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

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

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Contents

Abbreviations and acronyms

AEA	annual emission allocation
AR4	Fourth Assessment Report of the Intergovernmental Panel on Climate Change
BR	biennial report
CH_4	methane
CO_2	carbon dioxide
CO_2 eq	carbon dioxide equivalent
CTF	common tabular format
ERT	expert review team
ESD	effort-sharing decision
EU	European Union
EU ETS	European Union Emissions Trading System
F-gas	fluorinated gas
GDP	gross domestic product
GHG	greenhouse gas
HFC	hydrofluorocarbon
ICF	international climate finance
IE	included elsewhere
IPPU	industrial processes and product use
LULUCF	land use, land-use change and forestry
NA	not applicable
NC	national communication
NE	not estimated
NF_3	nitrogen trifluoride
NO	not occurring
non-Annex I Party	Party not included in Annex I to the Convention
non-ETS sectors	sectors not covered by the European Union Emissions Trading System
N_2O	nitrous oxide
ODA	official development assistance
OECD DAC	Organisation for Economic Co-operation and Development Development Assistance Committee
PaMs	policies and measures
PFC	perfluorocarbon
SF_6	sulfur hexafluoride
UNFCCC reporting guidelines on BRs	"UNFCCC biennial reporting guidelines for developed country Parties"
UNFCCC reporting guidelines on NCs	"Guidelines for the preparation of national communications by Parties included in Annex I to the Convention, Part II: UNFCCC reporting guidelines on national communications"
WAM	'with additional measures'
WEM	'with measures'
WOM	'without measures'

I. Introduction and summary

A. Introduction

1. This is a report on the in-country technical review of the BR3[1] of Luxembourg. The review was organized by the secretariat in accordance with the "Guidelines for the technical review of information reported under the Convention related to greenhouse gas inventories, biennial reports and national communications by Parties included in Annex I to the Convention", particularly "Part IV: UNFCCC guidelines for the technical review of biennial reports from Parties included in Annex I to the Convention" (annex to decision 13/CP.20).

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

3. The review was conducted from 12 to 17 November 2018 in Luxembourg City by the following team of nominated experts from the UNFCCC roster of experts: Mr. Roberto Acosta (Cuba), Mr. Matjaž Česen (Slovenia), Ms. Marjorie Doudnikoff (France), Ms. Olga Gavrilova (Estonia) and Mr. Shengmin Yu (China). Mr. Acosta and Mr. Česen were the lead reviewers. The review was coordinated by Mr. James Howland and Mr. Davor Vesligaj (UNFCCC secretariat).

B. Summary

4. The ERT conducted a technical review of the information reported in the BR3 of Luxembourg in accordance with the UNFCCC reporting guidelines on BRs (annex I to decision 2/CP.17).

1. Timeliness

5. The BR3 was submitted on 28 February 2018, after the deadline of 1 January 2018 mandated by decision 2/CP.17. The CTF tables were submitted on 28 February 2018 and resubmitted on 27 November 2018 to address issues raised during the review.

6. Luxembourg did not inform the secretariat about its difficulties with making a timely submission. In accordance with decision 13/CP.20, a Party should inform the secretariat thereof by the due date of the submission, in order to facilitate the arrangement of the review process. The ERT noted with great concern the delay in the submission and recommended that Luxembourg make its next submission on time.

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

7. Issues and gaps identified by the ERT related to the reported information are presented in table 1. The information reported by Luxembourg in its BR3 mostly adheres to the UNFCCC reporting guidelines on BRs.

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

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

Section of BR	*Completeness*	*Transparency*	*Reference to description of recommendations*
GHG emissions and trends	Complete	Transparent	
Assumptions, conditions and methodologies related to the attainment of the quantified economy-wide emission reduction target	Complete	Mostly transparent	Issue 1 in table 3
Progress in achievement of targets	Mostly complete	Mostly transparent	Issues 1 and 3 in table 5 Issues 4 and 9 in table 10
Provision of support to developing country Parties	Complete	Mostly transparent	Issues 1 and 2 in table 11

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

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

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

1. Technical assessment of the reported information

8. Total GHG emissions[2] excluding emissions and removals from LULUCF decreased by 21.6 per cent between 1990 and 2016, whereas total GHG emissions including net emissions or removals from LULUCF decreased by 25.7 per cent over the same period. Table 2 illustrates the emission trends by sector and by gas for Luxembourg

Table 2
Greenhouse gas emissions by sector and by gas for Luxembourg for the period 1990–2016

	GHG emissions (kt CO_2 eq)					*Change (%)*		*Share (%)*	
	1990	*2000*	*2010*	*2015*	*2016*	*1990–2016*	*2015–2016*	*1990*	*2016*
Sector									
1. Energy	10 263.87	8 029.97	10 672.86	8 823.18	8 538.41	–16.8	–3.2	80.3	85.1
A1. Energy industries	35.64	120.17	1 205.97	457.59	252.37	608.0	–44.8	0.3	2.5
A2. Manufacturing industries and construction	6 265.38	1 396.63	1 263.08	1 097.10	1 125.43	–82.0	2.6	49.0	11.2

[2] In this report, the term "total GHG emissions" refers to the aggregated national GHG emissions expressed in terms of CO_2 eq excluding LULUCF, unless otherwise specified. Values in this paragraph are calculated on the basis of the 2018 annual submission, version 1.

A3. Transport	2 584.67	4 817.63	6 464.14	5 650.86	5 479.75	112.0	–3.0	20.2	54.6
A4. and A5. Other	1 358.79	1 665.56	1 685.71	1 583.03	1 649.06	21.4	4.2	10.6	16.4
B. Fugitive emissions from fuels	19.39	29.98	53.96	34.60	31.80	64.0	–8.1	0.2	0.3
C. CO_2 transport and storage	NO	NO	NO	NO	NO	–	–	–	–
2. IPPU	1 640.25	779.35	675.55	627.51	652.06	–60.2	3.9	12.8	6.5
3. Agriculture	773.50	748.82	719.75	736.26	752.06	–2.8	2.1	6.0	7.5
4. LULUCF	48.33	–702.01	–153.17	–406.62	–491.05	–1 115.9	20.8	NA	NA
5. Waste	108.35	108.53	99.19	87.61	85.75	–20.9	–2.1	0.8	0.9
6. Other	NO	NO	NO	NO	NO	NA	NA	NA	NA
Gas[a]									
CO_2	11 812.04	8 672.87	11 154.29	9 259.66	9 002.96	–23.8	–2.8	92.4	89.8
CH_4	631.40	623.56	630.52	620.71	625.05	–1.0	0.7	4.9	6.2
N_2O	341.65	338.73	322.22	317.89	325.27	–4.8	2.3	2.7	3.2
HFCs	0.00	29.58	53.46	67.42	65.77	NA	–2.4	–	0.7
PFCs	NO	NO	NO	NO	NO	–	–	–	–
SF_6	0.88	1.93	6.87	8.89	9.23	953.7	3.9	0.0	0.1
NF_3	NO	NO	NO	NO	NO	–	–	–	–
Total GHG emissions without LULUCF	**12 785.97**	**9 666.67**	**12 167.35**	**10 274.56**	**10 028.28**	**–21.6**	**–2.4**	**100.0**	**100.0**
Total GHG emissions with LULUCF	**12 834.30**	**8 964.66**	**12 014.19**	**9 867.94**	**9 537.23**	**–25.7**	**–3.4**	**NA**	**NA**

Source: GHG emission data: Luxembourg's 2018 annual submission, version 1.
[a] Emissions by gas without LULUCF and without indirect CO_2.

9. Overall, the emission profile by gas of the country remained the same from 1990 to 2016: of the total GHG emissions, CO_2 accounted for 92.4 per cent in 1990 and 89.8 per cent in 2016; CH_4 for 4.9 per cent in 1990 and 6.2 per cent in 2016; N_2O for 2.7 per cent in 1990 and 3.2 per cent in 2016; and F-gases for 0.01 per cent in 1990 and 0.7 per cent in 2016. The overall decrease in emissions is mainly attributable to CO_2 emissions, which decreased by 23.8 per cent. Emissions of other gases decreased as well, with CH_4 emissions decreasing by 1.0 per cent and N_2O by 4.8 per cent. Emissions of F-gases increased by 8,459.4 per cent.

10. The decrease in total GHG emissions was driven mainly by factors such as technological changes in iron and steel industry between 1994 and 1998 (which resulted in a decrease in GHG emissions from fuel combustion in that sector from 4,067.15 kt CO_2 eq in 1994 to 310.75 kt CO_2 eq in 1998), and the decrease in related industrial process emissions in metal industry (from 770.83 kt CO_2 eq in 1994 to 140.69 kt CO_2 eq in 1998). However, there was significant growth in fuel consumption by local residents and cross-border commuters, which resulted in an increase in emissions (from 2,584.67 kt CO_2 eq in 1990 to 5,479.75 kt CO_2 eq in 2016).

11. To reflect the most recently available data, Luxembourg's 2018 annual submission (version 1) was used as the basis for the discussion herein. The ERT noted that those data are different from the 2017 annual submission data used by Luxembourg for its NC7. The ERT

also noted that there are no substantive differences between the trends presented in the latest version of the GHG inventory and those reported in the BR3.

12. The ERT noted that Luxembourg used different units in reporting and describing its GHG emission trends. The ERT also noted that the Party could improve transparency by using units consistently when reporting and explaining changes in GHG emissions and trends.

13. In brief, Luxembourg's national inventory arrangements were established in accordance with EU regulation 525/2013. There have been no changes in the arrangements since the BR2.

2. Assessment of adherence to the reporting guidelines

14. The ERT assessed the information reported in the BR3 of Luxembourg and recognized that the reporting is complete, transparent and adhering to the UNFCCC reporting guidelines on BRs. No issues relating to the topics discussed in this chapter of the review report were raised during the review.

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

1. Technical assessment of the reported information

15. For Luxembourg the Convention entered into force on 7 August 1994. Under the Convention Luxembourg committed to contributing to the achievement of the joint EU economy-wide emission reduction target of 20 per cent below the 1990 level by 2020. The EU offered to move to a 30 per cent reduction target on the condition that other developed countries commit to a comparable target and developing countries contribute according to their responsibilities and respective capabilities under a new global climate change agreement.

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

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

18. Under the ESD, Luxembourg has a target of reducing its total emissions to 20 per cent below the 2005 level by 2020 for non-ETS sectors. National emission targets for non-ETS sectors for 2020 have been translated into binding quantified AEAs for the period 2013–2020. Luxembourg's AEAs change following a linear path from 9,539.55 kt CO_2 eq in 2013 to 8,116.94 kt CO_2 eq in 2020.[3]

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

2. Assessment of adherence to the reporting guidelines

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

Table 3
Findings on the quantified economy-wide emission reduction target from the review of the third biennial report of Luxembourg

No.	*Reporting requirement, issue type and assessment*	*Description of the finding with recommendation or encouragement*
1	Reporting requirement specified in paragraph 4	Luxembourg referred in the textual part of its BR3 to sections of its NC7 that refer to its commitments under the Kyoto Protocol (first and second commitment periods) and not to its economy-wide emission reduction target under the Convention.
	Issue type: transparency	During the review, Luxembourg acknowledged that, in the textual part of its BR3, it described its commitments under the Kyoto Protocol rather than its target under the Convention.
	Assessment: recommendation	The ERT recommends that Luxembourg improve the transparency of its reporting in its next BR by presenting information on its quantified economy-wide emission reduction target under the Convention.

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

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

1. Mitigation actions and their effects

(a) Technical assessment of the reported information

20. Luxembourg provided information on its package of PaMs implemented, adopted and planned, by sector and by gas, in order to fulfil its commitments under the Convention and its Kyoto Protocol.

21. Luxembourg provided detailed information on its PaMs, many of which are new compared with those reported in its BR2, particularly in the agriculture, forestry and waste management sectors. The Party did not provide information on changes made since the previous submission to its institutional, legal, administrative and procedural arrangements used for domestic compliance, monitoring, reporting, archiving of information and evaluation of the progress made towards its target.

22. The second national "Action Plan for reducing CO_2 emissions", adopted in 2013, is Luxembourg's main tool for compliance with its 2020 target under the ESD. It defines actions for increasing energy efficiency in all sectors and promoting the use of renewable energy sources.

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

24. In operation since 2005, the EU ETS is a cap-and-trade system that covers all significant energy-intensive installations (mainly large point emissions sources such as power plants and industrial facilities), which produce 40–45 per cent of the GHG emissions of the EU. It is expected that the EU ETS will guarantee that the 2020 target (a 21 per cent emission reduction below the 2005 level) will be achieved for sectors under the scheme. The

third phase of the EU ETS started in 2013 and it now includes activities that were not covered in its previous phases: aircraft operations (since 2012), which are relevant to Luxembourg, as well as N_2O emissions from chemical industry, PFC emissions from aluminium production and CO_2 emissions from some industrial processes, which are not relevant to Luxembourg because the activities and processes do not occur in the country.

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

26. Luxembourg highlighted the EU-wide mitigation actions that are under development, such as the 2030 climate and energy framework and EU regulation 2018/1999, which requests member States to elaborate integrated national energy and climate plans. Among the mitigation actions that are critical for Luxembourg's contribution to attaining the EU-wide 2020 emission reduction target is the achievement of the country's ESD target of reducing GHG emissions by 20 per cent below the 2005 level, as this is the highest target among the EU member States and emissions under the ESD represent a significant share of Luxembourg's total GHG emissions (83.5 per cent in 2013).

27. Luxembourg introduced national-level policies to achieve its target under the ESD. The key policies reported are the strategy for sustainable mobility MoDu 2.0, the promotion of low-carbon fuels and electric mobility, energy efficiency standards for new buildings, and the voluntary agreement with industry to improve energy efficiency.

28. Luxembourg highlighted the domestic mitigation actions that are under development over the longer term, such as the third National Climate Plan (successor to the second National Climate Action Plan), which will be the main policy instrument with regard to the country's 2030 GHG-related targets. Among the mitigation actions that provide a foundation for substantial additional actions, the following are significant for Luxembourg to attain its future emission targets: controlling the increase in road transport emissions, increasing the use of renewable sources of energy and improving energy efficiency in the residential and commercial sectors. 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

Sector	*Key PaMs*	*Estimate of mitigation impact by 2020 (kt CO_2 eq)*	*Estimate of mitigation impact by 2030 (kt CO_2 eq)*
Policy framework and cross-sectoral measures	Second national "Action Plan for reducing CO_2 emissions"	NE	NE
	Climate Agreement with the municipalities ("Pacte Climat")	NE	NE
	EU ETS	NE	NE
	ESD	NE	NE
Energy			
Transport	Sustainable mobility strategy (MoDu 2.0)	NE	NE
	Framework and infrastructure development for low-carbon fuels and electric cars	17.05	NE
	Excise duties on fuel for transport purposes ("Kyoto cent")	19.75	NE

Sector	*Key PaMs*	*Estimate of mitigation impact by 2020 (kt CO_2 eq)*	*Estimate of mitigation impact by 2030 (kt CO_2 eq)*
Renewable energy	Feed-in tariffs for renewable electricity and heat cogeneration	23.18	23.18
	Feed-in tariffs for biogas supply	9.50	9.50
Energy efficiency	Increasing energy efficiency standards in residential buildings	78.89	142.36
	Increasing energy efficiency standards in non-residential buildings	20.06	44.55
	Climate Bank, supporting the financing of energy-efficiency renovation projects	10.62	10.62
	Voluntary agreement with industry (FEDIL)	NE	NE
IPPU	F-gas regulation	9.87	87.86
Agriculture	Livestock management	NE	NE
LULUCF	Protection of existing carbon stock in forests	NE	NE
Waste	Reduced landfilling of municipal solid waste	65.50	89.75
	Methane recovery systems	6.66	6.66
	Separate collection and treatment of biowaste	3.18	3.18

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

29. During the review, Luxembourg provided additional information on a capacity-building work programme initiated in 2017 for improving the reporting of its PaMs and estimating mitigation impact potentials. It consists of the development of an online portal to allow the various administrations in the different sectors to enter and update information on the PaMs that they are responsible for and that have an impact on GHG emissions or removals. It is also envisaged that the portal will be used for following up on energy-related and air quality policies. In addition, the programme included a consultant-led project to quantify the mitigation impacts and costs of PaMs, which resulted in the quantification of the mitigation impacts of 13 PaMs and the costs of 2 PaMs.

(b) Policies and measures in the energy sector

30. **Energy supply and renewable energy sources**. In 2015, final energy consumption in Luxembourg was approximately 18 per cent higher than in 1990. From 1990 to 2015 there was a decrease of 96 per cent in the consumption of carbon-intensive coal. At the same time, there was an increase of over 80 per cent in the consumption of gas and of 67 per cent in the consumption of oil. Oil currently accounts for the largest share of fossil fuel consumption in Luxembourg (74 per cent), followed by natural gas (24 per cent) and solid fuels (1 per cent). The majority of oil and gas consumed is imported (up to 91 per cent of primary energy supply). Following the closure of the TWINerg power plant in 2016, approximately 90 per cent of the country's electricity is imported. Because of this, Luxembourg does not consider the addition of in-country renewable generation to be a significant mitigation measure, as it would mostly replace electricity generation, and thus emissions, outside of Luxembourg. Luxembourg has established feed-in tariffs to promote the use of renewable sources for the production of electricity and heat, and also the use of biogas as a substitute for natural gas.

31. **Energy efficiency**. As one of the two main pillars of Luxembourg's first and second national "Action Plan for reducing CO_2 emissions" (published in April 2006 and May 2013, respectively), Luxembourg places high importance on energy efficiency measures. More

than 25 different measures for enhancing energy efficiency in all sectors, with a focus on transport, industry and buildings, are already in place or planned and are the Party's main tool for compliance with its commitments under the Kyoto Protocol and the EU 2020 climate and energy package. Luxembourg is still working on the capacity-building work programme initiated in 2017 to develop the reporting of climate PaMs as required under the EU monitoring mechanism regulation (525/2013); the mitigation impact potential of four energy efficiency PaMs has been quantified through this work to date. The quantified measures are expected to achieve emission reductions of about 114.18 kt CO_2 eq in 2020. However, Luxembourg informed the ERT that its third National Climate Plan is scheduled to be completed in 2018, in which the structure and content of the PaMs may be rearranged. Also crucial for the reduction of emissions is cooperation with the municipalities, formalized in the Climate Agreement ("Pacte Climat"), through which municipalities are encouraged to implement measures covering six areas, including municipal buildings, equipment and mobility.

32. **Residential and commercial sectors**. In its BR3, Luxembourg provided information on a number of PaMs targeting emission reductions in the residential and commercial sectors, many of which overlap with the energy efficiency PaMs described above. Buildings are an important pillar of the second national "Action Plan for reducing CO_2 emissions", with around 15 measures. Some examples of building-related PaMs are strengthening energy efficiency standards for new buildings (for residential buildings, the energy efficiency standard from 2012 requires near Passive House standard; for non-residential buildings, the standard was strengthened in 2011 and 2015); supporting the use of renewable energy in buildings (via subsidies and also a requirement for the use of renewable energy in new buildings); subsidies and loans (depending on socioeconomic factors and/or building age) through the Climate Bank; supporting the sustainable construction of residential buildings, energy efficiency renovations and a stronger reliance on renewable energy sources through the LENOZ and PRIMe House schemes; a reduced rate of value added tax (3 per cent instead of 17 per cent) being applied to new constructions and existing buildings being renovated; and monitoring the energy consumption of public buildings using smart meters.

33. **Transport sector**. The situation of Luxembourg is particular in that a large share of its road fuel is sold to non-residents owing to the lower road fuel prices compared with those of neighbouring countries and the proportion of road traffic due to commuters and freight crossing the border. Transport is the main emitting sector in Luxembourg, representing 54.6 per cent of total emissions in 2016. Emissions from this sector increased by 112.0 per cent between 1990 and 2016. In its BR3, Luxembourg provided an overview of key measures in the transport sector, including the sustainable mobility strategy MoDu 2.0, which aims at increasing the share of public transport and the use of 'soft' transport modes (cycling and walking); the obligation to blend a certain share of biofuels in transport-related fuels; and the promotion of electric mobility through purchase incentives for zero or low-emission vehicles, the development of a charging infrastructure and the mandatory purchase of zero or low-emission vehicles in public fleets.

34. The BR3 includes information on how Luxembourg promotes and implements the decisions of the International Civil Aviation Organization and the International Maritime Organization to limit emissions from aviation and marine bunker fuels. For aviation, Luxembourg supports the resolution on a global market-based measure to address CO_2 emissions from international aviation as of 2021 agreed upon by the International Civil Aviation Organization Assembly in October 2016. Luxembourg's domestic aviation is included in the EU ETS, and revenue from the auctioning of allowances is added to the Climate and Energy Fund, which finances the use of flexible mechanisms under the Kyoto Protocol. Luxembourg also supports the work undertaken by the International Maritime Organization to develop and adopt an ambitious initial strategy to reduce GHG emissions from ships.

35. **Industrial sector**. The main measures in the industrial sector are the EU ETS and the voluntary agreement of FEDIL, the business federation of Luxembourg, under which the objective is for all the participating companies to annually improve energy efficiency by 1 per cent.

(c) Policies and measures in other sectors

36. **Industrial processes**. In 1990–2016 emissions from the IPPU sector decreased by 60.2 per cent, with steel production being the dominant source of emissions until 1998, when the technological change from blast to electric arc furnaces resulted in a sharp decrease in emissions (by 93.0 per cent) between 1990 and 1998, which remained stable thereafter. The key measure in the industrial sector is the EU ETS, in which the installations responsible for most of the industrial process emissions (steel production, flat glass production, cement plants) take part. Another important policy in the sector is the F-gas regulation, which aims to limit emissions of HFCs and SF_6 from commercial and industrial refrigeration equipment and stationary and mobile air conditioning.

37. **Agriculture**. Between 1990 and 2016, GHG emissions from the agriculture sector decreased by 2.8 per cent and they accounted for 7.5 per cent of GHG emissions in 2016. The main driver for the emission decrease was the change in livestock numbers. The main PaMs for agriculture in Luxembourg continue to be the EU Common Agricultural Policy and the Rural Development Programme. Other important PaMs implemented in the sector at the national level include reducing GHG emissions from manure storage systems, introducing modern slurry spreading techniques and improving agricultural soils through rationalization of nitrogen fertilizers.

38. **LULUCF**. The LULUCF sector was a net sink of 491.05 kt CO_2 eq in Luxembourg in 2016, while in 1990 it had been a source, accounting for 48.33 kt CO_2 eq. The emission trend is driven mainly by the categories forest land remaining forest land and land converted to settlements. The main PaMs in the LULUCF sector are conserving carbon in existing forest biomass and increasing the carbon stock in forest and agricultural soils. Other important PaMs aim at prohibiting deforestation without authorization and without compensation, establishing subsidies for afforestation activities, enhancing the management of harvest rates for mature forest, and promoting financial support for organic agriculture.

39. **Waste management**. GHG emissions from the waste sector decreased by 20.9 per cent in 1990–2016, accounting for 0.9 per cent of total GHG emissions in 2016. The main contributor to the sectoral emissions is municipal solid waste disposal on land. Luxembourg has one of the highest rates of waste generation per capita in the EU (607 kg/year), owing to some extent to the high number of cross-border commuters (a third of the resident population), but it also has a very high collection and recovery rate of municipal solid waste: 50 per cent of the total generated municipal waste is currently recovered and recycled or incinerated with energy recovery. The overarching policy in this sector is the National Waste and Resources Management Plan, which drives the waste management activities aimed at the recovery and recycling of different waste streams. Most PaMs in the waste sector are regulatory instruments based on EU legislation, in particular the waste framework directive, the landfill directive and the waste incineration directive.

(d) Response measures

40. Luxembourg did not report on the assessment of the economic and social consequences of its response measures.

(e) Assessment of adherence to the reporting guidelines

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

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

No.	*Reporting requirement, issue type and assessment*	*Description of the finding with recommendation or encouragement*
1	Reporting requirement specified in paragraph 7 Issue type: completeness Assessment: recommendation	Luxembourg did not provide information on changes in its domestic institutional arrangements, including institutional, legal, administrative and procedural arrangements used for domestic compliance, monitoring, reporting, archiving of information and evaluation of the progress made towards its target. During the review, Luxembourg explained that these issues are covered by the Grand-Ducal Regulation of 24 April 2017 on the establishment of a national system for the monitoring, assessment and reporting of GHG emissions and air pollutants and the reporting of other information relating to climate change and air pollution. The ERT reiterates the recommendation made in the previous review report that Luxembourg include in its next BR information on changes in its domestic institutional arrangements used for domestic compliance, monitoring, reporting, archiving of information and evaluation of the progress made towards its target.
2	Reporting requirement specified in paragraph 8 Issue type: completeness Assessment: encouragement	The BR3 does not include information on the assessment of the economic and social consequences of response measures. The ERT noted that this information is included in the NC7 and that the Party could have made a reference to it in its BR3. During the review, Luxembourg explained that the use of market mechanisms and its ICF projects must align with sustainability criteria. The ERT reiterates the encouragement made in the previous review report that Luxembourg include in its next BR information on the assessment of the economic and social consequences of its response measures.
3	Reporting requirement specified in CTF table 3 Issue type: transparency Assessment: recommendation	The Party did not provide an estimate of mitigation impact for all of its mitigation actions, and the use of the notation keys "NE" and "IE" for some of the PaMs that were not evaluated is unclear (several individual measures were reported as "IE", indicating that their impacts were included with those of another, aggregated measure, but the aggregated measure was reported as "NE"). The BR3, by reference to the NC7, explained that the work on estimating the impacts of PaMs was ongoing when the document was being drafted and would continue in 2018. During the review, Luxembourg confirmed that it is building its capacity to evaluate its mitigation actions, and acknowledged the lack of clarity regarding the use of the notation keys "NE" and "IE". The ERT reiterates the recommendation that Luxembourg provide the estimated effect of each mitigation action, or a clear explanation as to why this may not be possible due to its national circumstances.

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

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

(a) Technical assessment of the reported information

42. For 2014, Luxembourg reported in CTF table 4 annual total GHG emissions excluding LULUCF of 10,755.97 kt CO_2 eq, which is 15.5 per cent below the 1990 base-year level. In 2014, emissions from non-ETS sectors relating to the target under the ESD amounted to 8,858.31 kt CO_2 eq.

43. For 2015, Luxembourg reported in CTF table 4 annual total GHG emissions excluding LULUCF of 10,268.93 kt CO_2 eq, which is 19.3 per cent below the 1990 base-year level. In 2015, emissions from non-ETS sectors relating to the target under the ESD amounted to 8,607.48 kt CO_2 eq.

44. On its use of units from LULUCF activities, Luxembourg explained that the contribution of the LULUCF sector is not included in CTF table 4(a)I because the LULUCF sector is not included in the EU target. Luxembourg reported in CTF table 4 and 4(b) that it did not use units from market-based mechanisms under the Convention in 2014 or 2015. Table 6 illustrates Luxembourg's total GHG emissions, the contribution of LULUCF and the use of units from market-based mechanisms to achieve its target.

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

Year	*Emissions excluding LULUCF (kt CO_2 eq)*	*Contribution of LULUCF (kt CO_2 eq)*[a]	*Emissions including contribution of LULUCF (kt CO_2 eq)*	*Use of units from market-based mechanisms (kt CO_2 eq)*
1990	12 730.46	NA	NA	NA
2010	12 149.97	NA	NA	2 542.63
2011	12 042.45	NA	NA	2 542.63
2012	11 749.85	NA	NA	2 542.63
2013	11 213.64	NA	NA	0.00
2014	10 755.97	NA	NA	0.00
2015	10 268.93	NA	NA	0.00

Sources: Luxembourg's BR3 and CTF tables 1, 4, 4(a)I, 4(a)II and 4(b).

[a] The EU's unconditional commitment to reduce GHG emissions by 20 per cent below the 1990 level by 2020 does not include emissions/removals from LULUCF.

45. In assessing the progress towards the achievement of the 2020 target, the ERT noted that Luxembourg's emission reduction target for non-ETS sectors is 20.0 per cent below the 2005 level (see para. 18 above). As discussed above, in 2015 Luxembourg's emissions from non-ETS sectors were 5.8 per cent (533.53 kt CO_2 eq) below the AEA under the ESD. In addition, the ERT noted that in 2015 market-based mechanisms were not utilized.

46. The ERT noted that Luxembourg is making progress towards its emission reduction target by implementing and planning mitigation actions that are delivering emission reductions. On the basis of the results of the projections under the WEM scenario (see para. 61 below), the ERT also noted that the Party is making progress towards achieving its ESD target. According to the WEM projections reported in the BR3, Luxembourg's cumulative emissions under the ESD for the period 2013–2020 amount to 68.69 Mt CO_2 eq, while the cumulative AEAs for the same period amount to 70.67 Mt CO_2 eq, resulting in a projected overachievement of Luxembourg's 2013–2020 target by 1.98 Mt CO_2 eq. Taking into account updated projections and preliminary actual emission data provided during the review, the projected cumulative emissions in the period 2013–2020 increase to 69.85 Mt CO_2 eq, thus reducing the emission surplus to 0.82 Mt CO_2 eq. The ERT noted that, according to these figures, Luxembourg will achieve its target under the ESD, but if further growth in emissions were to continue, as seen in 2017, achieving the target could be challenging and the Party would need to use units from the first Kyoto Protocol commitment period to meet it.

(b) Assessment of adherence to the reporting guidelines

47. The ERT assessed the information reported in the BR3 of Luxembourg and recognized that the reporting is complete and transparent. No issues relating to the topics discussed in this chapter of the review report were raised during the review.

3. Projections overview, methodology and results

(a) Technical assessment of the reported information

48. Luxembourg reported updated projections for 2020, 2025, 2030 and 2035 relative to actual inventory data for 2015 under the WEM scenario. The WEM scenario reported by Luxembourg includes implemented and adopted PaMs until 31 December 2016.

49. In addition to the WEM scenario, Luxembourg reported the WAM scenario. The WAM scenario does not include planned PaMs but rather an assumption that road fuel sales to non-residents will reduce by 2 per cent each year from 2019 onward. Luxembourg provided some information on the definition of its scenarios, explaining that its WEM scenario was based on different assumptions, but the ERT noted that a clear connection to the PaMs presented in the PaMs section is missing. The definitions indicate that the scenarios were not prepared completely according to the UNFCCC reporting guidelines on BRs.

50. The projections are presented on a sectoral basis, using the same sectoral categories as those used in the reporting on mitigation actions. The projections in the BR3 are presented on a gas-by-gas basis for CO_2, CH_4, N_2O, PFCs, HFCs and SF_6 (grouping PFCs and HFCs together in each case) and also as total GHG emissions in CO_2 eq using global warming potential values from the AR4. They are presented together with actual data for 1990–2015.

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

52. Emission projections related to fuel sold to ships (insignificant and relating only to river transport) and aircraft engaged in international transport were not reported separately and were not included in the totals. Luxembourg provided some information on factors and activities affecting emissions for each sector, but more detailed information is needed to better understand the projected emission trends, as well as more information on the connection between the PaMs and the projected emission trends.

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

53. The methodology used for the preparation of the projections is very similar to that used for the preparation of the emission projections for the BR2. Luxembourg reported supporting information explaining the methodologies and the changes made since the BR2. The projections in the BR3 are updates of those presented in the BR2 taking into account (1) the outcomes of the revised 2017 transportation study prepared for Luxembourg by Komobile; (2) the latest results from STATEC models; and (3) the PRIMES reference scenario from July 2016 (Capros et al., 2016).

54. For the projections in the energy sector, Luxembourg used a combination of models: ECONOTEC EPM, a bottom-up simulation model for energy and emission projections (for public electricity and heat production, excluding 2016 and households); STATEC-NEAM, a bottom-up empirical model used in conjunction with LuxGem, Luxembourg's computable general equilibrium economic model (for public electricity and heat production in 2016, fuel combustion in industry and the services sector); and GEORG and NEMO, bottom-up road and off-road transportation models (for road transport, rail transport, domestic navigation, fuel combustion in agriculture and other). The results from the EU PRIMES and GAINS models were also used as a basis for projecting emissions from international aviation, agriculture and biological treatment of solid waste. During the review, the Party briefly presented descriptions of the models used for making projections for the industrial processes sector and for other sources of emissions in the waste and LULUCF sectors: essentially the methodologies used are the same as those used in preparing the emissions inventory.

55. To prepare its projections, Luxembourg relied on the following key underlying assumptions: population in the period 2015–2035 rising by 38 per cent, and in the same period the number of households increasing by 50 per cent, and activity in passenger transport increasing by 24 per cent and in freight transport by 46 per cent. These variables and assumptions were reported in CTF table 5. The assumptions were updated on the basis of the most recent economic and other developments known at the time of the preparation of the

projections. GDP is not included among the key assumptions because Luxembourg's GDP is mostly driven by finance-related activities and transport activity is mostly affected by the GDP of neighbouring countries.

56. Luxembourg provided information in its CTF table 5 on the key variables and assumptions used in the preparation of the projection scenarios. Luxembourg did not provide information on changes to the assumptions in the BR3 or information on sensitivity analysis.

(c) Results of projections

57. The projected emission levels under different scenarios and information on the Kyoto Protocol targets and the quantified economy-wide emission reduction target are presented in table 7 and the figure below. Luxembourg's national emission reduction target, as well as projected emissions and AEAs under the ESD, are also presented in the figure below.

Table 7
Summary of greenhouse gas emission projections for Luxembourg

	GHG emissions (kt CO_2 eq per year)	*Changes in relation to base-year[a] level (%)*	*Changes in relation to 1990 level (%)*
Kyoto Protocol base year[b]	13 141.25	NA	NA
Quantified emission limitation or reduction commitment under the Kyoto Protocol (2013–2020)[c]	NA	NA	NA
Quantified economy-wide emission reduction target under the Convention[d]	NA	NA	NA
Inventory data 1990[e]	12 730.46		
Inventory data 2015[e]	10 268.94	–21.9	–19.3
WEM projections for 2020[f]	9 797.28	–25.4	–23.0
WAM projections for 2020[f]	9 628.27	–26.7	–24.4
WEM projections for 2030[f]	9 503.61	–27.7	–25.3
WAM projections for 2030[f]	8 516.82	–35.2	–33.1

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

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

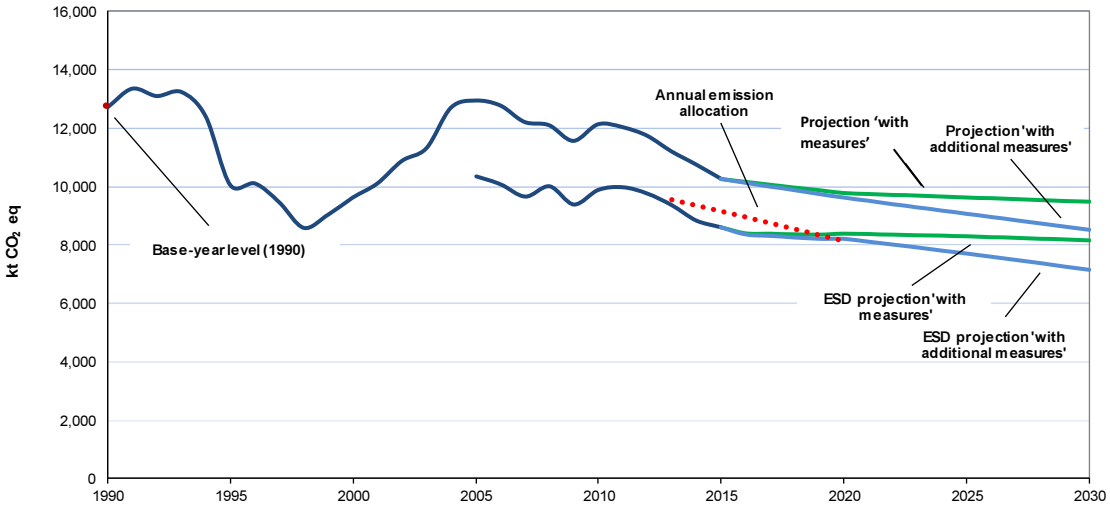
[c] The Kyoto Protocol target for the second commitment period (2013–2020) is a joint target of the EU and its 28 member States and Iceland. The target is to reduce emissions by 20 per cent compared with the base-year (1990) level by 2020. The target for non-ETS sectors is a 20 per cent reduction for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

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

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

[f] From Luxembourg's BR3.

Greenhouse gas emission projections reported by Luxembourg



Sources: (1) data for the years 1990–2015: Luxembourg's 2017 annual submission, version 1.2; total GHG emissions excluding LULUCF; (2) data for the years 2015–2030: Luxembourg's NC7 and BR3; total GHG emissions excluding LULUCF.

58. During the review, Luxembourg reported updated projections that were prepared on the basis of 2016 inventory data and proxy emissions for 2017. According to those data, in 2016 the decrease in emissions slowed, while in 2017 emissions started to increase again. Updated projections were provided for the WEM scenario.

59. Luxembourg's Kyoto Protocol target for the second commitment period (2013–2020) is a joint target of the EU and its 28 member States and Iceland. The target is to reduce emissions by 20.0 per cent in the period 2013–2020 compared with the Kyoto Protocol base-year level. Under the Convention, Luxembourg's target is also a joint target of the EU and its 28 member States: a 20.0 per cent reduction by 2020 compared with the 1990 level. The EU targets are split between emissions under the EU ETS and under the ESD (non-ETS sectors).

60. Luxembourg's total GHG emissions excluding LULUCF in 2020 and 2030 are projected to be 9,797.28 and 9,503.61 kt CO_2 eq, respectively, under the WEM scenario, which represents a decrease of 23.0 and 25.3 per cent, respectively, below the 1990 level. Under the WAM scenario, emissions in 2020 and 2030 are projected to be lower than those in 1990 by 24.4 and 33.1 per cent, and amount to around 9,628.27 and 8,516.82 kt CO_2 eq, respectively. The 2020 projections suggest that Luxembourg will continue contributing to the achievement of the EU target under the Convention (see para. 18 above).

61. Luxembourg's target for non-ETS sectors is to reduce its emissions by 20.0 per cent below the 2005 level by 2020 (see para. 15 above). Luxembourg's AEAs, which correspond to its national emission target for non-ETS sectors, change linearly from 9,539.56 kt CO_2 eq in 2013 to 8,116.94 kt CO_2 eq for 2020. According to the projections under the WEM scenario, emissions from non-ETS sectors are estimated to reach 8,381.86 kt CO_2 eq in 2020. Under the WAM scenario, Luxembourg's emissions from non-ETS sectors in 2020 are projected to be 8,212.86 kt CO_2 eq. The projected level of emissions under the WEM and WAM scenarios is 3.3 and 1.2 per cent, respectively, above the AEAs for 2020. The ERT noted that this suggests that Luxembourg may face challenges in meeting its 2020 target. However, owing to emission surpluses generated in the beginning of the 2013–2020 period when emissions were below the AEAs, Luxembourg's projected cumulative emissions for the whole period 2013–2020 based on the information in the BR3 are lower than the cumulative AEAs and thus under the ESD target.

62. Luxembourg presented the WEM and WAM scenarios in its BR3 by sector for 2020 and 2030, as summarized in table 8.

Table 8
Summary of greenhouse gas emission projections for Luxembourg presented by sector

	GHG emissions and removals (kt CO_2 eq)					*Change (%)*			
	1990	*2020*		*2030*		*1990–2020*		*1990–2030*	
Sector		*WEM*	*WAM*	*WEM*	*WAM*	*WEM*	*WAM*	*WEM*	*WAM*
Energy (not including transport)	7 679.20	2 821.83	2 821.83	2 608.57	2 608.57	–63.3	–63.3	–66.0	–66.0
Transport	2 584.67	5 636.17	5 467.16	5 685.44	4 698.65	118.1	111.5	120.0	81.8
Industry/industrial processes	1 640.25	597.91	597.91	466.09	466.09	–63.5	–63.5	–71.6	–71.6
Agriculture	714.41	658.26	658.26	666.27	666.27	–7.9	–7.9	–6.7	–6.7
LULUCF	48.33	–334.14	–334.14	–337.47	–337.47	–791.4	–791.4	–798.3	–798.3
Waste	111.92	83.11	83.11	77.24	77.24	–25.7	–25.7	–31.0	–31.0
Other (specify)									
Total GHG emissions without LULUCF	**12 730.46**	**9 797.28**	**9 628.27**	**9 503.61**	**8 516.82**	**–23.0**	**–24.4**	**–25.3**	**–33.1**

Source: Luxembourg's BR3 CTF table 6.

63. According to the projections reported for 2020 under the WEM scenario, the most significant emission reductions are expected to occur in the energy sector (excluding transport) and the IPPU sector, amounting to projected reductions of 4,857.37 kt CO_2 eq (63.3 per cent) and 1,042.34 kt CO_2 eq (63.5 per cent) between 1990 and 2020, respectively. Some reductions are also expected to occur in the agriculture and waste sectors, amounting to 56.15 kt CO_2 eq (7.9 per cent) and 28.81 (25.7 per cent) between 1990 and 2020, respectively. An increase in emissions of 3051.50 kt CO_2 eq (118.1 per cent) between 1990 and 2020, due mainly to growth in the 1995–2005 period, was projected in the transport sector.

64. The pattern of projected emissions reported for 2030 under the same scenario remains the same. The decrease in emissions from the energy sector (excluding transport) continues, with the projected emissions from the sector decreasing by a further 213.26 kt CO_2 eq from 2020, owing to energy efficiency measures in the buildings sector, resulting in a projected decrease in emissions from the energy sector of 5,070.63 kt CO_2 eq (66.0 per cent) for 2030 compared with the 1990 level. Emissions from the IPPU sector are projected to decrease by 131.82 kt CO_2 eq between 2020 and 2030. Emissions from the transport sector are projected to increase by 49.27 kt CO_2 eq between 2020 and 2030.

65. If additional measures are considered (i.e. under the WAM scenario), the patterns of emission reductions for 2020 presented by sector and by gas remain largely the same, because the additional measures in Luxembourg's WAM scenario only have an effect on emissions from the transport sector, which is the only sector where growth of emissions was observed in the 1990–2020 period. Under the WAM scenario, the projected emission increase in the transport sector between 1990 and 2020 drops to 2,882.49 kt CO_2 eq. Between 2020 and 2030, emissions from transport under the WAM scenario are projected to decrease by 768.51 kt CO_2.

66. Luxembourg presented the WEM and WAM scenarios by gas in its BR3 for 2020 and 2030, as summarized in table 9.

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

	GHG emissions and removals (kt CO_2 eq)					*Change (%)*			
		2020		*2030*		*1990–2020*		*1990–2030*	
Gas	*1990*	*WEM*	*WAM*	*WEM*	*WAM*	*WEM*	*WAM*	*WEM*	*WAM*
CO_2	11 812.05	8 869.93	8 703.14	8 595.28	7 623.31	–24.9	–26.3	–27.2	–35.5
CH_4	634.97	596.39	596.42	595.98	596.05	–6.1	–6.1	–6.1	–6.1
N_2O	282.56	254.07	251.82	268.83	253.94	–10.1	–10.9	–4.9	–10.1
HFCs	0.00	67.36	67.36	37.90	37.90	–	–	–	–
PFCs	NO	NO	NO	NO	NO	–	–	–	–
SF_6	0.88	9.53	9.53	5.62	5.62	983.0	983.0	538.6	538.6
NF_3	NO	NO	NO	NO	NO	–	–	–	–
Total GHG emissions without LULUCF	**12 730.46**	**9 797.28**	**9 628.27**	**9 503.61**	**8 516.82**	**–23.0**	**–24.4**	**–25.3**	**–33.1**

Source: Luxembourg's BR3 CTF table 6.

67. For 2020 the most significant reductions are projected for CO_2 emissions: 2,942.12 kt CO_2 eq (24.9 per cent) between 1990 and 2020; while for the 1990–2030 period CO_2 emission reductions in the amount of 3,216.77 kt CO_2 eq (27.2 per cent) are projected.

68. If additional measures are considered (i.e. under the WAM scenario), the patterns of emission reductions for 2020 presented by sector and by gas remain the same, with CO_2 emission reduction in the period 1990–2020 being 3,108.91 kt CO_2 eq (26.3 per cent) and 4,188.74 kt CO_2 eq (35.5 per cent) in 1990–2030.

69. Luxembourg's emissions are heavily characterized by the fact that it is a small country, meaning that the opening or closing of a single plant or industrial site can strongly influence emissions, and its emissions are very sensitive to changes in the amount of fuel sold to foreign vehicles. This has been observed in the past: when steel production technology changed, when an electricity generating unit came on- and offline, and when the amount of fuel sold to foreign vehicles increased. In the projections, no such events have been assumed, in line with common practice in projection methodologies.

(d) Assessment of adherence to the reporting guidelines

70. The ERT assessed the information reported in the BR3 of Luxembourg and identified issues relating to completeness, transparency and adherence to the UNFCCC reporting guidelines on BRs. The findings are described in table 10.

Table 10
Findings on greenhouse gas emission projections reported in the third biennial report of Luxembourg

No.	*Reporting requirement, issue type and assessment*	*Description of the finding with recommendation or encouragement*
1	Reporting requirement specified in paragraph 28 Issue type: transparency Assessment: encouragement	The ERT noted that Luxembourg did not report a WOM scenario. The ERT also noted that, according to the UNFCCC reporting guidelines on NCs and BRs, Parties are required to report WEM projections and may report WOM and WAM projections. To enhance the transparency of the reporting, the ERT encourages Luxembourg in its next BR to report a WOM scenario or information on why it cannot do so.
2	Reporting requirement specified in paragraph 29 Issue type: transparency Assessment: encouragement	Luxembourg reported WAM projections in its BR3. The ERT noted that the definition of the projections is not in accordance with the UNFCCC reporting guidelines on NCs and on BRs. The WAM scenario assumed a 2.0 per cent linear decrease in emissions per year from sales of fuel to non-residents, reflecting a possible narrowing of the road fuel price differential between Luxembourg and its neighbouring countries, which is not a measure planned by the Luxembourg Government, while the UNFCCC reporting guidelines on NCs and on BRs define the WAM scenario as encompassing planned PaMs. The narrowing of fuel prices was not presented in the PaMs chapter as a planned measure. During the review, Luxembourg acknowledged that the WAM scenario is not in accordance with the definition in the UNFCCC reporting guidelines on NCs and on BRs and was designed to explore the impact of potential future PaMs. The ERT encourages Luxembourg to provide WAM projections in its next BR that encompass planned PaMs.
3	Reporting requirement specified in paragraph 35 Issue type: completeness Assessment: encouragement	Luxembourg did not report in its BR3 projections for indirect GHGs. During the review, Luxembourg acknowledged that indirect GHGs were not reported. The ERT encourages Luxembourg to improve completeness and, in its next BR, report projections of indirect GHGs.
4	Reporting requirement specified in paragraph 36 Issue type: completeness Assessment: recommendation	Luxembourg did not report projections related to fuel sold to ships and aircraft engaged in international transport in its BR3. It described the methodology used for the projection of emissions from international transport but the projections were not presented or included in the totals. During the review, Luxembourg explained that projections related to fuel sold to aircraft engaged in international transport are available and provided them to the ERT. Fuel sold for international transport using ships occurs only on the Moselle river in Luxembourg and is minimal. The ERT reiterates the recommendation made in the previous review report that Luxembourg report in its next BR projections for fuel sold to ships and aircraft engaged in international transport, to the extent possible, separately and not included in the totals, including reporting when figures are zero.
5	Reporting requirement specified in paragraph 37 Issue type: transparency Assessment: encouragement	The ERT noted that Luxembourg provided projections in diagrams for 2005–2035, thus additional to the reporting requirement, but not for the period from 1990 (or another base year, as appropriate) to 2020. During the review, the Party provided additional data covering the period 1990–2000. The ERT encourages Luxembourg to present in its next BR projections in tabular format together with actual data for the period 1990–2000 or the latest year available.

No.	*Reporting requirement, issue type and assessment*	*Description of the finding with recommendation or encouragement*
6	Reporting requirement specified in paragraph 38	Luxembourg presented projections in diagrams for 2005–2035. According to the UNFCCC reporting guidelines on NCs and on BRs, Parties should present projections for the period from 1990 (or another base year, as appropriate) to 2020.
	Issue type: completeness	During the review, the Party provided additional diagrams covering the period from 1990.
	Assessment: encouragement	The ERT encourages Luxembourg to also present in its next BR diagrams showing unadjusted inventory data and WEM projections for the period from 1990 (or another base year, as appropriate) to 2020.
7	Reporting requirement specified in paragraph 43	Luxembourg presented in its BR3 the different models used for making projections. The presented models cover emissions from the energy sector; models for the agriculture, industrial processes, LULUCF and waste sectors were not presented.
	Issue type: transparency	During the review, the Party made available additional information regarding the models used for the non-energy sectors as well as for the energy sector, which helped the ERT to understand the projections.
	Assessment: encouragement	The ERT encourages Luxembourg to report in its next BR all information according to the UNFCCC reporting guidelines on NCs and on BRs for each model used for the projections.
8	Reporting requirement specified in paragraph 46	Luxembourg presented in its BR3 qualitatively the sensitivity of its projections for each sector, not just for the total emissions. According to the UNFCCC reporting guidelines on NCs and on BRs, sensitivity should also be addressed quantitatively where possible.
	Issue type: transparency	During the review, Luxembourg acknowledged that a quantitative sensitivity analysis is not available for the projections and that it was therefore not reported.
	Assessment: encouragement	The ERT reiterates the encouragement made in the previous review report for Luxembourg to include in its next BR a quantitative sensitivity analysis where possible. The ERT noted that one possible way to accomplish this would be to make different assumptions on the amount of transport fuel sold to non-residents based on different assumed circumstances.
9	Reporting requirement specified in paragraph 48	Luxembourg did not present relevant information on factors and activities for each sector to provide the reader with an understanding of emission trends.
	Issue type: completeness	During the review, Luxembourg provided some additional information, such as on the multiple drivers of transport emissions, that enabled the ERT to understand the trends, but more information would be helpful to understand the trends and connection between the PaMs and the projections.
	Assessment: recommendation	The ERT reiterates the recommendation made in the previous review report that Luxembourg include in its next BR relevant information on factors and activities for each sector to help the reader to understand the projected emission trends.

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

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

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

(a) Technical assessment of the reported information

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

72. Luxembourg provided details on what "new and additional" support it has provided and clarified how this support is "new and additional". Luxembourg's definition is that

resources that it commits to delivering are not taken over from earlier commitments and are thus "new", and that they are "additional" as they are on top of Luxembourg's ODA commitments and thus are not double counted or taking away from other resources dedicated to poverty eradication.

73. Luxembourg reported the financial support that it has provided to non-Annex I Parties, distinguishing between support for mitigation and adaptation activities and recognizing the capacity-building elements of such support. It explained how it tracks finance for adaptation and mitigation using both the OECD DAC Rio markers and the multilateral development banks' joint approach climate finance tracking methodology.

74. The BR3 includes limited information on the national approach to tracking the provision of support, indicators, delivery mechanisms used and allocation channels. Luxembourg applies the OECD DAC Rio markers to monitor and report its ODA financial flows and contributions. For its other official flows, coming from the EU fast-start finance scheme and its ICF commitment, Luxembourg explained during the review that it applies the multilateral development banks' joint three-step approach and the OECD DAC Rio markers. Each project submission applying for climate funding is analysed and evaluated using the ICF initial review template. The reviewer looks at the main objectives of the project and a clear set of impact indicators (with targets) for mitigation and/or adaptation presented by the applicant. These indicators are listed in the ICF strategy document (section 3.1) and the applicant can provide its own indicators as well. On the basis of the reviewer's analysis, the interministerial committee decides whether the activity can be supported by ICF. Once supported, the project applicant is responsible for monitoring the indicators and regularly reporting on the climate impact indicators. Luxembourg included information on how it has refined its approach to tracking climate support and on its methodologies, which are regularly reviewed and updated. For example, it has mainstreamed the use of the OECD DAC Rio markers across all projects and programmes.

75. Luxembourg described the methodology and underlying assumptions used for collecting and reporting information on financial support, including guidelines, eligibility criteria and/or indicators. The methodology used for preparing information on international climate support is reflected in its ICF allocation strategy, called "Attribution of international climate finance funds in the fight against climate change", and the ICF initial review template.

(b) Assessment of adherence to the reporting guidelines

76. The ERT assessed the information reported in the BR3 of Luxembourg and identified issues relating to transparency and adherence to the UNFCCC reporting guidelines on BRs. The findings are described in table 11.

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

No.	*Reporting requirement, issue type and assessment*	*Description of the finding with recommendation or encouragement*
1	Reporting requirement specified in paragraph 14 Issue type: transparency Assessment: recommendation	In its BR3 the Party did not provide a description of its national approach to tracking the provision of technological and capacity-building support to non-Annex I Parties. Indicators for tracking the provision of financial support other than ODA financial flows and contributions were also not reported. During the review, Luxembourg explained that its development cooperation follows the OECD DAC guidelines in terms of monitoring and reporting (see para. 74 above). The Party indicated during the review that it has a small administration, which limits resources available for tracking; however, it will examine the possibility of refining its data to make this information available in the future. The ERT reiterates the recommendation made in the previous review report that Luxembourg provide in its next BR a description of the national approach to tracking financial, technological and capacity-building support to non-Annex I Parties or changes therein since its previous BR, including information on indicators for tracking other official flows.
2	Reporting requirement specified in paragraph 15 Issue type: transparency Assessment: recommendation	The Party reported that it uses the Rio markers to track the mainstreaming of climate change considerations in its development cooperation. Given that Rio marker data provide only an indication of the policy objectives of aid (best estimate), following the OECD DAC Rio marker definitions and eligibility criteria, the methodology and underlying assumptions that Luxembourg uses to produce the quantitative information on finance for its BR were not transparently reported. During the review, Luxembourg explained that it applies the OECD DAC Rio marker guidance to classify projects as climate marker 1, 2 or 0. ICF funding priority is given to activities for which the climate objective is the main element of the activity and which would not have occurred without the climate goal (hence Rio climate marker 2). However, Luxembourg's ICF can also finance activities with climate marker 1 (i.e. climate targets are significant but not the main objective) in some cases, such as activities with very important benefits for the climate and sustainable development, the piloting of new forms of innovative financing (e.g. results-based finance, carbon market) subject to assessment on a case-by-case basis. ODA-funded projects and programmes with strong climate elements would be classified under climate marker 1, because the primary objective of ODA is the eradication of poverty. Depending on the climate markers attributed, fixed percentages of the overall budget are considered to be allocated to climate-specific work; for example, 100, 40 and 0 per cent for climate markers 2, 1 and 0 (i.e. not targeting the objective at all), respectively. The ERT recommends that Luxembourg improve the transparency of its reporting by including in its next BR information on the underlying assumptions and methodologies used to produce information on finance.

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

2. Financial resources

(a) Technical assessment of the reported information

77. Luxembourg reported information on the provision of financial support required under the Convention, including on financial support provided, committed and pledged, allocation channels and annual contributions.

78. Luxembourg indicated what "new and additional" financial resources it has provided and clarified how it has determined such resources as being "new and additional" (see para. 72 above).

79. Luxembourg described how its resources address the adaptation and mitigation needs of non-Annex I Parties. It also described how those resources assist non-Annex I Parties to mitigate and adapt to the adverse effects of climate change, facilitate economic and social response measures, and contribute to technology development and transfer and capacity-building related to mitigation and adaptation. The Party reported that, through its "Strategy for environment and climate change action", it aims to generate environmental and climatic benefits in developing countries by mainstreaming environment and climate change in its interventions; by supporting the national sustainable development goals and preservation of natural resources of those countries; and by supporting specific activities, including education and public awareness, in the fields of natural resources management, sustainable agriculture, energy and the fight against climate change.

80. Luxembourg reported information on the assistance that it has provided to developing country Parties that are particularly vulnerable to the adverse effects of climate change to help them to meet the costs of adaptation to those adverse effects. In order to maximize its effectiveness and impact, Luxembourg's development cooperation follows a policy of targeted intervention in a limited number of partner countries, which are chosen primarily by taking into account the composite human development index of the United Nations Development Programme. Luxembourg's development cooperation with seven partner countries (Burkina Faso, Cabo Verde, Lao People's Democratic Republic, Mali, Nicaragua, Niger and Senegal) and seven project countries (Afghanistan, El Salvador, Kosovo, Mongolia, Myanmar, State of Palestine and Viet Nam) is carried out through multiannual indicative cooperation programmes. The programmes cover a four- to five-year period, giving the partner countries medium-term budgetary predictability and cover in line with their planning periods. In 2015, Luxembourg disbursed EUR 2 million to the Adaptation Fund to pay off its pledged contribution to fast-start finance for 2010–2012.

81. With regard to the most recent financial contributions aimed at enhancing the implementation of the Convention by developing countries, Luxembourg reported that its climate finance has been allocated on the basis of its "Attribution of international climate finance funds in the fight against climate change" strategy. Luxembourg's ICF pledge concentrates on three main areas: 40 per cent for mitigation (preferential sectors: renewable energy, energy efficiency, transport, waste management, agriculture); 40 per cent for adaptation (especially in the least developed countries) and small island developing States (preferential sectors: resilience to climate change, reducing vulnerability to climate variability, early warning, adaptation in the agriculture sector); and 20 per cent for REDD-plus.[4] However, Luxembourg recognizes that this distribution is only an indication, and that account will be taken of the needs of the host and partner countries.

82. With respect to geographical distribution, Luxembourg's ICF programme seeks a balanced distribution of host countries, with, to the extent possible, a minimum amount of 50 per cent of ICF for projects in current and former cooperation partner countries (Burkina Faso, Lao People's Democratic Republic, Mali, Niger and Senegal, as well as Cabo Verde, as small island developing States). Table 12 includes some of the information reported by Luxembourg on its provision of financial support.

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

	Year of disbursement	
Allocation channel of public financial support	*2015*	*2016*
ODA[a]	46.77	56.44
Climate-specific contributions through multilateral channels, including:	13.32	11.07

[4] In decision 1/CP.16, paragraph 70, the Conference of the Parties encouraged developing country Parties to contribute to mitigation actions in the forest sector by undertaking the following activities: reducing emissions from deforestation; reducing emissions from forest degradation; conservation of forest carbon stocks; sustainable management of forests; and enhancement of forest carbon stocks.

Allocation channel of public financial support	Year of disbursement 2015	2016
Adaptation Fund	2.22	
Green Climate Fund	11.10	11.07
Financial institutions, including regional development banks	1.12	2.12
World Bank	1.11	0.33
Other multilateral financial institutions	0.01	1.79
United Nations bodies	2.07	1.89
United Nations Development Programme		
United Nations Environment Programme		
Other	2.07	1.89
Climate-specific contributions through bilateral, regional and other channels	30.26	41.36

Sources: (1) Query Wizard for International Development Statistics, available at http://stats.oecd.org/qwids/; (2) BR3 CTF tables; (3) data for 2013 and 2014 provided by the Party during the review.

83. Luxembourg reported on its climate-specific public financial support, totalling USD 46.78 million in 2015 and USD 56.61 million in 2016. With regard to future financial pledges aimed at enhancing the implementation of the Convention by developing countries, Luxembourg committed itself to providing EUR 120 million in ICF from 2014 to 2020. During the reporting period, Luxembourg placed a particular focus on Burkina Faso, Cabo Verde, Mali, Niger and Senegal (all least developed countries or small island developing States in West Africa) and the Lao People's Democratic Republic, for which it allocated USD 59.02 million. The ERT noted that Luxembourg reported in CTF table 7(b) its bilateral support allocated to non-Annex I Parties in 2015 and 2016. Information on financial support from the public sector provided through multilateral and bilateral channels and the allocation of that support by priority is presented in table 13.

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

Allocation channel of public financial support	Year of disbursement 2015	2016	Difference	Change (%)	Share (%) 2015	2016
Support through bilateral and multilateral channels allocated for:						
Mitigation	6.41	11.29	4.88	76.1	13.7	20.0
Adaptation	13.07	13.93	0.86	6.6	27.9	24.7
Cross-cutting	27.29	31.22	3.93	14.4	58.4	55.3
Other						
Total	**46.77**	**56.44**	**9.67**	**20.7**	**100.0**	**100.0**
Detailed information by type of channel						
Multilateral channels						
Mitigation		0.12	0.12	-	0.0	0.8
Adaptation	4.74	3.89	–0.85	–17.9	28.7	25.8
Cross-cutting	11.77	11.07	–0.7	–5.9	71.3	73.4
Other						
Total	**16.51**	**15.08**	**–1.43**	**–8.7**	**100.0**	**100.0**
Bilateral channels						
Mitigation	6.41	11.17	4.76	74.3	21.2	27.0
Adaptation	8.33	10.04	1.71	20.5	27.5	24.3
Cross-cutting	15.52	20.15	4.63	29.8	51.3	48.7

Allocation channel of public financial support	*Year of disbursement*				*Share (%)*	
	2015	*2016*	*Difference*	*Change (%)*	*2015*	*2016*
Other						
Total	**30.26**	**41.36**	**11.10**	**36.7**	**100.0**	**100.0**
Multilateral compared with bilateral channels						
Multilateral	16.51	15.08	–1.43	–8.7	35.3	26.7
Bilateral	30.26	41.36	11.10	36.7	64.7	73.3
Total	**46.77**	**56.44**	**9.67**	**20.7**	**100.0**	**100.0**

Source: CTF tables 7, 7(a) and 7(b) of the BR3 of Luxembourg.

84. The BR3 includes detailed information on the financial support provided though multilateral, bilateral and regional channels in 2015 and 2016. Specifically, Luxembourg contributed through multilateral channels, as reported in the BR3 and CTF table 7(a), USD 16.51 million and 15.08 million for 2015 and 2016, respectively. The contributions were made to specialized multilateral climate change funds, such as the Adaptation Fund, the Green Climate Fund, the World Bank, specialized United Nations bodies and other channels.

85. The BR3 and CTF table 7(b) include detailed information on the total financial support provided through bilateral (USD 23.98 million and 37.03 million) and regional (USD 6.28 million and 4.33 million) channels in 2015 and 2016, respectively.

86. The BR3 provides information on the types of support provided. In terms of the focus of public financial support, as reported in CTF table 7 for 2015, the shares of the total public financial support allocated for mitigation, adaptation and cross-cutting projects were 13.7, 27.9 and 58.4 per cent, respectively. In addition, 35.3 per cent of the total public financial support was allocated through multilateral channels and 64.7 per cent through bilateral, regional and other channels. In 2016, the shares of total public financial support allocated for mitigation, adaptation and cross-cutting projects were 20.0, 24.7 and 55.3 per cent, respectively. Furthermore, 26.7 per cent of the total public financial support was allocated through multilateral channels and 73.3 per cent through bilateral, regional and other channels.

87. The ERT noted that in 2015 the majority (71.3 per cent) of financial contributions made through multilateral channels were allocated to cross-cutting activities. Some funds were allocated for adaptation activities (28.7 per cent), such as resilience and disaster risk reduction, as reported in CTF table 7(a). The corresponding allocations for 2016 were 73.4 per cent for cross-cutting activities, 25.8 per cent for adaptation and 0.8 per cent for mitigation. With regard to the financial contributions made through bilateral, regional and other channels, the ERT noted that the projects and programmes reported in CTF table 7(b) for 2015 and 2016 address mitigation, adaptation and cross-cutting activities in a wide range of sectors, including energy, agriculture, forestry, water and sanitation, waste management and other areas. Considering that most of the projects and programmes presented in CTF table 7(b) are grouped by geographical zone and type of programme, they address multiple sectors and associated activities simultaneously, and therefore the ERT was not able to assess the sectoral distribution of the financial contributions through bilateral, regional and other channels.

88. CTF tables 7(a) and 7(b) include information on the types of financial instrument used in the provision of assistance to developing countries, such as grants, equity and other (first-loss guarantee). The ERT noted that all public climate-specific financial support disbursed in 2015 and 2016 was in the form of grants.

89. In the BR3 Luxembourg clarified that private finance is mainly mobilized for the export of goods, technologies and services in the environment, renewable energy, agriculture and clean technology sectors. It reported on how it uses public funds to promote private sector financial support for developing countries, which it sees as pivotal to effectively increasing mitigation and adaptation efforts in developing countries by relying on the private sector as a skilled and specialized technical partner. In 2016 and 2017, Luxembourg launched several climate finance initiatives together with the private financial sector: a joint initiative with the

European Investment Bank (the Luxembourg-EIB Climate Finance Platform), the Forestry and Climate Change Fund, and the Luxembourg International Climate Finance Accelerator.

90. Luxembourg reported on the difficulty of collecting information and reporting on private financial flows leveraged by bilateral climate finance for mitigation and adaptation activities in non-Annex I Parties, which is due to the lack of established practice for the measurement and reporting of publicly mobilized private climate finance.

(b) Assessment of adherence to the reporting guidelines

91. The ERT assessed the information reported in the BR3 of Luxembourg and identified an issue relating to completeness, transparency and adherence to the UNFCCC reporting guidelines on BRs. The finding is described in table 14.

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

No.	*Reporting requirement, issue type and assessment*	*Description of the finding with recommendation or encouragement*
1	Reporting requirement specified in paragraph 19 Issue type: completeness Assessment: encouragement	In its BR3 the Party did not report information on private financial flows leveraged by bilateral climate finance towards mitigation and adaptation activities in non-Annex I Parties. During the review, Luxembourg explained that in recent years Luxembourg has launched several climate finance initiatives together with the private financial sector, including the Luxembourg-EIB Climate Finance Platform, the Forestry and Climate Change Fund, and the Luxembourg International Climate Finance Accelerator. In this context, the Government of Luxembourg is providing financial support through its ICF budget as well as the Government's yearly budget in order to attract private sector investment by providing first-loss guarantees (Luxembourg-EIB Climate Finance Platform, the Forestry and Climate Change Fund) or to help innovative funds and asset managers to set up climate-related funds by providing support grants (ICF Accelerator). Luxembourg explained that it does not currently have a specific methodology for tracking private financial flows and it would be extremely difficult to track private finance as Luxembourg is an international finance centre. The Party informed the ERT that one of the recommendations of the Luxembourg Sustainable Finance Roadmap published in October 2018 is the creation of a public–private partnership, the Luxembourg Sustainable Finance Initiative, to bring together government representatives and private finance actors with the aim of translating the recommendations of the road map into real action. The Party indicated that the development of a methodology for tracking private financial flows is being considered, which links to the recommendation to collect relevant data, which are, so far, not available. The ERT encourages Luxembourg to report in its next BR, to the extent possible, on private financial flows leveraged by bilateral climate finance towards mitigation and adaptation activities in non-Annex I Parties.

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

3. Technology development and transfer

(a) Technical assessment of the reported information

92. Luxembourg provided information on steps, measures and activities related to technology transfer, access and deployment benefiting developing countries, including information on activities undertaken by the public and limited information on private sector activities. Luxembourg provided examples of support provided for the deployment and enhancement of the endogenous capacities and technologies of non-Annex I Parties, while highlighting the relevant capacity-building elements in the description of these technology

transfer projects. Luxembourg reported activities related to technology transfer, including success and failure stories, using table 6 of the UNFCCC reporting guidelines on NCs.

93. The ERT took note of the information provided in CTF table 8 on recipient countries, target areas, measures and focus sectors of technology transfer programmes.

94. The ERT noted that Luxembourg reported on its PaMs as well as success and failure stories in relation to technology transfer, and in particular on measures taken to promote, facilitate and finance the transfer and deployment of climate-friendly technologies. Examples include the Business Partnership Facility, which has an annual budget of EUR 1 million aimed at encouraging the private sector to engage with partners in developing countries to implement sustainable business projects; the capacity-building activities in Cabo Verde's Energies Training Centres, which aim to create an incentive for private sector investment in clean technologies in the country; and collaboration with the EcoInnovation Cluster to encourage Luxembourg's companies to provide photovoltaic panels and solar container systems, biogas installations and thermosolar boilers to developing countries, specifically in the case of the development of renewable energy sources in Cabo Verde.

(b) Assessment of adherence to the reporting guidelines

95. The ERT assessed the information reported in the BR3 of Luxembourg and recognized that the reporting is complete, transparent and adhering to the UNFCCC reporting guidelines on BRs. No issues relating to the topics discussed in this chapter of the review report were raised during the review.

4. Capacity-building

(a) Technical assessment of the reported information

96. In the BR3 and CTF table 9, Luxembourg supplied information on how it has provided capacity-building support for mitigation, adaptation and technology that responds to the existing and emerging needs identified by non-Annex I Parties. Luxembourg described individual measures and activities related to capacity-building support in textual and tabular format. Examples include programme CVE/083 in Cabo Verde, which seeks to reinforce governance, regulation and the business climate of the renewable energy sector and its fundraising capacity; programme VIE/033 in Viet Nam, which aims to adapt, strengthen and diversify the livelihoods of people in 29 coastal and lagoon communities and protect the fragile environment from the increasing impacts of climate change; programme BKF/023 in Burkina Faso, which provides capacity-building to national- and regional-level actors involved in implementing the national environment, green economy and climate change policy; and programme BKF/024 in Burkina Faso, which targets climate mitigation efforts through rehabilitation of degraded land and capacity-building for institutional actors involved in climate finance and fundraising ventures.

97. Luxembourg reported that it has supported climate-related capacity development activities relating to adaptation, mitigation, climate financing and other. It has responded to the existing and emerging capacity-building needs of non-Annex I Parties by following the principles of national ownership, stakeholder participation, country-driven demand, impact assessment and monitoring. Luxembourg's "Strategy for environment and climate change action" specifies that in all third- and fourth-generation indicative cooperation programmes its development cooperation will assist partner countries in identifying interventions that preserve natural resources and are part of efforts to adapt to climate change. It may also support the partner countries in terms of capacity-building, particularly at institutions responsible for clean development mechanism projects. Pooling resources and sharing environmental information will be given priority to promote interventions that generate the greatest environmental and social benefits.

(b) Assessment of adherence to the reporting guidelines

98. The ERT assessed the information reported in the BR3 of Luxembourg and recognized that the reporting is complete, transparent and adhering to the UNFCCC reporting guidelines

on BRs. No issues relating to the topics discussed in this chapter of the review report were raised during the review.

III. Conclusions and recommendations

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

100. Luxembourg's total GHG emissions excluding LULUCF covered by its quantified economy-wide emission reduction target were estimated to be 21.6 per cent below its 1990 level, whereas total GHG emissions including LULUCF were 25.7 per cent below its 1990 level, in 2016. Emission decreases were driven by changes in the iron and steel industry between 1994 and 1998, as the steel plants in Luxembourg changed from a blast furnace process to an electric arc furnace process. Those factors outweighed the significant increase in CO_2 emissions due to fuel consumption by local residents and cross-border commuters. The operation of a natural gas-fired power plant contributed to the increase in CO_2 emissions between 2002 and 2012.

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

102. Under the ESD, Luxembourg has a target of reducing its emissions by 20 per cent below the 2005 level by 2020. The 2013–2020 linear progression in Luxembourg's AEAs (its national emission target for non-ETS sectors) is 9,141.01–8,116.94 kt CO_2 eq.

103. Luxembourg's main policy framework relating to energy and climate change comprises the second national "Action Plan for reducing CO_2 emissions" and the Climate Agreement (which governs the involvement of municipalities in climate mitigation actions). Further, the EU ETS is one of the main tools used to reduce GHG emissions from industry. The key mitigation actions reported are the strategy for sustainable mobility MoDu 2.0, the promotion of low-carbon fuels and electric mobility, the energy-efficiency standards for new buildings, and the voluntary agreement with industry to improve energy efficiency.

104. For 2015, Luxembourg reported in CTF table 4 total GHG emissions excluding LULUCF of 10,268.93 kt CO_2 eq, which is 19.3 per cent below the 1990 base-year level. Luxembourg did not use units from market-based mechanisms in 2014 or 2015 towards achieving its 2020 target.

105. The GHG emission projections provided by Luxembourg in the BR3 correspond to the WEM and WAM scenarios. Under the two scenarios, emissions are projected to be 23.0 and 24.4 per cent below the 1990 level in 2020, respectively. According to the projections under the WEM scenario, emissions from non-ETS sectors are estimated to reach 8,381.86 kt CO_2 eq in 2020. Under the WAM scenario, Luxembourg's emissions from non-ETS sectors in 2020 are projected to be 8,212.86 kt CO_2 eq. These projected levels of emissions under the WEM and WAM scenarios are 3.3 and 1.2 per cent, respectively, above the AEAs for 2020. On the basis of the reported information, the ERT concludes that Luxembourg may face challenges in achieving its 2020 target. However, owing to emission surpluses that were generated at the beginning of the 2013–2020 period when emissions were below the AEAs, Luxembourg's projected cumulative emissions for the whole period 2013–2020, based on

the information in the BR3, are lower than the cumulative AEAs and thus within the ESD target.

106. Luxembourg continues to provide climate financing to developing countries in line with its climate finance programmes. It has increased its contributions by 24.3 per cent since the BR2: its public financial support in 2015 and 2016 totalled USD 46.77 million and USD 56.44 million per year, respectively. For those years, Luxembourg provided less support for mitigation than for adaptation. The biggest share of financial support went to cross-cutting projects, followed by the agriculture sector. Luxembourg reported activities related to technology transfer and supporting the development and enhancement of endogenous capacities and technologies of non-Annex I Parties. In providing capacity-building support for mitigation, adaptation and technology that responds to the existing and emerging needs identified by non-Annex I Parties, priority was given to its seven partner countries (Burkina Faso, Cabo Verde, Lao People's Democratic Republic, Mali, Nicaragua, Niger and Senegal) and seven project countries (Afghanistan, El Salvador, Kosovo, Mongolia, Myanmar, State of Palestine and Viet Nam), and the support is provided through multiannual indicative cooperation programmes.

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

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

(i) Including information on changes in its domestic institutional arrangements used for domestic compliance, monitoring, reporting, archiving of information and evaluation of the progress made towards its target (see issue 1 in table 5);

(ii) Reporting projections for fuel sold to aircraft engaged in international transport, to the extent possible, separately and not included in the totals, and projections for fuel sold to ships engaged in international transport (see issue 4 in table 10);

(iii) Including relevant information on factors and activities for projections and on their connection to PaMs (see issue 9 in table 10);

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

(i) Presenting information on its quantified economy-wide emission reduction target under the Convention in a more focused way (see issue 1 in table 3);

(ii) Providing the estimated effect of each mitigation action, or, if this is not feasible, providing justification for not estimating the mitigation effect (see issue 3 in table 5);

(iii) Providing a description of the national approach to tracking financial, technological and capacity-building support provided to non-Annex I Parties, or changes therein since its previous BR, including information on indicators for tracking other official flows (see issue 1 in table 11);

(iv) Including information on the underlying assumptions and methodologies used to produce the reported information on finance (see issue 2 in table 11);

(c) To improve the timeliness of its reporting by submitting its next BR on time (see para. 5 above).

Annex

Documents and information used during the review

A. Reference documents

2017 GHG inventory submission of Luxembourg. Available at https://unfccc.int/files/national_reports/annex_i_ghg_inventories/national_inventories_submissions/application/zip/lux-2017-nir-06apr17.zip.

2018 GHG inventory submission of Luxembourg. Available at https://unfccc.int/documents/65331.

BR3 of Luxembourg. Available at https://unfccc.int/sites/default/files/resource/290851_Luxembourg-BR3-1-BR3_final_180228.pdf.

BR3 CTF tables of Luxembourg. Available at https://unfccc.int/sites/default/files/resource/78634051_Luxembourg-BR3-2-BR3_LUX_2018_v2.0.xlsx.

Capros P, De Vita A, Tasios N, et al. 2016. *EU Reference Scenario 2016 – Energy, transport and GHG emissions trends to 2050*. European Commission. Available at https://ec.europa.eu/energy/en/data-analysis/energy-modelling.

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

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

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

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

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

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

NC7 of Luxembourg. Available at https://unfccc.int/sites/default/files/resource/39752148_Luxembourg-NC7-1-LU_NC7_180212.pdf.

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

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

Report on the review of the report to facilitate the calculation of the assigned amount for the second commitment period of the Kyoto Protocol of Luxembourg. FCCC/IRR/2016/LUX. Available at https://unfccc.int/resource/docs/2017/irr/lux.pdf.

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

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

B. Additional information provided by the Party

Responses to questions during the review were received from Mr. Eric De Brabanter, including additional material. The following documents[1] were provided by Luxembourg:

Aether Ltd. 2018. *Provision of Technical Support in the Field of Climate Policies and Measures.*

European Topic Centre on Air pollution and Climate change mitigation. 2018. *Quality check feedback report PaMs for Luxembourg*.

[1] Reproduced as received from the Party.