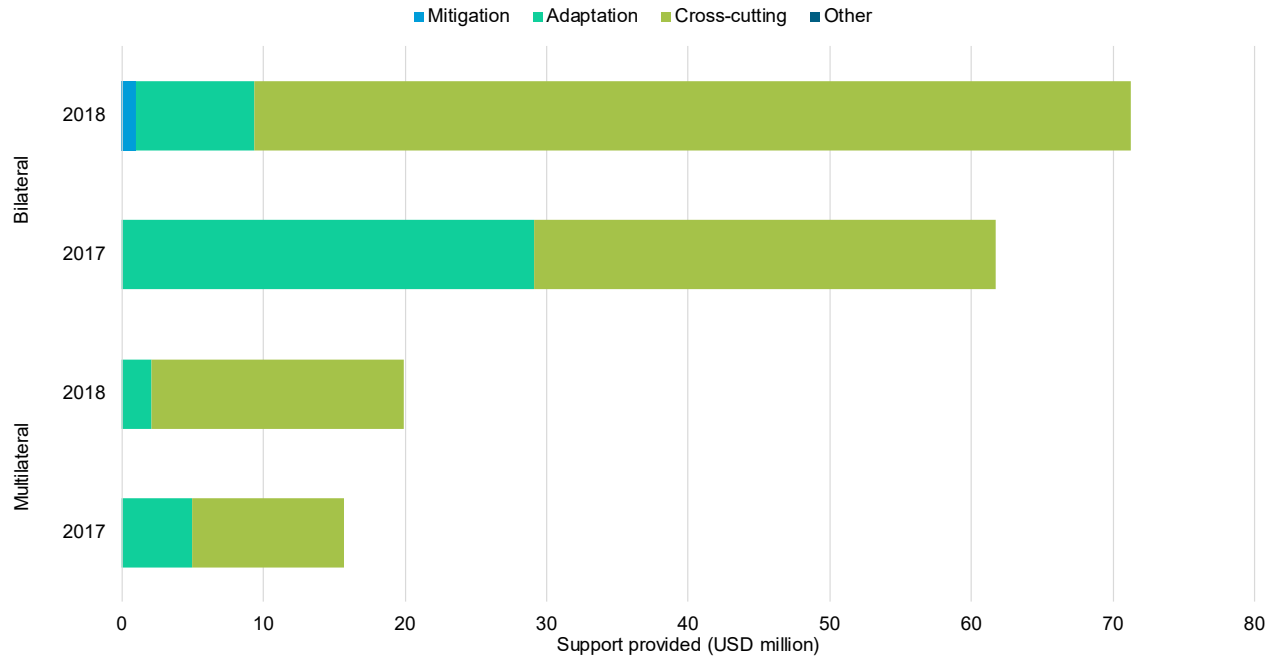
80. Ireland reported on its climate-specific public financial support, totalling USD 77.35 million in 2017 and USD 91.16 million in 2018. It has increased the level of its financial support by 61 per cent since the BR3, as reported in its local currency. Ireland's international climate finance has steadily increased since 2016, and has now surpassed the commitment made in 2015 to provide EUR 175 million by 2020. During the reporting period, Ireland placed a particular focus on the provision of support to the least developed countries, primarily in sub-Saharan Africa, both directly through bilateral assistance programmes and indirectly through contributions to the LDCF, to which it allocated USD 1.13 million in 2017 and 1.18 million in 2018, and to the LEG. The ERT noted that Ireland reported in CTF table 7(b) its bilateral support allocated to Annex I Parties in 2017 and 2018. Information on financial support from the public sector provided through multilateral and bilateral channels and the allocation of that support by target area is presented in figure 3 and table 11.

Table 10
Summary of information on provision of financial support by Ireland in 2017–2018
(Millions of United States dollars)

Allocation channel of public financial support	*Year of disbursement*	
	2017	*2018*
Official development assistance	838.03	934.25
Climate-specific contributions through multilateral channels, including:	6.89	5.02
LDCF	1.13	1.18
Adaptation Fund	3.34	0.35
Green Climate Fund	2.25	2.36
Trust Fund for Supplementary Activities	0.00	1.00
Other multinational climate change funds	0.17	0.12
Financial institutions, including regional development banks	7.38	10.74
United Nations bodies	1.38	4.17
Climate-specific contributions through bilateral, regional and other channels	61.69	71.22

Sources: BR4 CTF tables and Query Wizard for International Development Statistics, available at http://stats.oecd.org/qwids/.

Figure 3
Provision of financial support by Ireland in 2017–2018



Source: Ireland's BR4 CTF tables 7, 7(a) and 7(b).

Table 11
Summary of information on channels of financial support used in 2017–2018 by Ireland
(Millions of United States dollars)

	Year of disbursement				*Share (%)*	
Allocation channel of public financial support	*2017*	*2018*	*Difference*	*Change (%)*	*2017*	*2018*
Detailed information by type of channel						
Multilateral channels						
Mitigation	–	–	–	–	–	–
Adaptation	4.96	2.13	–2.84	–57.2	31.7	10.7
Cross-cutting	10.70	17.82	7.12	66.6	68.3	89.3
Other	–	–	–	–	–	–
Total multilateral	**15.66**	**19.94**	**4.29**	**27.4**	**100.0**	**100.0**
Bilateral channels						
Mitigation	–	0.99	–	–	–	1.4
Adaptation	29.10	8.33	–20.77	–71.4	47.2	11.7
Cross-cutting	32.59	61.90	29.30	89.9	52.8	86.9
Other	–	–	–	–	–	–
Total bilateral	**61.69**	**71.22**	**9.53**	**15.4**	**100.0**	**100.0**
Total multilateral and bilateral	**77.35**	**91.16**	**13.81**	**17.9**	**100.0**	**100.0**

Source: Ireland's BR4 CTF tables 7, 7(a) and 7(b).

81. The BR4 includes detailed information on the financial support provided though multilateral, bilateral and regional channels in 2017 and 2018. More specifically, Ireland contributed through multilateral channels, as reported in the BR4 and in CTF table 7(a), USD 15.66 million and 19.94 million for 2017 and 2018, respectively. The contributions were made to specialized multilateral climate change funds, such as the Adaptation Fund, the Green Climate Fund and the LDCF, through multilateral financial institutions (particularly

the World Bank and the African Infrastructure Investment Bank), as well as through specialized United Nations bodies.

82. The BR4 and CTF table 7(b) include detailed information on the total financial support provided though bilateral channels (USD 61.69 million and USD 71.22 million) in 2017 and 2018, respectively. Ethiopia, Malawi and the United Republic of Tanzania were among the recipients of the largest amounts of bilateral funding in these years.

83. The BR4 provides information on the types of support provided. In terms of the focus of public financial support, as reported in CTF table 7 for 2017, the shares of the total public financial support allocated for adaptation and cross-cutting projects were 44.0 and 56.0 per cent, respectively. In addition, 20.2 per cent of the total public financial support was allocated through multilateral channels and 79.8 per cent through bilateral, regional and other channels. In 2018, the shares of total public financial support allocated for mitigation, adaptation and cross-cutting projects were 1.1, 11.5 and 87.4 per cent, respectively. Furthermore, 21.9 per cent of the total public financial support was allocated through multilateral channels and 78.1 per cent through bilateral, regional and other channels.

84. The ERT noted that in 2017 a majority of financial contributions made through multilateral channels were allocated to agriculture, as reported in CTF table 7(a). The corresponding allocations for 2018 were directed mostly to the agriculture, forestry and water and sanitation sectors. In 2017 a majority of financial contributions made through bilateral and regional channels were allocated to agriculture, as reported in CTF table 7(b). The corresponding allocations for 2018 were directed mostly to the agriculture, forestry, energy and other (livelihoods and rural development) sectors.

85. CTF tables 7(a) and 7(b) include information on the types of financial instrument used for providing assistance to developing countries, which are primarily in the form of grants and, to a much lesser degree, technical assistance. The ERT noted that the grants provided in 2017 and 2018 accounted for all of the total public financial support.

86. Ireland clarified that private finance is mainly mobilized for the environment and energy sectors. It reported on how it uses public funds to promote private sector financial support for developing countries to increase mitigation and adaptation efforts in developing countries, including through support for various initiatives such as Financial Centres for Sustainability of the United Nations Environment Programme and the European Climate Innovation Summit. Ireland's Department of Finance also launched the International Financial Services 2020 Action Plan for 2018, which supports initiatives to promote investment in sustainable finance. The Party highlighted its success stories in reporting on private financial flows leveraged by bilateral climate finance for mitigation and adaptation activities in non-Annex I Parties. These flows amounted to a total of EUR 487,000 in additional private investment in climate-relevant industries as a result of grants for sustainable coffee production and the repurposing of mango seed husks for sustainable energy in Ethiopia and Kenya, respectively.

(c) Technology development and transfer

87. 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. The ERT identified in Ireland's BR4 support that, while not specifically identified as such, provided for the deployment and enhancement of the endogenous capacities and technologies of non-Annex I Parties, including for projects on global water flow monitoring through the Global Environment Monitoring System for freshwater programme; climate-smart agricultural technologies through the CGIAR Research Program on Climate Change, Agriculture and Food Security; and meteorological services through the World Meteorological Organization, for example the provision of appropriate weather information to farmers in person together with advice on agronomy.

88. 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. The Party reported on nine projects and programmes focused mainly on adaptation in the agriculture sector in four countries (Eritrea, Ethiopia, Kenya and Mozambique), eight of which have

been implemented. For example, one project sought to help 6,000 Kenyan smallholders to use mango kernels to produce livestock feed and the by-product of kernel husks as a sustainable energy source, while another project worked on implementing innovative solutions for sustainable livestock production in Mozambique.

89. The ERT noted that Ireland reported on its measures and activities undertaken to promote, facilitate and finance the transfer and deployment of climate-friendly technologies, including on activities implemented or planned since its NC7 and BR3. Ireland also included references to success stories in relation to technology transfer, highlighting for example the World Meteorological Organization project referred to in paragraph 87 above, which, according to evidence, led to higher crop yields in the successive planting seasons. The BR4 also elaborated on project weaknesses, and highlighted the importance of reaching out to female farmers and providing sufficient resources and planning to strengthen institutional capacity.

(d) Capacity-building

90. In its BR4 and CTF table 9, Ireland supplied information on how it has provided capacity-building support for mitigation, adaptation and technology transfer. Ireland described individual measures and activities related to capacity-building support in textual and tabular format. Examples include support for potato farming in Kenya and Ethiopia, milk product development and training in Kenya, adoption of cookstoves in Malawi, sustainable coffee production methods in Viet Nam, and adaptation finance tracking in Uganda and Ethiopia.

91. Ireland reported that it has supported climate-related capacity development activities focused on building human and institutional capacity across all sectors, particularly relating to adaptation. Most projects and programmes mentioned are in the agriculture sector and in the field of education. During the review, Ireland explained how it has responded to the existing and emerging capacity-building needs of non-Annex I Parties by following the principles of stakeholder participation, national ownership and country-driven demand and acting at both the national and subnational level. It noted that a number of Irish-funded initiatives are led by local, regional and national institutions with relevant expertise. Ireland also noted that its representation in the LEG has allowed it to better understand the concerns and experience of its developing country counterparts, thereby putting it in a position to ensure that key service delivery mechanisms such as the NDC Partnership and the United Nations Development Programme provide adequate support for meeting country needs.

2. Assessment of adherence to the reporting guidelines

92. The ERT assessed the information reported in the BR4 of Ireland and identified issues relating to completeness, transparency and thus adherence to the UNFCCC reporting guidelines on BRs. The findings are described in table 12.

Table 12
Findings on provision of support to developing country Parties from the review of the fourth 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	The ERT found in Ireland's BR4 examples of support that appear to provide for the development and enhancement of the endogenous capacities and technologies of non-Annex I Parties, but they was not identified in the reporting as such support.
	Issue type: transparency	During the review, Ireland noted that its international funding supports country- and sector-specific action and technology that contribute to the development and enhancement of partner countries, particularly in relation to climate resilience.
	Assessment: recommendation	The ERT recommends that Ireland provide in its next BR information that clearly identifies its support of the development and enhancement of the endogenous capacities and technologies of non-Annex I Parties. The ERT noted that the Party could, for example, report on whether, in providing its support, it has used technologies developed within the country receiving support or was assisted by a

No.	Reporting requirement, issue type and assessment	Description of the finding with recommendation or encouragement
		team of in-country and external individuals, or whether technologies were developed elsewhere and adapted to local needs and conditions.
2	Reporting requirement specified in paragraph 23 Issue type: completeness Assessment: recommendation	Ireland reported information on the capacity-building support it has provided to non-Annex I Parties in its BR4 in textual and tabular format, but did not report on how this capacity-building support responds to the existing and emerging capacity-building needs identified by non-Annex I Parties. During the review, Ireland explained that it assists in identifying capacity needs by working with partners such as the LEG and the International Institute for Environment and Development. The Party also explained that the country strategies reported in its BR4 as helping to identify sustainable development needs in cooperation with partner counties include capacity support. The ERT recommends that Ireland report in its next BR, to the extent possible, on how the capacity-building support it has provided to non-Annex I Parties responds to the existing and emerging capacity-building needs identified by non-Annex I Parties.

Note: Item 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 thus adhering to the UNFCCC reporting guidelines on BRs.

III. Conclusions and recommendations

93. The ERT conducted a technical review of the information reported in the BR4 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 the Party's quantified economy-wide emission reduction target; assumptions, conditions and methodologies related to the attainment of the target; the progress of Ireland towards achieving its target; and the Party's provision of support to developing country Parties.

94. Ireland's total GHG emissions excluding LULUCF and including indirect CO_2 covered by its quantified economy-wide emission reduction target were estimated to be 9.9 per cent above its 1990 level, whereas total GHG emissions including LULUCF were 8.0 per cent above its 1990 level, in 2018. Emission increases were driven by growth in CO_2 emissions from fossil fuel use, particularly from manufacturing and transport. Those factors outweighed the effects of improvements in waste management.

95. 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 GWP 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.

96. Under the ESD, Ireland has a target of reducing its emissions by 20 per cent below the 2005 level by 2020. The 2013–2020 progression in Ireland's AEAs (its national emission target under the ESD) is 46,891.9–37,651.3 kt CO_2 eq.

97. Ireland reported on the EU's joint 2030 targets under the EU ETS and EU effort-sharing regulation. Moreover, the Party has a commitment under its Climate Action Plan to enact a 2050 target into law in 2020.

98. Ireland's main policy framework relating to energy and climate change is laid down in the EU climate and energy package, which includes the revised EU ETS and the ESD. Key national policies supporting Ireland's climate change goals includes the Climate Action Plan, supported by specific actions and measures in all sectors of the economy aimed at reducing GHG emissions and meeting Ireland's 2030 emission targets, as well as by the National Development Plan, which prioritizes the transition to a low-carbon and climate-resilient society as a strategic investment for 2018–2027. The mitigation actions with the most

significant mitigation impact are related to increasing the share of renewable energy in electricity generation and transport, the supplier obligation scheme aimed at increasing end-use efficiency and the building regulations (2002) aimed at improving the minimum efficiency of new dwellings.

99. In 2017, Ireland's ESD emissions were 7.2 per cent (2,943.6 kt CO_2 eq) above the AEA under the ESD. Taking the use of market-based mechanisms for 2013–2017 into account, Ireland has a cumulative surplus of 7,132.9 kt CO_2 eq with respect to its AEAs. The ERT noted that, to achieve its target under the ESD, Ireland plans to use units from market-based mechanisms to help it meet its targets under the ESD. During the review, Ireland reported that, to date, Ireland holds 6.2 million ESD-eligible international credits in the national registry.

100. The GHG emission projections provided by Ireland in its BR4 correspond to the WEM and WAM scenarios. Under these scenarios, emissions are projected to be 11.0 and 9.2 per cent above the 1990 level by 2020, respectively. According to the projections under the WEM scenario, ESD emissions are estimated to reach 44,570.0 kt CO_2 eq by 2020. Under the WAM scenario, Ireland's emissions from ESD sectors in 2020 are projected to be 43,980.0 kt CO_2 eq. The projected level of emissions under the WEM and WAM scenarios is 18.4 and 16.8 per cent, respectively, above the AEAs for 2020. The ERT noted that the Party's cumulative deficit of AEAs for the 2013–2020 period could range from 10,316 to 11,286 kt CO_2 eq, depending on whether the WAM or WEM scenario is taken into account.

101. Ireland continues to provide climate financing to developing countries in line with its new international development strategy, entitled "A Better World". It has increased its contributions by 61 per cent since the BR3; its public financial support in 2017 and 2018 totalled USD 77.35 million and USD 91.16 million per year, respectively. For those years, Ireland provided more support for adaptation than for mitigation. The biggest share of financial support went to projects and programmes in the agriculture sector, followed by cross-cutting projects and programmes.

102. Ireland continues to provide information on support for technology development and transfer and capacity-building. Priority in terms of technological support was given to agricultural projects related to adaptation in Eritrea, Ethiopia, Kenya and Mozambique. Priority in terms of capacity-building support was given to agricultural projects related to adaptation in Viet Nam and several African countries. A key project was the implementation of innovative solutions for sustainable livestock production in Mozambique. Also a good example of support for capacity-building is the promotion of sustainable coffee production technologies in Viet Nam.

103. 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) Including information on total GHG emissions in CTF table 4 while reporting on the use of units from market-based mechanisms and LULUCF (see issue 1 in table5);

(ii) Reporting, to the extent possible, on how the capacity-building support it has provided to non-Annex I Parties responds to their existing and emerging capacity-building needs (see issue 2 in table 12);

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

(i) Reporting on PaMs and emission projections using the same sectors, to the extent possible (see issue 1 in table 9);

(ii) Providing information that clearly identifies the support provided for developing and enhancing the endogenous capacities and technologies of non-Annex I Parties (see issue 1 in table 12);

(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

2019 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-2019.

2020 GHG inventory submission of Ireland. Available at https://unfccc.int/ghg-inventories-annex-i-parties/2020.

BR3 of Ireland. Available at https://unfccc.int/documents/64965.

BR4 of the EU. Available at https://unfccc.int/BRs.

BR4 of Ireland. Available at https://unfccc.int/BRs.

BR4 CTF tables of Ireland. Available at https://unfccc.int/BRs.

"Common tabular format for 'UNFCCC biennial reporting guidelines for developed country Parties'". Annex to decision 19/CP.18. Available at https://unfccc.int/resource/docs/2012/cop18/eng/08a03.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.

European Green Deal. Available at https://ec.europa.eu/info/files/communication-european-green-deal_en.

"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.

Report on the individual review of the annual submission of Ireland submitted in 2018. FCCC/ARR/2018/IRL. Available at https://unfccc.int/process-and-meetings/transparency-and-reporting/reporting-and-review-under-the-convention/greenhouse-gas-inventories-annex-i-parties/inventory-review-reports/inventory-review-reports-2018.

Report on the technical review of the third biennial report of Ireland. FCCC/TRR.3/IRL. Available at https://unfccc.int/process/transparency-and-reporting/reporting-and-review-under-the-convention/national-communications-and-biennial-reports--annex-i-parties/international-assessment-and-review/review-reports.

"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.

B. Additional information provided by the Party

Responses to questions during the review were received from Emer Griffin (Department of Communications, Climate Action and Environment of Ireland), including additional material. The following documents[1] were provided by Ireland:

"Ireland's Final Greenhouse Gas Emissions, 1990-2018". Available at http://www.epa.ie/pubs/reports/air/airemissions/ghg2018/Ireland%20GHG%201990-2018%20Final%20Inventory_April%202020.pdf.

[1] Reproduced as received from the Party.