



COMPLIANCE COMMITTEE

CC/ERT/2009/8
15 December 2009

**Report of the centralized in-depth review of the fourth national
communication of Ireland**

Note by the secretariat

The report of the centralized in-depth review of the fourth national communication of Ireland was published on 8 December 2009. For purposes of rule 10, paragraph 2, of the rules of procedure of the Compliance Committee (annex to decision 4/CMP.2, as amended by decision 4/CMP.4), the report is considered received by the secretariat on the same date. This report, FCCC/IDR.4/IRL, contained in the annex to this note, is being forwarded to the Compliance Committee in accordance with section VI, paragraph 3, of the annex to decision 27/CMP.1.



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**Report of the centralized in-depth review of
the fourth national communication of Ireland**

According to decision 4/CP.8, Parties included in Annex I to the Convention are requested to submit to the secretariat, in accordance with Article 12, paragraphs 1 and 2, of the Convention, a fourth national communication by 1 January 2006. This report presents the results of the in-depth review of the fourth national communication of Ireland conducted by an expert review team in accordance with relevant provisions of the Convention and Article 8 of the Kyoto Protocol.

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I. Introduction and summary

A. Introduction

1. Ireland has been a Party to the Convention since 1994 and to its Kyoto Protocol since 2002. Within the burden-sharing agreement of the European Union (EU) for meeting commitments under the Kyoto Protocol, Ireland committed itself to limiting the growth in its greenhouse gas (GHG) emissions to 13 per cent in relation to the 1990 level during the first commitment period from 2008 to 2012.
2. This report covers the centralized in-depth review (IDR) of the fourth national communication (NC4) of Ireland, coordinated by the UNFCCC secretariat, in accordance with decision 7/CP.11. The review took place from 11 to 16 May 2009 in Bonn, Germany, and was conducted by the following team of nominated experts from the UNFCCC roster of experts: Ms. Eglantina Bruci (Albania), Mr. Ture Hammar (Denmark), Ms. Erika Hasznos (Hungary), Ms. Eva Jernbäcker (Sweden), Ms. Inga Kindsigo (Estonia), Mr. Guy Midgeley (South Africa), Mr. Dennis Rudov (Belarus), Mr. Evren Turkmenoglu (Turkey), Ms. Katalin Zaim (United Nations Development Programme) and Mr. Ji Zou (China). Ms. Bruci and Mr. Hammar were the lead reviewers. The review was coordinated by Mr. Harald Diaz-Bone (UNFCCC secretariat).
3. During the IDR, the expert review team (ERT) examined each part of the NC4. The ERT also evaluated the information contained in Ireland's report demonstrating progress (RDP) in achieving its commitments under the Kyoto Protocol, and the supplementary information provided by Ireland under Article 7, paragraph 2, of the Kyoto Protocol.
4. In accordance with the guidelines for review under Article 8 of the Kyoto Protocol (decision 22/CMP.1), a draft version of this report was communicated to the Government of Ireland, which provided comments that were considered and incorporated, as appropriate, in this final version of the report.

B. Summary

5. The ERT noted that Ireland's NC4 complies in general with the "Guidelines for the preparation of national communications by Parties included in Annex I to the Convention, Part II: UNFCCC reporting guidelines on national communications" (hereinafter referred to as the UNFCCC reporting guidelines). As required by decisions 22/CP.7 and 25/CP.8, the RDP provides clear information on the progress made by Ireland in achieving its commitments under the Kyoto Protocol. Supplementary information required under Article 7, paragraph 2, of the Kyoto Protocol¹ is provided both in the NC4 and the RDP. The ERT acknowledged a high degree of coherent and consistent reporting.

1. Completeness

6. The ERT noted that the NC4 covers all sections required by the UNFCCC reporting guidelines. The ERT further noted that Ireland's RDP contains all parts stipulated by decisions 22/CP.7 and 25/CP.8. Furthermore, the ERT noted that Ireland has provided the supplementary information required under Article 7, paragraph 2.

2. Timeliness

7. The ERT noted with concern that the NC4 was submitted on 30 April 2007 and the RDP on 16 October 2006. Decision 4/CP.8 requested Parties to submit their NC4 by 1 January 2006; decision 22/CP.7 set the same date for Parties to submit their RDP.

¹ Decision 15/CMP.1, annex, chapter II.

3. Transparency

8. The ERT acknowledged that Ireland's NC4 is comprehensive and transparent, well structured and concise. The NC4 provides clear information on all aspects of implementation. It is structured following the outline contained in the annex to the UNFCCC reporting guidelines. In the course of the review, the ERT formulated a number of recommendations that could help Ireland to further increase the transparency of its reporting, such as how to improve transparency in its reporting on policies and measures (PaMs), and projections. The review team noted that the information contained in the NC4 is generally consistent with that contained in the RDP.

II. Technical assessment of the reviewed elements

A. National circumstances relevant to greenhouse gas emissions and removals

9. In its NC4, Ireland has provided a description of its national circumstances, how these national circumstances affect GHG emissions and removals in Ireland, and how national circumstances and changes in national circumstances affect GHG emissions and removals over time. The ERT noted that the main drivers of emission trends in Ireland include economic development, increase in use of natural gas in electricity production and energy efficiency and increase in transport and waste sectors. Table 1 illustrates the national circumstances of the country by providing some indicators relevant to GHG emissions and removals.

Table 1. Indicators relevant to greenhouse gas emissions and removals for Ireland

	1990	1995	2000	2007	Change 1990–2000 (%)	Change 2000–2007 (%)	Change 1990–2007 (%)
Population (million)	3.51	3.6	3.8	4.32	8.26	13.68	23.08
GDP (2000 USD billion using PPP)	55.11	69.12	108.63	158.00	97.11	45.45	186.70
TPES (Mtoe)	10.32	10.74	14.19	15.48	37.52	9.14	50.09
GDP per capita (2000 USD thousand using PPP)	15.70	19.20	28.59	36.57	82.07	27.94	132.94
TPES per capita (toe)	2.94	2.98	3.73	3.58	27.02	-4.00	21.95
GHG emissions without LULUCF (Tg CO ₂ eq)	55.38	59.20	68.95	69.21	24.50	0.37	24.96
GHG emissions with LULUCF (Tg CO ₂ eq)	55.64	59.50	69.09	68.22	24.19	-1.26	22.62
CO ₂ emissions per capita (Mg)	9.23	9.80	11.78	11.00	27.57	-6.63	19.11
CO ₂ emissions per GDP unit (kg per 2000 USD using PPP)	0.59	0.51	0.41	0.30	-29.93	-27.02	-48.87
GHG emissions per capita (Mg CO ₂ eq)	15.85	16.53	18.18	15.79	14.71	-13.15	-0.37
GHG emissions per GDP unit (kg CO ₂ eq per 2000 USD using PPP)	1.00	0.86	0.63	0.44	-36.84	-30.99	-56.42

Data sources: (1) GHG emissions data: Ireland's 2009 greenhouse gas inventory submission; (2) Population, GDP and TPES data: International Energy Agency.

Abbreviations: GDP = gross domestic product, GHG = greenhouse gas, LULUCF = land use, land-use change and forestry, PPP = purchasing power parity, TPES = total primary energy supply.

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

10. Ireland has provided a summary of information on GHG emission trends for the period 1990–2004. This information is consistent with the 2006 national GHG inventory submission. Summary tables, including trend tables for emissions in carbon dioxide equivalent (CO₂ eq) (given in the common reporting format), are provided in an annex to the NC4.

11. Total GHG emissions excluding emissions and removals from land use, land-use change and forestry (LULUCF) increased by 25.0 per cent between the base year and 2007 and total GHG emissions including net emissions or removals from LULUCF increased by 22.6 per cent (see table 2 below). This was mainly attributed to CO₂ emissions, which increased by 46.6 per cent over this period. Emissions of fluorinated gases increased by 1,838.06 per cent, while emissions of nitrous oxide (N₂O) and methane (CH₄) decreased by 15.1 and 3.8 per cent, respectively. Emissions of fluorinated gases accounted for about 0.07 per cent of

total GHG emissions in 1990 and 1.0 per cent in 2007. Table 2 provides an overview of GHG emissions by sector from the base year to 2007 (see also discussion of sectoral trends in chapter II B).

Table 2. Greenhouse gas emissions by sector in Ireland, 1990–2007

	GHG emissions (Gg CO ₂ eq)						Change (%)		Shares ^a by sector (%)	
	1990	1995	2000	2005	2006	2007	1990–2007	2006–2007	1990	2007
1. Energy	31 448.6	34 450.4	43 408.5	46 486.7	46 072.5	46 156.2	46.8	0.2	56.8	66.7
A1. Energy industries	11 576.4	13 835.6	16 648.1	16 219.7	15 427.8	14 853.7	28.3	–3.7	20.9	21.5
A2. Manufacturing industries and construction	4 107.5	4 508.0	5 872.8	6 051.9	5 935.4	6 300.5	53.4	6.2	7.4	9.1
A3. Transport	5 171.0	6 284.3	10 782.7	13 045.0	13 728.2	14 377.5	178.0	4.7	9.3	20.8
A4.–A5. Other	10 462.6	9 708.3	10 019.8	11 113.5	10 879.2	10 564.8	1.0	–2.9	18.9	15.3
B. Fugitive emissions	131.1	114.2	85.1	56.6	101.9	59.7	–54.5	–41.4	0.2	0.1
2. Industrial processes	3 165.6	3 061.5	4 184.9	3 251.9	3 262.4	3 281.7	3.7	0.6	5.7	4.7
3. Solvent and other product use	79.4	84.6	79.0	78.7	81.3	83.2	4.7	2.3	0.1	0.1
4. Agriculture	19 228.6	19 917.5	19 634.9	18 667.7	18 434.6	17 747.9	–7.7	–3.7	34.7	25.6
5. LULUCF	252.0	294.0	142.0	–490.4	–494.0	–984.9	–490.9	99.4	0.5	–1.4
6. Waste	1 461.0	1 688.6	1 643.4	1 773.5	1 831.4	1 936.3	32.5	5.7	2.6	2.8
7. Other	NA	NA	NA	NA	NA	NA				
GHG total with LULUCF	55 635.1	59 496.5	69 092.6	69 768.0	69 188.3	68 220.2	22.6	–1.4	100.5	98.6
GHG total without LULUCF	55 383.1	59 202.5	68 950.7	70 258.4	69 682.3	69 205.2	25.0	–0.7	100.0	100.0

Abbreviations: GHG = greenhouse gas, LULUCF = land use, land-use change and forestry, NA = not available.

Note: The changes in emissions and the shares by sector are calculated using the exact (not rounded) values and may therefore differ from values calculated with the rounded numbers provided in the table.

^a The shares of sectors are calculated relative to GHG emissions without LULUCF; for the LULUCF sector, the negative values indicate the share of GHG emissions that was offset by GHG removals through LULUCF.

12. The major driver for the increase in GHG emissions is the increase in CO₂ emissions from transport. However, the ERT noted that economic growth and GHG emission trends have been decoupled owing to a shift towards natural gas and renewable energy sources (RES) in electricity generation. The large increase in the emissions of fluorinated gases is mainly due to an increased use of HFC-134a in refrigeration and air conditioning and an increased use of perfluorocarbons in the semiconductor manufacturing industry.

B. Policies and measures

13. As required by the UNFCCC reporting guidelines, Ireland has provided in its NC4 well organized information on its package of PaMs that have been implemented, adopted and planned in order to fulfil its commitments under the Convention and its Kyoto Protocol. During the review, the Party provided updated information on its PaMs. Each sector has its own textual description of the principal PaMs. Ireland has also provided information on how it believes its PaMs are modifying longer-term trends in anthropogenic GHG emissions and removals consistent with the objective of the Convention. However, the ERT noted that the NC4 does not provide a table that summarizes the PaMs by sector and describes each PaM in accordance with what is required in the UNFCCC reporting guidelines.

14. Table 3 provides a summary of the reported information on the PaMs of Ireland.

Table 3. Summary of information on policies and measures

Major policies and measures	Examples/comments
Framework policies and cross-sectoral measures	
Integrated Climate Programme	National Climate Change Strategy (2000); European Climate Change Programme (2005)
Energy/electricity/emissions taxation Emissions trading	Implementation of European Union (EU) Directive on Minimum Excise Duties EU emissions trading scheme (EU ETS); the National Treasury Management Agency designated as the purchasing agent on behalf of the Government and the National Carbon Fund as the funding mechanism; the EU ETS is expected to cover 33 per cent of total greenhouse gas (GHG) emissions and to count for equal GHG reductions towards the Kyoto Protocol target (3 Tg/year)
Energy supply	
Power generation	Fuel switching from coal and oil to natural gas, landfill gas and biomass has reduced GHG intensity of electricity. Efficiency of power generation has also improved from 35 to 41 per cent
Renewable energy sources (RES)	EU RES-Electricity Directive requires that Ireland generate 13.2 per cent of its electricity from RES by 2012 (1.30 Tg CO ₂ eq/year) New EU RES Directive requires that Ireland increase the share of renewable energy sources to 20 per cent by 2020. Ireland has introduced guaranteed feed-in tariffs for RES electricity
Combined heat and power (CHP)	CHP grant programme introduced to support and consolidate expansion of gas or biomass CHP
Co-firing Natural gas	Co-firing of biomass (wood) in peat-fired power stations Expansion/modernization of natural gas transmission network (57 Gg CO ₂ eq over the period 2001–2009)
Energy efficiency	
EU Energy Services Directive Demand side management (DSM)	Setting up a National Energy Efficiency Action Plan Support to energy efficiency programmes (Sustainable Energy Ireland). Peak clipping. Energy saving obligation to energy conservation opportunities (ECOs)
EU Directive on the Energy Performance of Buildings (EPBD)	Part L of the Building Regulations (on conservation of fuel and power) is being used as a mechanism for implementing some key aspects of the EU Directive on the Energy Performance of Buildings (0.30 Tg/year)
Intelligent Energy Europe	Programme for energy efficiency, renewable energy and transport supported by the EU
Transport	
Integrated transport planning	Dublin traffic measures (e.g. the Dublin Port Tunnel) (0.27 Tg/year); modal shift (investment in and use of public transport, expansion of railway network, promotion of cycling facilities, etc.)
Agreements/partnerships Vehicle and fuel taxes	EU voluntary agreement with car manufacturers (0.48 Tg/year) Biofuels excise relief (0.25 Tg/year); motor taxation and fuel labelling (0.05 Tg/year)
Industry	
Pollution prevention and control	Integrated Pollution Prevention and Control Licensing regime; Regulation of the European Parliament and of the Council on control of certain fluorinated gases (23 Tg by 2010)
Agriculture	
	Reform of the EU Common Agriculture Policy (2.40 Tg/year); policies to reduce livestock numbers and the amount of emissions per animal
Waste management	
	Implementation of EU Directive on Landfill of Waste (0.06 Tg/year)
Land use, land-use change & forestry	
	Afforestation programme (2.08 Tg/year)

1. Policy framework and cross-sectoral measures

15. The Government of Ireland retains the overall responsibility for Ireland's obligations under the Convention and the Kyoto Protocol. The Department of Environment, Heritage and Local Government is responsible for Ireland's policy on climate change.

16. As a member State of the EU, Ireland has adopted the EU legislation which is relevant to climate change. These measures include a mechanism for monitoring community GHG emissions and implementing the Kyoto Protocol and the European Union emissions trading scheme (EU ETS). The EU ETS covers about 33 per cent of national emissions. However, the impact of the EU ETS has not been reported in the NC4. Ireland's National Allocation Plan under the scheme was finalized in 2006 and, during the review, the Party has explained that 3 Mt out of 7.2 Mt CO₂ eq of annual reductions will come from the sectors under the EU ETS, while the remaining reductions are to be achieved outside the EU ETS.

2. Policies and measures in the energy sector

17. Between 1990 and 2007, GHG emissions from energy increased by 46.8 per cent. Emissions from energy industries grew by 28.3 per cent and energy use in industries increased by 53.4 per cent. In transport, emissions increased by 178 per cent. This large increase in emissions was mainly due to the rapid expansion of the Irish economy over the last decade. However, this has been followed by a recession in recent years. The increase in emissions has been counteracted to some extent by a gradual shift from coal and oil to gas and renewable energy. Further, the average energy efficiency increased from 35 per cent to 41 per cent during this period.

18. **Energy industries** (mainly power generation) account for 28 per cent of total GHG emissions. Electricity consumption has been increasing, while the CO₂/kWh produced has been declining considerably due to increased power generation efficiency and a switch to cleaner fuels. Consequently, CO₂ intensity of electricity production decreased by almost one third, from 920 to 640g CO₂/kWh during the period 1990–2004. The industry is included under the EU ETS.

19. During the review Ireland informed the ERT that the Government has set a national target of 15 per cent of electricity consumption to be from RES by 2010, which is higher than the 13.2 per cent target set for Ireland in the original EU RES Directive.

20. There is good potential for increasing the use of renewable energy in Ireland, particularly in the wind sector and in the emerging ocean energy sector. In the new EU RES Directive which forms part of the EU energy and climate package, Ireland has a target of sourcing 16 per cent of its total energy supply from RES in 2020. Ireland currently obtains around 4 per cent of its total energy supply from RES. During the review Ireland informed the ERT that the Government has set national targets for 2020 across the three energy sub-sectors for 40 per cent electricity, 12 per cent heating or cooling and 10 per cent transport to be from RES to meet the overall energy target.

21. Ireland intends to prioritize combined heat and power (CHP). Today, a capacity of 282 MW has been installed. The EU Directive on CHP has envisaged a doubling of the CHP capacity throughout Europe. During the review Ireland informed the ERT that it is planning to increase the potential for CHP with cleaner fuels through developing some district heating as well as further industrial usage.

22. There are opportunities in **co-firing** at existing power stations by substituting peat for biomass. The ERT encouraged Ireland to look into the energy efficiency aspects of this, taking into account the overall performance of the power stations and the options for establishing new CHP plants.

23. In **energy use and demand side management**, Ireland listed a number of initiatives in the NC4. Ireland intends to make efforts to reduce the growth in electricity consumption in order to avoid the need for new capacity and control energy use and emissions. Furthermore, higher energy efficiency standards for new residences are expected to result in improving the overall quality of housing as well as reducing overall energy usage.

24. The **National Energy Efficiency Action Plan** (NEEAP) outlines actions to improve energy efficiency by 1 per cent per year and to achieve the target of a 20 per cent reduction in energy intensity by 2020. Information and support programmes to underpin this are being run by Sustainable Energy Ireland (SEI) as well as by energy supply companies. A demand reduction scheme was introduced in 2003, which reduced electricity peak load.

25. The ERT encourages Ireland to take further steps in energy efficiency in the follow-up to the NEEAP. Considerable mitigation potential exists, particularly in energy renovation of buildings, which also offers employment opportunities. Interaction with EU programmes, such as the Covenant of Mayors, and

financing from the European Investment Bank could be beneficial. With regard to electricity savings, there are also many mitigation opportunities to be considered.

3. Policies and measures in the transport sector

26. The overall development of EU policies that increase the introduction of more **fuel efficient vehicles** are of importance for the development of emissions from the transport sector in Ireland. EU policies are complemented by national legislation on fuel economy labelling. Ireland is planning to introduce CO₂ differentiation of vehicle registration tax (VRT) and annual motor tax. In addition, there was a 50 per cent reduction on the VRT of hybrid and flexible-fuel vehicles up until June 2008, and the differentiated tax system was introduced on 1 July 2008 for new passenger cars.

27. **Biofuels** are promoted by excise relief and funding of pilot projects.

28. Ireland is highly aware of the important relationship between transport and **spatial planning** policies and the importance of investments in the transport infrastructure that may encourage modal shifts. Significant investment has been made in public transport and the railway network as well as in the building of new roads. Transport 21, a transport investment programme for 2006–2015 represents a major rebalancing of investment in favour of public transport. The 2002 National Spatial Strategy is a 20-year strategy which promotes integrated land-use and transport planning to realise more sustainable patterns of development and addresses land-use planning at national, regional and local levels through regional planning guidelines and city/county development plans.

29. The ERT noted that **fuel taxation** in Ireland is in accordance with the EU Directive on Minimum Excise Duties. The fuel prices are lower in Ireland than in neighbouring countries and this leads to ‘fuel tourism’.

4. Policies and measures in other sectors

30. In 2007, emissions from non-energy sectors accounted for 33.8 per cent of total GHG emissions. Agriculture and industrial processes had the largest shares, accounting for 25.6 and 4.7 per cent respectively; waste accounted for 2.8 per cent. Between 1990 and 2007, GHG emissions from industrial processes (including solvent and other product use), agriculture and waste decreased by 3.7 per cent, mainly driven by the decrease in emissions from agriculture (–7.7 per cent). The trend in GHG emissions from the waste sector showed a notable increase (+32.5 per cent). The LULUCF sector was a source of net emissions in the periods 1990–1997 and 2000–2001, but has been a sink since 2002, removing 1.4 per cent of total GHG emissions (without LULUCF) in 2007.

31. Most of the emissions from **industrial processes** were from cement, ammonia and nitric acid production until 2003. Emissions from the mineral industry continuously increased from 34.9 per cent of sectoral emissions in 1990 to 78.6 per cent in 2007 owing to increased cement production in line with economic growth. Accordingly, the share of the chemical industry in sectoral emissions decreased from 64.0 per cent in 1990 to 16.3 per cent in 2000. The ammonia and nitric acid plants closed in 2003 and 2002 respectively, owing to rationalization and restructuring measures by the major manufacturers of mineral fertilizers. Emissions of fluorinated gases steadily increased from 1.14 per cent of sectoral emissions in 1990 to 21.4 per cent in 2007 owing to increased use of these gases in semiconductor production, refrigeration and air conditioning. Ireland extended the licensing under the EU Directive on Integrated Pollution Prevention and Control to cover GHG emissions and translated EU legislation on fluorinated gases into national law.

32. The significant decrease in emissions from **agriculture** by 7.7 per cent during the period 1990–2007 is mainly a result of a reduction in animal numbers and use of synthetic nitrogen fertilizer following a reform of the EU Common Agricultural Policy.

33. Removals of CO₂ from the *forestry* sector fluctuated between 1990 and 1996. Ireland adopted an intensive afforestation programme in 1996, jointly funded by Ireland and the EU, which increased net removals from the forestry sector by 1,282.8 per cent (from 108.5 Gg CO₂ in 1996 to 1,500.9 Gg CO₂ in 2007). Ireland has implemented policies aimed at promoting renewable energy from biomass that will help to use tree thinnings and residues from both forestry and from saw milling.

34. Emissions from the *waste* sector increased by 32.5 per cent from 1990 to 2007. Fluctuations in emissions were observed between 1996 and 2003. The decreasing trend between these years is a result of the introduction of landfill gas capture in power generation policies; the increasing amount of waste sent to landfills counterbalanced this effect. Improved landfill gas management through flaring since 2001 has also contributed to a reduction in CH₄ emissions from this sector.

C. Projections and the total effect of policies and measures

1. Projections

35. The GHG emission projections provided by Ireland in the NC4 include a ‘with measures’ scenario until 2020. Projections are presented on a sectoral basis, using the same sectoral categories as in the PaMs section, and on a gas-by-gas basis for the following GHGs: CO₂, CH₄ and N₂O. In addition, projections are provided in an aggregated format for each sector as well as for a national total, using global warming potential values. Emission projections related to fuel sold to ships and aircraft engaged in international transport were not reported separately. The ERT noted that unlike in the NC3, Ireland did not include ‘without measures’ projections; the NC3 provided three different scenarios: ‘without measures’, ‘with measures’ and ‘with additional measures’. The ERT encourages the Party to continue with this work and to make efforts to update and include these scenarios in its next national communication. In its NC4, Ireland did not include a ‘with additional measures’ scenario, but during the review it provided a report from the Environmental Protection Agency (EPA) which contains ‘with measures’ and ‘with additional measures’ scenarios until 2020.² Table 4 and the figure below provide a summary of GHG emission projections for Ireland.

36. The emission projections in the NC4 were calculated using an integrated power model, energy models linked to macroeconomic models, waste emission models, the CARBWARE model, the Food and Agricultural Policy Research Institute model and road transport and industry emission models. The projections for each activity were carried out using the methodology specific to the activity. The NC4 describes the type of model and approach used, stating in some instances whether a bottom-up model, expert judgement, biological system model or econometric model was used. Explanations of the models used were provided in an annex to the NC4. In accordance with the UNFCCC reporting guidelines, information on the characteristics, strengths and synergies of most of the models was provided. The ERT encourages the Party to provide more explanation on the underlying assumptions, such as growth in the gross domestic product (GDP) and population growth, as it would greatly improve the transparency and quality of the projections. This also applies to the inclusion of a qualitative or quantitative discussion of the sensitivity of the projections to the underlying assumptions. The UNFCCC reporting guidelines call attention to the usefulness of reporting the main differences in the assumptions used, methods employed and results between projections in the current national communication and those in earlier national communications. The ERT noted that providing such a comparison would be especially useful, as there is a significant difference between the short-term (2010–2012) projections in the NC3 and NC4.

² Ireland Greenhouse Gas Emission Projections 2008–2020.

Table 4. Summary of greenhouse gas emission projections for Ireland

	Greenhouse gas emissions (Tg CO ₂ eq/year)	Changes in relation to base year level (%)
Inventory data 1990 ^a	55.38	-
Inventory data 2007 ^a	69.21	+24.45
Kyoto Protocol base year ^b	55.61	-
Kyoto Protocol target ^b	62.84	+13.0
'With measures' projections for 2010	65.4	+17.6
'With additional measures' projections for 2010 ^c	61.8	+11.1
Economic Shock on 'With additional measures' projections for 2010 ^c	58.4	+5.0

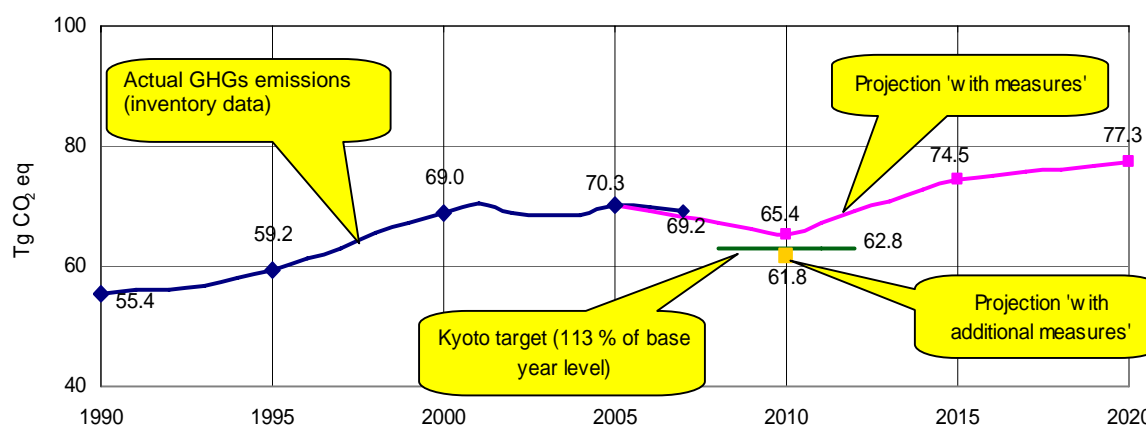
^a Data source: Ireland's 2009 greenhouse gas (GHG) inventory submission; the emissions are without land use, land-use change and forestry (LULUCF).

^b Based on the initial review report contained in document FCCC/IRR/2007/IRL.

^c Data source: Report by the Environmental Protection Agency: Ireland Greenhouse Gas Emission Projections 2008–2020. Value includes additional measures, LULUCF and the use of the Kyoto mechanisms.

37. According to the projections in the NC4, emissions in Ireland in 2012 would be 28.4 per cent higher than the base year, exceeding the Kyoto Protocol target of a maximum increase of 13 per cent. According to the NC4 (section 3.2.4), Ireland will continue to face an average annual shortfall in its Kyoto Protocol target by around 7.174 Mt CO₂ eq in the period 2008–2012. The projections contained in table 4.2 of the NC4 estimate that the Party will exceed its Kyoto Protocol target by 7.368 Mt annually. Carbon sinks are expected to reduce overall emissions by 2,074 kt CO₂ eq annually through afforestation.

Greenhouse gas emission projections



Data sources: (1) Data for the years 1990–2005: Ireland's 2009 greenhouse gas inventory submission; the emissions are without land use, land-use change and forestry. (2) Data for the years 2006–2012: Report by the Environmental Protection Agency: Ireland Greenhouse Gas Emission Projections 2008–2020. The EPA report includes emissions from land use, land-use change and forestry.

38. During the review the Party provided more updated projections, prepared by EPA. These projections included a 'with measures' and 'with additional measures' scenario. While the 'with measures' scenario for 2010 indicates that Ireland would still exceed its Kyoto Protocol target (+17.6 per cent above the base year level), the 'with additional measures' scenario suggests that Ireland would meet this target by using additional measures and LULUCF activities. In this report, the Party also provides an economic shock analysis as part of a sensitivity analysis; this analysis is applied to the 'with measures' and 'with additional measures' scenarios and indicate a lower level of annual emissions (see table 4). The ERT noted that there is a significant difference in the projections in the NC4 and the EPA report, which is not explained in the latter.

The ERT noted that the NC4 refers to the National Climate Change Strategy (NCCS), whereas the EPA report contains references to a series of PaMs, but their quantitative effect is not reported and the difference in assumptions (e.g. growth in GDP) is not described.

39. The ERT recommends that the Party, in its future national communications, provide projections for fluorinated gases, as required by the UNFCCC reporting guidelines. The ERT acknowledges the additional information provided by the Party during the review and recommends that Ireland provide an explanation on the main differences between the previous national communication and the national communication under review, in particular the difference in the projections. The ERT further recommends that the Party report information on key underlying assumptions and values of variables as contained in the NC3. The ERT recognized that the EPA report elaborates on certain assumptions, but noted that this only applies to information on the assumptions concerning trends in gross national product (GNP) and GDP, and advises the Party to include other important factors, such as population growth, tax levels and international fuel prices.

2. Total effect of policies and measures

40. In the NC4, Ireland presents the estimated and expected individual effects of implemented and adopted PaMs and an estimate of the total effects of its PaMs, in accordance with the ‘with measures’ definition, up to 2012. It also presents relevant information on factors and activities for each sector for the years 1990–2020. However, the ERT noted that Ireland did not provide the following reporting elements required by the UNFCCC reporting guidelines: an estimate of the total effect of its PaMs, in accordance with the ‘with measures’ definition, compared with a situation without such PaMs, presented in terms of GHG emissions avoided or sequestered, by gas (in terms of CO₂ eq) in 1995 and 2000 (para. 40). Table 5 provides an overview of the total effect of PaMs as reported by Ireland.

Table 5. Projected effects of planned, implemented and adopted policies and measures in 2010

Sector	Effect of implemented and adopted measures (Tg CO ₂ eq)	Relative value (% of base year emissions)	Effect of planned measures (Tg CO ₂ eq)	Relative value (% of base year emissions)
Energy (without CO ₂ from transport)	NA	NA	NA	NA
Transport – CO ₂	NA	NA	NA	NA
Industrial processes	NA	NA	NA	NA
Agriculture	NA	NA	NA	NA
Land-use change and forestry	NA	NA	NA	NA
Waste management	NA	NA	NA	NA
Total	7.95	14.3	NA	NA

Data source: Ireland’s fourth national communication.

Abbreviation: NA = not available.

Note: The total effect of implemented and adopted policies and measures is defined as an aggregate of individual policy measures. The value represents an average reduction for the period 2008–2012.

41. Ireland provides the total effect of implemented individual policies in table 4.1 of the NC4. According to this table, 11 PaMs result in a reduction of 7.95 Mt during the first commitment period. The largest reductions are a result of the reform of the EU Common Agricultural Policy and afforestation (accounting for more than 50 per cent of the reduction). However, in the absence of ‘with measures’ scenarios and lacking sectoral estimates of the mitigation effects, the overall effect of these 11 PaMs is difficult to verify. The NC4 does not provide information on additional policies. In the EPA report, a distinction is made between a ‘with measures’ and ‘with additional measures’ scenario, making it possible to estimate the impact of additional measures in the main sectors. In order to ensure transparency, the Party should report information on key underlying assumptions and values of variables. Ireland reported assumptions regarding GDP and GNP growth in the EPA report, but did not provide information regarding tax levels and international fuel prices.

42. The ERT recommends that the Party follow the UNFCCC reporting guidelines more closely and focus more on the estimated total effects of PaMs. The ERT further recommends that the Party clearly distinguish existing measures from additional measures in order to provide a transparent assessment of their reduction effects. Providing a ‘without measures’ scenario may also be useful in this respect. The ERT also recommends that the Party provide these estimates in its next national communication.

D. Vulnerability assessment, climate change impacts and adaptation measures

43. In its NC4, Ireland has provided the required information on the expected impacts of climate change in the country and on adaptation options. The ERT noted that Ireland provided information on the expected impacts of climate change for a limited number of sectors. Information on climate scenario development and impact assessment methodologies is not explicit and a limited range of future scenarios is presented. Table 6 summarizes the information on vulnerability and adaptation to climate change presented in the NC4.

Table 6. Summary of information on vulnerability and adaptation to climate change

Vulnerable area	Examples/comments/adaptation measures reported
Agriculture	Vulnerability: Droughts may increase irrigation demand; viability of certain crops, such as potatoes, may be threatened Adaptation: A need for potential increase in irrigation is identified
Water resources	Vulnerability: Increased pressures on water supply infrastructure in the Greater Dublin Areas; likelihood of increased flood frequency in the west of the country Adaptation: Office of Public Works appointed as lead agency to implement flooding policy in Ireland; develop strategy to manage flood risk; programme of flood defence schemes; awareness-raising on flood preparation, integration of adaptation into development plans; draft statutory guidance on planning and flood risk assessment published in 2008, to be finalized by September 2009
Marine environment and coastal zone	Vulnerability: Undefined general impacts due to warmer waters; coastline threatened by higher sea levels; undefined general threats to ecosystems and biodiversity Adaptation: Integrated coastal zone management; Planning and Development Act 2000 (regulates, restricts and controls the development of coastal areas and development in the vicinity of inland waterways)

44. Knowledge of climate change impacts and vulnerability is still relatively limited in Ireland, but adverse and positive impacts are evident, whose implications will require integrated assessments across a broader range of key sectors, including assessment of the socio-economic implications of these impacts. Actions to implement adaptation may be constrained by the current lack of impact assessment information.

45. Information supplied during the review process by Ireland described recent efforts to conduct impact assessments in more sectors.

E. Financial resources and transfer of technology

1. Financial resources

46. In its NC4, Ireland has provided sufficient details of measures taken to give effect to its commitments under Article 4, paragraphs 3, 4 and 5, of the Convention. It indicates what ‘new and additional’ financial resources it has provided pursuant to Article 4, paragraph 3, and clarifies how it has determined such resources as being ‘new and additional’.³ Ireland has also provided detailed information on the assistance it has made available to developing country Parties that are particularly vulnerable to the adverse effects of climate change to help them meet the costs of adaptation to those adverse effects. Furthermore, Ireland has provided information on other financial resources related to the implementation of the Convention provided through bilateral, regional and other multilateral channels. However, the ERT noted that Ireland did not provide information on its pledge to the third replenishment of the Global Environment Facility (GEF) Trust Fund. During the review, Ireland informed the ERT that it pledged financial assistance of €5.73m for the

³ The Party indicated that “as a result new and additional funds amounting to USD 2,900,000 were made available in 2005” (See RDP, p. 75 and NC4, p. 69).

third replenishment of the GEF Trust Fund for the four-year period from 2002–2005; Ireland also pledged a similar amount to the fourth replenishment of this fund covering the period 2006–2009. Table 7 summarizes information on financial resources and technology transfer.

Table 7. Summary of information on financial resources and technology transfer

Official development assistance (ODA)	The total ODA contributed by Ireland was EUR 445 705, EUR 488 923, and EUR 578 460 in 2003, 2004 and 2005, respectively
Climate-related aid in bilateral ODA	Most of the aid is related to the recipients' adaptation to climate change. In 2004, Ireland spent over USD 21 million on agriculture in its programme countries. The projects are related to adaptation, including agricultural diversification, water resource management, vulnerability assessment, risk reduction, crop diversification, irrigation and the introduction of new crop varieties
Climate-related support programmes	Ireland's ODA is focused on the least developed countries, particularly those in sub-Saharan Africa. Ireland has six bilateral development programmes in Africa (Lesotho, Mozambique, United Republic of Tanzania, Ethiopia, Zambia and Uganda) and two programmes in Asia (Timor-Leste and Vietnam). Ireland is also active in South Africa
Contributions to the GEF	Contributions have been made to the GEF of USD 1.3 million annually in 2003, 2004, and 2005, as well as contributions to the Special Climate Change Fund of USD 0.55 million, to Least Developed Countries Fund of USD 2.0 million, and to the Trust Fund for Participation in the UNFCCC Process of USD 0.1 million in 2005
Pledge for third GEF replenishment	NA
Activities implemented jointly	NA
JI and CDM under the Kyoto Protocol	An initial provision of EUR 20 million for the purchase of credits has been made by the Irish Government and will be supplemented, as necessary, up to and throughout the commitment period
Other (bilateral/multilateral)	Contributions have been made to the World Bank, United Nations Development Programme, United Nations Environment Programme, UNFCCC Fund, United Nations Institute for Training and Research, Renewable Energy and Energy Efficiency Partnership and Consultative Group on International Agricultural Research
Technology transfer	Major activities related to technology transfer are in the fields of water supply, transport infrastructure and agriculture and complement existing aid projects. Specific technologies such as soil conservation, new crop varieties and irrigation are addressed.

Abbreviations: CDM = clean development mechanism, GEF = Global Environment Facility, JI = joint implementation, NA = not available.

47. The ERT recommends that Ireland provide information on its pledge to the third replenishment of the Global Environment Facility Trust Fund in accordance with the requirements of the UNFCCC reporting guidelines.

2. Transfer of technology

48. In its NC4, Ireland has provided some information on measures related to the promotion, facilitation and financing of the transfer of, or access to, environmentally sound technologies. It also reports activities related to technology transfer, including success stories and a description of activities undertaken by the public sector. However, the ERT noted that Ireland did not provide the following reporting elements required by the UNFCCC reporting guidelines: its activities for financing access by developing countries to 'hard' or 'soft' environmentally sound technologies (para. 55), information, in textual format, on steps taken by governments to promote, facilitate and finance transfer of technology, and to support development and enhancement of endogenous capacities and technologies of developing countries (para. 56). The ERT

recommends that Ireland provide these reporting elements required by the UNFCCC reporting guidelines in its next national communication.

F. Research and systematic observation

49. Ireland has provided information on its actions relating to research and systematic observation, and addressed both domestic and international activities, including the International Geosphere–Biosphere Programme, the Global Climate Observing System (GCOS) and the Intergovernmental Panel on Climate Change. Furthermore, Ireland has provided a summary of information on GCOS activities (in accordance with para. 64 of the UNFCCC reporting guidelines). However, the ERT noted that Ireland did not provide information on its actions taken to support related capacity-building in developing countries (para. 58).

50. Ireland is increasing its capacity for research and systematic observation through key investments in institutional development, research projects and infrastructure. National and international engagement in this area is substantive and wide-ranging, including through key studies in paleoclimatic reconstruction. Barriers to free and open exchange of information have been identified and are being addressed. The current emphasis in mitigation-related research is on biological sinks, but some efforts are also reported in the energy sector. There is a growing interest in developing understanding of the socio-economic impacts of climate change policy and responses.

G. Education, training and public awareness

51. In the NC4, Ireland has provided information on its actions relating to education, training and public awareness, as required by the UNFCCC reporting guidelines (para. 65). Ireland has made substantial progress since its NC3, with expanded reporting that now includes a description of the main organizations involved in promoting public awareness of climate change issues.

52. Public cooperation is promoted at the national level. The environmental and sustainable development information service (ENFO) premises, including a reference library, are open to the public. Information leaflets are distributed and school visits, thematic exhibitions, lectures and seminars are conducted. Following a review of the existing ENFO service a new enhanced service has been developed which will be launched in the autumn of 2009. SEI offers training opportunities on the sustainable use of energy for businesses and homeowners. In addition, SEI carries out several awareness raising programmes on energy saving and organizes national campaigns such as Energy Awareness (which began in 1998) and Car Free Day (which began in 2000). During the review Ireland informed the ERT that its National Climate Change Awareness Campaign, Change, commenced in December 2007 and is designed to raise public awareness of climate change, its causes, impacts and implications for Ireland. The campaign which will run over two years includes the administration of website <<http://www.change.ie>>, both personal and business carbon calculators, advertising and PR campaigns along with an educational initiative.

53. At the government level, a forum for national consultation and dialogue on all issues relating to sustainable development (COMHAR) has been established in order to promote sustainable development across all sectors of the economy and parts of the society, with 25 representatives from a wide range of academic, public and government institutions and non-governmental organizations (NGOs). COMHAR activities include international cooperation with other councils in order to work towards sustainable development in Europe. A COMHAR working group on climate change, which was established in 2002, has developed recommendations to the Government on the NCCS, including on carbon/energy taxation. This working group has also prepared various publications on climate change and has acted as a forum for dialogue on climate-related issues among various stakeholders.

54. The Local Agenda 21 Environmental Partnership Fund promotes sustainable development by assisting small scale, non-profit environmental projects at local level. It is an approach based on greater participation by communities in local decision making for sustainable development. Supported projects focus

on environmental awareness initiatives which complement national environmental policies such as those on waste, biodiversity, climate change and sustainable development.

55. The NC4 highlights the important role of NGOs in raising public awareness and participation in national policy on climate change. The Department of the Environment, Heritage and Local Government supports capacity-building in NGOs.

56. During the review, Ireland provided the ERT with additional information on awareness-raising programmes, information campaigns and policies. It also reported that the National Education for Sustainable Development Strategy is being prepared which will have as one of its priorities the implementation of education on sustainable development at every level of education system. The ERT encourages the Party to include information provided during the review in its next national communication.

III. Evaluation of information contained in the report demonstrating progress and of supplementary information under Article 7, paragraph 2, of the Kyoto Protocol

A. Information contained in the report demonstrating progress

57. Ireland's RDP includes four chapters, which contain most of the information required by decisions 22/CP.7 and 25/CP.8. The ERT found the information contained in the RDP to be consistent with that provided in the NC4. Ireland provided updated information on projections and intended use of Kyoto Protocol mechanisms and LULUCF activities.

58. The Department of Environment, Heritage and Local Government is responsible for Ireland's policy on climate change and has an overarching role in the delivery of climate change policy. Inventories of GHG emissions are compiled and published annually by EPA. The National Treasury Management Agency has been designated as the purchasing agent for Kyoto Protocol units on behalf of the Government.

59. Ireland plans to meet its Kyoto Protocol target by implementing the PaMs set out in the NCCS and additional PaMs subsequently adopted by the Government, by purchasing carbon allowances from installations participating in the EU ETS, and by using the Kyoto Protocol mechanisms. According to the projections provided in the RDP, Ireland expects to face an average annual shortfall in its Kyoto Protocol target by around 7.174 Mt CO₂ eq. Ireland plans to reduce its emissions by at least 3.02 Mt CO₂ eq annually by combining domestic emission reductions and purchasing allowances through the EU ETS. According to the RDP, the remaining reductions of 4.154 Mt CO₂ eq will be met through a combination of additional measures and the use of the Kyoto Protocol mechanisms.

60. During the review, Ireland provided updated information on projections. According to the 'with additional measures' scenario with economic shock analysis, the Party is expected to meet its Kyoto Protocol target.

61. In Ireland's new projections contained in the EPA report the emissions from sectors covered by the EU ETS are projected to be below the annual allocation in the 2008–2012 trading period. To meet the Kyoto Protocol target, additional measures in sectors that are not under the EU ETS and government purchases of Kyoto Protocol units of between 1.3–5.2 Mt CO₂ eq/year may be required. The lower figure comes from a scenario where effects of the recession are taken into account.

B. Supplementary information under Article 7, paragraph 2, of the Kyoto Protocol

62. Ireland has provided most of the supplementary information under Article 7, paragraph 2, of the Kyoto Protocol in its NC4 and RDP. This information reflects the steps taken by Ireland to implement the relevant provisions of the Kyoto Protocol. The supplementary information is placed in different sections of

the NC4 and RDP. Table 8 provides references to the NC4 and RDP chapters in which supplementary information is provided.

Table 8. Overview of supplementary information under Article 7, paragraph 2, of the Kyoto Protocol

Supplementary information	Reference
Supplementarity relating to the mechanisms pursuant to Articles 6, 12 and 17	RDP, chapter 3
Policies and measures in accordance with Article 2	RDP, chapters 1 and 3 NC4, chapter 3
Domestic and regional programmes and/or legislative arrangements and enforcement and administrative procedures	RDP, chapter 1
Information under Article 10	RDP, chapter 4
Financial resources	RDP, chapter 4.3 NC4, chapter 6

63. Ireland has not reported the following elements of the supplementary information required under Article 7, paragraph 2, of the Kyoto Protocol: a description of the national inventory system, or a description of the national registry. However, Ireland provided information on its national inventory system and national registry during the review. The ERT recommends that Ireland include these reporting elements in its next national communication.

64. Ireland did not provide information on the steps it has taken to promote and/or implement any decisions taken by the Civil Aviation Organization and the International Maritime Organization (IMO). The ERT recommends that Ireland follow the UNFCCC reporting guidelines more closely and that the Party provide this information in its next national communication. During the review, Ireland informed the ERT that it takes an active role at the IMO in relation to promoting progress in reducing the GHG emissions from shipping and continues to work closely with other member states of the EU in this respect. Ireland attends the Marine Environment Protection Committee (MEPC) at the IMO and has attended the GHG working group meetings at MEPC meetings. Ireland supported the recent decisions taken at MEPC 59 in relation to the adoption of energy efficiency indices for the design and operation of ships.

IV. Conclusions

65. Ireland has an energy policy and a climate change policy in effect. The Climate and Energy Strategy of 2000 was revised and adopted in April 2007. It comprises policies and measures currently being implemented by the Party. In parallel, Ireland has published the National Climate Change Strategy, the National Energy Efficiency Action Plan, and plans for bioenergy and biofuels in transport.

66. In its NC4, Ireland has provided a description of its national circumstances, GHG emission trends and the impact of PaMs. The ERT noted that main driver of increasing GHG emissions is a rapid growth in economic activity and in the transport sector. However, energy intensity has been constantly reduced and this has helped to lower the increase in GHG emissions.

67. According to the projections in as contained in the RDP, emissions were expected to increase by 47 per cent from 1990 to 2020, and were expected to be well above the Kyoto Protocol target in 2010, which allows for a 13 per cent increase in GHG emissions from 1990 levels during the first commitment period. In the projections contained in the 2009 EPA report, Ireland presents three scenarios for 2010: 'with measures', 'with additional measures', and 'economic shock plus additional measures'. For 2010, the 'with measures' scenario shows an increase of 17.6 per cent above base year levels; in the other two scenarios emissions are 11.1 and 5.0 per cent above base year levels, respectively.

68. In the course of the IDR, the ERT formulated a number of recommendations relating to the completeness and transparency of Ireland's reporting under the Convention and its Kyoto Protocol. The key recommendations⁴ are that Ireland in its next national communication:

- (a) Provide projections, including several scenarios and information on key underlying assumptions and values of variables;
- (b) Focus more on the estimated total effects of PaMs and clearly distinguish existing measures from additional measures in order to provide a transparent assessment of their reduction effects;
- (c) Provide transparent information on the further implementation of PaMs, especially regarding renewable energy and energy efficiency;
- (d) Report on emissions trading and the stability of trading conditions, as experience has already been gained from the first trading period;
- (e) Provide additional information on how the transport sector is expected to develop on the basis of implemented PaMs;
- (f) Provide information on its pledge to the third replenishment of the Global Environment Facility Trust Fund;
- (g) Provide complete supplementary information under Article 7, paragraph 2, of the Kyoto Protocol, including a description of the national inventory system and the national registry.

⁴ The recommendations are given in full in the relevant sections of this report.

Annex

Documents and information used during the review

A. Reference documents

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

“Guidelines for the preparation of the information required under Article 7 of the Kyoto Protocol”. Decision 15/CMP.1. Available at <<http://unfccc.int/resource/docs/2005/cmp1/eng/08a02.pdf#page=54>>.

“Guidelines for review under Article 8 of the Kyoto Protocol”. Decision 22/CMP.1. Available at <<http://unfccc.int/resource/docs/2005/cmp1/eng/08a03.pdf#page=51>>.

FCCC/IDR.3/IRL. Report on the in-depth review of the third national communication of Ireland. Available at <<http://unfccc.int/resource/docs/idr/irl03.pdf>>.

FCCC/SBI/2006/INF.2. Synthesis of reports demonstrating progress in accordance with Article 3, paragraph 2, of the Kyoto Protocol. Available at <<http://unfccc.int/resource/docs/2006/sbi/eng/inf02.pdf>>.

FCCC/SBI/2007/INF.6. Compilation and synthesis of fourth national communications. Available at <<http://unfccc.int/resource/docs/2007/sbi/eng/inf06.pdf>>.

FCCC/SBI/2007/INF.7. Compilation and synthesis of supplementary information incorporated in fourth national communications submitted in accordance with Article 7, paragraph 2, of the Kyoto Protocol. Available at <<http://unfccc.int/resource/docs/2007/sbi/eng/inf07.pdf>>.

FCCC/ARR/2008/IRL. Report of the individual review of the greenhouse gas inventory of Ireland submitted in 2007 and 2008. Available at <<http://unfccc.int/resource/docs/2008/arr/IRL.pdf>>

FCCC/IRR/2007/IRL. Report of the review of the initial report of Ireland. Available at <<http://unfccc.int/resource/docs/2007/irr/irl.pdf>>.

Fourth national communication of Ireland. Available at <<http://unfccc.int/resource/docs/natc/irlnc4.pdf>>.

Report demonstrating progress of Ireland. Available at <<http://unfccc.int/resource/docs/dpr/irl1.pdf>>.

2009 GHG inventory submission of Ireland. Available at <http://unfccc.int/national_reports/annex_i_ghg_inventories/national_inventories_submissions/items/4771.php>.

B. Additional information provided by the Party

Responses to questions during the review were received from Ms. Catherine Bannon from Department of Environment, Heritage and Local Government, including additional material on updated policies and measures, greenhouse gas projections, the national registry and recent climate policy developments in Ireland. The following documents were also provided by Ireland:

Environmental Protection Agency. 2009. *Ireland's Greenhouse Gas Emission Projections 2008–2020*. Dublin. Available at
<http://www.epa.ie/downloads/pubs/air/airemissions/GHG_Emission_Proj_08_12_30032009.pdf>.
