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## Report of the technical review of the sixth national communication of Luxembourg

Parties included in Annex I to the Convention are requested, in accordance with decision 9/CP.16, to submit a sixth national communication to the secretariat by 1 January 2014. In accordance with decision 7/CMP.8, Parties included in Annex I to the Convention that are also Parties to the Kyoto Protocol shall include in their sixth national communication supplementary information under Article 7, paragraph 2, of the Kyoto Protocol. In accordance with decision 15/CMP.1, these Parties shall start reporting the information under Article 7, paragraph 1, of the Kyoto Protocol with the inventory submission due under the Convention for the first year of the commitment period. This includes supplementary information on the minimization of adverse impacts in accordance with Article 3, paragraph 14, of the Kyoto Protocol.

This report presents the results of the technical review of the sixth national communication and supplementary information under the Kyoto Protocol of Luxembourg conducted by an expert review team in accordance with the “Guidelines for the technical review of information reported under the Convention related to greenhouse gas inventories, biennial reports and national communications by Parties included in Annex I to the Convention” and the “Guidelines for review under Article 8 of the Kyoto Protocol”.

GE.14-15106 (E)



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## I. Introduction and summary

### A. Introduction

1. For Luxembourg the Convention entered into force on 7 August 1994 and the Kyoto Protocol on 16 February 2005. Under the Convention, Luxembourg made a commitment to contribute to the joint European Union (EU) member states economy-wide greenhouse gas (GHG) emission reduction target of 20 per cent below the 1990 level by 2020. Within the burden-sharing agreement of the EU for meeting commitments under the Kyoto Protocol, Luxembourg committed itself to reducing its GHG emissions by 28 per cent compared with the base year<sup>1</sup> level during the first commitment period (CP1), from 2008 to 2012. For the second commitment period (CP2) of the Kyoto Protocol, from 2013 to 2020, Luxembourg committed to contributing to the joint EU commitment to reduce GHG emissions by 20 per cent compared with the base-year level.

2. This report covers the in-country technical review of the sixth national communication (NC6) of Luxembourg, coordinated by the secretariat, in accordance with the “Guidelines for the technical review of information reported under the Convention related to greenhouse gas inventories, biennial reports and national communications by Parties included in Annex I to the Convention” (decision 23/CP.19) and the “Guidelines for review under Article 8 of the Kyoto Protocol” (decision 22/CMP.1).

3. The review took place from 24 February to 1 March 2014 in the city of Luxembourg, Luxembourg, and was conducted by the following team of nominated experts from the UNFCCC roster of experts: Mr. Rizaldi Boer (Indonesia), Mr. Koen E.L. Smekens (Belgium), Mr. Christoph Streissler (Austria) and Mr. Samir Tantawi (Egypt). Mr. Boer and Mr. Streissler were the lead reviewers. The review was coordinated by Ms. Sylvie Marchand (secretariat).

4. During the review, the expert review team (ERT) reviewed each section of the NC6. The ERT also reviewed the supplementary information provided by Luxembourg as a part of the NC6 in accordance with Article 7, paragraph 2, of the Kyoto Protocol. In addition, the ERT reviewed the information on the minimization of adverse impacts in accordance with Article 3, paragraph 14, of the Kyoto Protocol, which was provided by Luxembourg in its 2013 annual submission and previous submissions under Article 7, paragraph 1, of the Kyoto Protocol.

5. In accordance with decisions 23/CP.19 and 22/CMP.1, a draft version of this report was communicated to the Government of Luxembourg, which provided comments that were considered and incorporated, as appropriate, in this final version of the report.

### B. Summary

6. The ERT conducted a technical review of the information reported in the NC6 of Luxembourg in accordance with the “Guidelines for the preparation of national

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<sup>1</sup> “Base year” refers to the base year under the Kyoto Protocol, which is 1990 for carbon dioxide (CO<sub>2</sub>), methane (CH<sub>4</sub>) and nitrous oxide (N<sub>2</sub>O), and 1995 for hydrofluorocarbons (HFCs), perfluorocarbons (PFCs) and sulphur hexafluoride (SF<sub>6</sub>), excluding land use, land-use change and forestry (LULUCF) emissions. The base year emissions include emissions from sectors/source categories listed in Annex A to the Kyoto Protocol.

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 on NCs). The ERT noted that, as required by decision 15/CMP.1, supplementary information required under Article 7, paragraph 2, of the Kyoto Protocol<sup>2</sup> is provided in the NC6 (see para. 117 below). The supplementary information on the minimization of adverse impacts referred to in paragraph 4 above is complete and transparent.

7. Luxembourg considered part of the recommendations provided in the report on the in-depth review (IDR) of the fifth national communication (NC5) of Luxembourg.<sup>3</sup> The ERT commended Luxembourg for its improved reporting. During the review, Luxembourg provided further relevant information on, for example: institutional procedures and practices for climate change policymaking; policies and measures (PaMs) affecting emissions from the non-energy sectors; some objectives of PaMs in quantitative terms; data for reporting projections on a gas-by-gas basis; the units secured under the different mechanisms; and bilateral cooperation. Description of the information provided during the review can be found in the relevant paragraphs below.

**1. Completeness and transparency of reporting**

8. Gaps and issues related to the reported information identified by the ERT are presented in table 1 below.

**2. Timeliness**

9. The NC6 was submitted on 21 January 2014, after the deadline of 1 January 2014 mandated by decision 9/CP.16. Luxembourg informed the secretariat about its difficulties with the timeliness of its NC6 on 26 December 2013 in accordance with paragraph 79 of the annex to decision 23/CP.19 and paragraph 139 of the annex to decision 22/CMP.1. Luxembourg submitted revised NC6 versions on 12 February 2014 and during the in-country visit, on 28 February 2014. The ERT noted with concern the delay in the submission of the NC6 and strongly recommends that Luxembourg submit its next national communication (NC) on time.

**3. Adherence to the reporting guidelines**

10. The information reported by Luxembourg in its NC6 is partially in adherence to the UNFCCC reporting guidelines on NCs as per decision 4/CP.5 as several reporting elements are not complete or transparent (see table 1).

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<sup>2</sup> Decision 15/CMP.1, annex, chapter II.

<sup>3</sup> FCCC/IDR.5/LUX.

Table 1

**Assessment of completeness and transparency issues of reported information in the sixth national communication of Luxembourg<sup>a</sup>**

<i>of national communication</i>	<i>Completeness</i>	<i>Transparency</i>	<i>Reference to paragraphs</i>	<i>Supplementary information under the Kyoto Protocol</i>	<i>Completeness</i>	<i>Transparency</i>	<i>Reference to paragraphs</i>
Executive summary	Complete	Transparent		National systems	Mostly complete	Transparent	17
National circumstances	Complete	Transparent		National registries	Complete	Transparent	
Greenhouse gas inventory	Complete	Transparent		Supplementarity relating to the mechanisms pursuant to Articles 6, 12 and 17	Partially complete	Partially transparent	88
Policies and measures (PaMs)	Partially complete	Partially transparent	32	PaMs in accordance with Article 2	Complete	Transparent	
Projections and total effect of PaMs	Partially complete	Mostly transparent	62, 63, 82	Domestic and regional programmes and/or arrangements and procedures	Mostly complete	Partially transparent	22, 27, 28
Vulnerability assessment, climate change impacts and adaptation measures	Mostly complete	Transparent	104	Information under Article 10	Complete	Transparent	
Financial resources and transfer of technology	Complete	Mostly transparent	91	Financial resources	Complete	Mostly transparent	91
Research and systematic observation	Mostly complete	Transparent	109	Minimization of adverse impacts in accordance with Article 3, paragraph 14	Complete	Transparent	
Education, training and public awareness	Complete	Transparent					

<sup>a</sup> A list of recommendations pertaining to the completeness and transparency issues identified in this table is included in the Conclusions and recommendations chapter of this report.

## II. Technical review of the reported information in the national communication and supplementary information under the Kyoto Protocol

### A. Information on greenhouse gas emissions and national circumstances relevant to greenhouse gas emissions and removals, including other elements related to the Kyoto Protocol

#### 1. Information on relevant national circumstances

11. In its NC6, Luxembourg has provided a complete and transparent description of the national circumstances relevant to GHG emissions and removals and elaborated on the framework legislation and key policy documents on climate change. Further information on the review of the institutional and legislative arrangements for the coordination and implementation of PaMs is provided in chapter II.B below. Table 2 illustrates the national circumstances of Luxembourg by providing some indicators relevant to GHG emissions and removals. The ERT noted that during the period 1990–2011 the population and gross domestic product (GDP) increased by 36.8 and 117.0 per cent, respectively, while GHG emissions per capita and GHG emissions per GDP unit decreased by 31.5 and 57.0 per cent, respectively. Still, according to the Intergovernmental Panel on Climate Change (IPCC) Guidelines for National Greenhouse Gas Inventories, Luxembourg ranks among the countries with the highest GHG emissions per capita.

Table 2

**Indicators relevant to greenhouse gas emissions and removals for Luxembourg**

	1990	2000	2005	2010	2011	Change 1990–2011 (%)	Change 2010–2011 (%)
Population (million)	0.38	0.44	0.47	0.51	0.52	36.8	2.0
GDP (2005 USD billion using PPP)	16.31	26.65	31.77	34.82	35.39	117.0	1.6
TPES (Mtoe)	3.39	3.34	4.38	4.22	4.17	23.0	–1.2
GHG emissions without LULUCF (kt CO <sub>2</sub> eq)	12 901.02	9 760.03	13 096.36	12 252.09	12 097.92	–6.2	–1.2
GHG emissions with LULUCF (kt CO <sub>2</sub> eq)	13 248.77	9 374.62	12 710.71	11 956.83	11 803.72	–10.9	–1.3
GDP per capita (2005 USD thousand using PPP)	42.92	60.57	67.60	68.27	68.06	58.6	–0.3
TPES per capita (toe)	8.92	7.59	9.32	8.27	8.02	–10.1	–3.0
GHG emissions per capita (t CO <sub>2</sub> eq)	33.95	22.18	27.86	24.02	23.27	–31.5	–3.1
GHG emissions per GDP unit (kg CO <sub>2</sub> eq per 2005 USD using PPP)	0.79	0.37	0.41	0.35	0.34	–57.0	–2.9

*Sources:* (1) GHG emissions data: Luxembourg's 2013 GHG inventory submission; (2) Population, GDP and TPES data: International Energy Agency.

*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.

*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.

12. Luxembourg reported three main drivers that caused GHG emissions to significantly increase between 1998 and 2005: (i) high economic growth driven by development of the service sector; (ii) an overall increase in road transportation flows in Europe combined with a strong increase in the resident population and in cross-border commuters, the effect of which is amplified mainly by differences in road fuel taxation between Luxembourg and bordering countries; and (iii) the installation of the TWINerg gas power plant. Luxembourg reported in the NC6 that its currently known potential for reducing emissions is limited. Although the NC6 provided information on the context, the assumptions and the analysis that led to this conclusion, the ERT considers that Luxembourg could report more comprehensively and transparently on the mitigation potential of its entire economy. The ERT therefore encourages Luxembourg to provide in its next NC more, and clearer, information on the assumptions and analysis underlying its claim that the national emissions reduction potential may be limited, namely by considering the mitigation potential of its entire economy.

## 2. Information on the greenhouse gas inventory, emissions and trends

13. Luxembourg has provided a complete and transparent summary of information on GHG emission trends for the period 1990–2011 and, in addition, provided some provisional estimates for 2012 in its NC6. The information for 1990–2011 is fully consistent with the 2013 national GHG inventory submission. Summary tables 2 and 10, including the trend tables for emissions by gas and in carbon dioxide equivalent (CO<sub>2</sub> eq) (given in the common reporting format), are provided in an annex to the NC6.

14. Total GHG emissions<sup>4</sup> excluding emissions and removals from land use, land-use change and forestry (LULUCF) decreased by 6.2 per cent between 1990 and 2011, whereas total GHG emissions including net emissions or removals from LULUCF decreased by 10.9 per cent over the same period. Overall, the emission profile of the country remained the same: of total GHG emissions, CO<sub>2</sub> was responsible for 92.6 per cent in 1990 and 92.0 per cent in 2011; methane (CH<sub>4</sub>) for 3.6 per cent in both 1990 and 2011; nitrous oxide (N<sub>2</sub>O) for 3.7 per cent in 1990 and 3.8 per cent in 2011; and fluorinated gases (F-gases) for 0.1 per cent in 1990 and 0.6 per cent in 2011. The overall decrease in emissions was mainly attributed to CO<sub>2</sub> emissions, which decreased by 6.9 per cent over this period. Emissions of other gases decreased as well, with CH<sub>4</sub> by 5.3 per cent and N<sub>2</sub>O by 3.3 per cent. Emissions of F-gases increased by 470.4 per cent.

15. The GHG emissions trend shows a major emissions decrease of 33.0 per cent between 1990 and 1998, followed by an almost equal increase to 2005 (to 1.5 per cent above the 1990 level), and finally a slight decrease to 6.2 per cent below the 1990 level in 2011. The main driver of the decrease in CO<sub>2</sub> emissions is from the iron and steel production sector that came about as the steel plants in Luxembourg changed from using a blast furnace process to using an electric arc furnace process in the period 1994–1998. This was followed by a continuous increase in CO<sub>2</sub> emissions from road transportation between 1998 and 2005, driven by higher consumption due to population and mobility increases, by a substantial increase in trans-border commuting of the labour force

<sup>4</sup> In this report, the term “total GHG emissions” refers to the aggregated national GHG emissions expressed in terms of CO<sub>2</sub> eq excluding land use, land-use change and forestry, unless otherwise specified.

and by fuel price differences with bordering countries. The operation of a gas-fired power plant since 2002 also contributed to the increase in CO<sub>2</sub> emissions, as did steadily increasing emissions in hydrofluorocarbon (HFC) and sulphur hexafluoride (SF<sub>6</sub>) because of a greater use of coolant-containing appliances and an increase in electricity consumption, respectively. Finally, minor decreases over 2005–2011 were observed in the energy, industrial processes, LULUCF and waste sectors, which resulted in the overall decrease cited above in paragraph 14. Analysis of the drivers for GHG emissions trends in each sector is provided in chapter II.B below. Table 3 provides an overview of GHG emissions by sector from 1990 to 2011.

Table 3  
**Greenhouse gas emissions by sector in Luxembourg, 1990–2011**

Sector	GHG emissions (kt CO <sub>2</sub> eq)				Change (%)		Share <sup>a</sup> by sector (%)	
	1990	2000	2010	2011	1990–	2010	1990	2011
					2011	–2011		
1. Energy	10 429.93	8 189.11	10 839.35	10 688.67	2.5	–1.4	80.8	88.4
A1. Energy industries	35.56	120.01	1 207.08	994.69	2 697.5	–17.6	0.3	8.2
A2. Manufacturing industries and construction	6 304.70	1 450.41	1 437.41	1 293.16	–79.5	–10.0	48.9	10.7
A3. Transport	2 721.07	4 865.33	6 388.14	6 848.96	151.7	7.2	21.1	56.6
A4.–A5. Other	1 352.31	1 728.18	1 761.39	1 512.58	11.9	–14.1	10.5	12.5
B. Fugitive emissions	16.29	25.18	45.33	39.29	141.2	–13.3	0.1	0.3
2. Industrial processes	1 621.50	756.56	660.24	671.49	–58.6	1.7	12.6	5.6
3. Solvent and other product use	23.90	15.81	14.34	15.77	–34.0	10.0	0.2	0.1
4. Agriculture	743.20	721.34	677.94	663.65	–10.7	–2.1	5.8	5.5
5. LULUCF	347.75	–385.41	–295.26	–294.20	–184.6	–0.4	2.7	–2.4
6. Waste	82.48	77.20	60.21	58.33	–29.3	–3.1	0.6	0.5
<b>GHG total with LULUCF</b>	<b>13 248.77</b>	<b>9 374.62</b>	<b>11 956.83</b>	<b>11 803.72</b>	<b>–10.9</b>	<b>–1.3</b>	<b>NA</b>	<b>NA</b>
<b>GHG total without LULUCF</b>	<b>12 901.02</b>	<b>9 760.03</b>	<b>12 252.09</b>	<b>12 097.92</b>	<b>–6.2</b>	<b>–1.2</b>	<b>100.0</b>	<b>100.0</b>

*Note:* The changes in emissions and the share 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.

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

<sup>a</sup> 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.

### 3. National system

16. Luxembourg provided in its NC6 a mostly complete and transparent description of how its national system is performing the general and specific functions defined in the guidelines for national systems under Article 5, paragraph 1, of the Kyoto Protocol (decision 19/CMP.1). The description includes most of the elements mandated by decision 15/CMP.1. The NC6 also contains a reference to the description of the national inventory system (NIS) as provided in the national inventory report (NIR) of the 2013 annual submission. The ERT took note of the review of the changes to the national system as reflected in the draft report on the individual review of the GHG inventory of Luxembourg submitted in 2013.



17. The NC6 does not include some information required by the guidelines; namely, the name of and contact information for the national entity with overall responsibility for the national inventory of Luxembourg and its designated representative. The ERT recommends that Luxembourg include this information on its NIS in its next NC.

18. Following the recommendation from the previous review report, Luxembourg has increased its financial resources and the number of experts involved in the development of its national inventory. During the review, Luxembourg provided the ERT with the names of the experts assigned for each sector. The ERT commends Luxembourg for this improvement.

#### **4. National registry**

19. In its NC6, Luxembourg has provided complete and transparent information on the national registry in accordance with the annex to decision 13/CMP.1 and the annex to decision 5/CMP.1. The ERT took note of the review of the changes to the national registry as reflected in the report on the individual review of the GHG inventory of Luxembourg submitted in 2013.

20. Luxembourg described the changes, specifically due to the centralization of the European Union Emissions Trading System (EU ETS) operations into a single EU registry operated by the European Commission and called the Consolidated System of European Union registries (CSEUR). The CSEUR is a platform which implements the national registries in a consolidated manner and was developed together with the new EU registry.

#### **5. Domestic and regional programmes and/or legislative arrangements procedures related to the Kyoto Protocol**

21. Luxembourg has reported in its NC6 information that is mostly complete and partially transparent on its domestic and regional programmes and/or legislative arrangements and procedures related to the Kyoto Protocol.

22. While information on inventory preparation and the involvement of the different actors was presented in a clear and comprehensive way in the NC6, information on the policymaking process was less transparent. Limited information was provided in the NC6 on the roles and responsibilities of the various ministries, the overall process for decision-making and implementation, and the mechanisms in place to ensure cooperation among the national government and municipalities. During the review, Luxembourg provided further information on institutional procedures and practices for climate change policymaking. The ERT recommends that Luxembourg enhance the transparency of its reporting by providing clearer information on the institutional arrangements in place for the implementation of the national and EU climate change policy in its next NC.

23. The overall responsibility for climate change policymaking lies with the Department of the Environment within the Ministry of Sustainable Development and Infrastructure of Luxembourg, and other ministries and agencies are also involved in the coordination or implementation of policies, for example the Environment Agency and the Nature and Forests Agency. Most of the tasks related to the national registry and to the inventory preparation are fulfilled by the Environment Agency. The Party reported that due to its size, “there are no regional programmes or legislative arrangements and enforcement” in Luxembourg and that Government programmes and declarations are used instead.

24. As an EU member State, Luxembourg also implements EU climate policy, including EU common and coordinated PaMs that are relevant to climate change. These include, among others, the European Council decision 2002/358/EC on the burden sharing of the EU’s emission reduction target for the Kyoto Protocol, and European Parliament and Council decision 280/2004/EC on the so-called monitoring mechanism, repealed by

European Parliament and Council regulation 525/2013/EU, which ensures that EU's progress towards meeting the Kyoto Protocol target is monitored and evaluated in a systematic way. Furthermore, the EU directive 2003/87/EC introduced the European system for CO<sub>2</sub> emissions trading. With the introduction of the EU ETS, a large part of European emissions was restricted under an EU-wide maximum cap. As a result, national targets for the period 2013–2020 under EU legislation only take into account the emissions outside the ETS (EU effort-sharing decision (ESD) 406/2009/EC).

25. As a Party to the Kyoto Protocol, Luxembourg had an emission reduction target for CP1 during 2008–2012. As part of the EU, which agreed upon a reduction in GHG emissions of 8 per cent below the base year level, Luxembourg agreed to fulfil its commitments for the CP1 of the Kyoto Protocol jointly with the other 14 EU countries. Luxembourg's share of the 'burden-sharing agreement' was an emission reduction target of 28 per cent below the base year level over the 2008–2012 period. For the second commitment period from 2013 to 2020, Luxembourg committed to the joint EU target to reduce GHG emissions by 20 per cent compared with the base-year level.

26. The NC6 contains information on the authorities responsible for the implementation of the Kyoto Protocol and the related obligations. Implementation of the Kyoto Protocol is underpinned by the second Action Plan for Reducing CO<sub>2</sub> Emissions, which was adopted in May 2013. The Climate Agreement concluded with municipalities is a further important achievement serving the implementation of effective measures to combat climate change.

27. The NC6 does not contain a dedicated section on how access by the public to information relating to climate change policy is ensured. There is, however, a dissemination of information on climate change policy (see chapter IX of the NC6 and paras. 114–116 of this report) and, judging from the report on the Environment and Climate Partnership, a broad and active stakeholder involvement in the formulation of climate change policy. The ERT recommends that Luxembourg enhance the transparency of its reporting by including this information in a dedicated section related to the Kyoto Protocol requirements.

28. Luxembourg did not provide a description of national legislative arrangements and administrative procedures that seek to ensure that the implementation of activities under Article 3, paragraph 3, and elected activities under Article 3, paragraph 4, of the Kyoto Protocol also contribute to the conservation of biodiversity and the sustainable use of natural resources. However, the NC6 reported that the National Forests Programme aims to restore the quality of forests that are characterized by high fragmentation and old species. The ERT recommends that Luxembourg enhance the transparency of its reporting by explaining how the National Forests Programme can help ensure that the implementation of activities under Article 3, paragraph 3, of the Kyoto Protocol also contribute to the conservation of biodiversity and the sustainable use of natural resources.

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

29. Luxembourg has provided in its NC6 partially complete and partially transparent information on its package of PaMs implemented, adopted and planned in order to fulfil its commitments under the Convention and its Kyoto Protocol.

### **1. Policies and measures related to implementation of commitments under the Convention**

30. Luxembourg reported on its PaMs adopted, implemented and planned in achieving its commitments under the Convention. Luxembourg provided a description of the principal PaMs, which, with a few exceptions, form a similar set of PaMs to those in the NC5.

31. The ERT noted that some recommendations from the previous review report relating to the reporting on PaMs under the Convention were not implemented (see para. 32 below).

32. The NC6 does not include some information required by the guidelines. Luxembourg did not: report on the main PaMs for the non-energy sectors; organize the reporting of PaMs in the energy sector subdivided by gas; and did not provide information on how it believes its PaMs are modifying longer-term trends in anthropogenic GHG emissions and removals, in accordance with the objective of the Convention. The ERT reiterates the recommendations made in the previous review report that Luxembourg:

- (a) Report on all sectors for which PaMs are in place;
- (b) Organize the reporting of PaMs by sector and by gas;
- (c) Provide 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.

33. The NC6 does not provide a description of the way in which progress with PaMs to mitigate GHG emissions is monitored and evaluated over time. The report on the review of the NC5 highlighted that “such a lack of analysis and of evidence-based policymaking could undermine any assessment of the progress made by Luxembourg in meeting its national and international Kyoto Protocol and longer-term targets”. The ERT noted, in relation to the subsidy scheme for low-emission cars (CAR-e scheme, see table 4), the Court of Auditors of Luxembourg came to the conclusion that, due to lack of data, an evaluation of the economic and environmental effectiveness of the scheme cannot be performed currently (Cour des Comptes, 2014, p.71). The ERT strongly encourages Luxembourg to improve the transparency of its reporting on PaMs by providing a description of the way in which progress with PaMs to mitigate GHG emissions is monitored and evaluated over time, as well as information on the institutional arrangements involved in the monitoring and evaluation of PaMs.

34. Luxembourg did not provide quantitative estimates of the impacts on GHG emissions of any of the individual PaMs or groups thereof and tabular information on the estimated mitigation impact for specific years in the NC6 as required according to table 1 of the reporting guidelines. The NC6 contains explanations as to why the quantitative estimates of the impacts of PaMs could not be provided. The ERT noted that Luxembourg is aware of the fact that the information should have been submitted in the NC6. The ERT strongly encourages Luxembourg to report on the assessment of the effects of PaMs, or groups of PaMs, including estimated changes in activity levels and/or emissions and removals due to adopted and implemented PaMs in the next NC according to table 1 of the reporting guidelines.

35. Finally, the ERT noted that Luxembourg did not report:

- (a) Information about the costs of PaMs. Such information should be accompanied by a brief definition of ‘cost’ in this context;
- (b) Information about non-GHG mitigation benefits of PaMs. Such benefits include, for example, reduced emissions of other pollutants and health benefits;
- (c) How the policy or measure interacts with other PaMs at the national level. This may include a description of how policies complement each other in order to enhance overall GHG mitigation.

36. The ERT encourages Luxembourg report, in its next submission, on: information about the costs of PaMs; information about the non-GHG benefits of PaMs; and how a PaM interacts with other PaMs at the national level.

37. During the review, Luxembourg, in an open and cooperative way, provided additional information, elaborating on measures affecting emissions from the agriculture and waste sector (see table 4 below) and on some objectives of PaMs in quantitative terms.

## 2. Policy framework and cross-sectoral measures

38. In the NC6, Luxembourg describes comprehensively how the targets and objectives agreed upon at the EU level provide the framework for policy formulation at the national level. Luxembourg reports on the process of establishing the Environment and Climate Partnership in 2010, which brought together stakeholder representatives to discuss climate change and sustainable development issues. This Partnership led to the formulation of the first National Adaptation Strategy on Climate Change; the Climate Agreement, which governs the involvement of municipalities in climate change-related policies; and a second Action Plan for Reducing CO<sub>2</sub> Emissions. These constitute the current framework for climate change policy in Luxembourg and the list of PaMs of the second Action Plan for Reducing CO<sub>2</sub> Emissions is the source document for the PaMs reported in the NC6. In addition, the Party provides comprehensive information on other national plans targeting sectors or specific areas that influence climate change policy, among them the second National Energy Efficiency Action Plan (see para. 47 below) published in 2011 and the National Renewable Energy Action Plan (see para. 46 below), published in 2010.

39. However, institutional arrangements for the coordination of climate change policy with other political objectives, in particular with fiscal objectives and with Luxembourg's energy policy, were not reported clearly in the NC6. An encouragement to enhance transparency by providing clearer information on institutional arrangements was already given in the report on the review of the NC5. During the review of the NC6, the ERT was informed that a report by the Court of Auditors of Luxembourg examining the implementation of the Kyoto Protocol by the government had been recently published. In the context of a specific subsidy scheme for buildings (PRIME House, see para 48), the Court noted that the lack of data exchange between ministries is a general problem at the state level (Cour des Comptes, 2014, p. 75). This finding resonates with the observation of the ERT.

40. Nonetheless, some coordination happens between different ministries for the management of the Climate and Energy Fund, which has been set up as the main tool to finance the purchase of units from Kyoto Protocol mechanisms as well as medium- to long-term investments in the areas of climate change mitigation and energy policies. The responsibility of the Fund lies with the Ministers responsible for the Environment, Finance and Energy.

41. Parliament (Chambre des Députés) together with the Government and the Council of State (Conseil d'Etat) exert legislative power in Luxembourg. There is no (regional) legislative level below the national level. The role of municipalities is that of administrative bodies. Hence PaMs based on legislative acts are adopted at the national level. However, municipalities have an important role in the transposition and promotion of PaMs at the local level. During the review, the ERT was informed that municipalities in Luxembourg can set energy standards for buildings, subsidize cleaner energy sources, issue local regulations that complement or go beyond national laws and administrative regulations, and have competencies in urban planning. In addition, municipalities have specific competencies for the direct provision of waste, transport and even, in some cases, energy services.

42. Table 4 provides a summary of the reported information on the PaMs of Luxembourg.

Table 4  
**Summary of information on policies and measures reported by Luxembourg**

<i>Sectors affected</i>	<i>List of key policies and measures</i>	<i>Estimate of mitigation impact (kt CO<sub>2</sub> eq)</i>
<b><i>Policy framework and cross-sectoral measures</i></b>	Second Action Plan for Reducing CO <sub>2</sub> Emissions	NE
	Climate Agreement, a legal, technical and financial reference framework that reinforces the role of municipalities in climate change policy	NE
	Transposition of the EU directive 2003/87/EC on the EU emission trading system	NE
<b><i>Energy</i></b>		
Renewable energy	National Renewable Energy Action Plan: Transposition of the EU directive 2009/28/EC on renewable energy sources	NE
	Increase of second generation biofuels in road fuel in order to support achievement of the target of 10% alternative energy sources in the transportation sector	NE
	Promotion of the supply of renewable electricity through investment aid and feed-in tariffs	NE
	Promotion of the supply of renewable energy sources with a focus on biomass; financial compensation for the supply of biogas; compensation mechanisms (tariffs) to promote renewable heat generation	NE
Energy efficiency	Second Energy Efficiency Action Plan: Transposition of the EU directive 2012/27/EU on promotion of energy efficiency (to be transposed into national law in 2014)	NE
Residential and commercial sectors	Improvement of planning instruments for the development of new residential areas (Housing Sector Plan); subsidies and other fiscal measures for residential buildings (new and renovated), notably for energy efficiency in construction and to meet sustainable development criteria; building codes increasing the energy performance standards of new residential and non-residential buildings	NE
<b><i>Transport</i></b>		
	Reduction in the price differential between Luxembourg and its neighbouring countries with regard to road fuels while considering the impacts on public finances and the economy in general (feasibility study)	NE
	Support the CAR-e scheme in order to reach a share of 10 per cent for electric vehicles in the total number of passenger cars by 2020	NE
	The programme for sustainable mobility, aiming for 25 per cent of daily trips by non-motorized traffic (walking and cycling) and 25 per cent of motorized trips by public transport by 2020	NE
<b><i>Industrial sectors</i></b>	Voluntary agreement with the Business Federation of Luxembourg to promote the improvement of energy efficiency and energy management systems	NE
<b><i>Agriculture</i></b>	Encouragement of practices in agriculture that have a mitigating effect on GHG emissions	NE
<b><i>Forestry</i></b>	Agro-forestry activities: combining agricultural and forestry activities to promote economic and ecological aims at the same time; actively developing the role of	NE

<i>Sectors affected</i>	<i>List of key policies and measures</i>	<i>Estimate of mitigation impact (kt CO<sub>2</sub> eq)</i>
	forests and of cultivated land as carbon sinks	
<b>Waste management</b>	Waste Prevention and Management Plan: further reductions of the amount of waste that is either incinerated or sent to landfill as well as closure of one of the two landfill sites of the country	NE
	Future installation of nitrogen removal steps in wastewater treatment plants	

*Abbreviations:* EU = European Union, NE = not estimated.

### 3. Policies and measures in the energy sector

43. Between 1990 and 2011, GHG emissions from the energy sector increased by 2.5 per cent (258.74 kt CO<sub>2</sub> eq). After a significant decrease in the 1990s, due mainly to the decommissioning of blast furnaces in the steel industry, GHG emissions increased significantly from around 2000 to 2005, mainly because of the installation of the TWINerg gas power plant and also the increasing amount of fuel sold for transportation. GHG emissions from the energy sector amounted to 10,688.67 kt CO<sub>2</sub> eq in 2011. The trend in GHG emissions from fuel combustion showed a notable increase in transport (151.7 per cent or 4,127.89 kt CO<sub>2</sub> eq) whereas a significant decrease occurred in the manufacturing industries (-79.5 per cent or -5,011.55 kt CO<sub>2</sub> eq).

44. In the framework of the EU 20-20-20 targets, Luxembourg is committed to reducing its GHG emissions not covered by the EU ETS by 20 per cent below the 2005 emissions level by 2020; to achieving a share of 11 per cent renewable energy in final energy consumption and a share of 10 per cent alternative energy sources in transport; and to achieving a level of final energy consumption of 4.24 Mtoe (49,292 gigawatt-hour) by increasing energy efficiency (the 2011 level was 4.17 Mtoe, see table 2). These targets comprise the starting point for the overarching policies Luxembourg has developed or is in the course of developing (see para. 38 and table 4 above).

45. **Energy supply.** The TWINerg gas power plant is the only major power plant in Luxembourg and its production accounted for 24.7 per cent of TPES in 2011. Mainly because of Luxembourg's fuel taxation policy, which leads to considerably lower fuel prices than in neighbouring countries, there is an already high and still increasing share of oil products in primary energy supply. In 2011, oil accounted for 60.9 per cent of total primary energy supply (TPES) in Luxembourg. Other sources that contributed to TPES in 2011 include imported electricity for 9.2 per cent, coal for 1.4 per cent, and renewable energy sources, including waste, for 3.7 per cent. The NC6 does not contain explicit information on the trend in energy intensity, but according to table 2 above, average annual energy intensity decrease by only 3.9 per cent in the period 1990–2011.

46. **Renewable energy sources.** A key area in the energy sector is subsidy schemes for the promotion of renewable energy sources (investment aid and feed-in tariffs for electricity from renewable sources, subsidy schemes for renewable heat and subsidy schemes for feeding biogas into the grid). The NC6 does not contain information on the amount of public financial support and on the amount of renewable energy produced under this scheme. Luxembourg noted in the NC6 that the production of renewable electricity substitutes electricity imports and hence does not affect domestic GHG emissions. Apart from this information, the NC6 does not contain data on reduction in GHG emissions that can be attributed to the increased share of renewable energy in the energy mix. The ERT noted that the Renewable Energy Action Plan drawn up by Luxembourg in the context of the EU directive on renewable energy sources contains considerably more detailed data for

the period to 2020 on expected amounts of renewable energy, on reduction of GHG emissions and on employment. For instance, the production of biogas (to be injected in the gas grid) and renewable heat substitute either gas or oil imports and hence affect domestic GHG emissions.

47. **Energy efficiency.** Apart from energy efficiency in the residential and commercial sector (see para. 48 below), the principal measure currently implemented in the area of energy efficiency is a voluntary agreement with the Business Federation of Luxembourg. The current agreement covers the period 2011 to 2016 and includes 56 medium and large manufacturing enterprises. Their objective is to annually increase energy efficiency by 1 per cent collectively. Discussions are underway to have energy efficiency measures supported by revenues from the auctioning of EU ETS allowances. The second Energy Efficiency Action Plan, submitted by Luxembourg to the European Commission in 2011 in order to implement EU directive 2012/27/EU on energy efficiency, contains detailed analysis of measures promoting energy efficiency but only superficially touches on GHG emissions reduction. The directive will be translated into law in the course of 2014.

48. **Residential and commercial sectors.** Key measures in the residential and commercial sectors are refurbishment of existing buildings and energy efficiency standards for new buildings, both targeted at residential and non-residential buildings. These measures take the form of regulatory measures (building codes setting the energy performance of buildings, Housing Sector Plan), and are complemented in some instances by subsidy schemes, in this case the PRIME House scheme from 2012. The NC6 does not include data on the amount of public financial support for these programmes or on the number of buildings affected by the measures. The NC6 also does not contain information on the effects of the PaMs in the residential and commercial sector on GHG emissions. During the review, information on the number of applications and on the public funds allocated to these PaMs was provided, aggregated since 2001. Since 2001, public subsidies for investments in thermal building refurbishment (taking into account energy criteria and insulation), low energy buildings and renewable energy sources in buildings amounted to EUR 171 million.

49. **Transport sector.** CO<sub>2</sub> emissions from transport are by far the largest emission category in Luxembourg, which reflects the substantial growth in CO<sub>2</sub> emissions from this sector of 153.0 per cent between 1990 and 2011. In the NC6, Luxembourg reported on several PaMs addressing the transport sector, among them the programme for sustainable mobility; the promotion of e-mobility and natural gas mobility by subsidies for the purchase of vehicles; large investment programmes to improve public transport and promotion of intermodal transport; and the Housing Sector Plan, expected to reduce transport demand. In addition, the ERT was informed that, in order to have a more reliable basis for decision-making, a study on the effects of ending the dependence on revenues from road fuel sales to non-residents, which account for about 10 per cent of the State budget, has been commissioned. Furthermore, a study is planned to better model demand for transport by residents and cross-border commuters, as well as freight. The substitution of fossil fuels by biofuels, the use of which has increased considerably across developed countries, is governed by EU legislation and Luxembourg intends to promote the use of second generation biofuels.

50. **Industrial sectors.** The principal measure targeted at industry is the participation of certain installations in the EU ETS. In the trading period 2008–2012, 15 installations were included in the EU ETS; the installations with the highest emissions were the TWINerg power plant and the only cement plant in Luxembourg. In the trading period 2013–2020, an additional four installations are included in the EU ETS, whereas three installations that took part in the trading period 2008–2012 are no longer participating. Apart from this measure and the voluntary agreement with the Business Federation of Luxembourg (see

para. 47 above), Luxembourg has implemented a research programme on eco-technologies in invention and innovation, which is targeted at industry.

#### 4. Policies and measures in other sectors

51. Between 1990 and 2011, GHG emissions from industrial processes (including solvent and other product use), agriculture and waste decreased by 43.0 per cent (1,061.84 kt CO<sub>2</sub> eq), mainly owing to the switch from blast furnaces to electric arc furnaces between 1994 and 1998. According to the NIR 2013 (table 4-12), CO<sub>2</sub> emissions from iron and steel production decreased from about 985 kt in 1990 to 124 kt in 2011. Compared with this effect, other changes in emissions that occurred during the period are small.

52. **Industrial processes.** Between 1990 and 2011, GHG emissions from the industrial processes sector decreased by 58.6 per cent (950.01 kt CO<sub>2</sub> eq). While these emissions accounted for 12.6 per cent of total GHG emissions in 1990, this share decreased to 5.6 per cent in 2011. The decrease was mainly driven by a change in technology in the steel production sector whereby blast furnaces were substituted by electric arc furnaces. The principal PaM in the industrial sectors is the EU ETS, in which the installations responsible for most of the industrial processes emissions (iron and steel production, flat glass production, the cement plant) take part. The NC6 contains no information on any other PaMs specifically targeted at the reduction of emissions from industrial processes.

53. **Agriculture.** Between 1990 and 2011, GHG emissions from the agriculture sector decreased by 10.7 per cent (79.55 kt CO<sub>2</sub> eq) and accounted for 5.5 per cent of GHG emissions in 2011. The main driver was the reduction in the use of fertilizers. The NC6 does not contain information on PaMs targeted at the reduction of GHG emissions from agriculture. During the review, the ERT was informed that the agriculture ministry encourages practices in agriculture that have possible mitigating effects on GHG emissions (e.g. enhancing the role of grassland as a carbon sink, reduced tilling, extensification). In the NC6 there is no assessment of these measures concerning their individual contribution to mitigation efforts.

54. **LULUCF.** The LULUCF sector was a net removal of 294.20 kt CO<sub>2</sub> eq in Luxembourg in 2011, while in 1990 it had been a source accounting for 347.75 kt CO<sub>2</sub> eq GHG emissions. This reduction amounts to a decrease in GHG emissions of 184.6 per cent. The trend was mainly driven by the categories “forest land remaining forest land” and “land converted to forest land”. The NC6 does not contain information on PaMs targeted at the LULUCF sector except a rather general one aiming at developing agro-forestry activities which consist in combining agricultural and forestry activities<sup>5</sup> and a research measure targeted at increasing the carbon sink role of forests and cultivated land. Information on the specific nature of these PaMs was not supplied during the review.

55. **Waste management.** Between 1990 and 2011, GHG emissions from the waste management sector decreased by 29.3 per cent (24.2 kt CO<sub>2</sub> eq), mainly owing to the transposition of the EU landfill directive 1999/31/EC in Luxembourg. Emissions in 2011 amounted to 58.33 kt CO<sub>2</sub> eq, or 0.5 per cent of total GHG emissions. The main source of emissions was solid waste disposal on land, while the main drivers for the reduction of emissions were a reduction in the amount of waste being deposited in landfills, the installation of landfill gas collection systems and the pre-treatment of waste. The NC6 does not contain information on PaMs targeted at the reduction of emissions from the waste

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<sup>5</sup> Agro-forestry activities combine, on the same plot of land, production from annual agricultural activities (such as crops and pasture) and from delayed long-term production by trees (for example timber and services).



management sector. During the review, the ERT was provided with an overview of the perspectives of treatment of solid waste and of wastewater. The Waste Prevention and Management Plan foresees further reductions of the amount of waste that is either incinerated or sent to landfill as well as closure of one of the two landfill sites of the country. Both should have a mitigating impact on emissions. The installation of nitrogen removal steps in wastewater treatment plants will have a mitigating effect on N<sub>2</sub>O emissions.

## **5. Policies and measures related to the implementation of commitments under the Kyoto Protocol**

56. Luxembourg reported on its package of PaMs adopted, implemented and elaborated in achieving its commitment under the Kyoto Protocol. The NC6 implicitly addressed PaMs for achieving quantified emission limitation and reduction commitment in order to promote sustainable development by referring to its Sustainable Development Plan, and by providing information about the adopted measures to apply sustainability criteria for public procurement and to extend the Environment and Climate Partnership to a sustainability commission. All required elements were included, however, in different parts of the PaMs chapter, because sustainable development is a cross-cutting theme. Nevertheless, the ERT encourages Luxembourg to report this information in a dedicated section, possibly by cross-referencing the relevant parts of the NC6 for the purposes of fulfilling its reporting obligations under the Kyoto Protocol.

57. The NC6 includes information on how Luxembourg promotes and implements the International Civil Aviation Organization (ICAO)/the International Maritime Organization (IMO) decisions to limit emissions from aviation and marine bunker fuels. Luxembourg reported that it actively participates in the work of ICAO and that it supports the decision of the General Assembly of ICAO to design a global market-based measure by 2016 and the inclusion of aviation in the EU ETS.

58. In its NC6, Luxembourg reported information on how it strives to implement PaMs under Article 2 of the Kyoto Protocol in such a way as to minimize adverse effects, including the adverse effects of climate change and effects on international trade and effects on social, environmental and economic impacts, on other Parties, especially developing country Parties. Further information on how Luxembourg strives to implement its commitments under Article 3, paragraph 1, in such a way as to minimize adverse social, environmental and economic impacts on developing country Parties, as reported in the 2013 annual submission, is presented in chapter III.B below.

59. The NC6 underlines the importance Luxembourg attaches to social, environmental and economic impacts on other Parties. Luxembourg reports that strict criteria are applied when selecting projects under the clean development mechanism (CDM) and joint implementation (JI), going beyond the sustainability criteria established according to the Kyoto Protocol. To minimize potential negative effects on developing countries arising from the demand for biofuels, Luxembourg supports limiting the use of first generation biofuels at the national as well as the EU level.

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

### **1. Projections overview, methodology and key assumptions**

60. Luxembourg has provided in its NC6 partially complete and mostly transparent information on projections and the total effect of PaMs. The GHG emission projections

provided by Luxembourg in the NC6 include a 'with existing measures' (WEM) scenario, and a 'with additional measures' (WAM) scenario up to 2030. In contrast to the NC5, no 'without measures' (WOM) scenario has been provided. Results of these projections are presented relative to actual inventory data for 1990 to 2011 as required by the reporting guidelines, and are also provided in absolute numbers. Provisional inventory data for 2012 are included as well. Projections are also provided in an aggregated format for each sector, using the same sectoral categories used in the PaMs section, as well as for a national total, using the global warming potential (GWP) values from the IPCC Second Assessment Report.

61. The ERT noted that the recommendation in the previous review report for projections to be reported on a gas-by-gas basis was not followed. However, the data required to do so were presented to the ERT during the review. In addition, the ERT noted that projections for the LULUCF sector are not available in the NC6 and could not be presented during the review. Finally, emission projections related to fuel sold to ships and aircraft engaged in international transport were not reported in the NC6. During the review, Luxembourg provided additional information on emission projections related to fuel sold to ships and aircraft engaged in international transport and on the projection methodology applied. This relates mainly to international aviation as there is only very little international shipping on the Moselle River. Emissions from international transport are expected to grow by 313.8 per cent between 1990 and 2020. The ERT concludes that, except for GHG emission projections for the LULUCF sector, Luxembourg already disposes of the necessary information to report in its next NC on the missing elements.

62. The ERT reiterates the recommendations made in the previous review report that Luxembourg, in its next NC:

- (a) Report on projections for all sectors, including LULUCF;
- (b) Present its projections on a gas-by-gas basis for CO<sub>2</sub>, CH<sub>4</sub>, N<sub>2</sub>O, perfluorocarbons (PFCs), HFCs and SF<sub>6</sub> (treating PFCs and HFCs collectively in each case);
- (c) Report information on emission projections related to fuel sold to ships and aircraft engaged in international transport, to the extent possible separately and not included in the totals.

63. The reported WEM projections for total GHGs excluding LULUCF have 2010 as the starting year as recommended by the European Commission for 2013 reporting under decision 280/2004/EC, and include all implemented and adopted PaMs up to 1 January 2013. Projected effects are provided for the years 2015, 2020, 2025 and 2030. The NC6 contains only a brief qualitative description of modelled PaMs in the residential, commercial and institutional buildings sector and for road transportation. It is not clear to what extent PaMs listed in these sectors, as well as other PaMs in the energy and other sectors identified in chapter II.B above, are included in the WEM scenario projections. The additional background documentation provided to the ERT during the review was also not transparent enough on how the PaMs reported in chapter II.B have been modelled in the emission projections. The ERT recommends that Luxembourg improve the transparency of its NC by reporting on all the implemented and adopted PaMs included in the WEM scenario projections, as well as on the completeness of coverage of PaMs in the projections in relation to what is reported in the PaMs chapter.

64. The WAM scenario differs from the WEM scenario in two sectors only:

- (a) In the residential and non-residential sectors (including the public sector), the national 'near zero emission building' standards for new buildings are assumed to be in force by 31 December 2018;

(b) For the transport sector, the implementation of a 10 per cent sustainable biofuel share in the fuel mix by 2020 and further onwards is assumed, as well as an introduction of 40,000 electric passenger cars by 2020 and further onwards.

65. The projections are produced using different models and approaches for different sectors and gases and are briefly described in the NC6:

(a) Energy/Emissions Projections Model (EPM) for CO<sub>2</sub> emission projections of the built environment is a bottom-up simulation model for energy demand and GHG emissions;

(b) The TREMOVE transport model – a transport and emissions simulation model developed for the European Commission – and the Sustainable Transport Illustrative Scenarios SULTAN Tool for the projections of traffic evolution in the transport sector. For non-road transport, the PRIMES models are used for civil aviation. A combination of the European Coordinate Reference Systems and Eurocontrol data are used;

(c) Expert judgments and model results (based on selected scenario results of the PRIMES model and GAINS (Greenhouse Gas and Air Pollution Interactions and Synergies) model) for CO<sub>2</sub> emission projections of other sectors;

(d) An indicator-based approach for CH<sub>4</sub>, N<sub>2</sub>O and F-gas emissions. For most CH<sub>4</sub> and N<sub>2</sub>O emissions, an indicator based on CO<sub>2</sub> has been applied to the projected CO<sub>2</sub> emissions of the sector; for example, averaged 2007–2011 CH<sub>4</sub>/CO<sub>2</sub> and N<sub>2</sub>O/CO<sub>2</sub> emission ratios have been applied to project CH<sub>4</sub> and N<sub>2</sub>O emissions of the sector concerned. As this approach does not take into account any technology or other improvements leading to emissions reduction, it can be considered to be a conservative approach.

66. Luxembourg reports that 2010 inventory data from the 2012 GHG inventory submission have been used to calibrate the EPM model used for CO<sub>2</sub> emission projections. The simple assumptions applied are transparently reported in the NC6, and rationales are provided for projections of emissions, except for the residential, commercial and institutional buildings sector and the road transport sector, and for projections of emissions of non-CO<sub>2</sub> gases (see para. 65 above). However, Luxembourg did not provide information on the extent to which the macroeconomic, policy and other modelling assumptions were harmonized across the different models used for the reported WEM and WAM scenarios. The ERT encourages Luxembourg to report more transparently on its procedures to select and set up consistent scenarios and on how it has ensured the harmonization of common background assumptions for the different applied methodologies for its scenarios.

67. The emission projections, calculated and estimated by the different models and approaches described above, are finally fitted to the 2010 total emission levels of the separate GHGs as reported in the 2013 GHG inventory submission. After this fit, done proportionally based on a ratio of the calculated emissions to the inventory emissions for 2010, the emissions are reported as WEM and WAM in the NC6 and BR1. The ERT has reservations about this approach because actual annual emissions data may differ from the more ‘normalized’ emissions data provided by projection models. Annual variability, due to for example climatic circumstances, is generally not covered by models but could be visible in annual emission data. The ERT encourages Luxembourg to provide more rationale when choosing to fit model projections to actual and reported emission data of a single year and to analyse and report on possible consequences from its choice.

68. Luxembourg included only a concise and qualitative uncertainty analysis of its projections and provided some explanation of why the ‘common’ drivers for projections, such as GDP and population, are not applicable to it (see also chapter II.A.1 on national circumstances above). The ERT encourages Luxembourg to extend the uncertainty analysis towards a quantitative assessment and to report on it in its next NC.

69. During the review, Luxembourg expressed its intention to increase its capacity regarding scenario development and GHG emission projections by participating in planned EU activities on projections. Luxembourg also mentioned its plans to develop a national system and procedures for scenario development under the current national regulation covering the NIS. The ERT welcomes this information and encourages Luxembourg to report on progress and outcomes as well as the effects on its national procedures for scenario development in its next submission.

70. Luxembourg did not report clearly on the changes made to the projection methodology compared with the NC5 and did not reference supporting documentation in the NC6. During the review, Luxembourg explained that the main change between the NC5 and NC6 is that the WOM (serving as a counterfactual business-as-usual scenario), WEM and WAM scenarios were all included in the NC5 but only the WEM and WAM scenarios were included in the NC6. Other differences include that for the NC5, the cut-off date for a PaM to be included in the WOM scenario was 2006; that is, three years before the projections for the NC5 were realized (in 2009). The total effect of existing PaMs was obtained by subtracting the GHG emissions level of the WEM scenario from the emissions level of the WOM scenario for a given year. Similarly, the projected emissions level of the WAM scenario was subtracted from the emissions level for the WEM scenario to obtain the total effect of additional PaMs in a particular year.

71. In the NC6, Luxembourg reported that changes to methodology from the NC5 also include an extension of the time horizon from 2020 to 2030 and revised assumptions for the WEM and WAM scenario projections to integrate to some extent the effects of the recent economic crisis on macroeconomic variables. Other changes include updates to the methodology used for the industry sector and the electricity supply sector; updates to the transport sector projections; and updates to the residential, commercial and public buildings modelling. However, as noted in paragraph 70 above, the description of these changes in the NC6 lacked transparency. During the review, Luxembourg explained that the NC6 does not contain an analysis of the resulting changes in the projected GHG emissions levels compared with the NC5 due to the late delivery of the NC6 projection results by the external consultant. The ERT encourages Luxembourg to report more information on the main differences in the results between projections in the current NC and those in the previous NC as a result of updates in assumptions and methods used.

## 2. Results of projections

72. Luxembourg's Kyoto Protocol target for the CP1 is set at 28 per cent below the GHG emissions level in the base year,<sup>6</sup> which translates into an average annual emissions level of 9,480.60 kt CO<sub>2</sub> eq per year over the period 2008–2012. The average reviewed annual emissions level for the years 2008 to 2011 is 12,056.90 kt CO<sub>2</sub> eq or 8.4 per cent below the base year emissions level of 13,167.50 kt CO<sub>2</sub> eq, but 27.2 per cent above the average annual CP1 target emissions level.<sup>7</sup> The NC6 contains an analysis of the causes of this gap from the CP1 target (see para. 85). Luxembourg expressed in its NC6 that it intends to reach its target by using assigned amount units (AAUs) and credits from the Kyoto Protocol mechanisms (e.g. certified emission reductions (CERs)) and provided more

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<sup>6</sup> The base year is 1990 for CO<sub>2</sub>, CH<sub>4</sub> and N<sub>2</sub>O, and 1995 for HFCs, PFCs and SF<sub>6</sub>, excluding LULUCF emissions.

<sup>7</sup> According to the data from the 2014 inventory submission, which became available during the preparation of this report, the average annual emissions level for the first commitment period of the Kyoto Protocol, for years 2008 to 2012 is 12,017.20 kt CO<sub>2</sub> eq or 8.7 per cent below the base year emissions level of 13,167.5 kt CO<sub>2</sub> eq, but 26.8 per cent above the average annual CP1 target emissions level of 9,480.60 kt CO<sub>2</sub> eq.

information during the review on the amounts and price of such units and credits already secured. In the NC6, Luxembourg reported that it had already secured units for a total of 13,200 kt CO<sub>2</sub> eq for which it had committed EUR 173 million. During the review, Luxembourg mentioned that an additional 130 kt CO<sub>2</sub> eq had been secured but did not provide the price paid for this amount. The Party also mentioned that in total, a sum of 113 million EUR has been disbursed so far for compliance under the first commitment period of the Kyoto Protocol, leading to a weighted average price of EUR 11.05/tonne (t).

73. Luxembourg reported it will account only for Kyoto Protocol Article 3, paragraph 3, activities and did not elect any Article 3, paragraph 4, activities for the CP1 of the Kyoto Protocol. As the NC6 covers only the period to 2011, it could not be assessed during this review what the contribution of such activities is regarding achievement of the CP1 target.

74. In its NC6, Luxembourg provided the required information on its Kyoto Protocol target for the CP2. This target for Luxembourg is a contribution towards the target for the EU as a group of 28 member States, which is a reduction in emissions by 20 per cent below the base year level by 2020 for all gases and sectors, including LULUCF in the non-ETS sectors under the ESD. Across the EU, it is expected that the market approach embedded in the ETS will guarantee that emissions from sectors falling under the EU ETS (mainly large point sources such as power plants and industrial facilities) will achieve the 2020 ETS target.

75. In addition, the NC6 provided information on how the EU ESD translates into emissions levels in Luxembourg for the emissions not covered by the EU ETS. The EU as a whole has a collective target of reducing emissions not covered by the ETS by 10 per cent by 2020 compared with 2005. As of 2013, these emissions are regulated by member State specific targets, determined based on average emissions from 2008 to 2010. In Luxembourg, this translates into a 20 per cent reduction by 2020 below 2005, or an emissions level of 8,085 kt CO<sub>2</sub> eq.

76. The projections reported in the NC6 estimate that total GHG emissions in the WEM scenario would reach a level that is 0.9 per cent below the 1990 level in 2020 and 7.5 per cent above the 1990 level in 2030; in the WAM scenario, emissions would reach a level that is 6.6 per cent and 0.3 per cent below the 1990 level in 2020 and 2030, respectively. Luxembourg reported that in the WEM scenario for 2020, emissions not covered by the EU ETS are projected to reach a level that is 29.0 per cent (10,427 kt CO<sub>2</sub> eq.) above the target level of 8,085 kt CO<sub>2</sub> eq., while in the WAM scenario emissions reach a level that is 19.9 per cent (9,695 kt CO<sub>2</sub> eq.) above that target level. In other words, to achieve its 2020 ESD target Luxembourg would need to implement further PaMs in sectors not covered under the EU ETS that should deliver a reduction of 22.5 per cent from the projected level in the WEM scenario and a 16.6 per cent reduction from the level projected in the WAM scenario.

77. The ERT commends Luxembourg for providing this useful additional information in a transparent manner. However, beyond reporting that it will have to turn to the options offered by the ESD, namely the provisions foreseen by the EU ESD that allow certified emissions reduction (CERs) and emissions reduction units (ERUs) to be used for compliance, Luxembourg did not include a description of how specifically it intends to achieve the 2020 target, including information on additional measures that would be necessary. The ERT encourages Luxembourg to report, in its next NC, on further exploration of PaMs and on other efforts and cooperation towards achieving long-term targets.

78. The reported projections of the WEM and WAM scenarios between 2011 and 2030 do not show substantial changes compared with the emission trends of 2000–2011. CO<sub>2</sub> remains the GHG which will contribute the most to future emissions as its emissions

are expected to continue to grow. In addition, projections show an increase in the share of CO<sub>2</sub> emissions from 91.9 per cent to 93.6 per cent in the WEM scenario and from 91.9 to 93.2 per cent in the WAM scenario between 2010 and 2030. In the same time period, the projected share of total emissions reduces for all other gases as follows: the share of CH<sub>4</sub> emissions decreases from 3.7 to 2.7 per cent in the WEM scenario and from 3.7 to 2.9 per cent in the WAM scenario; the share of N<sub>2</sub>O emissions decreases from 3.8 to 2.9 per cent in the WEM scenario and from 3.8 to 3.1 per cent in the WAM scenario; and the share of F-gas emissions increases from 0.6 to 0.8 per cent in both WEM and WAM scenarios. Neither of these scenarios leads to a change in the total emissions trend, which remains upwards towards 2020 and 2030.

79. Luxembourg reported sectoral projections using sectoral categories similar to those used in the PaMs section. The GHG emissions from the transport sector, especially from road transport, continue to dominate the trend in total GHG emissions projections as their share increases from 52.1 per cent in 2010 to 62.5 per cent in 2030 in the WEM scenario and to 60.3 per cent in the WAM scenario. The second largest emitting sector comprises the commercial, institutional and residential buildings sector together with the other miscellaneous sources sectors and it has a decreasing share of 14.4 per cent in 2010 to 8.4 per cent and 8.3 per cent in 2030 in the WEM and WAM scenarios, respectively. Energy and manufacturing sectors each maintain about a 10 per cent share and the agriculture and industrial processes sector about a 5 per cent share. The other sectors (waste, solvents and fugitive emissions) remain small in terms of emissions, with a less than 1 per cent share.

80. The projected GHG emissions levels under the different scenarios and information on the Kyoto Protocol targets and quantified economy-wide emission reduction target are presented in table 5 and the figure below.

Table 5  
**Summary of greenhouse gas emission projections for Luxembourg**

	<i>Greenhouse gas emissions (kt CO<sub>2</sub> eq per year)</i>	<i>Changes in relation to the base year<sup>a</sup> level (%)</i>	<i>Changes in relation to the 1990 level (%)</i>
Kyoto Protocol base year <sup>b</sup>	13 167.50	0.0	2.1
Kyoto Protocol target for the first commitment period (2008–2012)	9 480.60	–28.0	–26.5
Kyoto Protocol target for the second commitment period (2013–2020) <sup>c</sup>	Not available yet		
Quantified economy-wide emission reduction target under the Convention <sup>d</sup>	Not available yet		
Inventory data 1990 <sup>e</sup>	12 901.02	–2.1	0.0
Inventory data 2011 <sup>e</sup>	12 097.92	–8.1	–6.2
Average annual emissions for 2008–2011 <sup>e</sup>	12 056.90	–8.4	–6.5
‘With measures’ projections for 2020 <sup>f</sup>	12 785.74	–2.9	–0.9
‘With additional measures’ projections for 2020 <sup>f</sup>	12 053.97	–8.5	–6.6
‘With measures’ projections for 2030 <sup>f</sup>	13 863.56	5.3	7.5
‘With additional measures’ projections for 2030 <sup>f</sup>	12 867.72	–2.3	–0.3

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

<sup>a</sup> Base year in this column refers to the base year under the Kyoto Protocol.

<sup>b</sup> The Kyoto Protocol base year level of emissions is provided in the initial review report contained in document FCCC/IRR/2007/LUX.

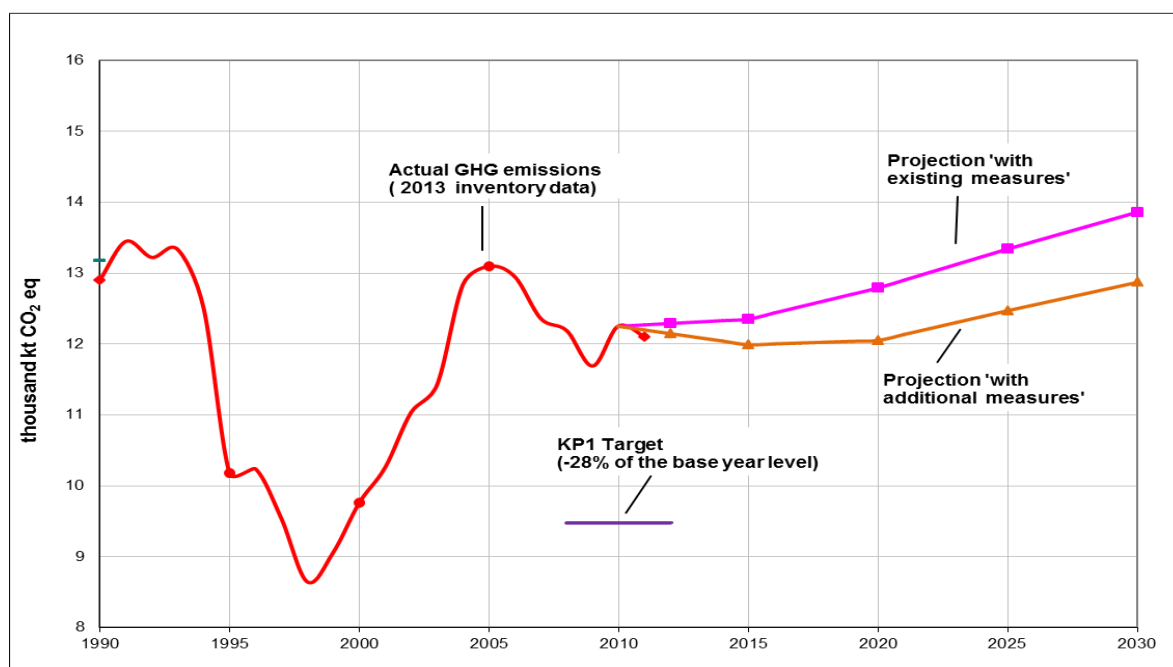
<sup>c</sup> The Kyoto Protocol target for the second commitment period (2013–2020) is a joint target for the European Union and its 28 member States and Iceland. The target is to reduce emissions by 20 per cent by 2020 compared with the base year (1990) level. At the time of the review, national targets for EU member States for the second commitment period of the Kyoto Protocol were not yet decided. The target for sectors not covered by the European Union Emissions Trading System is 20 per cent compared to 2005 for Luxembourg under the European Union effort-sharing decision.

<sup>d</sup> Quantified economy-wide emission reduction target under the Convention is a joint target for the European Union and its 28 member States. The target is to reduce emissions by 20 per cent by 2020 compared with the base year (1990) level. At the time of the review, 2020 national targets for EU member States under the Convention were not yet decided.

<sup>e</sup> Luxembourg's 2013 greenhouse gas inventory submission; the emissions are without land use, land-use change and forestry (LULUCF).

<sup>f</sup> Luxembourg's sixth national communication and/or first biennial report.

### Greenhouse gas emission projections



*Sources:* (1) Data for the years 1990–2011: Luxembourg's 2013 greenhouse gas (GHG) inventory submission; the emissions are without land use, land-use change and forestry (LULUCF); (2) Data for the years 2010–2030: Luxembourg's sixth national communication and first biennial report; the emissions are without LULUCF.

*Note:* The target for the second commitment period of the Kyoto Protocol is based on the 1990 GHG emissions level, excluding LULUCF. The initial assigned amount for the second commitment period will be established after the initial review for the second commitment period of the Kyoto Protocol.

*Abbreviations:* GHG = greenhouse gas, KP1 = first commitment period of the Kyoto Protocol, kt = kilotonnes.

### 3. Total effect of policies and measures

81. In the NC6, Luxembourg presents neither the estimated and expected total effect of implemented and adopted PaMs, nor an estimate of the total effect of its PaMs, in accordance with the 'with measures' definition, compared with a situation without such

PaMs. The NC6 also does not present relevant information on factors and activities for each sector for the years 1990 to 2030.

82. The ERT reiterates the recommendation made in the previous IDR that Luxembourg report its estimated and expected total effect of adopted and implemented PaMs in its next NC. Elements that could be included and that could lead to an improvement in the reporting:

(a) Effects of all PaMs in the energy sector (e.g. during the review Luxembourg presented an ambitious stepwise plan to enhance public transport by means of infrastructure improvements and discouragement policies for private car use, which is already partially implemented, but possible effects on energy and emissions were not quantified, and this measure was not included in the scenarios);

(b) Effects on energy use and emissions from the non-energy sector PaMs (e.g. PaMs in waste and agriculture sectors were presented during review, but their effects were not quantified);

(c) Expected effect of PaMs at the development stage (ex ante analysis);

(d) Estimated effect of PaMs during and after implementation (ex post analysis).

83. During the review, Luxembourg explained that a lack of clear communication between the teams involved in the preparation of the NC and the sectoral experts with possible knowledge about the individual and total effects of PaMs may have played a role in the estimation of the expected effect of PaMs at the development stage and after implementation not being consistently performed in Luxembourg. The ERT encourages the Party to report on the development and results of a national monitoring mechanism for the effects of PaMs in its next submission.

84. According to the information reported, additional (planned) PaMs in the transport sector will deliver the largest emission reductions between 2015 and 2030, followed by the planned PaMs in the residential, commercial and institutional building sector. These PaMs are described in chapter II.B above. Table 6 provides an overview of the total effect of PaMs calculated by the ERT as the difference between the WEM and WAM scenarios for these sectors. Luxembourg identified only additional PaMs in the transport and in the residential, commercial and institutional building sectors, the latter being included in energy in table 6.

Table 6  
**Projected effects of planned, implemented and adopted policies and measures in 2020 and 2030**

Sector	<i>Effect of implemented and adopted measures (kt CO<sub>2</sub> eq)</i>	<i>Relative value (% of 1990 emissions)</i>	<i>Effect of planned measures (kt CO<sub>2</sub> eq)</i>	<i>Relative value (% of 1990 emissions)</i>	<i>Effect of implemented and adopted measures (kt CO<sub>2</sub> eq)</i>	<i>Relative value (% of 1990 emissions)</i>	<i>Effect of planned measures (kt CO<sub>2</sub> eq)</i>	<i>Relative value (% of 1990 emissions)</i>
	2020				2030			
Energy (without CO <sub>2</sub> from transport)	NA		NA		NA		101.73	0.8
Transport – CO <sub>2</sub>	NA		731.77	5.7	NA		895.11	6.9
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	



Sector	<i>Effect of implemented and adopted measures (kt CO<sub>2</sub> eq)</i>	<i>Relative value (% of 1990 emissions)</i>	<i>Effect of planned measures (kt CO<sub>2</sub> eq)</i>	<i>Relative value (% of 1990 emissions)</i>	<i>Effect of implemented and adopted measures (kt CO<sub>2</sub> eq)</i>	<i>Relative value (% of 1990 emissions)</i>	<i>Effect of planned measures (kt CO<sub>2</sub> eq)</i>	<i>Relative value (% of 1990 emissions)</i>
	2020				2030			
<b>Total</b>			<b>731.77</b>	<b>5.7</b>			<b>995.84</b>	<b>7.7</b>

*Source:* Calculated from estimates available from Luxembourg's sixth national communication and first biennial report.

*Note:* The sectoral and total effect of planned policies and measures is defined as the difference between the 'with measures' and 'with additional measures' scenarios.

*Abbreviation:* NA = not available.

85. The NC6 contains an analysis of the reasons for the gap in emissions from Luxembourg's CP1 target. As emphasized by Luxembourg both in its NC6 and during the review, emissions from road fuel sales to non-residents are among the main drivers of the increase and the level of GHG emissions during the CP1. These sales are mainly triggered by the fuel price difference that arises as a result of lower tax rates in Luxembourg compared with neighbouring countries. It was reported that the tax revenues from these sales are about EUR 900 million annually. Comparing these revenues with the estimated 5,000 kt CO<sub>2</sub> emissions generated by non-resident fuel sales, the indicative revenue would be EUR 180.00/t CO<sub>2</sub> emitted. The ERT noted that this value cannot be compared with the cost-effectiveness of adopted, implemented or planned PaMs as no data is available.

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

86. Luxembourg in its NC6 provided partially complete and partially transparent information on how its use of the mechanisms under Articles 6, 12 and 17 of the Kyoto Protocol is supplemental to domestic action. Luxembourg assumes that any use in any quantity of units or credits from the Kyoto Protocol mechanisms is supplemental to domestic action; it does not use target shares of the emission gap between baseline or projected emissions and the target, nor any other quantified contributions of use of the mechanisms.

87. Luxembourg described in its NC6 how it intends to reach its CP1 target by using Assigned Amount Units (AAUs) and credits from the Kyoto Protocol mechanisms (for example CERs) and provided more information during the review on the amounts and price of such units and credits already secured. Luxembourg also explained during the review that it assumes its domestic potential for emission reductions is exhausted and already included in the WAM scenario. However, this statement could not fully be supported by an analysis or be quantified. The ERT considers that Luxembourg has neither explored to the full nor quantified its domestic potential for emission reductions. During the review, Luxembourg mentioned that it plans to use units from market mechanisms to the amount of 14,197 kt CO<sub>2</sub> eq, which is an update from the 15,106 kt CO<sub>2</sub> eq reported in the NC6. Luxembourg also mentioned during the review that it has already secured a total 13,330 kt of units, paid through the Climate and Energy Fund, set up as the main tool to finance the purchase of units from Kyoto Protocol mechanisms.

88. Because Luxembourg did not provide an estimate of the total effect of implemented and adopted domestic PaMs in the CP1, it is not possible for the ERT to conclude how its use of the Kyoto Protocol mechanisms is supplemental to domestic action, and how its domestic action thus constitutes a significant element of the effort made to meet its quantified limitation and reduction commitments under Article 3, paragraph 1, in accordance with the provisions of decision 5/CP.6. Therefore, the ERT reiterates the

recommendation made in the previous IDR that Luxembourg reports on how its use of the Kyoto Protocol mechanisms is supplemental to domestic action, and how its domestic action constitutes a significant element of the effort made to meet its quantified limitation and reduction commitments under Article 3, paragraph 1, in accordance with the provisions of decision 5/CP.6.

## **D. Provision of financial resources and technology transfer to developing country Parties, including information under Articles 10 and 11 of the Kyoto Protocol**

### **1. Financial resources, including ‘new and additional’ resources and resources under Article 11 of the Kyoto Protocol**

89. In the NC6, Luxembourg provided complete and mostly transparent information on provision of support required under the Convention and its Kyoto Protocol. Luxembourg provided details on measures taken to give effect to its commitments under Article 4, paragraphs 3, 4 and 5, of the Convention as required by the UNFCCC reporting guidelines on NCs and under Article 11 of the Kyoto Protocol, as required by the “Guidelines for the preparation of information required under Article 7 of the Kyoto Protocol”. Luxembourg has indicated what ‘new and additional’ financial resources it has provided pursuant to Article 4, paragraph 3, and clarified how it has determined such resources as being ‘new and additional’. Specifically, the NC6 specifies that “new and additional” resources follow the principle of additionality between official development assistance (ODA) and climate finance. Therefore, resources committed to deliver are determined as “new” as they would not be taken over from earlier commitments; those resources would be determined as “additional” as they would come “on top of” Luxembourg’s ODA commitments and thus not “double counted” or drained on other resources dedicated to poverty eradication.

90. Luxembourg has also provided information on the assistance it has made available to developing country Parties that are particularly vulnerable to the adverse effects of climate change. The Party reported that through its Strategy for Environment and Climate Change Action for assisting vulnerable countries (Ministry of Foreign and European Affairs, Development Cooperation Directorate), it strives to ensure better integration of environmental concerns and climate policy acquisition, and to promote sustainable energy, clean technology and technology transfer in these countries. The Strategy includes an environmental and climate change-related clause to be inserted in all third generation Indicative Cooperation Programmes.<sup>8</sup> The strategy also provides access to environmental information.

91. However, the NC6 did not transparently explain how these actions specifically help vulnerable countries to meet the costs of adaptation and did not reference table 5 of the NC reporting guidelines on bilateral and regional financial contributions, which was not reported. Instead, Luxembourg reported as an annex to its NC6 information on contributions through bilateral, regional and other channels in 2011 and 2012, for both mitigation and adaptation, as part of the common tabular format (CTF) tables 7 and 7(b) of its first biennial report (BR1). The ERT recommends that Luxembourg enhance the transparency of its next NCs by reporting how its actions will specifically help particularly vulnerable countries to meet the costs of adaptation. The ERT encourages Luxembourg to

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<sup>8</sup> Luxembourg’s development cooperation with major partner countries is carried out through multi-annual Indicative Cooperation Programmes (ICP). ICPs cover a 4 to 5 year period, giving partner countries medium-term budgetary predictability and cover in parallel the planning periods of partner countries. The ICPs are at their third generation stage.

reference table 5 of the NC reporting guidelines on financial resources provided through bilateral and regional financial contributions.

92. In the text of NC6 and during the review, Luxembourg provided additional information, elaborating on bilateral cooperation, made by Luxembourg's executing agency for development LuxDev, which is the operational pillar of bilateral cooperation for delivering and tracking support to least developed countries; and through framework agreements with non-governmental organisations for its ODA related to climate change. The lists of partner developing countries and countries receiving bilateral aid were presented during the review. The ERT noted that the list of partner countries had some updates since the NC5; namely, that the Occupied Palestinian Territories had been added to the list. The criteria for the selection of the partner countries and reasons for these changes were not transparently explained in the NC6.

93. With regards to NGO projects linked to climate change and supported by Luxembourg's ODA contributions, some projects and programmes have been funded in developing countries, namely, in Latin America (Bolivia (Plurinational State of), Nicaragua and Peru), in Asia (Philippines) and in Africa (Burkina Faso, Malawi and Sudan). The ERT encourages Luxembourg to include such detailed information and to enhance the transparency of its reporting by indicating the criteria for identifying the number and the selection of partner countries for bilateral cooperation in its next NC.

94. The NC6 included information on its overall financial contributions to multilateral cooperation for the years 2010, 2011 and 2012 according to table 4 of the NC reporting guidelines but without reference to multilateral scientific, technological and training programmes. Luxembourg clarified in its NC6 that its development cooperation has poverty eradication as its primary objective, notably in least developed countries (LDCs), within a framework of sustainable development linked to Millennium Development Goal 7, particularly (i) poverty eradication and (ii) reducing biodiversity loss. The Party stated that it will continue its effort in allocating 1 per cent of gross national income (GNI) for development cooperation. Luxembourg thus confirms its position among the top five donors who meet the commitments made in 1970 at the United Nations General Assembly to allocate at least 0.7 per cent of their GNI to development cooperation. Luxembourg in fact ranked first in 2012.<sup>9</sup>

95. In response to a recommendation made in the previous review report, Luxembourg provided in its NC6 information on its financial contribution to the Adaptation Fund, established in accordance with decision 10/CP.7 of the UNFCCC. With regard to the most recent financial contributions, in its NC6 and during the review Luxembourg provided the ERT with detailed information on its contribution to fast-start finance (2010–2012) to enhance the implementation of the Convention by developing countries and reported the total pledged sum of EUR 9 million, or EUR 3 million annually. However, at the time of the review, only EUR 8.85 million had been firmly committed. Detailed information on the distribution of fast-start finance was presented during the review week and further disaggregation of support provision and clear distinction between mitigation and adaptation activities were reported. The ERT encourages Luxembourg to report this additional

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<sup>9</sup> Sources: Ministry of Foreign and European Affairs, Directorate for Development Cooperation. 2012. Luxembourg's Development Cooperation, Annual Report 2012. Available at <[http://www.cooperation.lu/\\_dbfiles/lacentrale\\_files/500/598/MAE-RA\\_2012-1col-EN\\_def-web.pdf](http://www.cooperation.lu/_dbfiles/lacentrale_files/500/598/MAE-RA_2012-1col-EN_def-web.pdf)>; OECD – DAC via the Aidflows.org tool available at <<http://www.aidflows.org/>> (see pp.16–17). Eurostat's Sustainable Development Indicator tsdgp100. Available at <<http://epp.eurostat.ec.europa.eu/tgm/table.do?tab=table&init=1&plugin=1&language=en&pcode=tsdgp100>>.

information in its next NC to enhance the transparency of its reporting. Table 7 summarizes information on financial resources and technology transfer.

Table 7  
**Summary of information on financial resources and technology transfer for 2010–2012**  
(Million European euros)

<i>Allocation channel of public financial support</i>	<i>Years of disbursement</i>		
	<i>2010</i>	<i>2011</i>	<i>2012</i>
Bilateral official development assistance	12.36	13.42	23.67
Contributions through multilateral channels, including:			
Pledge for Global Environment Facility replenishment	1.33	1.37	1.47
United Nations bodies	20.51	20.38	21.92
European Union	27.26	26.43	22.80
International financial institutions	24.70	22.07	25.12
Fast-start finance	2.97	2.97	2.97

96. In the NC6, Luxembourg reported that no financial contributions were made to the Least Developing Country Fund (LDCF) for the three years 2010–2012. The ERT notes that including information about its non-contribution to LDCF since 2010 and about the criteria applied for identifying the levels of vulnerability of developing countries would enhance the transparency of the reporting. Furthermore, information on Luxembourg's pledges to post-2012 fast-start finance (2013–2020) and the Green Climate Fund were not reported in the NC6. The ERT notes that reporting on the status of these contributions would enhance the transparency of the next NC.

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

97. Compared with the NC5, and as a response to recommendations made in the last review report, Luxembourg has provided in its NC6 comprehensive and well-organized information on activities related to the transfer of technology and notable activities by the public and private sectors. The ERT commends Luxembourg for the significant improvements in that section of the NC6. See also chapter II.D.3 of the report of the technical review of the first biennial report.

98. Luxembourg also reported activities related to technology transfer, including success and failure stories, and its activities for financing access by developing countries to 'hard' or 'soft' environmentally sound technologies. Luxembourg reported detailed information on facilitation and financing of the transfer of technologies, and on steps taken to support the development and enhancement of capacities and technologies undertaken by the Government, the private sector and NGOs.

99. Luxembourg's general strategy for development cooperation is to consider climate change as one of the global challenges. Luxembourg delivers and tracks the provision of technological support through LuxDev (see para. 92), the country's operational pillar of bilateral cooperation. Luxembourg has a national approach for tracking the provision of technological support.

100. Although Luxembourg reported success stories of some projects and programmes, the ERT noted this information is limited and that the implementation period of some projects and programmes was outside the reporting years (e.g. project no. TUN/016,

1990–2003, Mise en place du CITET (Centre International des Technologies de l'Environnement de Tunis)). Luxembourg informed the ERT that the Party's public research centre (Henri Tudor) continues a sporadic collaboration in capacity-building workshops with CITET in Tunisia. The ERT encourages Luxembourg to update its NC in this regard and provide more examples on success and failure stories in its next NC.

101. Luxembourg reported that all activities described in the NC6 are publicly financed or co-financed to at least 66 per cent in the case of NGO projects, and that as a public administration having the mandate to implement development policies and ODA management, it does not have access to information on the investments from the private sector and therefore cannot report on such amounts. The ERT noted that the reported information on the distinction between activities undertaken by the public and the private sectors on measures related to the promotion, facilitation and financing of access to, or transfer of technology is therefore limited. Given the barriers for accessing such information from the private sector could be alleviated, the ERT encourages Luxembourg to provide more information in its next NCs to convey a clearer picture of the contribution of the private sector in those activities. Luxembourg also reported that for publicly funded projects in the field of technology transfer it still relies on private sector knowledge and skills but provided limited information in two short examples. The ERT suggests Luxembourg provide more information about how it encourages activities undertaken by the private sector in its next NCs.

### **3. Information under Article 10 of the Kyoto Protocol**

102. In its NC6, Luxembourg has provided information on fulfilment of its commitments under Article 10 of the Kyoto Protocol. The information is complete and transparent. More detailed information was presented during the review; for example, on bilateral programmes in partner countries, and on collaboration with international partners such as the International Renewable Energy Agency. The ERT encourages Luxembourg to include such information in its next NC.

## **E. Vulnerability assessment, climate change impacts and adaptation measures**

103. In its NC6, Luxembourg has provided mostly complete and transparent information on the expected impacts of climate change in the country and on adaptation options. The Party provided information on actions taken to implement Article 4, paragraph 1(b), of the Convention with regard to adaptation.

104. The ERT noted that Luxembourg did not provide information on Article 4, paragraph 1(e), of the Convention, on cooperation for the development of integrated plans for coastal zone management, water resources and agriculture, particularly with countries affected by drought and desertification as well as floods. During the review, Luxembourg informed the ERT that it has implemented a number of cooperation projects with Parties not included in Annex I to the Convention in the area of adaptation, such as improvement of education and production in agriculture for better adaptation of rural communities in Latin America (e.g. Plurinational State of Bolivia), improvement of food security through improved cultivation methods and education in Africa (e.g. the Sudan), and improvement of water management and development of sustainable agriculture to mitigate climate change impacts in Asia. The ERT recommends that Luxembourg provide information on its actions to implement Article 4, paragraph 1(e), of the Convention with regard to cooperation in preparing for adaptation. In addition, the ERT encourages Luxembourg to report updated information relating to the National Adaptation Strategy on Climate Change provided during the review, in particular on progress made in climate projections and in

climate change impact and vulnerability assessment, and measures taken to implement this strategy, in particular the actions carried out in each priority sector and the results of these actions.

105. Table 8 summarizes the information on vulnerability and adaptation to climate change presented in the NC6.

Table 8  
**Summary of information on vulnerability and adaptation to climate change**

<i>Vulnerable area</i>	<i>Examples/comments/adaptation measures reported</i>
Agriculture and food security	<p><i>Vulnerability:</i> temperature increase is likely to: modify the vegetation period and increase the risk of damage to vegetation; modify the life cycle of insects; increase the length of dry periods; and impact the agriculture sector, as only a very small part of land surface area used for agriculture is irrigated</p> <p><i>Adaptation:</i> four measures to minimize the impact of climate change on this sector are: minimizing soil degradation and maintaining its production potential; protecting animals against heat and potential new diseases; practicing more adaptive crop management technologies; and managing climate risks through multi-risk insurance and the existing rural development policy</p>
Biodiversity and natural ecosystems	<p><i>Vulnerability:</i> changing climatic conditions are expected to lead to species range shifts, in particular a south to north migration of species, and temperature increase could have an impact on the biogeography of flora</p> <p><i>Adaptation:</i> the National Adaptation Strategy on Climate Change includes the following measures: vulnerability analysis; establishment of protected areas and green corridors; agroforestry; regional implementation and the planning of measures, conservation and restoration of wetlands and permanent grassland; green infrastructure and architecture; the monitoring of biodiversity; combating invasive alien species; and a study on the economics of ecosystem services and biodiversity. The River Basin Management Plan (2009–2015) aims to re-establish river morphology and a natural river dynamic to help preserve and re-establish biological continuity</p>
Drought	<p><i>Vulnerability:</i> expected increase in the number of dry periods and the number of days within a dry period resulting in increased risk of drought</p> <p><i>Adaptation:</i> the Water Management Agency has identified potential adaptation measures, including the prohibition of certain water uses to guarantee the water supply</p>
Forests	<p><i>Vulnerability:</i> projected overall yearly temperature increases could lead to a decline in forest health because of the increased risk of the outbreak of diseases and insect or parasite infestations</p> <p><i>Adaptation:</i> the National Adaptation Strategy on Climate Change specifically targets forests and proposes adaptation measures for forests that include certification, conservation and use of wood as a renewable energy resource. Monitoring of the health of forests and plans to institutionalize this with legislation. These measures will be integrated into the country’s 10-year forest management plan</p>
Human health	<p><i>Vulnerability:</i> expected increase in temperature in all seasons and in the number and length of dry periods could increase the risk of heatwaves and have an effect on air quality. Changes in the water cycle could increase public health risks related to water quality and water scarcity</p> <p><i>Adaptation:</i> the National Adaptation Strategy on Climate Change does not currently address human health, but will do so at a later stage. Plans are under way for additional water intake points in emergency cases (by 2024) and increased water storage capacity for drinking water</p>
Infrastructure and economy	<p><i>Vulnerability:</i> expected increase in rainfall of 0–25 per cent, with increasing discharges in winter, could increase the frequency of inundations. Luxembourg is currently participating in a regional study to assess the eventual consequences of climate change for floods and low water flow in the Moselle and Saar catchments and to develop adjustment strategies</p> <p><i>Adaptation:</i> Luxembourg has carried out a preliminary flood risk assessment and has</p>

<i>Vulnerable area</i>	<i>Examples/comments/adaptation measures reported</i>
Water resources	<p>prepared flood hazard maps and flood risk maps, and is planning to establish flood risk management plans by 2015. The country also has a flood warning service operated by the Water Management Agency, the Agriculture Technical Services Administration of the Ministry of Agriculture, Viticulture and Consumer Protection, and the Centre de Recherche Public-Gabriel Lippmann</p> <p><i>Vulnerability:</i> expected future changes in the water cycle, such as a 0–25 per cent increase in rainfall, with increasing discharges in winter and a 5–25 per cent decrease in rainfall with reduced run-off in summer by 2050</p> <p><i>Adaptation:</i> the National Adaptation Strategy on Climate Change includes measures in the water resources sector, such as a monitoring network, riverbank restoration, water retention, water loss reduction, production water recycling, rainwater use and anti-erosion measures</p>

106. In its NC6, Luxembourg provided more information on climate change impacts and vulnerability assessment and adaptation compared with its NC5. The ERT commends the Party for the efforts made in the improvement of this information. During the review, Luxembourg also provided more updated progress on research activities, particularly in the area of climate modelling. The Party currently uses more ensemble models compared with what is reported in NC6. The Party presented its plan for further research on climate projection using more ensemble models with higher resolution and more emission scenarios (such as representative concentration pathways) as this will increase understanding of the uncertainty of the projections.

107. During the review, Luxembourg presented its plan to improve climate change impact and vulnerability assessment using the improved climate projections results. For enhancing transparency, the ERT reiterates the encouragement of the previous review report that Luxembourg report more detailed information on the methodologies used for the assessment following the IPCC *Technical Guidelines for Assessing Climate Change Impacts and Adaptations* and the United Nations Environment Programme *Handbook on Methods for Climate Change Impact Assessment and Adaptation Strategies*.

## F. Research and systematic observation

108. Luxembourg has provided mostly complete and transparent information on its actions relating to research and systematic observation (RSO) and addressed both domestic and international activities, including the Global Climate Observing System (GCOS) and the IPCC. Furthermore, Luxembourg has provided a summary of information on GCOS activities.

109. However, Luxembourg did not report information in its NC6 on actions taken to support related capacity-building to establishing and maintaining observing systems, and related data and monitoring systems in developing countries. The ERT recommends that Luxembourg report this information in its next NC.

110. Regarding information on domestic and international activities relating to RSO, Luxembourg did not provide information on activities related to the World Climate Programme (WCP) and the International Geosphere–Biosphere Programme (IGBP). The ERT encourages Luxembourg to provide information on its international activities, related, for example, to WCP and IGBP, in its next NC.

111. During the review, Luxembourg presented progress on its efforts to improve domestic actions relating to RSO (climate modelling and monitoring). The Party is developing a centralized system for processing meteorological data from heterogeneous networks (of equipment, maintenance, data transmission and station set-up). This system

will ensure and broadcast to the public the quality level of meteorological data. The ERT noted that there are a number of stations already in operation, such as stations for air quality and terrestrial systems (e.g. forests).

112. During the review, Luxembourg presented to the ERT its new research plan on climate modelling and monitoring, including regional climate impacts on the water cycle, which will use an integrated modelling approach for Luxembourg and its neighbouring regions. Depending on funding available, this research also aims to assess socio-economic impacts of climate change in the region. However, the ERT noted that the Party does not yet have a long-term research plan or a concrete plan for funding RSO. The implementation of this new research plan is subject to the availability of funding. To enhance the completeness and transparency of its reporting, the ERT encourages Luxembourg to report on its plans, actions and efforts for RSO in the next NC, particularly on plans for the development of systematic observation systems, which include not only atmospheric climate observation systems, but also atmospheric constituents (air quality) and terrestrial climate.

113. Information reported in the NC6 together with the information provided to the ERT during the review confirms that Luxembourg continues to improve and enhance its activities in the area of climate change RSO.

## **G. Education, training and public awareness**

114. In the NC6, Luxembourg has provided complete and transparent information on its actions relating to education, training and public awareness (ETPA) at both the domestic and international level. Compared with the NC5, the Party provided more extensive information on domestic public awareness activities. Many innovative awareness-raising and education programmes were reported in the NC6, particularly related to mitigation and specifically on energy issues. However, the ERT noted that ETPA activities related to adaptation were not included. The ERT encourages Luxembourg to report on the status of its ETPA activities relating to adaptation in its next NC.

115. The implementation of ETPA programmes is mainly coordinated by the Department of the Environment within the Ministry of Sustainable Development and Infrastructure of Luxembourg with the strong involvement of the Ministry of the Economy and the Ministry of Housing. The use of online media is becoming more intensive for ETPA campaigns. Civil society is heavily involved in some of Luxembourg's flagship initiatives that help to achieve the goal set by the EU of a 20 per cent reduction in emissions by 2020, compared with the 2005 GHG emissions level, for the sectors not covered by the EU ETS. About 80 per cent of the funding for ETPA activities related to the national sustainable development plan and to the environment and climate implemented by civil society organizations is provided by the Government. Many international activities are implemented by Luxembourg through multilateral and bilateral aid and cooperation; these are reported in the NC6.

116. The ERT noted that most activities in education are strongly oriented towards awareness-raising in schoolchildren and youth through exhibitions, field activities (e.g. 'green miles' to encourage more biking and walking) and educational materials. In the NC6, there is no information reported on initiatives for introducing climate change science-related topics into school curricula. During the review, the Party informed the ERT that Luxembourg plans to include sustainable development, the environment and climate change in school curricula with the assistance of the Ministry of Education. In addition to these domestic ETPA activities, Luxembourg participated in providing training (organized by the Government of Germany) to experts from developing countries in technical research



capacity on climate projection. Most of the Party's ETPA programmes have so far focused on mitigation with less attention given to adaptation. To enhance the transparency of its reporting, the ERT notes that Luxembourg could report on plans for future developments in both mitigation and adaptation aspects of climate change and on its international activities in a separate sub-section of the ETPA chapter.

### III. Summary of reviewed supplementary information under the Kyoto Protocol

#### A. Overview of supplementary information under Article 7, paragraph 2, of the Kyoto Protocol

117. Supplementary information provided by Luxembourg under Article 7, paragraph 2, of the Kyoto Protocol in its NC6 is mostly complete and mostly transparent. The supplementary information is located in different sections of the NC6. Table 9 provides an overview of supplementary information under Article 7, paragraph 2, of the Kyoto Protocol as well as references to the NC6 sections in which this information is provided.

118. Luxembourg has provided all of the information concerning its national registry; it has also provided all of the information on its national system apart from the name of and contact information for the national entity with overall responsibility for the national inventory of the Party and its designated representative. Luxembourg provided some information on how it sees its use of the mechanisms under Articles 6, 12 and 17 of the Kyoto Protocol as supplemental to domestic action, although it did not elaborate on supplementarity as such.

119. The technical assessment of the information reported under Article 7, paragraph 2, of the Kyoto Protocol is contained in the relevant sections of this report. The ERT commends Luxembourg for having included most of the supplementary information under Article 7, paragraph 2, of the Kyoto Protocol in a clear and well-structured way.

Table 9

#### Overview of supplementary information under Article 7, paragraph 2, of the Kyoto Protocol

<i>Supplementary information</i>	<i>Reference to the sixth national communication</i>
National registry	Chapter III.3
National system	Chapter III.2
Supplementarity relating to the mechanisms pursuant to Articles 6, 12 and 17	Chapter V.5
Policies and measures in accordance with Article 2	Chapter IV.3, in particular IV.3.4 and IV.3.6
Domestic and regional programmes and/or legislative arrangements and enforcement and administrative procedures	Chapter IV.2
Information under Article 10	Article 10(a): chapter III.2; Article 10(b): chapter IV.2; Article 10(c): chapter VII.5; Article 10(d): chapter VIII; Article 10(e): chapter IX
Financial resources	Chapter VII

## **B. Minimization of adverse impacts in accordance with Article 3, paragraph 14, of the Kyoto Protocol**

120. Luxembourg reported the information requested in section H, “Minimization of adverse impacts in accordance with Article 3, paragraph 14”, of the annex to decision 15/CMP.1 as a part of its 2013 annual submission. It had not reported, however, how it gives priority to the actions taken in implementing its commitments under Article 3, paragraph 14, of the Kyoto Protocol. During the review, Luxembourg provided the ERT with the additional information on how it strives to implement its commitments under Article 3, paragraph 1, of the Kyoto Protocol in such a way as to minimize adverse social, environmental and economic impacts on developing country Parties, particularly those identified in Article 4, paragraphs 8 and 9, of the Convention; as well as gives priority to the actions taken in implementing its commitments under Article 3, paragraph 14, of the Kyoto Protocol. Luxembourg submitted a revised NC6 on 28 February 2014 including this missing information, and the ERT considers the reported information to be complete and transparent. The ERT commends Luxembourg for the additional information provided and advises it to continue exploring and reporting on the adverse impacts of the response measures.

121. The 2013 NIR and the additional information provided during the review presented several initiatives of Luxembourg aimed at minimizing adverse impacts, including: (i) careful selection of CDM and JI projects; (ii) promotion and tax exemption for biofuels that do not compete with food security and a cap for first generation biofuels; (iii) a gradual elimination of harmful environmental subsidies; and (4) granting a free emission allowance to certain companies to avoid carbon leakage under the (EU ETS).

## **IV. Conclusions and recommendations**

122. The ERT conducted a technical review of the information reported in the NC6 of Luxembourg according to the UNFCCC reporting guidelines on NCs. The ERT concludes that the NC6 provides a reasonable overview of the national climate policy of Luxembourg. The NC6 provided information on all elements of the supplementary information under Article 7 of the Kyoto Protocol. The ERT noted with concern the delay in the submission of the NC6.

123. Luxembourg’s total GHG emissions for 2011 were 6.2 per cent below its 1990 level excluding LULUCF and 10.9 per cent below including LULUCF. GHG emissions were driven by a decrease in CO<sub>2</sub> emissions from the iron and steel sector, as the steel plants in Luxembourg changed from a blast furnace process to an electric arc furnace process in the period 1994–1998. These factors outweighed major increases in CO<sub>2</sub> emissions that occurred in the road transport sector from 1998 onwards, driven by a higher consumption due to population and mobility increases, by a substantial increase in trans-border commuting, and by fuel price differences with bordering countries. The operation of a gas-fired power plant since 2002 contributed to the increase in CO<sub>2</sub> emissions.

124. In the NC6, Luxembourg presents GHG emission projections for the period from 2011 to 2020 and 2030 for both a WEM and a WAM scenario. The projections estimate that total GHG emissions in the WEM scenario would reach a level that is 0.9 per cent below the 1990 level in 2020 and 7.5 per cent above the 1990 level in 2030; in the WAM scenario, emissions would reach a level that is 6.6 per cent and 0.3 per cent below the 1990 level in 2020 and 2030, respectively. Based on a comparison of the target and the average annual emissions for 2008–2011, Luxembourg is not in a position to meet its 28 per cent reduction target from the base year as part of the joint EU Kyoto Protocol target for the CP1 by domestic efforts only.

125. Luxembourg participates in, and contributes to the EU target of a 20 per cent reduction in GHG emissions by 2020 compared with the base year level. At the time of the review, national targets for EU member States for the second commitment period of the Kyoto Protocol were not decided yet. The ETS sectors have an EU-wide emissions cap and can purchase emission credits to offset GHG emissions. For the non-ETS sectors (excluding LULUCF), the required effort for Luxembourg is an emissions reduction of 20 per cent below the 2005 level. To achieve this target, Luxembourg would need to implement further PaMs in sectors not covered under the EU ETS that should deliver a reduction of 22.5 per cent from the projected emissions level in the WEM scenario and a 16.6 per cent reduction from the emissions level projected in the WAM scenario. The projections therefore indicate that Luxembourg will need to make an additional effort to reduce significantly its emissions towards achieving the EU's joint Kyoto Protocol target for the CP2. This expected additional effort reflects the fact that among Member states participating in the ESD, Luxembourg is the one with the highest GDP per capita value and is expected to make an extra effort compared to Member states that are not as rich.

126. Luxembourg describes in its NC6 how it intends to reach the CP1 target under the Kyoto Protocol and provides some information on how it sees its use of the mechanisms under Articles 6, 12 and 17 of the Kyoto Protocol as supplemental to domestic action, although it did not explain how its domestic actions thus constitutes a significant element of the effort made to meet its quantified reductions commitment. The Party assumes that any use in any quantity of units and credits from these mechanisms is supplemental to domestic action; it does not use target shares of the emission gap between baseline or projected emissions and the target, nor quantified contributions of such use. Luxembourg has already secured units to the amount of 13,330 kt CO<sub>2</sub> eq in order to bridge the gap provisionally estimated at 14,197 kt CO<sub>2</sub> eq for the 2008–2012 period.

127. In the NC6, Luxembourg describes comprehensively how the targets and objectives agreed upon at the EU level provide the framework for policy formulation at the national level. In this context, the EU ETS remains the main instrument to reduce emissions. Luxembourg also reports on the process of establishing the Environment and Climate Partnership in 2010, which brought together stakeholder representatives to discuss climate change and sustainable development issues. The Partnership resulted in the first National Adaptation Strategy on Climate Change, the Climate Agreement (which governs the involvement of municipalities in climate change-related policies), and a second Action Plan for Reducing CO<sub>2</sub> Emissions. These constitute the current framework for climate change policy in Luxembourg. Other national plans that influence climate change policy include the second National Energy Efficiency Action Plan (2011) and the National Renewable Energy Action Plan (2010).

128. The information on financial resources and technology transfer provided in the NC6 indicates that Luxembourg's primary objective is humanitarian and development cooperation within a sustainable development framework on poverty eradication and reduction in biodiversity loss with a notable focus on LDCs. The Party stated that it will continue its effort in allocating 1 per cent of GNI for development cooperation. In addition, Luxembourg contributes to bilateral cooperation, mainly via its executing agency LuxDev, and uses the EU, United Nation agencies and NGOs, as well as international financial institutions, to channel its resources to multilateral cooperation. Luxembourg's pledged contribution to fast-start finance over the period 2010–2012 amounted to EUR 9 million with EUR 8.85 million being firmly committed.

129. Luxembourg has made a significant improvement in reporting climate change impact, vulnerability and adaptation in the NC6 compared with the NC5. In June 2011, Luxembourg's Council of Ministers adopted a National Adaptation Strategy on Climate

Change, which provides a framework for adaptation to climate change impacts in Luxembourg. The strategy prioritizes biodiversity, water, agriculture and forestry.

130. Luxembourg participates in many international activities on climate change RSO. At the national level, the Party is developing a centralized system for processing meteorological data from heterogeneous networks to ensure and communicate the quality level of meteorological data. The Party is also developing a research plan on climate modelling using more ensemble models, and monitoring, including regional climate impacts on the water cycle using an integrated modelling approach for Luxembourg and its neighbouring regions. Depending on funding available, this research also aims to assess socio-economic impacts of climate change in the region.

131. Overall, Luxembourg's programmes on enhancing education, training and public awareness focus on mitigation, with less attention on adaptation, and the Party uses more online media to implement its programmes. Most activities in education are strongly oriented towards awareness-raising in schoolchildren and youth through exhibitions, field activities (e.g. 'green miles' to encourage more biking and walking) and educational materials. Civil society is heavily involved in some of the Party's flagship initiatives that help to achieve the goal set by the EU of a 20 per cent reduction in emissions by 2020 for the sectors not covered by the EU ETS.

132. In its 2013 annual submission and during the review, the Party provided supplementary information under Article 7, paragraph 1, of the Kyoto Protocol on the minimization of adverse impacts in accordance with Article 3, paragraph 14, of the Kyoto Protocol. In particular, Luxembourg aims at minimizing adverse impacts by carefully selecting CDM and JI projects; by promoting, and exempting from tax, biofuels that do not compete with food security and a cap for first generation biofuels; gradually eliminating harmful environmental subsidies; and granting a free emission allowance to certain companies to avoid carbon leakage under the EU ETS.

133. In the course of the review, the ERT formulated several recommendations relating to the completeness, transparency and timeliness of Luxembourg's reporting under the Convention and its Kyoto Protocol. The key recommendations<sup>10</sup> are that Luxembourg:

- (a) Improve the timeliness of reporting by providing future NCs on time (para. 9);
- (b) Improve the completeness of reporting by including in the next NC the mandatory sections and elements from the outset, in particular:
  - (i) The name of and contact information for the national entity with overall responsibility for the national inventory of Luxembourg and its designated representative (para. 17);
  - (ii) A description of the principal PaMs, in all sectors for which PaMs are in place (para 32);
  - (iii) Information on how Luxembourg believes its PaMs are modifying longer-term trends in anthropogenic GHG emissions and removals consistent with the objective of the Convention (para. 32);
  - (iv) Information on projections for all sectors, including LULUCF (para. 62);
  - (v) Information on projections on a gas-by-gas basis for CO<sub>2</sub>, CH<sub>4</sub>, N<sub>2</sub>O, PFCs, HFCs and SF<sub>6</sub> (treating PFCs and HFCs collectively in each case) (para. 62);

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<sup>10</sup> The recommendations are given in full in the relevant sections of this report.

- (vi) Information on emission projections related to fuel sold to ships and aircraft engaged in international transport, to the extent possible separately and not included in the totals (para. 62);
  - (vii) Information on the estimated and expected total effects of adopted and implemented PaMs (para. 82);
  - (viii) Information on how Luxembourg's use of the Kyoto Protocol mechanisms is supplemental to domestic action, and how its domestic action thus constitutes a significant element of its effort made to meet its quantified limitation and reduction commitments (para. 88);
  - (ix) Information on actions taken to implement Article 4, paragraph 1(e), of the Convention with regards to adaptation (para. 104);
  - (x) Information on actions taken to support capacity-building to establishing and maintaining observing systems, and related data and monitoring systems in developing countries (para. 109);
- (c) Improve the transparency of reporting by including in the next NC the following:
- (i) More detailed information on the institutional arrangements in place for the implementation of the national and EU climate change policies in its next NC (para. 22);
  - (ii) A dedicated section including the information on how access by the public to information relating to climate change policy is ensured (para. 27);
  - (iii) Information on how the National Forests Programme can help to ensure that the implementation of activities under Article 3, paragraph 3, of the Kyoto Protocol also contribute to the conservation of biodiversity and the sustainable use of natural resources (para. 28);
  - (iv) Information on PaMs by sector, subdivided by GHG (para. 32);
  - (v) Information on all the implemented and adopted PaMs included in the WEM scenario projections, as well as on the completeness of coverage of PaMs in the projections in relation to the PaMs chapter (para. 63);
  - (vi) See recommendation (b)(viii) above;
  - (vii) Information on how its actions reported in NC6 will specifically help particularly vulnerable countries to meet the costs of adaptation (para. 91);

## V. Questions of implementation

134. During the review, the ERT assessed the NC6, including supplementary information provided under Article 7, paragraph 2, of the Kyoto Protocol and reviewed information on the minimization of adverse impacts in accordance with Article 3, paragraph 14, of the Kyoto Protocol, with regard to timeliness, completeness, transparency and adherence to the reporting guidelines on NCs. No question of implementation was raised by the ERT during the review.

## 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 national communications by Parties included in Annex I to the Convention, Part I: UNFCCC reporting guidelines on annual inventories”. 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>>.

“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 23/CP.19. Available at <<http://unfccc.int/resource/docs/2013/cop19/eng/10a02.pdf#page=20>>.

FCCC/SBI/2011/INF.1. Compilation and synthesis of fifth national communications. Executive summary. Note by the secretariat. Available at <<http://unfccc.int/resource/docs/2011/sbi/eng/inf01.pdf>>.

FCCC/SBI/2011/INF.1/Add.1. Compilation and synthesis of fifth national communications. Note by the secretariat. Addendum. Policies, measures, and past and projected future greenhouse gas emission trends of Parties included in Annex I to the Convention. Available at <<http://unfccc.int/resource/docs/2011/sbi/eng/inf01a01.pdf>>.

FCCC/SBI/2011/INF.1/Add.2. Compilation and synthesis of fifth national communications. Note by the secretariat. Addendum. Financial resources, technology transfer, vulnerability, adaptation and other issues relating to the implementation of the Convention by Parties included in Annex I to the Convention. Available at <<http://unfccc.int/resource/docs/2011/sbi/eng/inf01a02.pdf>>.

FCCC/SBI/2011/INF.2. Compilation and synthesis of supplementary information incorporated in fifth national communications submitted in accordance with Article 7, paragraph 2, of the Kyoto Protocol. Note by the secretariat. Available at <<http://unfccc.int/resource/docs/2011/sbi/eng/inf02.pdf>>.

FCCC/ARR/2013/LUX. Report of the individual review of the annual submission of Luxembourg submitted in 2013. Available at <<http://unfccc.int/resource/docs/2014/arr/lux.pdf>>.

FCCC/IRR/2007/LUX. Report of the review of the initial report of Luxembourg Available at <<http://unfccc.int/resource/docs/2007/irr/lux.pdf>>.

FCCC/IDR.5/LUX. Report of the in-depth review of the fifth national communication of Luxembourg. Available at <[http://unfccc.int/resource/docs/natc/lux\\_nc5.pdf](http://unfccc.int/resource/docs/natc/lux_nc5.pdf)>.

Sixth national communication of Luxembourg. Available at [http://unfccc.int/files/national\\_reports/annex\\_i\\_natcom/submitted\\_natcom/application/pdf/dev\\_nc6\\_final.pdf](http://unfccc.int/files/national_reports/annex_i_natcom/submitted_natcom/application/pdf/dev_nc6_final.pdf).

First biennial report of Luxembourg. Available at [http://unfccc.int/files/national\\_reports/biennial\\_reports\\_and\\_iar/submitted\\_biennial\\_reports/application/pdf/br1\\_lux\\_18314.pdf](http://unfccc.int/files/national_reports/biennial_reports_and_iar/submitted_biennial_reports/application/pdf/br1_lux_18314.pdf).

2013 GHG inventory submission of Luxembourg. Available at [http://unfccc.int/national\\_reports/annex\\_i\\_ghg\\_inventories/national\\_inventories\\_submissions/items/7383.php](http://unfccc.int/national_reports/annex_i_ghg_inventories/national_inventories_submissions/items/7383.php).

2014 GHG inventory submission of Luxembourg. Available at [http://unfccc.int/national\\_reports/annex\\_i\\_ghg\\_inventories/national\\_inventories\\_submissions/items/8108.php](http://unfccc.int/national_reports/annex_i_ghg_inventories/national_inventories_submissions/items/8108.php).

## B. Additional information provided by the Party

Responses to questions during the review were received from Mr. Eric De Brabanter (Ministry of Sustainable Development and Infrastructure of Luxembourg), including additional material on updated policies and measures, greenhouse gas projections, the national registry and recent climate policy developments in Luxembourg. The following documents<sup>1</sup> were also provided by Luxembourg:

Cour des Comptes (Court of Auditors). 2014. *Rapport spécial concernant la mise en application du Protocole de Kyoto* (Special Report on the Implementation of the Kyoto Protocol). Luxembourg. Available at [http://www.cour-des-comptes.lu/rapports/rapports\\_speciaux/2014/kyoto.pdf](http://www.cour-des-comptes.lu/rapports/rapports_speciaux/2014/kyoto.pdf).

ECONOTEC Consultants. 2013. *Mission préparatoire pour la mise à jour des projections d'émissions de CO<sub>2</sub> dans le cadre de l'UNFCCC* (Preparatory Assignment for Updating CO<sub>2</sub> Emissions Projections in the Framework of the UNFCCC). Final report to the Department of the Environment of Luxembourg.

ECONOTEC Consultants. 2013. *Mise à jour des projections d'émissions de CO<sub>2</sub> dans le cadre de l'UNFCCC – complément* (Update of CO<sub>2</sub> Emissions Projections in the Framework of the UNFCCC, addendum). Final report to the Department of the Environment of Luxembourg.

ECONOTEC Consultants. 2013. *Développement d'un outil de projection d'émissions de CO<sub>2</sub> pour les secteurs résidentiel et tertiaire au Grand-Duché de Luxembourg* (Development of a Tool for Projecting CO<sub>2</sub> Emissions for the Residential and Tertiary Sector in the Grand Duchy of Luxembourg). Final report to the Department of the Environment of Luxembourg.

Ministry of the Economy. 2010. *Luxemburger Aktionsplan für erneuerbare Energie* (Luxembourg Renewable Energy Action Plan). Luxembourg. Available at [http://www.eco.public.lu/documentation/rapports/Luxemburger\\_Aktionsplan\\_f\\_\\_r\\_erneuerbare\\_Energie.pdf](http://www.eco.public.lu/documentation/rapports/Luxemburger_Aktionsplan_f__r_erneuerbare_Energie.pdf).

Ministry of the Economy. 2011. *Zweiter Nationaler Energieeffizienzplan* (Second National Energy Efficiency Plan). Luxembourg. Available at [http://www.eco.public.lu/documentation/rapports/Zweiter\\_nationaler\\_Energieeffizienzakti](http://www.eco.public.lu/documentation/rapports/Zweiter_nationaler_Energieeffizienzakti)

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<sup>1</sup> Reproduced as received from the Party.

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Ministry of Sustainable Development and Infrastructure, Department of the Environment. 2013. 2. *Nationaler Aktionsplan Klimaschutz* (Second National Climate Protection Action Plan). Luxembourg. Available at <[http://www.developpement-durable-infrastructures.public.lu/fr/actualites/articles/2013/05/presentation\\_plan\\_action\\_climat/2\\_Nationaler-Aktionsplan-Klimaschutz.pdf](http://www.developpement-durable-infrastructures.public.lu/fr/actualites/articles/2013/05/presentation_plan_action_climat/2_Nationaler-Aktionsplan-Klimaschutz.pdf)>.

Partenariat pour l'environnement et le climat (Environment and Climate Partnership). 2011. *Paquet Climat* (Climate Package). Luxembourg. Available at <[http://www.developpement-durable-infrastructures/public.lu/fr/developpement-durable-infrastructures/partenariat/Paquet\\_Climat\\_integral.pdf](http://www.developpement-durable-infrastructures.public.lu/fr/developpement-durable-infrastructures/partenariat/Paquet_Climat_integral.pdf)>.

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