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## **Report on the technical review of the eighth national communication and the technical review of the fifth biennial report of Luxembourg**

Parties included in Annex I to the Convention were requested by decision 6/CP.25 to submit their eighth national communication to the secretariat by no later than 31 December 2022. According to decision 15/CMP.1, Parties included in Annex I to the Convention that are also Parties to the Kyoto Protocol are required to include in their national communications supplementary information under Article 7, paragraph 2, of the Kyoto Protocol. This report presents the results of the technical review of the eighth national communication and relevant supplementary information under the Kyoto Protocol of Luxembourg, conducted by an expert review team in accordance with the “Guidelines for the technical review of information reported under the Convention related to greenhouse gas inventories, biennial reports and national communications by Parties included in Annex I to the Convention” and the “Guidelines for review under Article 8 of the Kyoto Protocol”.

Developed country Parties were requested by decision 6/CP.25 to submit their fifth biennial report to the secretariat by no later than 31 December 2022. This report presents the results of the technical review of the fifth 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”.

The review of these submissions took place in Luxembourg City from 11 to 15 March 2024.



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## Abbreviations and acronyms

AD	activity data
AEA	annual emission allocation
AR	Assessment Report of the Intergovernmental Panel on Climate Change
BR	biennial report
CH <sub>4</sub>	methane
CO <sub>2</sub>	carbon dioxide
CO <sub>2</sub> eq	carbon dioxide equivalent
CTF	common tabular format
DAC	Development Assistance Committee
ERT	expert review team
ESD	European Union effort-sharing decision
ESR	European Union effort-sharing regulation
EU	European Union
EU ETS	European Union Emissions Trading System
GCOS	Global Climate Observing System
GEORG	emission model for off-road vehicles and machinery
GHG	greenhouse gas
GWP	global warming potential
HFC	hydrofluorocarbon
ICF	international climate finance
IDFC	International Development Finance Club
IPCC	Intergovernmental Panel on Climate Change
IPPU	industrial processes and product use
LDC	least developed country
LT-LEDS	long-term low-emission development strategy(ies)
LUAgriEmissionModel	Luxembourg agricultural emission model
LULUCF	land use, land-use change and forestry
LuxGEM	Luxembourg general equilibrium model
MDB	multilateral development bank
MeteoLux	Meteorological Department of the Air Navigation Administration of Luxembourg
N <sub>2</sub> O	nitrous oxide
NA	not applicable
NAP	national adaptation plan
NC	national communication
NE	not estimated
NEAM	national energy accounting model
NECP	national energy and climate plan
NEMO	network emission model
NF <sub>3</sub>	nitrogen trifluoride
NIR	national inventory report
NO	not occurring
non-Annex I Party	Party not included in Annex I to the Convention
ODA	official development assistance
OECD	Organisation for Economic Co-operation and Development
PaMs	policies and measures
PFC	perfluorocarbon

REDD+	reducing emissions from deforestation; reducing emissions from forest degradation; conservation of forest carbon stocks; sustainable management of forests; and enhancement of forest carbon stocks (decision 1/CP.16, para. 70)
reporting guidelines for supplementary information	“Guidelines for the preparation of the information required under Article 7 of the Kyoto Protocol. Part II: Reporting of supplementary information under Article 7, paragraph 2”
SF <sub>6</sub>	sulfur hexafluoride
SIDS	small island developing State(s)
STATEC	National Institute of Statistics and Economic Studies of Luxembourg
UNFCCC reporting guidelines on BRs	“UNFCCC biennial reporting guidelines for developed country Parties”
UNFCCC reporting guidelines on NCs	“Guidelines for the preparation of national communications by Parties included in Annex I to the Convention, Part II: UNFCCC reporting guidelines on national communications”
WAM	‘with additional measures’
WEM	‘with measures’

## I. Introduction and summary

### A. Introduction

1. This is a report on the in-country technical review of the NC8 and BR5 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” and “Part V: UNFCCC guidelines for the technical review of national communications from Parties included in Annex I to the Convention” (annex to decision 13/CP.20), and the “Guidelines for review under Article 8 of the Kyoto Protocol” (annex to decision 22/CMP.1 and annex I to decision 4/CMP.1).
2. In accordance with decision 13/CP.20, a draft version of this report was transmitted to the Government of Luxembourg, which provided comments that were considered and incorporated into this final version of the report.
3. The review was conducted from 11 to 15 March 2024 in Luxembourg City by the following team of nominated experts from the UNFCCC roster of experts: Kokou Jérémi Fontodji (Togo), Olga Gavrilova (Estonia), Ellie Kilroy (United Kingdom of Great Britain and Northern Ireland),<sup>1</sup> Laurentiu Radu (Romania), Sanjay Sookhraz (Mauritius), Alvin Fonantee Terry (Liberia) and Jongikhaya Witi (South Africa). Olga Gavrilova and Jongikhaya Witi were the lead reviewers. The review was coordinated by Jamie Howland and Jeeyoon Jung (secretariat).

### B. Summary

4. The ERT conducted a technical review of the information reported in the NC8 of Luxembourg in accordance with the UNFCCC reporting guidelines on NCs,<sup>2</sup> the reporting guidelines for supplementary information, in particular the supplementary information required under Article 7, paragraph 2, and on the minimization of adverse impacts under Article 3, paragraph 14, of the Kyoto Protocol<sup>3</sup> and of the information reported in the BR5 of Luxembourg in accordance with the UNFCCC reporting guidelines on BRs.<sup>4</sup>

#### 1. Timeliness

5. The NC8 was submitted on 29 November 2023, after the deadline of 31 December 2022 mandated by decision 6/CP.25. The NC8 was resubmitted on 24 December 2023 and again on 29 March 2024 to address issues raised during the review. The resubmission included changes to the information reported on national circumstances; projections and the total effects of PaMs; financial, technological and capacity-building support; research and systematic observation; and education, training and public awareness. Detailed information on improvements related to the resubmission is provided in paragraph 13 below. Unless otherwise specified, the information and values from the latest submission are used in this report.
6. Luxembourg informed the secretariat on 22 December 2022 about its difficulties with making a timely NC8 submission. The ERT noted with great concern the delay in the submission and recommended that Luxembourg make its next submission on time.
7. The BR5 was submitted on 29 November 2023, after the deadline of 31 December 2022 mandated by decision 6/CP.25. The CTF tables were submitted on 5 December 2023.

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<sup>1</sup> Ellie Kilroy’s participation in the review was funded by the EU under the research project “Support to the Development of Monitoring, Reporting and Verification Modalities, Procedures and Guidelines under the UNFCCC and to the Participation by the EU in UNFCCC Technical Reviews”.

<sup>2</sup> Decision 6/CP.25, annex.

<sup>3</sup> Decision 15/CMP.1, annex, and decision 3/CMP.11, annex III.

<sup>4</sup> Decision 2/CP.17, annex.

The BR5 and CTF tables were resubmitted on 24 December 2023. The CTF tables were resubmitted again on 29 March 2024 to address issues raised during the review. The resubmission included changes to the information reported on the quantified economy-wide emission reduction target and financial, technological and capacity-building support. Detailed information on improvements related to the resubmission is provided in paragraph 13 below. Unless otherwise specified, the information and values from the latest submission are used in this report.

8. Luxembourg informed the secretariat on 22 December 2022 about its difficulties with making a timely BR5 submission. 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**

9. Issues and gaps identified by the ERT related to the information reported by Luxembourg in its NC8 are presented in tables 1–2. The information reported, including the supplementary information under the Kyoto Protocol, mostly adheres to the UNFCCC reporting guidelines on NCs. The ERT concludes that the issues of a mandatory nature related to supplementary information under the Kyoto Protocol do not influence the Party’s ability to fulfil its commitments for the second commitment period of the Kyoto Protocol.

10. The ERT noted that Luxembourg made improvements to the reporting in its NC8 compared with that in its NC7, including by addressing many recommendations and encouragements from the previous review report in the areas of PaMs; projections and the total effects of PaMs; financial, technological and capacity-building support; education, training and public awareness; and supplementary information related to the Kyoto Protocol.

Table 1

**Assessment of completeness and transparency of mandatory information reported by Luxembourg in its eighth national communication**

<i>Section of NC</i>	<i>Completeness</i>	<i>Transparency</i>	<i>Reference to description of recommendation</i>
Executive summary	Complete	Transparent	–
National circumstances relevant to GHG emissions and removals	Complete	Transparent	–
GHG inventory	Complete	Transparent	–
PaMs	Mostly complete	Transparent	Issue 1 in table I.1
Projections and the total effect of PaMs	Complete	Transparent	–
Vulnerability assessment, climate change impacts and adaptation measures	Complete	Transparent	–
Financial resources and transfer of technology	Complete	Transparent	–
Research and systematic observation	Complete	Transparent	–
Education, training and public awareness	Complete	Transparent	–

*Note:* A list of recommendations pertaining to the completeness and transparency issues identified in this table is included in annex I. The assessment of completeness and transparency by the ERT in this table is based only on the “shall” reporting requirements.

Table 2

**Assessment of completeness and transparency of mandatory supplementary information under the Kyoto Protocol reported by Luxembourg in its eighth national communication**

<i>Supplementary information under the Kyoto Protocol</i>	<i>Completeness</i>	<i>Transparency</i>	<i>Reference to description of recommendation</i>
National system	Mostly complete	Transparent	Issue 1 in table I.6
National registry	Complete	Transparent	–
Supplementarity relating to the mechanisms pursuant to Articles 6, 12 and 17	Complete	Transparent	–

<i>Supplementary information under the Kyoto Protocol</i>	<i>Completeness</i>	<i>Transparency</i>	<i>Reference to description of recommendation</i>
PaMs in accordance with Article 2	Complete	Transparent	–
Domestic and regional programmes and/or arrangements and procedures	Complete	Mostly transparent	Issues 2–3 in table I.6
Information under Article 10 <sup>a</sup>	Complete	Transparent	–
Financial resources	Complete	Transparent	–
Minimization of adverse impacts in accordance with Article 3, paragraph 14	Complete	Transparent	–

*Note:* A list of recommendations pertaining to the completeness and transparency issues identified in this table is included in annex I. The assessment of completeness and transparency by the ERT in this table is based only on the “shall” reporting requirements.

<sup>a</sup> The assessment refers to information provided by the Party on the provisions contained in Article 4, paras. 3, 5 and 7, of the Convention, as reported under Article 10 of the Kyoto Protocol, which is relevant to Parties included in Annex II to the Convention only. An assessment of the information on the other provisions of Article 10 of the Kyoto Protocol is provided under the relevant substantive headings under the Convention, for example research and systematic observation.

11. Issues and gaps identified by the ERT related to the information reported by Luxembourg in its BR5 are presented in table 3. The information reported mostly adheres to the UNFCCC reporting guidelines on BRs.

12. The ERT noted that Luxembourg made improvements to the reporting in its BR5 compared with that in its BR4 by addressing many recommendations and encouragements from the previous review report in the areas of its quantified economy-wide emission reduction target and related assumptions, conditions and methodologies; projections; and the provision of financial, technological and capacity-building support to developing country Parties.

Table 3

**Summary of completeness and transparency of mandatory information reported by Luxembourg in its fifth biennial report**

<i>Section of BR</i>	<i>Completeness</i>	<i>Transparency</i>	<i>Reference to description of recommendation</i>
GHG emissions and removals	Complete	Transparent	–
Quantified economy-wide emission reduction target and related assumptions, conditions and methodologies	Complete	Transparent	–
Progress in achievement of targets	Mostly complete	Transparent	Issue 2 in table II.1
Provision of support to developing country Parties	Complete	Transparent	–

*Note:* A list of recommendations pertaining to the completeness and transparency issues identified in this table is included in annex II. The assessment of completeness and transparency by the ERT in this table is based only on the “shall” reporting requirements.

13. The NC8 and CTF tables, which are included by reference in the NC8, resubmissions made during the review improved:

(a) The information reported on national circumstances relevant to GHG emissions and removals by correcting a typographical error;

(b) The information reported on projections and the total effects of PaMs by correcting a typographical error and providing consistent descriptions of the WEM and WAM scenarios;

(c) The information reported on financial, technological and capacity-building support by providing more details on the approaches to tracking support provided, addressing the needs of non-Annex I Parties, assisting developing country Parties that are particularly vulnerable to climate change and leveraging private sector finance;

(d) The information reported on research and systematic observation by describing funding sources and providing consistent numbers of meteorological stations operated by the Water Agency;

(e) The information reported on education, training and public awareness by describing the process for monitoring, review and evaluation of the Party's implementation of Article 6 of the Convention;

(f) The CTF tables by clarifying in table 4(a)II that LULUCF is not included in the quantified economy-wide emission reduction target and providing in tables 7, 7(a) and 7(b) the amounts of financial contributions expressed in United States dollars along with the exchange rate used.

## **II. Technical review of the information reported in the eighth national communication and fifth biennial report**

### **A. National circumstances relevant to greenhouse gas emissions and removals**

#### **1. Technical assessment of the reported information**

14. The NC8 contains key data on legislation, population trends, geography and land use, climate and climate change, economic developments, energy, transport, the buildings sector, industry, trade, the services sector, agriculture, forestry, resource efficiency and wastewater.

15. Luxembourg reported in its NC8 that the country has experienced strong growth in population, which increased by 65.7 per cent between 1991 and 2021, mainly driven by immigration. As a consequence, the number of households increased by 90.5 per cent during the same period, while the labour force grew by 135.0 per cent, driven by economic restructuring and the country's development towards the tertiary sector coupled with high salaries. Luxembourg also reported an increasing trend in cross-border commuters who live in neighbouring countries and work in Luxembourg owing to the country's economic attractiveness. This trend has implications on demand for services, as well as on road transportation. The Party reported that the country's central location in Western Europe has made it the main transit route for both goods and passengers, resulting in an increase in road traffic flows.

16. As a result of Luxembourg's economic restructuring and development towards a service-oriented economy, the country has experienced fluctuations in its economic growth. In the mid-1990s there was a slowdown in economic activity, leading to an economic downturn and low growth up until 2004, followed by steady growth up until the 2008 global financial and economic crisis, which had a particularly strong impact in 2009. This was followed by a period of economic recovery, leading to steady growth from 2013 onward until the emergence of the coronavirus disease 2019 pandemic in 2020.

17. With a total area of about 2,586 km<sup>2</sup>, Luxembourg has a forest coverage of 23.5 per cent and uses 61.0 per cent of its total land area for agricultural activities. Human settlements account for 10.3 per cent of the total land area, while water bodies and transport infrastructure together account for 5.0 per cent.

#### **2. Assessment of adherence to the reporting guidelines**

18. The ERT assessed the information reported in the NC8 of Luxembourg and recognized that the reporting is complete and transparent, and thus adheres to the UNFCCC reporting guidelines on NCs. There were no issues raised during the review relating to the topics discussed in this chapter of the review report.



## B. Greenhouse gas inventory information<sup>5</sup>

### 1. Technical assessment of the reported information

19. Luxembourg reported information in its BR5 and NC8 on its historical GHG emissions and inventory arrangements using GWP values from the AR4. More recent information on GHG emissions was reported in Luxembourg's 2023 inventory submission using GWP values from the AR5. Total GHG emissions<sup>6</sup> excluding emissions and removals from LULUCF decreased by 29.0 per cent between 1990 and 2020, while total GHG emissions including net emissions or removals from LULUCF decreased by 32.6 per cent over the same period. Emissions peaked in 1991, fluctuated until 2006 and gradually decreased thereafter. Total GHG emissions excluding emissions and removals from LULUCF increased by 4.0 per cent between 2020 and 2021, while total GHG emissions including net emissions or removals from LULUCF increased by 2.6 per cent over the same period.

20. The changes in total emissions were driven mainly by factors other than the country's economic profile owing largely to the shift towards a service-oriented economy. Developments in three areas in particular had an impact on the overall GHG emission trend. The first area relates to the types of energy used to produce and consume fuels. The Party reported that the final energy mix has undergone significant changes, with the proportion of solid fuels, primarily used in the iron and steel industry, decreasing, while liquid fuels and natural gas have gained prominence. Specifically, between 1990 and 2021, despite a sharp decline of 96.5 per cent in the use of coal and other solid fuels, total final energy consumption grew by 20.2 per cent owing to (1) an increase in liquid fuel use of 60.6 per cent due to the growth in sales of kerosene and fuel for road transportation and (2) an increase in final consumption of natural gas of 53.5 per cent due to expansion of the natural gas distribution network.

21. The second area influencing the emission trend is the structural changes in the energy and industry sectors, owing mainly to the shift from blast furnaces to electric arc furnaces in the iron and steel industry between 1994 and 1998. The Party reported that, since 2005, emissions from iron and steel and non-metallic industries have decreased by more than 20 per cent owing to the replacement of a flat glass production unit with a more efficient technology.

22. The third area of development affecting the emission trend is sales of fuel for road transportation. Between 1990 and 2021, overall GHG emissions excluding LULUCF decreased by 26.2 per cent. In the same period, road transportation emissions attributable to fuel sales to non-residents grew by 94.8 per cent, while those related to the national vehicle fleet increased by 76.6 per cent. The increase in emissions from the national vehicle fleet is attributable to the increase in the number of passenger cars per 1,000 inhabitants, which rose from 477 in 1990 to 681 in 2021; the Party reported this as being the second highest level within the EU. The increase in road transportation emissions is also linked to the growing number of commuters crossing the border into Luxembourg and the increase in road freight transport in Europe.

23. Table 4 illustrates the emission trends by sector and by gas for Luxembourg. The emissions reported in the 2023 inventory submission differ from the data reported in CTF table 1 in part because different GWP values were used. The ERT noted that the difference between the emissions reported in the inventory submission and in CTF table 1 for 1990–2020 is insignificant, at –0.2 per cent.

<sup>5</sup> GHG emission data in this section, for which GWP values from the AR5 were used, are based on Luxembourg's 2023 inventory submission, version 2, which has been subject to review, although the final review report has not yet been published. All emission data in subsequent chapters are based on Luxembourg's BR5 CTF tables, for which GWP values from the AR4 were used unless otherwise noted.

<sup>6</sup> In this report, the term "total GHG emissions" refers to the aggregated national GHG emissions expressed in terms of CO<sub>2</sub> eq excluding LULUCF, unless otherwise specified.

Table 4  
Greenhouse gas emissions by sector and by gas for Luxembourg for 1990–2021

Sector	GHG emissions (kt CO <sub>2</sub> eq)					Change (%)		Share (%)		
	1990	2000	2010	2020	2021	1990–2020	2020–2021	1990	2021	
1. Energy	10 296.28	8 084.28	10 733.04	7 616.71	8 039.18	–26.0	5.5	80.9	85.6	
A1. Energy industries	34.82	117.86	1 204.58	215.07	222.00	517.6	3.2	0.3	2.4	
A2. Manufacturing industries and construction	6 244.49	1 343.43	1 270.11	1 141.89	1 193.90	–81.7	4.6	49.1	12.7	
A3. Transport	2 630.97	4 917.73	6 504.84	4 618.32	4 919.04	75.5	6.5	20.7	52.4	
A4. and A5. Other	1 364.05	1 671.31	1 692.40	1 609.91	1 670.34	18.0	3.8	10.7	17.8	
B. Fugitive emissions from fuels	21.95	33.95	61.11	31.52	33.90	43.6	7.6	0.2	0.4	
C. CO <sub>2</sub> transport and storage	NO	NO	NO	NO	NO	NA	NA	NA	NA	
2. IPPU	1 607.66	749.90	653.49	620.53	565.94	–61.4	–8.8	12.6	6.0	
3. Agriculture	702.07	684.72	662.09	702.97	697.35	0.1	–0.8	5.5	7.4	
4. LULUCF	8.99	–614.75	–205.40	–447.65	–605.35	–5 078.9	–35.2	NA	NA	
5. Waste	116.40	116.09	110.42	89.68	88.26	–23.0	–1.6	0.9	0.9	
6. Other <sup>a</sup>	NO	NO	NO	NO	NO	NA	NA	NA	NA	
Gas <sup>b</sup>										
CO <sub>2</sub>	11 815.50	8 703.62	11 197.59	8 067.69	8 429.71	–31.7	4.5	92.9	89.8	
CH <sub>4</sub>	677.03	665.02	672.56	667.83	663.18	–1.4	–0.7	5.3	7.1	
N <sub>2</sub> O	228.98	236.04	232.53	239.11	244.23	4.4	2.1	1.8	2.6	
HFCs	0.00	28.33	49.25	45.36	43.69	69 780	475.0	–3.7	0.0	0.5
PFCs	NO	NO	NO	NO	NO	NA	NA	NA	NA	
SF <sub>6</sub>	0.90	1.98	7.11	9.91	9.92	997.6	0.1	0.0	0.1	
NF <sub>3</sub>	NO	NO	NO	NO	NO	NA	NA	NA	NA	
<b>Total GHG emissions excluding LULUCF</b>	<b>12 722.41</b>	<b>9 635.00</b>	<b>12 159.05</b>	<b>9 029.90</b>	<b>9 390.73</b>	<b>–29.0</b>	<b>4.0</b>	<b>100.0</b>	<b>100.0</b>	
<b>Total GHG emissions including LULUCF</b>	<b>12 731.40</b>	<b>9 020.25</b>	<b>11 953.65</b>	<b>8 582.25</b>	<b>8 785.38</b>	<b>–32.6</b>	<b>2.4</b>	<b>NA</b>	<b>NA</b>	

Source: GHG emission data: Luxembourg's 2023 inventory submission, version 2.

<sup>a</sup> Emissions and removals reported under the sector other (sector 6) are not included in total GHG emissions. Luxembourg reported that emissions under the sector other are not occurring.

<sup>b</sup> Emissions by gas without LULUCF.

24. In brief, Luxembourg's national inventory arrangements were established in accordance with the Grand Ducal regulation of 24 April 2017 on the establishment of a national system for monitoring, assessing and reporting GHG emissions, which assigned a single national entity as the national GHG inventory compiler and focal point. According to the regulation, the Environment Agency of the Ministry of the Environment, Climate and Biodiversity has responsibility for compiling the national GHG inventory under the guidance of the Ministry. There have been no changes in these arrangements since the BR4.

## 2. Assessment of adherence to the reporting guidelines

25. The ERT assessed the information reported in the NC8 and BR5 of Luxembourg and recognized that the reporting is complete and transparent, and thus adheres to the UNFCCC reporting guidelines on NCs and 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.

### **3. National system for the estimation of anthropogenic emissions by sources and removals by sinks**

#### **(a) Technical assessment of the reported information**

26. Luxembourg provided in the NC8 a description of how its national system for the estimation of anthropogenic emissions by sources and removals by sinks of all GHGs not controlled by the Montreal Protocol is performing the general and specific functions defined in the annex to decision 19/CMP.1 in conjunction with decisions 3/CMP.11 and 4/CMP.11. The description includes most of the elements mandated by paragraph 30 of the annex to decision 15/CMP.1.

#### **(b) Assessment of adherence to the reporting guidelines**

27. The ERT assessed the information reported in the NC8 of Luxembourg and identified an issue relating to completeness and thus adherence to the reporting guidelines for supplementary information. The finding is described in table I.6.

### **4. National registry**

#### **(a) Technical assessment of the reported information**

28. In its NC8 Luxembourg provided information on how its national registry performs the functions in accordance with the annex to decision 13/CMP.1 in conjunction with decision 3/CMP.11 and the annex to decision 5/CMP.1 and complies with the requirements of the technical standards for data exchange between registry systems.

#### **(b) Assessment of adherence to the reporting guidelines**

29. The ERT assessed the information reported in the NC8 of Luxembourg and recognized that the reporting is complete and transparent, and thus adheres to the reporting guidelines for supplementary information. No issues relating to the topics discussed in this chapter of the review report were raised during the review.

## **C. Quantified economy-wide emission reduction target and related assumptions, conditions and methodologies**

### **1. Technical assessment of the reported information**

30. Luxembourg reported information on its economy-wide emission reduction target in its BR5. 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.

31. The 2020 target for the EU and its member States was formalized in the EU 2020 climate and energy package. The legislative package regulated emissions of CO<sub>2</sub>, CH<sub>4</sub>, N<sub>2</sub>O, HFCs, PFCs and SF<sub>6</sub> using GWP values from the AR4 to aggregate the GHG emissions of the EU until 2020. Emissions and removals from the LULUCF sector are not included in the quantified economy-wide emission reduction target for 2020 under the Convention.

32. The EU-wide targets for 2020 under the Convention and for 2013–2020 under the Kyoto Protocol are primarily implemented through the EU ETS and ESD. The EU ETS covers mainly point emissions sources in the energy, industry and aviation sectors. An EU-wide emission cap was put in place for 2013–2020 for the EU ETS with the goal of reducing emissions by 21 per cent below the 2005 level by 2020. For 2030, a reduction target of 62 per cent below the 2005 level has been set for emissions covered by the EU ETS. The ESD was operational in 2013–2020 and covered sectors outside the EU ETS, including transport (excluding aviation and international maritime transport), residential and commercial buildings, agriculture, small industry and waste. The ESD was regulated through targets for

each member State that added up to a reduction at the EU level of 10 per cent below the 2005 level by 2020. The ESR, the successor to the ESD, was adopted in 2018 and amended in 2023 with the target of reducing emissions covered under the ESR by 40 per cent below the 2005 level by 2030.

33. The EU generally allowed its member States to use units from the Kyoto Protocol mechanisms for compliance purposes, subject to a number of restrictions in terms of origin and type of project and up to an established limit. Operators and airline operators could use such units to fulfil their requirements under the EU ETS in 2013–2020, and member States could use such units for their national ESD targets, within specific limitations.

34. The European Commission set out its vision for a climate-neutral EU in November 2018, and in December 2019 presented the European Green Deal as a road map with actions for making the EU economy sustainable. The European Council endorsed in December 2019 the objective of making the EU climate-neutral by 2050. As part of the European Green Deal, the 2050 climate-neutrality target was made binding in the first European Climate Law, adopted in 2021. It also increased the ambition of the 2030 emission reduction target to at least 55 per cent below the 1990 level. Member States will set out any increased ambition in the update of their NECPs.

35. Luxembourg has a national target of reducing its emissions to 20 per cent below the 2005 level by 2020 for ESD sectors. This target has been translated into binding quantified AEAs for 2013–2020. Luxembourg’s AEAs change following a linear path from 9,539.56 kt CO<sub>2</sub> eq in 2013 to 8,116.94 kt CO<sub>2</sub> eq in 2020.<sup>7</sup> Under the ESR, Luxembourg has a national target of reducing emissions from covered sectors to 50 per cent below the 2005 level by 2030.

36. Luxembourg reported on its domestic medium-term target of reducing emissions to 55 per cent below the 2005 level by 2030 (for emissions not covered by the EU ETS). The Party noted that this target is more ambitious than the target required under EU legislation and is driven by the need to hold the increase in the global average temperature to well below 2 °C above the pre-industrial level and the goal of achieving net zero emissions by 2050. The target of a 55 per cent emission reduction is included in Luxembourg’s first NECP, which was submitted to the European Commission in 2020, and in a draft update to the NECP submitted in 2023. Luxembourg has to submit in 2024 the final update to its NECP that will set out its commitment to achieving the 55 per cent target, including a description of its sectoral targets for 2021–2030 defined in the national Climate Law.

37. Luxembourg also reported on its longer-term target of achieving climate neutrality by 2050 in accordance with its Climate Law. Longer-term targets are included in Luxembourg’s LT-LEDS, which reflects the country’s strategic vision and identifies the key areas of action and measures needed for a successful transition to climate neutrality. The LT-LEDS was adopted in 2021 and submitted to the UNFCCC in the same year. The Party noted in its NC8 that its more ambitious target of a 55 per cent reduction in emissions below the 2005 level by 2030 demonstrates its commitment to achieving climate neutrality by 2050.

## **2. Assessment of adherence to the reporting guidelines**

38. The ERT assessed the information reported in the BR5 of Luxembourg and recognized that the reporting is complete and transparent, and thus adheres 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.

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<sup>7</sup> According to the EU transaction log.

## D. Information on policies and measures

### 1. Technical assessment of the reported information

39. Luxembourg provided in its NC8 and BR5 information on its PaMs<sup>8</sup> implemented, adopted and planned to fulfil its commitments under the Convention. In its NC8 and BR5 Luxembourg's set of PaMs has been revised and expanded as part of the 2023 draft NECP update. The total number of PaMs evaluated and reported in the Party's NC8 is 202, compared with 79 PaMs reported in the NC7 and 75 PaMs in the BR4.

40. Luxembourg reported on its policy context and legal and institutional arrangements in place for implementing its commitments and monitoring and evaluating the effectiveness of its PaMs. Luxembourg also indicated that there have been no changes to its institutional, legal, administrative and procedural arrangements used for domestic compliance, monitoring, reporting, archiving of information and evaluation of progress towards its target. The Grand Ducal regulation of 24 April 2017 designates the roles of sectoral experts or competent institutions responsible for compiling the projections and for the ex ante and ex post evaluation of PaMs. The sectoral experts are responsible for determining appropriate methods, AD, underlying parameters and emission factors to estimate the effects of mitigation actions, as well as for conducting the ex ante and ex post evaluation of PaMs, including the related costs. According to the regulation, the projections focal point acts as the projections and PaMs coordinator and is located within the Ministry of the Environment, Climate and Biodiversity. There is also a focal point for the UNFCCC and GHG-related reporting and another for the Convention on Long-range Transboundary Air Pollution and associated reporting in the same Ministry. Owing to the significant revisions and enhancements to the set of PaMs reported in the NC8 and BR5, Luxembourg reported the mitigation effects of its individual PaMs as "NE". However, the Party clarified during the review that activities to assess the mitigation effects are ongoing and the information reported on PaMs is considered during the evaluation of emission and removal projections.

41. Luxembourg's assessment of the economic and social consequences of its response measures includes an assessment of the direct and indirect negative impacts of the implementation of its PaMs on other Parties with the aim of minimizing adverse effects on other Parties, in particular developing country Parties, and ensuring that the choice of project-based mechanisms is in line with ICF criteria on sustainability. Moreover, the Party indicated that it supports developing countries in combating the adverse effects of climate change. For example, Luxembourg's cooperation support is focused on the LDCs and several programmes operated by international financial institutions. The risk of carbon leakage to developing countries has been addressed under the EU ETS. Finally, Luxembourg indicated that, for a number of years, it has been addressing key issues such as human rights and gender equality in the context of climate change.

42. Luxembourg reported that it has taken action to identify and review its own policies and practices that encourage activities that lead to greater levels of emissions. Specifically, Luxembourg's second National Sustainable Development Plan, launched in 2010, identified 14 unsustainable trends, including the continued rise in GHG emissions due to an increase in energy use and the continuous growth of transport flows, with negative impacts on energy consumption, land use and road safety. To address these unsustainable trends, 18 long-term objectives were established, to be achieved by 2050. Longer-term national objectives are framed through implementation of the 2030 Agenda for Sustainable Development and the Party's third National Sustainable Development Plan, which covers the 17 Sustainable Development Goals, including Goal 13 on taking urgent action to combat climate change and its impacts. Luxembourg is actively seeking synergies and consistency between its third National Sustainable Development Plan and its NECP. In addition, Luxembourg has identified some subsidies with potentially harmful effects and perverse incentives in its tax system.

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<sup>8</sup> The UNFCCC reporting guidelines on BRs use the term "mitigation actions", whereas the UNFCCC reporting guidelines on NCs use the term "policies and measures". The terms are used interchangeably in this report to refer to the relevant information in either the NC or BR.

43. In its reporting on PaMs, Luxembourg did not provide the estimated emission reduction impacts for all of its PaMs. The Party explained during the review that owing to the recent revision of its PaMs and the limited resources (human, capacity and knowledge) available, it is still working on quantifying the mitigation effects specific to individual PaMs and the emission reduction impact for all PaMs was therefore reported as “NE”.

44. 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<sub>2</sub> emissions from cars and vans, the carbon capture and storage directive, and the general programmes for environmental conservation, namely the 7<sup>th</sup> Environment Action Programme and the clean air policy package. The 2021 European Climate Law, which forms part of the European Green Deal, made climate neutrality by 2050 legally binding and raised the EU-wide 2030 emission reduction target to at least 55 per cent compared with the 1990 level. In 2023, the EU adopted several pieces of legislation that were part of the “Fit for 55” package intended to help achieve the new 2030 target. These new laws strengthened both the ESR and EU ETS 2030 targets, extended the EU ETS to include maritime shipping in 2024 and established the Social Climate Fund to address equitability of mitigation impacts. They also created the EU ETS 2 to cover at the point of distribution most fuel used in sectors not covered by the EU ETS, beginning in 2027.

45. The 2021–2030 EU-wide policies are operationalized through the NECPs of EU member States, which should set out national objectives for each of the five dimensions of the Energy Union, namely energy security; the internal energy market; energy efficiency; decarbonization; and research, innovation and competitiveness. The NECPs are periodically updated to reflect changes to EU policy, such as the implementation of the European Green Deal. Luxembourg has put in place energy and governance regulations through which the Platform for Climate Action and Energy Transition and the Climate Policy Observatory were established.

46. Luxembourg’s NECP specifies the following targets: a 55 per cent reduction in emissions below the 2005 level by 2030 for all sectors outside the EU ETS; a 37 per cent share of energy from renewable sources by 2030 in all forms in final energy consumption; and an improvement in energy efficiency of 44 per cent compared with the final energy consumption estimated for 2030.

47. Luxembourg introduced national-level policies to achieve its targets under the ESD, the ESR and domestic emission reduction targets. The key policies reported include promoting public transport and renewable fuels; investing in photovoltaic installations; renovating and decarbonizing energy-inefficient buildings; supporting sustainable and environmentally friendly agriculture; implementing and continually developing waste legislation; and introducing various taxes and incentives, such as a CO<sub>2</sub> tax and tax incentives for the energy renovation of housing. The ERT identified the following PaMs as being of particular interest owing to their innovative nature: decarbonizing the energy sector through the use of hydrogen and biomethane and the resulting shift to less carbon-intensive fuels in the energy mix and transition away from fossil fuels; enhancing cross-border cooperation with neighbouring countries to promote the use of renewable energy through financial participation in renewable energy production projects in other EU member States; and funding sustainable and low-emission practices in two ESD sectors, namely agriculture and waste management, including the use of feed additives and the introduction of circularity in waste management practices.

48. Luxembourg highlighted the domestic mitigation actions that are under development, such as those being revised to align with the more ambitious 2030 target of the EU to reduce domestic emissions by at least 55 per cent compared with the 1990 level. Among the mitigation actions that provide a foundation for significant additional progress are promoting the installation of photovoltaic systems in all residential buildings; increasing the share of biogas in the energy mix by using incentives; promoting efficient district heating and cooling; decarbonizing construction sites; promoting innovative mobility services and co-working areas; and developing infrastructure for electric cars.

49. In its NC8 Luxembourg provided detailed information on the mitigation actions identified in its 2023 draft NECP update. Table 5 provides a summary of the reported information on the PaMs of Luxembourg.

Table 5  
**Summary of information on policies and measures reported by Luxembourg**

<i>Sector</i>	<i>Key PaMs<sup>a</sup></i>	<i>Estimated mitigation impact in 2020 (kt CO<sub>2</sub> eq)</i>	<i>Estimated mitigation impact in 2030 (kt CO<sub>2</sub> eq)</i>
Policy framework and cross-sectoral measures	Climate Law	NE	NE
	Climate and Energy Fund	NE	NE
	Climate Pact 2.0 with municipalities	NE	NE
	Decarbonization strategy pursuing the objective of climate neutrality of State Administration as of 2040	NE	NE
	Draft Master Programme for Spatial Planning 2023: gradual reduction of land take and concentration of development in the most appropriate locations	NE	NE
Energy			
Energy efficiency	Energy Efficiency Obligation Scheme	NE	NE
	Regulation on the energy performance of buildings	NE	NE
	Energy renovation obligation for functional buildings	NE	NE
Energy supply and renewable energy	National entity accompanying energy renovation, decarbonization and installation of photovoltaic installations for residential buildings	NE	NE
	Climate Loans Scheme	NE	NE
	Obligation to decarbonize through an accelerated fossil phase-out for functional buildings with a surface area greater than 1 000 m <sup>2</sup>	NE	NE
Transport	National Mobility Plan 2035	NE	NE
	Promotion of public transport	NE	NE
	Promotion of electrification of Luxembourg registered car fleet	NE	NE
	Tax on road vehicles	NE	NE
	CO <sub>2</sub> tax	NE	NE
IPPU	Industry Decarbonization Roadmap	NE	NE
	Climate Pact for Businesses (small and medium-sized enterprises)	NE	NE
	Energy audits mandatory for companies	NE	NE
	Enterprise aid scheme – environmental protection	NE	NE
	Risk-Sharing Facility for Energy Efficiency and Decarbonization of Enterprises Projects	NE	NE
Agriculture	Aid for the use of food additives to reduce methane emissions from digestion	NE	NE
	Aid for the conversion and maintenance of organic farming	NE	NE
	Premium for sustainable and environmentally friendly agriculture	NE	NE
	Legal framework for the use of nitrogen fertilizers in agriculture	NE	NE
LULUCF	Forestry – forest management	NE	NE
	Protection of total forest area	NE	NE
	Establishment of strictly protected areas in public forests with limited timber harvesting	NE	NE
	Increased use of wood from Luxembourgish forests as building material	NE	NE

<i>Sector</i>	<i>Key PaMs<sup>a</sup></i>	<i>Estimated mitigation impact in 2020 (kt CO<sub>2</sub> eq)</i>	<i>Estimated mitigation impact in 2030 (kt CO<sub>2</sub> eq)</i>
Waste	Aid for the transformation of arable land into permanent grassland	NE	NE
	Wastes and National Waste and Resources Management Plan	NE	NE
	Support to a circular economy	NE	NE
	Incineration of waste	NE	NE
	Methane recovery systems	NE	NE
	Wastewater management	NE	NE

<sup>a</sup> Names of PaMs reproduced as reported in Luxembourg’s BR5.

## 2. Assessment of adherence to the reporting guidelines

50. The ERT assessed the information reported in the NC8 and BR5 of Luxembourg and identified issues relating to completeness and thus adherence to the UNFCCC reporting guidelines on NCs and the UNFCCC reporting guidelines on BRs. The findings are described in tables I.1 and II.1.

## 3. Domestic and regional programmes and legislative arrangements and procedures related to the Kyoto Protocol

### (a) Technical assessment of the reported information

51. In its NC8 Luxembourg reported that the implementation of the Kyoto Protocol is underpinned by the EU 2020 climate and energy package. To achieve the targets outlined in the Kyoto Protocol and EU climate policy, the Party developed the second national Action Plan for CO<sub>2</sub> Emissions Reduction in 2013. The overall responsibility for climate change policymaking lies with the Ministry of the Environment, Climate and Biodiversity, and a number of national institutions are involved in policy implementation.

52. For the second commitment period of the Kyoto Protocol, from 2013 to 2020, Luxembourg committed to contributing to the joint EU effort to reduce GHG emissions by 20 per cent below the base-year level (see paras. 30–32 above).

53. Luxembourg has provisions in place to make information on legislative arrangements and administrative procedures related to compliance and enforcement publicly accessible, such as awareness-raising and information campaigns on environmental issues, climate change and saving energy and other initiatives organized and funded by the Ministry of the Environment, Climate and Biodiversity and the Energy Directorate of the Ministry of the Economy. These initiatives involve more than 100 municipalities and private companies and have resulted in the development of numerous projects, tools and educational initiatives in Luxembourg. Through targeted information campaigns, educational events and other public outreach efforts, the Party seeks to generate interest in sustainable technologies and raise awareness about the benefits of an eco-friendly lifestyle.

54. Luxembourg has national legislative arrangements and administrative procedures in place that seek to ensure that the implementation of activities under Article 3, paragraph 3, and any elected activities under Article 3, paragraph 4, of the Kyoto Protocol also contributes to the conservation of biodiversity and the sustainable use of natural resources. Luxembourg is implementing its third National Plan for Nature Preservation 2023–2030, which is structured around four pillars: protection, restoration, transformative change and international commitments. The majority of the Party’s PaMs are aimed at protecting biodiversity and facilitating the sustainable use of natural resources.

### (b) Assessment of adherence to the reporting guidelines

55. The ERT assessed the information reported in the NC8 of Luxembourg and identified issues relating to transparency and thus adherence to the reporting guidelines for supplementary information. The findings are described in table I.6.



#### **4. Policies and measures in accordance with Article 2 and minimization of adverse impacts in accordance with Article 3, paragraph 14, of the Kyoto Protocol**

##### **(a) Technical assessment of the reported information**

56. In the NC8 Luxembourg reported information on how it strives to implement PaMs under Article 2 of the Kyoto Protocol in such a way as to minimize adverse effects, including the adverse effects of climate change and effects on international trade and social, environmental and economic impacts on other Parties, especially developing country Parties. For example, the Party has determined that the measures included in its NECP and its draft update have no direct or indirect effects on other Parties, in particular developing country Parties.

57. The NC8 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. Luxembourg participates in the International Civil Aviation Organization's work through the Abis group, which is comprised of civil aviation authorities from eight European States, namely Austria, Belgium, Croatia, Ireland, the Kingdom of the Netherlands, Portugal and Switzerland, as well as Luxembourg. With respect to the International Maritime Organization, Luxembourg participates in the work of its Marine Environment Protection Committee and supports the work on the adoption of the International Maritime Organization's strategy to reduce GHG emissions from ships.

58. Further information on how Luxembourg strives to implement its commitments under Article 3, paragraph 14, of the Kyoto Protocol in such a way as to minimize adverse social, environmental and economic impacts on developing country Parties was reported in the 2022 annual GHG inventory submission. The Party reported information on what it prioritized in implementing its commitments under Article 3, paragraph 14, including engaging in projects that meet the ecological and social criteria established within the framework of approval procedures for clean development mechanism and joint implementation projects; purchasing only high-quality credits, such as Gold Standard certified emission reductions, for any new emission reduction purchase agreements; and supporting the EU directives on the promotion of the use of energy from renewable sources and on fuel quality. The Party also limits the use of first-generation biofuels to a maximum of 5 per cent of total biofuel use in order to promote the use of second-generation biofuels, which are considered to be more sustainable.

##### **(b) Assessment of adherence to the reporting guidelines**

59. The ERT assessed the information reported in the NC8 of Luxembourg and recognized that the reporting is complete and transparent, and thus adheres to the reporting guidelines for supplementary information. No issues relating to the topics discussed in this chapter of the review report were raised during the review.

#### **E. Estimates of emission reductions and removals and the use of units from market-based mechanisms and land use, land-use change and forestry and progress in achieving the quantified economy-wide emission reduction target**

##### **1. Technical assessment of the reported information**

60. Luxembourg reported in its BR5 that it did not use units from market-based mechanisms under the Kyoto Protocol to meet its commitment under the ESD. It reported in CTF tables 4 and 4(b) that it did not use any units from market-based mechanisms in 2019 or 2020. Given that the contribution of LULUCF activities is not included in the joint EU target under the Convention, reporting thereon is not applicable to Luxembourg. Table 6 illustrates Luxembourg's ESD emissions and use of units from market-based mechanisms for achieving its ESD target.

Table 6

**Summary of information on emissions covered by the European Union effort-sharing decision annual emission allocation and use of units from market-based mechanisms by Luxembourg**(kt CO<sub>2</sub> eq)

<i>Year</i>	<i>ESD emissions</i>	<i>AEA</i>	<i>Use of units from market-based mechanisms</i>	<i>AEAs transferred to (–) or from (+) other Parties</i>	<i>Annual AEA surplus/deficit</i>	<i>Cumulative AEA surplus/deficit</i>
2013	9 365.30	9 539.56	0.00	0.00	174.26	174.26
2014	8 858.31	9 340.28	0.00	0.00	481.97	656.23
2015	8 607.48	9 141.01	0.00	0.00	533.53	1 189.76
2016	8 524.46	8 941.74	0.00	0.00	417.28	1 607.04
2017	8 743.46	8 737.85	0.00	0.00	–5.61	1 601.43
2018	9 075.52	8 530.88	0.00	0.00	–544.64	1 056.79
2019	9 239.04	8 323.91	0.00	0.00	–915.13	141.66
2020	7 687.84	8 116.94	0.00	0.00	429.10	570.76

*Sources:* Luxembourg's BR5 and BR5 CTF table 4(b), and the EU transaction log (AEAs), for which GWP values from the AR4 were used.

*Note:* For a given year, a positive number (surplus) indicates that annual or cumulative ESD emissions were lower than the corresponding AEA or cumulative AEAs, while a negative number (deficit) indicates that annual or cumulative ESD emissions were higher than the corresponding AEA or cumulative AEAs.

## 2. Assessment of adherence to the reporting guidelines

61. The ERT assessed the information reported in the BR5 of Luxembourg and recognized that the reporting is complete and transparent, and thus adheres 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.

## 3. Assessment of achievement of the quantified economy-wide emission reduction target

62. In assessing the Party's contribution towards achievement of the 2020 joint EU target on the basis of the information reported in its BR5, the ERT noted that, under the EU 2020 climate and energy package, Luxembourg committed to reducing its emissions under the ESD to 20 per cent below the 2005 level by 2020 (see para. 35 above). This target has been translated into binding quantified AEAs for 2013–2020. In 2020 Luxembourg's ESD emissions were 5.3 per cent (429.10 kt CO<sub>2</sub> eq) below the AEA. Luxembourg has a cumulative surplus of 570.76 kt CO<sub>2</sub> eq with respect to its AEAs between 2013 and 2020. The ERT noted that the Party did not make use of units from market-based mechanisms in 2020.

63. The ERT noted that the Party reported that the total GHG emissions excluding LULUCF of the EU and including the use of units from market-based mechanisms do not exceed the emission level corresponding to the target in 2020, and thus that the EU has achieved its joint target. See the report on the technical review of the BR5 of the EU for further details. Therefore, the ERT concluded that, on the basis of the information reported in the BR5, Luxembourg has met its 2020 commitment under the Convention through its contribution to achieving the joint EU target.

64. The ERT noted that the Party's ESD emissions in 2020 do not exceed its AEA for 2020. The Party's assessment of its progress towards meeting its target, as reported in the NC8, demonstrates that its ESD emissions were below or close to following the AEA trajectory between 2013 and 2016, but above the trajectory between 2017 and 2019. However, in 2020 the impact of the pandemic resulted in Luxembourg's ESD emissions being below the AEA for that year, thus allowing the Party to fulfil its commitment under the ESD.

## **F. Projections**

### **1. Projections overview, methodology and results**

#### **(a) Technical assessment of the reported information**

65. Luxembourg reported in its BR5 and NC8 updated projections for 2025–2050 relative to actual inventory data for 2021 under the WEM scenario, using GWP values from the AR5. The starting year used for the projections (2021) is different from the latest year of the inventory reported in the NC8 (2020) because the 2023 inventory submission, covering 1990–2021, was available before the NC8 was submitted and 2021 was therefore used as the starting point for the projections underpinning Luxembourg’s draft NECP update. The WEM scenario reported by Luxembourg includes PaMs implemented and adopted until 31 December 2021.

66. In addition to the WEM scenario, Luxembourg reported the WAM scenario. The WAM scenario includes PaMs implemented, adopted or planned, starting from 2022. Luxembourg provided a definition of its scenarios, explaining that its WEM scenario is the ‘business as usual’ scenario and includes the PaMs in the draft NECP update that were adopted and implemented up until 31 December 2021, such as the CO<sub>2</sub> tax, free public transport and the PRIME House scheme for energy-efficient renovation. Its WAM scenario takes into account all PaMs included in the draft NECP update, such as increasing the CO<sub>2</sub> tax by EUR 5/t CO<sub>2</sub> each year; increasing renewable energy sources; implementing the road map for the decarbonization of Luxembourg’s manufacturing industry and the national hydrogen strategy; accelerating the phase-out of oil- and gas-fired boilers; closing the last landfill site in 2035; using animal feed additives to reduce enteric fermentation in dairy cattle; and implementing new near-natural forest management practices. The definitions indicate that the scenarios were prepared in accordance with the UNFCCC reporting guidelines on BRs.

67. The projections are presented on a sectoral basis, using the same sectoral categories as those used in the reporting on mitigation actions, and on a gas-by-gas basis for CO<sub>2</sub>, CH<sub>4</sub>, N<sub>2</sub>O, HFCs and SF<sub>6</sub> for 2025–2050. The Party did not report PFC and NF<sub>3</sub> emissions as they do not occur in the country. The projections were provided by STATEC as aggregated CO<sub>2</sub> eq emissions; historical inventory data were then used to disaggregate the projections by gas. During the review, Luxembourg explained that STATEC is continuously working to improve its models and is planning to publish emission data disaggregated by gas in the future. The projections are also provided in an aggregated format for each sector and for a Party total using GWP values from the AR5. Luxembourg reported on factors and activities affecting emissions for each sector.

68. Luxembourg did not report emission projections for indirect GHGs such as carbon monoxide, nitrogen oxides, non-methane volatile organic compounds or sulfur oxides. In its NC8 Luxembourg explained that emission projections related to fuel sold to ships were not reported as this is a small source of emissions for Luxembourg, and therefore a low priority when preparing the projections.

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

69. The methodology used for the preparation of the projections reported in the NC8 is different from that used for the preparation of the emission projections for the NC7. Luxembourg provided information on changes since the submission of its NC7 in the assumptions, methodologies, models and approaches used for the projection scenarios. The Party noted that the projections reported in the NC8 were compiled by the Government whereas those reported in the NC7 were compiled by a consortium of German institutes; therefore, the NC8 projections better reflect Luxembourg’s specific circumstances and are a marked improvement over the NC7 projections. Luxembourg explained in the NC8 and further clarified during the review that the projections reported in the NC7 were not directly compared with those reported in the NC8 because different approaches and GWP values were used in their preparation, making a comparison of the two sets of projections unsuitable.

70. Luxembourg’s projections reported in the NC8 were prepared using different models or approaches depending on the sector:

(a) Energy and industrial processes: the projections were estimated using a modelling approach developed by STATEC that combines two models: NEAM and LuxGEM. NEAM is a bottom-up trend projection model used to assess the impact of the Government’s PaMs aimed at increasing energy efficiency and reducing national GHG emissions. NEAM is based on input data on buildings and vehicles and is calibrated to the energy balance of Luxembourg on an annual basis. NEMO is used as an input to NEAM for road transportation emissions, while GEORG is used as an input to NEAM for emissions from off-road mobile machinery. The main outputs of NEAM are physical quantities of final and primary energy demand and energy production in Luxembourg, broken down by means of production, energy type and energy use, as well as the associated CO<sub>2</sub> emissions. LuxGEM is a computable general equilibrium model that helps to understand the macroeconomic and sectoral impacts of GHG-related policies. During the review, Luxembourg mentioned ongoing improvements, including the replacement of the LuxGEM model with the ThreeME model. The interface between NEAM and LuxGEM was described in Luxembourg’s NC8;

(b) Agriculture: the projections were modelled by the Rural Economy Department of the Ministry of Agriculture, Food and Viticulture using the LUAgriEmissionModel, a bottom-up model developed using Microsoft Excel that simulates both GHG emissions and air pollutant emissions in the agriculture sector. The AD used in the projections are partly based on trends and partly based on assumptions to take account of future developments. The emission factors and calculation methodology are the same as used in the inventory and described in the 2023 NIR;

(c) LULUCF: ad hoc methods developed by the Environment Agency of the Ministry of the Environment, Climate and Biodiversity were used for the projections using information on demographic and housing developments in Luxembourg. The two main variables on which the projections were based are the conversion of grassland and arable land to settlements and the evolution of harvesting rates in forests, with land use for the development of settlements being the main driver of land-use change in Luxembourg. The projections for the LULUCF sector under the WEM scenario are identical to those used to calculate the forest management reference level and are described in the 2023 NIR;

(d) Waste: the projections were prepared by the Environment Agency of the Ministry of the Environment, Climate and Biodiversity using bottom-up methods based on AD and other variables underpinning the emissions, such as expected trends in waste generation, recycling and reuse over the coming year, and waste composition based on average waste fractions in 2016–2018.

71. To prepare its projections, Luxembourg relied on key underlying assumptions relating to, for example, population, number of households and activity in passenger transport. The assumptions were updated on the basis of the most recent economic developments known at the time of the preparation of the projections.

72. Sensitivity analyses were conducted for a number of important assumptions, such as population trends and economic development indicators. Assuming a lower annual gross domestic product growth of 0.5 per cent, emissions in 2050 would be about 50 kt CO<sub>2</sub> eq lower than under the WAM scenario presented in the NC8. During the review, Luxembourg explained that further sensitivity analyses have been performed since submission of the NC8. For example, sensitivity to gross domestic product growth and population were included in the draft NECP update submitted in 2023, while sensitivity to foreign CO<sub>2</sub> taxes, international energy prices and fossil fuel phase-out will be included in the final update to the NECP due to be finalized in June 2024.

**(c) Results of projections**

73. The projected emission levels under different scenarios are presented in table 7 and figure 1.

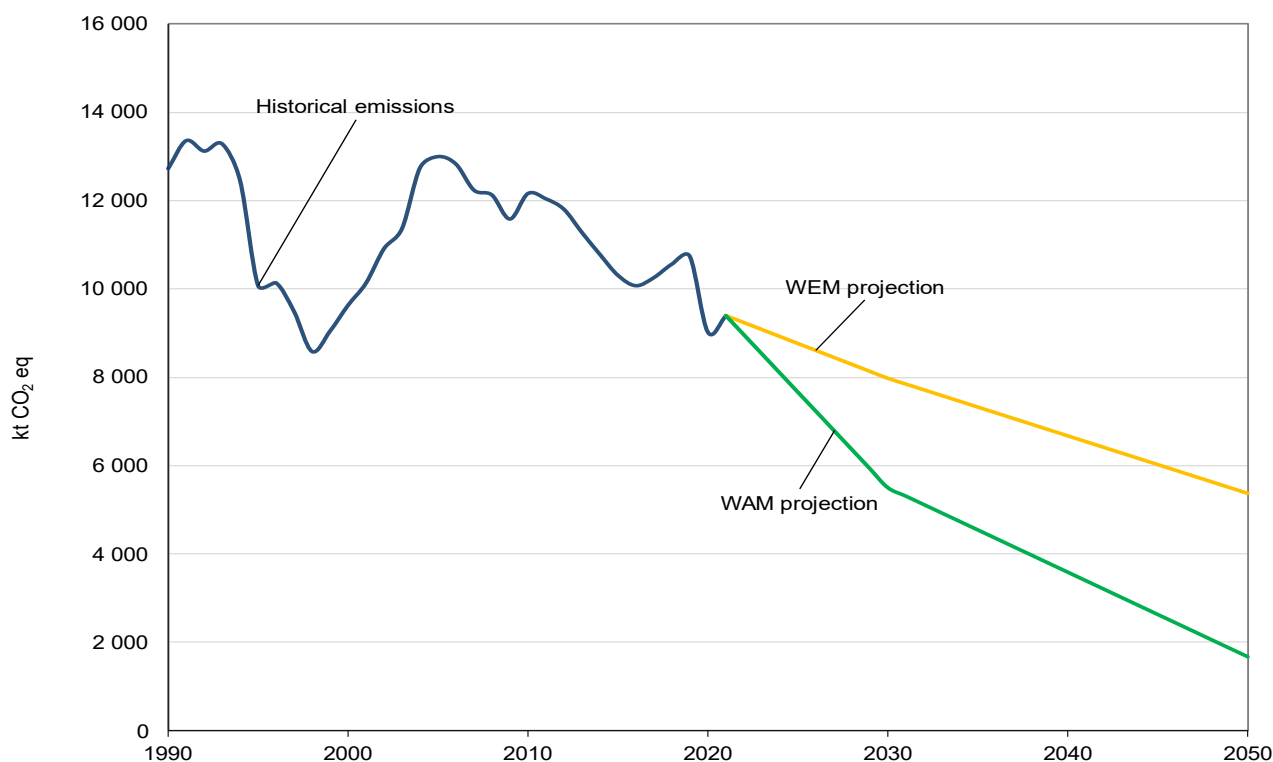
Table 7  
**Summary of greenhouse gas emission projections for Luxembourg**

	<i>GHG emissions (kt CO<sub>2</sub> eq/year)</i>	<i>Change in relation to 1990 level (%)</i>	<i>Change in relation to 2020 level (%)</i>
Inventory data 1990	12 722.41	NA	NA
Inventory data 2005	12 993.83	2.1	NA
Inventory data 2020	9 029.90	-29.0	NA
WEM projections for 2030	7 975.86	-37.3	-11.7
WAM projections for 2030	5 499.99	-56.8	-39.1
WEM projections for 2050	5 379.32	-57.7	-40.4
WAM projections for 2050	1 675.58	-86.8	-81.4

Sources: Luxembourg’s NC8 and BR5 CTF table 6, for which GWP values from the AR5 were used.

Note: The projections are of GHG emissions excluding LULUCF and excluding indirect CO<sub>2</sub>.

Figure 1  
**Greenhouse gas emission projections reported by Luxembourg**

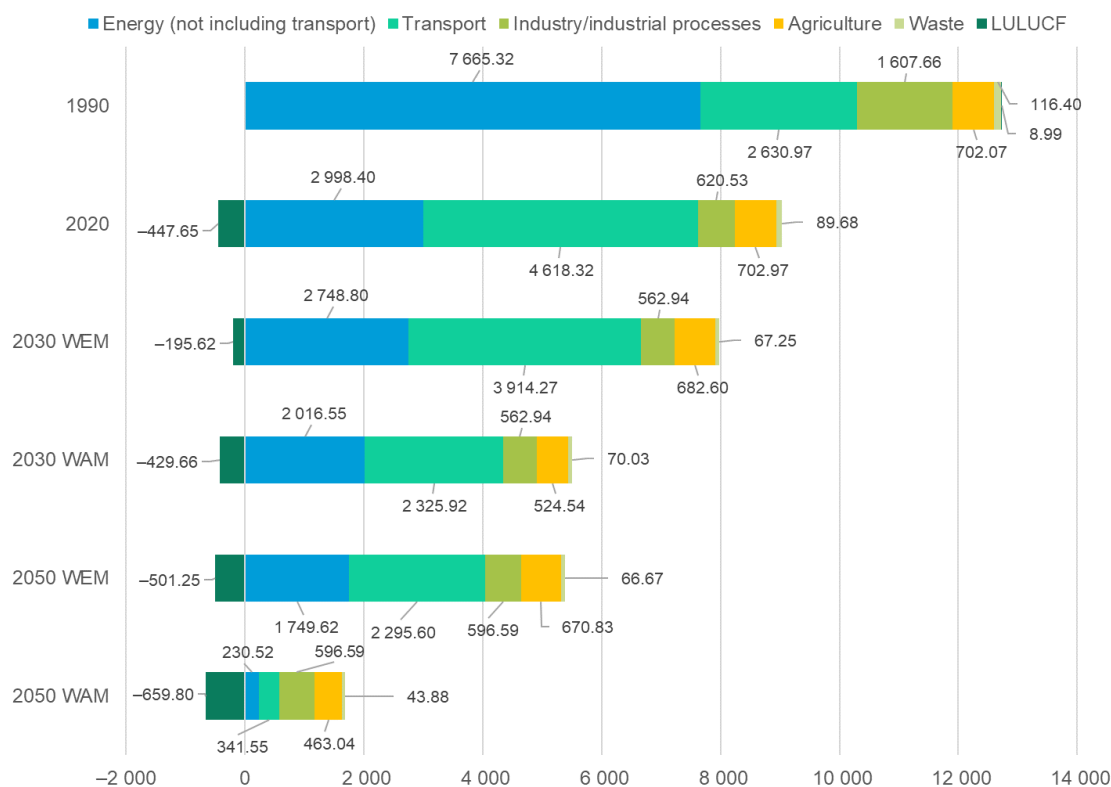


Sources: Luxembourg’s NC8 and BR5 CTF tables 1 and 6 (total GHG emissions excluding LULUCF), for which GWP values from the AR5 were used.

74. Luxembourg’s total GHG emissions excluding LULUCF are projected under the WEM scenario to decrease by 37.3 and 57.7 per cent below the 1990 level in 2030 and 2050 respectively. When including LULUCF, total GHG emissions are projected under the WEM scenario to decrease by 38.8 and 61.7 per cent below the 1990 level in 2030 and 2050 respectively. Under the WAM scenario, emissions excluding LULUCF in 2030 and 2050 are projected to be lower than those in 1990 by 56.8 and 86.8 per cent respectively.

75. Luxembourg presented the WEM and WAM scenarios by sector for 2030 and 2050, as summarized in figure 2 and table 8.

Figure 2  
**Greenhouse gas emission projections for Luxembourg presented by sector**  
 (kt CO<sub>2</sub> eq)



Sources: Luxembourg's NC8 and BR5 CTF table 6, for which GWP values from the AR5 were used.

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

Sector	GHG emissions and removals (kt CO <sub>2</sub> eq)					Change (%)			
	1990	2030		2050		1990–2030		1990–2050	
		WEM	WAM	WEM	WAM	WEM	WAM	WEM	WAM
Energy (not including transport)	7 665.32	2 748.80	2 016.55	1 749.62	230.52	-64.1	-73.7	-77.2	-97.0
Transport	2 630.97	3 914.27	2 325.92	2 295.60	341.55	48.8	-11.6	-12.7	-87.0
Industry/industrial processes	1 607.66	562.94	562.94	596.59	596.59	-65.0	-65.0	-62.9	-62.9
Agriculture	702.07	682.60	524.54	670.83	463.04	-2.8	-25.3	-4.4	-34.0
LULUCF	8.99	-195.62	-429.66	-501.25	-659.80	-2 276.0	-4 879.3	-5 675.6	-7 439.3
Waste	116.40	67.25	70.03	66.67	43.88	-42.2	-39.8	-42.7	-62.3
Other	-	-	-	-	-	-	-	-	-
<b>Total GHG emissions excluding LULUCF</b>	<b>12 722.41</b>	<b>7 975.86</b>	<b>5 499.99</b>	<b>5 379.32</b>	<b>1 675.58</b>	<b>-37.3</b>	<b>-56.8</b>	<b>-57.7</b>	<b>-86.8</b>

Sources: Luxembourg's NC8 and BR5 CTF table 6, for which GWP values from the AR5 were used.

76. According to the projections reported for 2030 under the WEM scenario, the most significant absolute emission reductions are expected to occur in the energy sector (excluding transport), amounting to projected reductions of 64.1 per cent between 1990 and 2030. Emission reductions are also expected to occur in the agriculture and waste sectors, amounting to projected reductions of 2.8 and 42.2 per cent respectively. The transport sector shows a projected increase in emissions of 48.8 per cent over the same period.

77. The pattern of projected emissions reported for 2050 under the same scenario changes for some sectors but remains the same for others. The decrease in emissions from the energy sector (excluding transport) continues, with a projected reduction in sectoral emissions by a further 999.18 kt CO<sub>2</sub> eq between 2030 and 2050 owing to energy efficiency measures in the buildings sector, the closure of a fossil-based power generation plant and an increase in the share of renewable energy in the generation mix. Total emissions from the energy sector are projected to decrease by 77.2 per cent (4,498.42 kt CO<sub>2</sub> eq) in 2050 below the 1990 level. Emissions from the industry/industrial processes sector are projected to decrease by 62.9 per cent (33.65 kt CO<sub>2</sub> eq) between 2030 and 2050 mainly owing to improvements in energy efficiency and the use of electricity as the main source of energy. Emissions from the transport sector are projected to decrease by 87.0 per cent (1,618.68 kt CO<sub>2</sub> eq) during the same period. This drop is due to an increase in the CO<sub>2</sub> tax on fuel, which will reduce the sale of fuel to non-residents. Electric and hybrid vehicles will also contribute to the reduction in emissions from the transport sector.

78. Luxembourg presented the WEM and WAM scenarios by gas for 2030 and 2050, as summarized in table 9.

Table 9

**Summary of greenhouse gas emission projections for Luxembourg presented by gas**

Gas <sup>a</sup>	GHG emissions and removals (kt CO <sub>2</sub> eq)					Change (%)			
	2030		2050			1990–2030		1990–2050	
	1990	WEM	WAM	WEM	WAM	WEM	WAM	WEM	WAM
CO <sub>2</sub>	11 815.50	7 086.49	4 805.47	4 534.20	1 129.96	–40.0	–59.3	–61.6	–90.4
CH <sub>4</sub>	677.03	628.09	470.63	600.63	351.16	–7.2	–30.5	–11.3	–48.1
N <sub>2</sub> O	228.98	234.92	197.52	212.44	162.42	2.6	–13.7	–7.2	–29.1
HFCs	0.00	17.73	17.58	10.21	12.15	NA	NA	NA	NA
PFCs	NO	NO	NO	NO	NO	NA	NA	NA	NA
SF <sub>6</sub>	0.90	8.63	8.79	21.84	19.90	858.9	876.7	2 326.7	2 111.1
NF <sub>3</sub>	NO	NO	NO	NO	NO	NA	NA	NA	NA
<b>Total GHG emissions without LULUCF</b>	<b>12 722.41</b>	<b>7 975.86</b>	<b>5 499.99</b>	<b>5 379.32</b>	<b>1 675.58</b>	<b>–37.3</b>	<b>–56.8</b>	<b>–57.7</b>	<b>–86.8</b>

Sources: Luxembourg's NC8 and BR5 CTF table 6, for which GWP values from the AR5 were used.

<sup>a</sup> Luxembourg did not include indirect CO<sub>2</sub> emissions in its projections.

79. Luxembourg's small size and open economy influence its emission trends; the opening or closing of a single plant or industrial site can strongly influence its emissions, and its emissions are very sensitive to changes in the amount of fuel sold to foreign vehicles and wider political and economic developments.

**(d) Assessment of adherence to the reporting guidelines**

80. The ERT assessed the information reported in the NC8 and BR5 of Luxembourg and identified issues relating to transparency and thus adherence to the UNFCCC reporting guidelines on NCs and the UNFCCC reporting guidelines on BRs. The findings are described in tables I.2 and II.2.

**2. Assessment of the total effect of policies and measures**

**(a) Technical assessment of the reported information**

81. In its NC8 Luxembourg presented an estimate of the total effect of its PaMs, in accordance with the WAM scenario up until 2050. Information is presented in terms of GHG emissions avoided or sequestered, by gas (on a CO<sub>2</sub> eq basis) for 2025–2050. The Party also presented relevant information on factors and activities for each sector for 1990–2030.

82. Luxembourg reported that the total estimated effect of its implemented, adopted and planned PaMs is 3.80 Mt CO<sub>2</sub> eq in 2030, 6.43 Mt CO<sub>2</sub> eq in 2040 and 6.98 Mt CO<sub>2</sub> eq in

2050. According to the information reported in the NC8, PaMs implemented in the energy, transport, and residential and commercial buildings sectors will deliver the largest emission reductions. Table 10 provides an overview of the total effect of PaMs as reported by Luxembourg.

Table 10

**Projected effects of Luxembourg’s planned, implemented and adopted policies and measures in 2030 and 2050**  
(kt CO<sub>2</sub> eq)

Sector	2030	2050
	<i>Effect of implemented, adopted and planned measures</i>	<i>Effect of implemented, adopted and planned measures</i>
Energy (without transport) and manufacturing industries and construction	264	486
Transport	2 593	4 577
Residential and commercial buildings	733	1 646
Agriculture and forestry	175	236
Waste and wastewater treatment	36	35
<b>Total</b>	<b>3 801</b>	<b>6 980</b>

*Source:* Luxembourg’s NC8, for which GWP values from the AR5 were used.

*Note:* The total effect of implemented, adopted and planned PaMs is defined as the difference in emissions compared with the 2021 level.

**(b) Assessment of adherence to the reporting guidelines**

83. The ERT assessed the information reported in the NC8 of Luxembourg and identified issues relating to transparency and thus adherence to the UNFCCC reporting guidelines on NCs. The findings are described in table I.2.

**3. Supplementary relating to the mechanisms pursuant to Articles 6, 12 and 17 of the Kyoto Protocol**

**(a) Technical assessment of the reported information**

84. In the NC8 Luxembourg reported that it does not plan to use market-based mechanisms to meet its Kyoto Protocol target. The ERT notes that reporting on the supplementary of such mechanisms is therefore not relevant for Luxembourg.

**(b) Assessment of adherence to the reporting guidelines**

85. The ERT assessed the information reported in the NC8 of Luxembourg and recognized that the reporting is complete and transparent, and thus adheres to the reporting guidelines for supplementary information. No issues relating to the topics discussed in this chapter of the review report were raised during the review.

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

**1. Technical assessment of the reported information**

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

86. In its NC8 and BR5 Luxembourg reported information on its provision of financial, technological and capacity-building support to non-Annex I Parties.

87. Luxembourg has provided support that it considers to be “new and additional”. Its definition of “new and additional” is that financial pledges are not carried over from previous commitments and are therefore considered to be “new”, while support is considered to be “additional” when it exceeds Luxembourg’s ODA commitments and is therefore not double counted. Luxembourg’s process for determining resources to be “new and additional” takes



into account its ICF strategy, where funding is additional to its objective of allocating 1.0 per cent of gross national income to ODA.

88. Luxembourg reported on the support that it has provided to non-Annex I Parties, distinguishing between support for mitigation and adaptation activities and identifying the capacity-building elements of such support. In the absence of a generally accepted definition of international climate finance, Luxembourg's ICF programme applies both the joint approach used by MDBs to monitoring and identifying climate finance and the OECD DAC Rio markers.

89. Luxembourg's national approach to tracking the provision of support, including information on indicators, delivery mechanisms used and allocation channels tracked, is based on the OECD DAC policy marker system (including an "Aid to Environment" marker and four Rio markers), which is used to identify programmes and projects targeting climate change objectives. Luxembourg provided detailed information regarding its ICF strategy and the eligibility and selection criteria used for allocating funds. The Party indicated that in addition to the climate components methodology used by MDBs and IDFC members, which is based on the MDB-IDFC common principles for climate change mitigation and adaptation finance tracking, and the OECD DAC Rio marker methodology, it also uses the EU taxonomy for sustainable activities when identifying climate change mitigation and adaptation projects. Besides the use of the new EU taxonomy, there have been no major changes to the Party's approach since its NC7 and BR4.

90. Luxembourg's methodology and underlying assumptions used for collecting and reporting information on financial support, including underlying assumptions, guidelines, eligibility criteria and/or indicators, are based on the OECD DAC Rio markers, in particular the mitigation and adaptation markers, to identify programmes and projects targeting climate change objectives. The Ministry of the Environment, Climate and Biodiversity uses the MDB-IDFC common principles for climate change mitigation and adaptation finance tracking as well as a national methodology included in its ICF strategy, but the Party reported that the Ministry does not have the capacity to carry out a detailed climate component analysis for each supported activity.

**(b) Financial resources**

91. Luxembourg reported in its NC8 and BR5 information on its provision of financial support to non-Annex I Parties as required under the Convention, including on financial support committed and disbursed, allocation channels and annual contributions. Luxembourg's support strategy is focused on four main areas: improving access to essential social services; boosting the socioeconomic status of women and youth; fostering inclusive and sustainable growth; and enhancing inclusive governance. This approach is deeply rooted in principles such as human rights, gender equality, equity and environmental protection. By integrating these fundamental principles into all four areas of the strategy, Luxembourg aims to provide comprehensive and varied support for sustainable development. The Party's strategy and efforts are shaped by the specific needs and priorities of partner countries, leading to the creation of tailored programmes and projects. These efforts are reflected in its development cooperation, including its contributions through ODA and the national ICF programme, which are designed to align closely with the Sustainable Development Goals. This alignment underscores Luxembourg's commitment to making a significant contribution towards the achievement of the Sustainable Development Goals under the 2030 Agenda for Sustainable Development.

92. Luxembourg described how it seeks to ensure that the resources it provides to non-Annex I Parties effectively address their adaptation and mitigation needs. The Party provided a general description of its ICF programme and how it selected the themes and preferential sectors for mitigation, adaptation and REDD+ activities. The Party aims to provide a balanced allocation of funds, providing 40 per cent for adaptation measures, 40 per cent for mitigation measures and 20 per cent for REDD+ activities. Luxembourg noted that this distribution is indicative only and that the needs of the host and partner countries are taken into account. Luxembourg also uses geographical distribution criteria and several other criteria to determine eligible activities, as well as the beneficiaries. Table 11 summarizes the information reported by Luxembourg on its provision of financial support.

Table 11  
**Summary of information on provision of financial support by Luxembourg in 2019–2020**

(Millions of United States dollars)

<i>Allocation channel of public financial support</i>	<i>Disbursement in 2019–2020</i>
ODA	923.91
Climate-specific contributions through multilateral channels, including:	58.33
Green Climate Fund	16.99
Financial institutions, including regional development banks	26.58
United Nations bodies	14.75
Climate-specific contributions through bilateral, regional and other channels	70.06

*Sources:* Luxembourg’s BR5 CTF tables and Query Wizard for International Development Statistics, available at <http://stats.oecd.org/qwids/>.

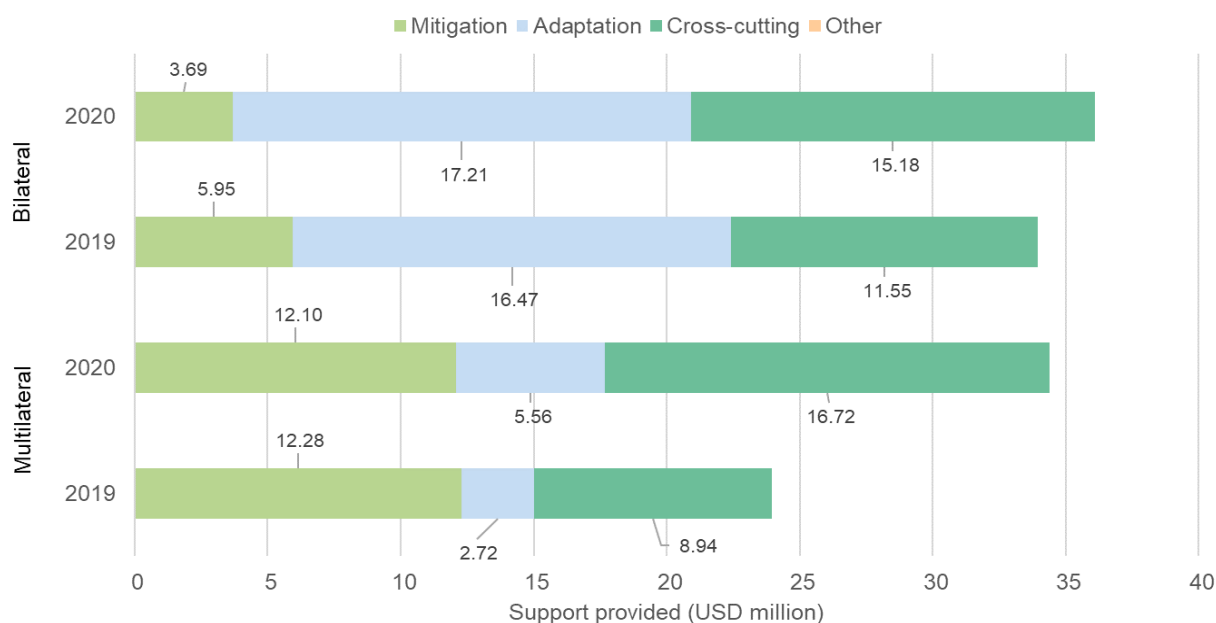
93. Luxembourg’s climate-specific public financial support<sup>9</sup> totalled USD 128.39 million in 2019–2020, representing an increase of 30.9 per cent since the BR4 (2017–2018).<sup>10</sup> With regard to future financial pledges aimed at enhancing the implementation of the Convention by developing countries, Luxembourg has committed to providing EUR 220 million in ICF between 2021 and 2025. This pledge includes a contribution of EUR 40 million to the Green Climate Fund for 2020–2024.

94. Luxembourg contributed through multilateral channels USD 58.33 million in 2019–2020. The contributions were made to specialized multilateral climate change funds, such as the Green Climate Fund, other financial institutions, including regional development banks, and United Nations bodies. Since the BR4, the overall amount of disbursed funding has increased by approximately 47.5 per cent, from USD 39.55 million to USD 58.33 million, largely owing to new financial pledges made by the Party, especially in the area of mitigation, representing a significant increase in allocations compared with the BR4. In addition, while the most significant increase was in the area of mitigation, changes in funding allocation to other areas such as adaptation, where funding increased by 25.4 per cent, and cross-cutting, where funding decreased by 22.0 per cent, reflect the Party’s evolving priorities in responding to climate change in terms of mitigation and adaptation support. Information on financial support from the public sector provided through multilateral and bilateral channels and the allocation of that support by target area is presented in figure 3 and table 12.

<sup>9</sup> For the remainder of this chapter, the term “financial support” means climate-specific financial support, unless otherwise noted.

<sup>10</sup> Comparisons with data from previous years have been calculated directly without adjusting for inflation.

Figure 3  
Provision of support by Luxembourg in 2019–2020



Sources: Luxembourg's BR5 CTF tables 7, 7(a) and 7(b).

Table 12  
Summary of information on channels of financial support reported by Luxembourg  
(Millions of United States dollars)

Allocation channel of public financial support	Amount disbursed in 2019–2020	Amount disbursed in 2017–2018	Change (%) <sup>a</sup>	Share of total (2019–2020) (%)
<b>Detailed information by type of channel</b>				
<b>Multilateral channels</b>				
Mitigation	24.38	0.06	38 362.9	41.8
Adaptation	8.29	6.61	25.4	14.2
Cross-cutting	25.66	32.88	–22.0	44.0
Other	0.00	0.00	–	–
<b>Total multilateral</b>	<b>58.33</b>	<b>39.55</b>	<b>47.5</b>	<b>100.0</b>
<b>Bilateral channels</b>				
Mitigation	9.65	17.75	–45.7	13.8
Adaptation	33.68	23.81	41.5	48.1
Cross-cutting	26.73	17.01	57.2	38.2
Other	0.00	0.00	–	–
<b>Total bilateral</b>	<b>70.06</b>	<b>58.56</b>	<b>19.6</b>	<b>100.0</b>
<b>Total multilateral and bilateral</b>	<b>128.39</b>	<b>98.11</b>	<b>30.9</b>	<b>100.0</b>

Source: Luxembourg's BR4 and BR5 CTF tables 7(a) and 7(b).

<sup>a</sup> Note that variances in contribution amounts from year to year can occur that are not reflective of trends, owing to factors such as the biennial or triennial contribution cycles of some multilateral funds, the timing of approvals for individual bilateral projects or changes in exchange rates.

95. The Party reported detailed information on the total financial support provided through bilateral and regional channels, amounting to USD 70.06 million, in 2019–2020. During the reporting period, Luxembourg placed a particular focus on SIDS and the LDCs, allocating financial support to several partner countries within those groups, including Burkina Faso (USD 13.11 million), Cabo Verde (USD 5.33 million) Mali (USD 10.66 million), the Niger (USD 2.62 million) and Senegal (USD 1.33 million) in West Africa, and beyond Africa to countries such as the Lao People's Democratic Republic (USD 2.69 million) and Nicaragua (USD 3.02 million).

96. The NC8 and the BR5 provide information on the types, sectors and instruments of support provided. The information reported shows that in 2019–2020 the average shares of bilateral and regional financial support allocated to mitigation, adaptation and cross-cutting projects were 13.8, 48.1 and 38.2 per cent respectively. In 2019–2020, the majority of financial contributions through bilateral and regional channels were allocated to the energy, agriculture, water and sanitation, and cross-cutting sectors. The ERT noted that the grants provided in 2019–2020 accounted for most of the bilateral and regional financial support. According to the data provided in CTF tables 7(a) and 7(b), Luxembourg has supported a wide range of sectors and used diverse financial instruments to support developing countries. Luxembourg's choice of sectors demonstrates its strategic focus on areas that are critical for both mitigating climate change impacts and promoting sustainable development.

97. Luxembourg explained that private finance is mainly mobilized for exporting goods, technologies and services in the environment, energy, commercial activities and other sectors. It also reported on how it uses public funds to promote private sector financial support for developing countries to increase mitigation and adaptation efforts in developing countries by providing grants and first loss guarantees through initiatives such as the Luxembourg–European Investment Bank Climate Finance Platform, the Forestry and Climate Change Fund and the International Climate Finance Accelerator. 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 reporting practices among private organizations and the challenge of tracking private financial flows given Luxembourg's status as an international finance centre. The Party has implemented several policies to promote the scaling up of private investment in climate finance, focusing on mobilizing private finance for climate action through initiatives such as its ICF programme, the Luxembourg Sustainable Finance Road Map and the European Microfinance Award, as well as through the Green Bond Cornerstone Fund of the European Investment Bank. An example of a project through which private finance has been mobilized is the Energy Efficient Lighting Nationally Appropriate Mitigation Action Pilot in Hue City in Viet Nam, carried out from 2018 to 2022 with funding of EUR 2 million. This project was aimed at reducing GHG emissions and improving energy efficiency by replacing conventional lighting with low-energy, high-quality light-emitting diode lighting in selected public urban areas in the city of Hue.

98. An example of Luxembourg's support is the funding of EUR 536,733 provided for the "Capacity-building Support in Senegal (2016–2023)" project, which supported the Ecological Monitoring Centre of Senegal in establishing a reference bureau for climate change adaptation and mitigation. The reference bureau's goals include strengthening the capacity of local and subregional institutions, facilitating access to climate data and information, providing climate services to support local climate change adaptation and mitigation policies, and supporting local authorities in accessing climate finance. The Party also reported on a project providing capacity-building support to bolster climate adaptation and resilience in the Thua Thien Hue Province of Viet Nam in 2018–2022, to which Luxembourg allocated funding of EUR 2.96 million. The project was aimed at strengthening the capacity of both the Government and local communities in coastal areas to understand and adapt to the impacts of climate change. It was also focused on enhancing disaster risk reduction, improving small-scale infrastructure for better protection of livelihoods and supporting resilient ecosystems for effective adaptation to climate challenges.

**(c) Technology development and transfer**

99. Luxembourg reported on its measures and activities related to technology transfer, access and deployment benefiting developing countries, including activities undertaken by the public and private sector. Examples of support provided for the deployment and enhancement of the endogenous capacities and technologies of non-Annex I Parties include a project on enhancing resilience to climate change through solar power driven access to water in rural areas of the outer islands in Vanuatu (2018–2025), with funding of EUR 3.1 million, and a project on technology development and transfer and capacity-building support in Senegal for green wastewater, plastic waste, and electrical and electronic equipment waste management in secondary cities through the development of an innovative business model for recycling and recovery (2018–2023), with funding of EUR 3 million.

100. Luxembourg focused the provision of its technology transfer support on the LDCs, with a particular focus on countries in West Africa, such as Burkina Faso, the Niger, Mali and Senegal, and beyond Africa to the Lao People’s Democratic Republic. In addition, SIDS, such as Cabo Verde, have been identified as priority partners in Luxembourg’s efforts to address climate change and support sustainable development. Luxembourg’s support has been directed towards enhancing resilience to climate change, promoting sustainable agriculture and waste management, and improving access to water and sanitation through innovative and sustainable solutions.

101. Since its previous NC and BR, Luxembourg has implemented additional measures and activities. Luxembourg also described success and failure stories in relation to technology transfer, and in particular measures taken to promote, facilitate and finance the transfer and deployment of climate-friendly technologies. One success story is Luxembourg’s support provided to Cabo Verde to revise its energy sector strategy to include training in renewable energy technology in order to facilitate the energy transition.

**(d) Capacity-building**

102. Luxembourg reported on its capacity-building support for mitigation, adaptation and technology that responds to the existing and emerging needs identified by non-Annex I Parties. It described individual measures and activities related to capacity-building support in textual and tabular format. Through country-driven approaches and in alignment with needs assessments conducted by non-Annex I Parties, Luxembourg’s support has been focused on several key areas such as strengthening institutional capacities, promoting sustainable energy and efficient energy use, enhancing resilience to climate change and supporting sustainable waste management. By aligning its support with the needs identified by recipient countries and leveraging a mix of financial, technological and knowledge-sharing resources, Luxembourg is actively contributing to global efforts to combat climate change and promote sustainable development.

103. Luxembourg has supported climate-related capacity development activities relating to adaptation, mitigation, climate financing and other sectors. Since the BR4, the focus of support has remained the same. Luxembourg’s support 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, cooperation between donors and across programmes, and impact assessment and monitoring. Luxembourg’s support is delivered through a variety of mechanisms and programmes. Priorities and approaches implemented by Luxembourg include the development of innovative financial instruments through the Climate and Energy Fund, emphasizing the importance of sustainable cities, clean energy production and efficient energy use, as well as wider measures aimed at realizing commitments set out in the nationally determined contributions of non-Annex I Parties.

**2. Assessment of adherence to the reporting guidelines**

104. The ERT assessed the information reported in the NC8 and BR5 of Luxembourg and identified issues relating to transparency and thus adherence to the UNFCCC reporting guidelines on NCs and the UNFCCC reporting guidelines on BRs. The findings are described in tables I.3 and II.3.

**3. Reporting on finance, capacity-building and technology transfer information related to the Kyoto Protocol**

**(a) Technical assessment of the reported information**

105. In its NC8 Luxembourg reported its activities, actions and programmes undertaken in fulfilment of its commitments under Article 10 of the Kyoto Protocol. Luxembourg provided information on steps taken to promote, facilitate and finance the transfer of technology to developing countries and to build their capacity in order to facilitate implementation of Article 10 of the Kyoto Protocol. For example, Luxembourg is supporting Cabo Verde in revising its energy sector strategy. The Party also reported on the support provided to Burkina

Faso for capacity-building to improve livestock management and sustainable pastoral resources management, including support for the national forestry programme and for various projects targeting the rehabilitation of degraded land.

106. Luxembourg provided information on its implementation of Article 11 of the Kyoto Protocol, including on its provision of assistance to developing countries that are vulnerable to the impacts of climate change. Luxembourg’s development cooperation follows a policy of targeted interventions in a limited number of partner countries whose selection is informed by the human development index of the United Nations Development Programme, as well as by geographical distribution. In 2020, the five partner countries in West Africa that benefited from Luxembourg’s support were Burkina Faso, Cabo Verde, Mali, the Niger and Senegal, in addition to the two partner countries in other regions, namely the Lao People’s Democratic Republic and Nicaragua. Luxembourg also supported projects in Afghanistan, El Salvador, Kosovo, Mongolia, Myanmar, the State of Palestine, Tajikistan and Viet Nam. Multiannual indicative cooperation programmes, generally carried out over a four- to five-year period, ensure the predictability of funding. Luxembourg focuses on sectors where it can provide added value and aligns its development assistance with the priorities and development strategies of its partner countries. The Party described how its contributions are “new and additional” (see para. 87 above).

107. Luxembourg reported on its financial contributions to the Adaptation Fund, which consisted of a disbursement of EUR 2 million to settle its pledged contribution to fast-start finance for 2010–2012.

**(b) Assessment of adherence to the reporting guidelines**

108. The ERT assessed the information reported in the NC8 of Luxembourg and recognized that the reporting is complete and transparent, and thus adheres to the reporting guidelines for supplementary information. No issues relating to the topics discussed in this chapter of the review report were raised during the review.

**H. Vulnerability assessment, climate change impacts and adaptation measures**

**1. Technical assessment of the reported information**

109. In its NC8 Luxembourg provided information on the expected impacts of climate change in the country; the adaptation policies covering regional, sectoral and cross-sectoral vulnerabilities and considerations; and an outline of the action taken to implement Article 4, paragraph 1(b) and (e), of the Convention with regard to adaptation. Luxembourg provided a description of climate change vulnerability and impacts on biodiversity and vegetation, human health, agriculture, forestry and water and highlighted the adaptation response actions taken and planned at different levels of government. In 2018, 86 expected climate impacts were identified on the basis of their potential threat over the coming decades, 40 of which were prioritized using a methodology combining the impacts that are expected to be most relevant to Luxembourg with the areas that are expected to experience the greatest climate variability by 2050.

110. Luxembourg has addressed adaptation matters through the adoption in 2018 of the revised National Adaptation Strategy to Climate Change (2018–2023), which includes a climate change action plan. On the basis of past observations and future projections of the effects of climate change, 42 measures have been developed for 13 sectors. In 2020, Luxembourg adopted the national Climate Law, article 12 of which provides the legal basis for the National Adaptation Strategy to Climate Change and the NAP. In accordance with the provisions of the Climate Law, Luxembourg started the process of updating the Strategy and the NAP in 2023; the updates will integrate the provisions of the 2021 EU Strategy on Adaptation to Climate Change. These policies will provide further direction to government agencies on enhancing preparedness for climate change. Table 13 summarizes the information on vulnerability and adaptation to climate change presented in the NC8 of Luxembourg.

Table 13

**Summary of information on vulnerability and adaptation to climate change reported by Luxembourg**

<i>Vulnerable area</i>	<i>Examples/comments/adaptation measures reported</i>
Agriculture and food security	<p><b>Vulnerability:</b> Projected changes in heat and water stress will have a negative impact on most crops, such as grapes and wheat. A lack of water, combined with extreme weather events (heatwaves, droughts and storms), is likely to result in considerable yield losses. The vegetation period is expected to begin earlier in spring, causing an increased risk of frost damage to vegetation, and to last longer into autumn, leading to a shorter period for groundwater recharge. The projected increase in temperature is also expected to have an impact on the life cycle of insects. Projections show that the number of dry periods, as well as the days within a dry period could increase. These factors, as well as the fact that Luxembourg has very little agricultural surface area using irrigation, could lead to significant impacts on the agriculture sector. Nevertheless, Luxembourg does not identify climate change as an imminent threat to national food security, as it is already a net importer of food.</p> <p><b>Adaptation:</b> Luxembourg’s adaptation measures include providing insurance for the agriculture sector; developing warning systems and forecasting models in the areas of agriculture, arboriculture and viticulture; implementing varietal trials of indigenous plants; monitoring diseases and pests in crops and indigenous plants; and developing a soil erosion map and measures to reduce tillage.</p>
Biodiversity and natural ecosystems	<p><b>Vulnerability:</b> Climate change will have an impact on many species, such as pollinating insects, and will weaken local populations and favour exotic species. The projected change in temperature and rainfall variations will affect wetlands and the phenology of plants and animals, including the migratory behaviour of birds and insects. Temperature changes will also have an impact on the biogeography of flora and fauna.</p> <p><b>Adaptation:</b> Luxembourg has integrated measures into its National Plan for the Protection of Nature (2017–2021) and its National Adaptation Strategy to Climate Change (2018–2023) to preserve and protect ecosystems and biodiversity. In addition, the River Basin Management Plan (2009–2015) included measures to re-establish river morphology and a natural river dynamic that should help to preserve and re-establish biological continuity.</p>
Forests	<p><b>Vulnerability:</b> The projected increase in temperature (by 1 to 2 °C in 2021–2050) will lead to more frequent and more increased stress conditions for forestry, with perennial forest trees most severely impacted. Prolonged periods of drought could also increase the risk of forest fires. The projected rise in temperature will lead to greater heat stress on plants, with a particular impact on young trees and thus on the natural rejuvenation of forests. The projected overall yearly temperature increases could lead to a decline in Luxembourg’s forest health owing to the increased risk of the outbreak of diseases and insect or parasite infestation. In addition, as higher temperatures will most likely lead to more extreme storm events in Europe, severe winds could cause considerable damage to forests in Luxembourg.</p> <p><b>Adaptation:</b> Forest certification has been carried out through the Forest Stewardship Council and the Programme for the Endorsement of Forest Certification, in addition to conservation and the use of wood as a renewable energy resource among other measures. Luxembourg also monitors the health of its forests and adopted the Forest Law on 12 July 2023, which establishes a legal framework for sustainable forest management. A regulation was also passed on 3 March 2022 providing subsidies to promote sustainable forest management among privately owned forests.</p>
Human health	<p><b>Vulnerability:</b> The predicted changes in Luxembourg’s climate such as temperature increase, heatwaves, drought and rainfall will have a significant direct and indirect impact on human health and could lead to health problems such as heat stress and the intensification of existing and spread of new infectious diseases. Climate change will also have a significant impact on the occurrence, intensity and frequency of heatwaves and will influence air quality. Temperature extremes will have a direct impact on human health, especially for the most vulnerable groups such as the elderly, young people, people with pre-existing illnesses and other marginalized groups.</p> <p><b>Adaptation:</b> To guarantee rapid containment in case of the pollution of drinking water and to inform the public of any such events, a crisis management group has been established.</p>

<i>Vulnerable area</i>	<i>Examples/comments/adaptation measures reported</i>
Infrastructure and economy	<p>Vulnerability: The projected increase in rainfall with increasing discharges in winter means that there could be an increase in the frequency of inundations. An increased flood frequency and intensity may affect human safety and human health and cause environmental, property and infrastructure damage, as well as a slowdown in economic activity.</p> <p>Adaptation: Luxembourg has carried out a preliminary flood risk assessment and has prepared flood hazard and risk maps. Luxembourg has a flood warning service operated by the Water Agency. The Agriculture Technical Services Administration of the Ministry of Agriculture, Food and Viticulture monitors the weather through its own network of stations and warns farmers of weather events, while the Luxembourg Institute of Science and Technology analyses rainfall. To improve flood risk management, the Government approved the second Flood Risk Management Plan (2021–2027).</p>
Water resources	<p>Vulnerability: Projections indicate that by the middle of the century, higher discharges are to be expected during the winter and lower discharges during the summer, while regional variations may occur. The estimated changes in the seasonal distribution of precipitation and discharges of river flows will have consequences on the quality of water treated by wastewater treatment plants. Increased heavy rainfall will also affect the discharge frequencies of the sewerage system.</p> <p>Adaptation: Luxembourg has established a hydroclimatic monitoring network to support the design of flood protection measures and river restoration projects. Other measures include riverbank restoration, water retention basins, water loss reduction, production water recycling, rainwater use and anti-erosion measures. To improve the treatment of wastewater and tackle future challenges, Luxembourg is undertaking feasibility and detailed studies on the effect of micropollutants and is planning to equip its main wastewater treatment plant with the necessary tools to deal with them.</p>

111. Luxembourg provided a detailed description of international adaptation activities, including the development of plans for water resources in the context of the International Commission for the Protection of the Rhine. In 2015, the Commission adopted a climate change adaptation strategy for the international river basin district of the Rhine. Luxembourg also participates in other regional commissions, including for the protection of the Moselle and the Saar rivers. Expert groups have been established within the river basin commissions and will continue to contribute to their work programmes for 2022–2027. Luxembourg also provided information on bilateral cooperation with developing countries on adaptation, such as support provided for technology transfer and capacity-building to Burkina Faso, Cabo Verde, the Lao People’s Democratic Republic, the Niger, Mali and Senegal, including in the areas of agriculture and water.

## 2. Assessment of adherence to the reporting guidelines

112. The ERT assessed the information reported in the NC8 of Luxembourg and identified an issue relating to transparency and thus adherence to the UNFCCC reporting guidelines on NCs. The finding is described in table I.4.

### I. Research and systematic observation

#### 1. Technical assessment of the reported information

113. In its NC8 Luxembourg provided information on its general policy and funding relating to research and systematic observation and both domestic and international activities, including contributions to GCOS and the IPCC. Luxembourg also provided information on the identification of opportunities for and barriers to free and open international exchange of data and information and on action taken to overcome such barriers.

114. Luxembourg has implemented international and domestic policies and programmes on climate change research, systematic observation and climate modelling that aim to advance capabilities to predict and observe the physical, chemical, biological and human components of the Earth’s system over space and time. In accordance with article 7 of Luxembourg’s Climate Law, the Climate Policy Observatory was established and the



Government nominated its members in October 2021. Its tasks include advising on projects, actions or measures that may have an impact on climate policy, scientifically evaluating measures taken or planned in the field of climate policy and analysing the effectiveness of implemented and planned measures and proposing new ones. The Observatory is also tasked with preparing an annual report for the Government on the implementation of climate policy, the first of which were published in 2022 and 2023, and proposing areas of research related to climate change. Studies in the field of climate change are also being undertaken by institutions such as the University of Luxembourg, the Luxembourg Institute of Science and Technology and the Luxembourg Institute of Socio-Economic Research, as well as by private research companies.

115. In terms of activities related to systematic observation, Luxembourg reported on national plans, programmes and support for ground- and space-based climate observing systems, including satellite and non-satellite climate observation. According to the NC8, 61 observation stations were in operation in Luxembourg at the end of 2022, including 36 meteorological stations operated by the Meteorology Department of the Administration of Technical Agricultural Services, 20 meteorological stations operated by the Water Agency, four stations operated by the Luxembourg Institute of Science and Technology and one station located at Luxembourg Airport operated by MeteoLux. The Water Agency also operates hydrometric monitoring stations, including 40 gauging stations, 14 precipitation stations, 10 air temperature stations, four meteorological stations and three groundwater monitoring stations. The data from those stations are used to support climate-monitoring applications and contribute to the analyses of the IPCC. The meteorological station at Luxembourg Airport is an integral part of GCOS and its Surface Network and has also been part of the Global Basic Observing Network since 1 January 2023. The Meteorology Department of the Administration of Technical Agricultural Services represents the Government of Luxembourg at the meetings of the World Meteorological Organization. The Water Agency provides flood forecasts for major watercourses in Luxembourg, including flood warnings for the general population, while MeteoLux provides high-quality data sets within the framework of the EU public sector information directive. Luxembourg contributes to space-based observations on weather, climate and environmental monitoring through its membership of the European Space Agency and the European Organisation for the Exploitation of Meteorological Satellites. Luxembourg is also a member of the European Centre for Medium-Range Weather Forecasts.

116. The NC8 reflects action taken to support capacity-building and the establishment and maintenance of observation systems and related data and monitoring systems in developing countries. Luxembourg provided funding for scientists from developing countries working on global climate change research. Since 2015, Luxembourg has contributed EUR 3 million to the Climate Risk and Early Warning Systems initiative and held the Presidency of its Governing Board from December 2018 to April 2021. In addition, MeteoLux has contributed a total of EUR 1.18 million to the European Centre for Medium-Range Weather Forecasts and the European Organisation for the Exploitation of Meteorological Satellites, which assist developing countries with space-based observations and forecasts.

## **2. Assessment of adherence to the reporting guidelines**

117. The ERT assessed the information reported in the NC8 of Luxembourg and identified issues relating to completeness and thus adherence to the UNFCCC reporting guidelines on NCs. The findings are described in table I.5.

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

### **1. Technical assessment of the reported information**

118. In its NC8 Luxembourg provided information on its actions relating to education, training and public awareness at the domestic and international level. The Party provided information on the general policy on education, training and public awareness; primary, secondary and higher education; public information campaigns; training programmes;

education materials; resource or information centres; the involvement of the public and non-governmental organizations; and its participation in international activities.

119. Luxembourg reported information on several activities related to increasing public awareness on climate change matters that have been carried out since the NC7. These include the annual climate fair (ClimateExpo), which is open to the general public (in 2021 and 2022, the fair included 40 exhibitions and the participation of representatives of municipalities); the permanent exhibition on climate change matters; publications on climate matters, such as CO<sub>2</sub>OL magazine; the climate pact for municipalities, through which all municipalities committed themselves to implementing measures from the catalogue of measures under the European Energy Award scheme; the climate pact for businesses, which was launched in 2023 to support companies in relation to decarbonization and energy transition; the national energy saving campaign launched by the Government in 2022; bicycle and mobility weeks; the free public transport scheme launched in 2020; and the promotion of car- and bicycle-sharing. In 2019, the Government launched a mobility app, which includes multimodal travel options (bus, tram, train, cycling, car-sharing and walking). Luxembourg also has a website dedicated to climate issues.<sup>11</sup>

120. Luxembourg provided detailed information on its activities for educating schoolchildren, university students and the general public on sustainable living and protecting the environment. The Party reported on numerous training activities related to climate change mitigation and adaptation, including on sustainable construction, safe and ecological cleaning, sustainable use of resources, safe handling of hazardous substances, energy saving in buildings, sustainable procurement, waste and the circular economy. These activities were organized by governmental entities, professional associations, non-governmental organizations, private sector enterprises, schools and municipalities. Luxembourg also reported information on the active involvement of civil society, including non-governmental organizations, in education, training and public awareness activities. In addition, the Party reported on higher education training programmes in Luxembourg that integrate matters related to the environment and climate change, such as a Master of Science in civil engineering with a component on megastructure engineering using sustainable resources; a Master of Architecture with courses on global environmental change in the Anthropocene and on international development, sustainability and policy coherence; a Master of Geography and Spatial Planning; and a Certificate in Sustainable Development and Social Innovation, which is a one-year certificate open to students at the Bachelor, Master or PhD level, as well as to professionals. Luxembourg also reported on an ongoing process that began in 2021 to reform the primary education curriculum, which led to the development of a white paper published in October 2023 that will guide the reform process in the coming years up until implementation of the new curriculum in 2026. The white paper contains a strong commitment to anchor education for sustainable development in the school curriculum.

## **2. Assessment of adherence to the reporting guidelines**

121. The ERT assessed the information reported in the NC8 of Luxembourg and recognized that the reporting is complete and transparent, and thus adheres to the UNFCCC reporting guidelines on NCs. No issues relating to the topics discussed in this chapter of the review report were raised during the review.

## **III. Conclusions and recommendations**

122. The ERT conducted a technical review of the information reported in the NC8 of Luxembourg in accordance with the UNFCCC reporting guidelines on NCs. The ERT concluded that the reported information mostly adheres to the UNFCCC reporting guidelines on NCs and that the NC8 provides an overview of the national climate policy of Luxembourg.

123. The information provided in the NC8 includes most of the elements of the supplementary information under Article 7, paragraph 2, of the Kyoto Protocol. Luxembourg reported on the national system, the national registry, supplementarity relating to the

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<sup>11</sup> <https://klima.lu/>.

mechanisms pursuant to Articles 6, 12 and 17 of the Kyoto Protocol, PaMs in accordance with Article 2 of the Kyoto Protocol, domestic and regional programmes and/or legislative arrangements and enforcement and administrative procedures, information under Article 10 of the Kyoto Protocol, and financial resources provided to developing country Parties. Supplementary information under Article 7, paragraph 1, of the Kyoto Protocol on the minimization of adverse impacts in accordance with Article 3, paragraph 14, of the Kyoto Protocol was provided by Luxembourg in its 2022 annual submission.

124. The ERT conducted a technical review of the information reported in the BR5 and BR5 CTF tables of Luxembourg in accordance with the UNFCCC reporting guidelines on BRs. The ERT concluded that the reported information mostly adheres to the UNFCCC reporting guidelines on BRs and that the BR5 and its CTF tables provide an overview of emissions and removals related to the Party's quantified economy-wide emission reduction target; assumptions, conditions and methodologies related to the attainment of the target; the progress of Luxembourg towards achieving its target; and the Party's provision of support to developing country Parties.

125. In its NC8 Luxembourg reported on its key national circumstances related to GHG emissions and removals, including developments in three areas that have had an impact on the overall GHG emission trend. The first area relates to the types of energy used to produce and consume fuels, while the second area relates to structural changes in the energy and industry sectors, which were mainly caused by the shift from blast furnaces to electric arc furnaces in the iron and steel industry between 1994 and 1998. Since 2005, emissions from the iron and steel industry, including non-metallic industries, have decreased by more than 20 per cent owing to the replacement of a flat glass production unit with a more efficient technology. The third area relates to sales of fuel for road transportation. Road transportation attributable to fuel sales to non-residents grew by 94.8 per cent in 1990–2021, while that related to the national vehicle fleet increased by 76.6 per cent.

126. Luxembourg's total GHG emissions excluding LULUCF in 2021 were estimated to be 26.2 per cent below its 1990 level, using GWP values from the AR5. Emissions peaked in 1991, fluctuated until 2006 and gradually decreased thereafter. The changes in total emissions were driven mainly by factors such as technology changes in the iron and steel industry, the closure of the fossil-based power generation plant and increased sales of road fuels, as well as external factors such as the global financial and economic crisis and the coronavirus disease 2019 pandemic in 2020.

127. As reported in the BR5, under the Convention Luxembourg committed to contributing to the achievement of the joint EU quantified economy-wide target of a 20 per cent reduction in emissions below the 1990 level by 2020. The target covered all sectors and CO<sub>2</sub>, CH<sub>4</sub>, N<sub>2</sub>O, HFCs, PFCs and SF<sub>6</sub>, expressed using GWP values from the AR4. Emissions and removals from the LULUCF sector were not included. Under the ESD Luxembourg had a target of reducing its emissions by 20 per cent below the 2005 level by 2020.

128. The EU has a joint 2030 emission reduction target of at least 55 per cent below the 1990 level. This will be primarily implemented through the EU ETS and ESR, which have targets to reduce emissions by 2030 by 62 and 40 per cent respectively compared with the 2005 level. Luxembourg submitted its LT-LEDS in 2021. The Party, under its Climate Law, is committed to achieving climate neutrality by 2050, and the LT-LEDS provides key actions and strategies for a successful transition. The Party's more ambitious target of a 55 per cent reduction in emissions below the 2005 level by 2030 demonstrates its commitment to achieving climate neutrality by 2050.

129. The ERT noted that the total GHG emissions of the EU excluding LULUCF do not exceed the emission level corresponding to the target in 2020, and thus that the EU has achieved its joint target. The ERT therefore concluded that Luxembourg has met its 2020 commitment under the Convention through its contribution to achieving the joint target of the EU. See the report on the technical review of the BR5 of the EU for further details. The ERT noted that the Party met its 2020 ESD target because its ESD emissions in 2020 did not exceed its AEA for 2020.

130. The GHG emission projections provided by Luxembourg in its NC8 and BR5 correspond to the WEM and WAM scenarios. Under the WEM scenario, emissions in 2030

are projected to be 38.8 per cent below the 1990 level and 11.7 per cent below the 2020 level. Under the WAM scenario, emissions in 2030 are projected to be 56.8 per cent below the 1990 level and 39.1 per cent below the 2020 level.

131. Luxembourg's main policy framework relating to energy and climate change is the NECP. The Party described the mitigation actions that it has implemented to help it achieve its 2020 and longer-term targets. Luxembourg's 2023 draft NECP update for 2021–2030 sets out new and modified mitigation actions to help achieve its medium- and long-term emission reduction targets. The Party's PaMs include improved energy efficiency standards (heating and cooling) for existing and new residential, industrial and commercial buildings, which are to be implemented through close cooperation with municipalities, businesses, civil society and others. Several PaMs provide a road map for increasing the share of renewable sources in the energy mix for heating and cooling systems in the buildings, transport and industry sectors. The Party has also established market incentive instruments (e.g. a CO<sub>2</sub> tax) to facilitate the transition away from fossil fuels and towards investments in the generation of renewable sources (e.g. biogas).

132. Luxembourg continued to provide climate financing to developing countries in line with its climate finance programmes such as the ICF programme. It has increased its contributions by 30.9 per cent since the BR4; its public financial support in 2019–2020 totalled USD 128.39 million. For those years, Luxembourg provided more support for cross-cutting measures that targeted both mitigation and adaptation. The biggest share of support went to projects and programmes in the energy and agriculture sectors and cross-cutting projects. An example of this support is the project providing support for capacity-building and technology development and transfer entitled Energy Efficient Lighting Nationally Appropriate Mitigation Action Pilot in Hue City carried out from 2018 to 2022 in Viet Nam.

133. Luxembourg continued to provide support for technology development and transfer and capacity-building. Priority for technological support was given to projects and programmes in mitigation and adaptation in countries such as Cabo Verde, Senegal and Vanuatu. Over time, the focus has remained the same. Priority for capacity-building support was given to projects and programmes in mitigation and adaptation in Burkina Faso, Cabo Verde, Mali, Myanmar, Senegal and Viet Nam. Over time, the focus has remained the same.

134. In its NC8 Luxembourg provided information on the expected impacts of climate change in the country; the adaptation policies covering regional, sectoral and cross-sectoral vulnerabilities and considerations; and an outline of the action taken to implement Article 4, paragraph 1(b) and (e), of the Convention with regard to adaptation. The Party has made significant progress in addressing adaptation through the development and adoption of a revised and more comprehensive National Adaptation Strategy to Climate Change (2018–2023).

135. In its NC8 Luxembourg provided information on its activities relating to research and systematic observation. Luxembourg carried out climate change research activities that informed the projected estimates of temperature increase, changes in precipitation and other changes related to climate change and has comprehensively identified national impacts and vulnerabilities. Luxembourg participates in the activities of GCOS and the Global Basic Observing Network at the national and international level and contributes to the analyses of the IPCC.

136. In its NC8 Luxembourg provided information on its actions relating to education, training and public awareness. These include awareness-raising activities on climate change matters such as the annual climate fair, campaigns on energy saving and sustainable mobility and publications such as CO<sub>2</sub>OL magazine, as well as the climate pact for municipalities and the climate pact for businesses. The promotion of sustainability is prioritized in public awareness-raising campaigns, which are organized by a broad range of actors, including government entities, professional associations, non-governmental organizations, private sector enterprises, municipalities and schools. The Party also reported on higher education training programmes that integrate matters related to the environment and climate change.

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

(a) To improve the completeness of its reporting by providing information on the estimated effects of its mitigation actions and by providing year of implementation and gases affected for all mitigation actions (see issue 1 in table I.1);

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

138. In the course of the review of Luxembourg’s NC8, the ERT formulated the following recommendations relating to adherence to the reporting guidelines for supplementary information:

(a) To improve the completeness of its reporting by providing the name and contact details of the national entity with overall responsibility for compiling the national inventory (see issue 1 in table I.6);

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

(i) Providing information on the domestic and regional legislative arrangements and enforcement and administrative procedures established pursuant to the implementation of the Kyoto Protocol (see issue 2 in table I.6);

(ii) Providing an explanation of how the implementation of activities under Article 3, paragraph 3, of the Kyoto Protocol also contributes to the conservation of biodiversity and the sustainable use of natural resources (see issue 3 in table I.6).

139. In the course of the review of Luxembourg’s BR5, the ERT formulated the following recommendations relating to adherence to the UNFCCC reporting guidelines on BRs:

(a) To improve the completeness of its reporting by providing information on the estimated effects of its mitigation actions and by providing year of implementation and gases affected for all mitigation actions (see issue 2 in table II.1);

(b) To improve the timeliness of its reporting (see para. 8 above).

## Annex I

### Assessment of adherence to the reporting guidelines for the eighth national communication of Luxembourg

Tables I.1–I.6 summarize the ERT assessment of adherence to the UNFCCC reporting guidelines on NCs for Luxembourg’s NC8.

Table I.1

#### Findings on policies and measures from the review of the eighth national communication of Luxembourg

No.	<i>Reporting requirement, issue type and assessment</i>	<i>Description of the finding with recommendation or encouragement</i>
1	Reporting requirement specified in paragraph 19  Issue type: completeness  Assessment: recommendation	<p>The ERT noted that Luxembourg reported in its NC8 the mitigation impact for the majority of its mitigation actions as “NE”. In its NC8 the Party explained that, in order to improve the transparency and completeness of the reporting on PaMs, the list of PaMs was completely revised for the draft NECP update. The Party also reported that, owing to its limited human resources, it was not able to calculate estimates of the mitigation effect of each individual policy or measure. The ERT also noted that the year of implementation and information on gases covered is missing for some PaMs.</p> <p>During the review, the Party provided information on the estimated mitigation impact for some groups of PaMs, as well as for some individual PaMs. The Party clarified that quantitative estimates are not applicable to some PaMs (e.g. PaMs on training activities) and that the estimated mitigation effect of some PaMs is interlinked and could be affected by the implementation of other PaMs and, therefore, cannot be evaluated for each individual policy or measure. The Party also explained that the interlinkages between some PaMs was considered when compiling the projections of GHG emissions and removals, the results of which were presented in NC8 table IV.4-10, which shows the aggregated effect of PaMs by sector. Furthermore, the Party provided the missing information, that is year of implementation and gases affected.</p> <p>The ERT recommends that Luxembourg improve the completeness of its reporting by providing information on the estimated effects of its mitigation actions. The ERT notes that the Party could improve transparency by including in its next NC the information provided to the ERT during the review, namely by explaining whether some of the PaMs do not have a quantifiable mitigation impact (or the impact can be quantified, but with a very high level of uncertainty). The ERT also notes that the Party could group the PaMs resulting in emission reductions that are interlinked with other PaMs and present the estimated mitigation effect for the group of PaMs, specifying which individual PaMs are included. The ERT also recommends that the Party report year of implementation and gases affected for all mitigation actions.</p>
2	Reporting requirement specified in paragraph 21  Issue type: completeness  Assessment: encouragement	<p>Luxembourg did not report information on the costs of PaMs, the non-GHG benefits of PaMs or how PaMs interact with each other at the national level.</p> <p>During the review, Luxembourg clarified that as this information is not currently available, it prioritized the limited resources available for the NECP update, which is due to be finalized by the end of June 2024. At the EU level, the EU governance regulation requires the reporting of ex ante impacts of PaMs, while the reporting of ex post impacts and costs are optional; the Party therefore did not prioritize the reporting of this information. However, Luxembourg stressed that it intends to improve its monitoring and evaluation activities once the appropriate resources are available.</p> <p>The ERT reiterates the encouragement from the previous review report for Luxembourg to report in its next submission information on the costs of PaMs, the non-GHG benefits of PaMs and how PaMs interact with each other at the national level. Top of Form.</p>

*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 and transparent, and thus adheres to the UNFCCC reporting guidelines on NCs.

Table I.2

**Findings on projections including aggregate effects of policies and measures reported in the eighth national communication of Luxembourg**

<i>No.</i>	<i>Reporting requirement, issue type and assessment</i>	<i>Description of the finding with recommendation or encouragement</i>
1	Reporting requirement specified in paragraph 32 Issue type: completeness Assessment: encouragement	The Party did not report emission projections for indirect GHGs in its NC8. During the review, Luxembourg explained that projections for indirect GHGs such as nitrogen oxides, sulfur oxides, carbon monoxide and non-methane volatile organic compounds will be reported in the future, as the preparation of these projections has recently been streamlined with preparation of the GHG emission projections by using the same AD, where applicable. The ERT reiterates the encouragement from the previous review report for Luxembourg to improve the completeness of its reporting by providing projections of indirect GHGs.
2	Reporting requirement specified in paragraph 40 Issue type: transparency Assessment: encouragement	The Party provided comprehensive information in its NC8 on the methods used for preparing the projections; however, the ERT noted that the weaknesses of those methods were not reported. During the review, Luxembourg provided information on the weaknesses and limitations of the methods used for the projections. For example, the Party explained that the lack of data limits the level of detail used in the modelling and that a measure on the development of statistics, models and indicators has been included in the draft NECP update to address this issue. Luxembourg also provided supporting information on the limitations and uncertainties of the projection models. The ERT encourages the Party to report in its next submission on the weaknesses of the projection models used.

*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 and transparent, and thus adheres to the UNFCCC reporting guidelines on NCs.

Table I.3

**Findings on financial, technological and capacity-building support from the review of the eighth national communication of Luxembourg**

<i>No.</i>	<i>Reporting requirement, issue type and assessment</i>	<i>Description of the finding with recommendation or encouragement</i>
1	Reporting requirement specified in paragraph 55 Issue type: transparency Assessment: encouragement	The Party reported in its NC8 that it is not able to report information on private financial flows leveraged by bilateral climate finance towards mitigation and adaptation activities in non-Annex I Parties, although it mentioned that it provides financial support through ICF, as well as through the Government’s annual budget, in order to attract private sector investment by providing first loss guarantees through initiatives such as the Luxembourg–European Investment Bank Climate Finance Platform and the Forestry and Climate Change Fund. The Party also helps innovative funds and asset managers to set up climate-related funds by providing support grants, including through its International Climate Finance Accelerator and Restoration Seed Capital Facility. During the review, Luxembourg explained its strategic approach to leveraging private financial flows within the ICF framework. The selection process for ICF-supported activities includes evaluating the potential to mobilize private sector funding, focusing on the clarity of the objectives, the expected financial mobilization and the strength of the causal relationship between ICF initiatives and private finance. The Ministry of the Environment, Climate and Biodiversity requires clear objectives and relevant key performance indicators for monitoring and reporting, with a specific emphasis on additionality and direct or indirect leverage of private finance. The evaluation conducted by the Ministry of the Environment, Climate and Biodiversity also assesses the proportion of private finance in total project funding and the role of other donors. Certain ICF funds indirectly support activities that foster a regulatory and policy environment conducive to private finance. However, challenges remain in establishing clear causal links and in ensuring the completeness and consistency of monitoring data, resulting in the Party’s cautious approach to reporting on this area to the UNFCCC. The ERT encourages Luxembourg to improve the transparency of its reporting in its next submission by providing, to the extent possible, information on private financial

No.	Reporting requirement, issue type and assessment	Description of the finding with recommendation or encouragement
		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 NCs. The reporting on the requirements not included in this table is considered to be complete and transparent, and thus adheres to the UNFCCC reporting guidelines on NCs.

Table I.4  
**Findings on vulnerability assessment, climate change impacts and adaptation measures from the review of the eighth national communication of Luxembourg**

No.	Reporting requirement, issue type and assessment	Description of the finding with recommendation or encouragement
1	Reporting requirement specified in paragraph 47  Issue type: completeness and transparency  Assessment: encouragement	<p>Luxembourg did not use the reporting structure suggested in paragraph 47 of the UNFCCC reporting guidelines on NCs for reporting: (1) climate modelling, projections and scenarios; (2) an assessment of risks and vulnerability to climate change; (3) climate change impacts; (4) domestic adaptation policies and strategies; (5) the monitoring and evaluation framework; and (6) progress and outcomes of adaptation action. In addition, the Party did not report information on climate modelling, projections and scenarios, or on the approaches used for monitoring and evaluating implemented adaptation strategies or plans.</p> <p>During the review, Luxembourg explained that the information on climate modelling, projections and scenarios is based on a project developing high-resolution climate change projections for Luxembourg (the ‘CHAPEL’ project) of the Luxembourg Institute of Science and Technology, in particular on chapter 2.1 (on simulation workflow and numerical model set-up) of the 2023 annual report on the project. In addition, Luxembourg explained that no assessment or evaluation of the National Adaptation Strategy to Climate Change or the NAP has been published to date and that the related monitoring indicators have not yet been defined. Further, it indicated that owing to limited staff resources, it used the same reporting structure as for the NC7 and did not realize that the UNFCCC reporting guidelines on NCs include a specific reporting structure for this part of the NC.</p> <p>The ERT encourages Luxembourg to use the reporting structure set out in paragraph 47 of the UNFCCC reporting guidelines on NCs in its next NC and to report information on climate modelling, projections and scenarios and on the approaches used for monitoring and evaluating implemented adaptation strategies or plans.</p>

*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 and transparent, and thus adheres to the UNFCCC reporting guidelines on NCs.

Table I.5  
**Findings on research and systematic observation from the review of the eighth national communication of Luxembourg**

No.	Reporting requirement, issue type and assessment	Description of the finding with recommendation or encouragement
1	Reporting requirement specified in paragraph 66  Issue type: completeness  Assessment: encouragement	<p>The Party did not report information in its NC8 on highlights and efforts with regard to socioeconomic analysis, including analysis of the impacts of climate change and response options, or on research and development of mitigation and adaptation technologies.</p> <p>During the review, Luxembourg explained that the national Climate Law established the Climate Policy Observatory, which has been operational since 2021 and is tasked with providing advice on projects, actions or measures that may have an impact on climate policy, scientifically evaluating existing or planned measures in the field of climate policy and analysing their effectiveness, and proposing new measures (NC8 section VIII.2.1 and figure IV.2-2). In addition, the Party explained that ongoing research is being conducted by the Luxembourg Institute of Socio-Economic Research on the socioeconomic analysis of climate change impacts, but no results of this analysis have been made available to date.</p> <p>The ERT reiterates the encouragement from the previous review report for Luxembourg to include information in its next NC on highlights and efforts with regard to</p>



No.	<i>Reporting requirement, issue type and assessment</i>	<i>Description of the finding with recommendation or encouragement</i>
		socioeconomic analysis, including analysis of the impacts of climate change and response options, and on research and development of mitigation and adaptation technologies.
2	Reporting requirement specified in paragraph 67 Issue type: completeness Assessment: encouragement	<p>The Party did not report information in its NC8 on the current status of plans and programmes for ground- and space-based climate observing systems or on the exchange and archiving of data in the area of support for developing countries to establish and maintain observing systems and related data and monitoring systems.</p> <p>During the review, Luxembourg explained that the contribution of MeteoLux to research includes the contribution of EUR 1.18 million to the European Centre for Medium-Range Weather Forecasts and the European Organisation for the Exploitation of Meteorological Satellites, which assist developing countries with space-based observations and forecasts. In addition, Luxembourg is one of the funding partners of the Climate Risk and Early Warning Systems initiative.</p> <p>The ERT reiterates the encouragement from the previous review report for Luxembourg to include in its next NC information on the current status of plans and programmes for ground- and space-based climate observing systems and on the exchange and archiving of data in the area of support provided for developing countries to establish and maintain observing systems and related data and monitoring systems.</p>

*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 and transparent, and thus adheres to the UNFCCC reporting guidelines on NCs.

Table I.6

**Findings on minimization of adverse impacts and supplementary information related to the Kyoto Protocol reported in the eighth national communication of Luxembourg**

No.	<i>Reporting requirement, issue type and assessment</i>	<i>Description of the finding with recommendation</i>
1	Reporting requirement specified in paragraph 30 Issue type: completeness Assessment: recommendation	<p>Luxembourg did not provide the name and contact details of the national entity with overall responsibility for the national inventory. This information was, however, provided for the national registry.</p> <p>During the review, the Party indicated that the contact details for the national GHG inventory system are provided in its NIR.</p> <p>The ERT recommends that the Party include in its next NC the name and contact details of the national entity with overall responsibility for compiling the national inventory.</p> <p>The ERT concludes that this potential problem of a mandatory nature does not influence the Party’s ability to fulfil its commitments for the second commitment period of the Kyoto Protocol.</p>
2	Reporting requirement specified in paragraph 37 Issue type: transparency Assessment: recommendation	<p>The Party has arrangements and enforcement procedures to meet its commitments under the Kyoto Protocol, including procedures for addressing non-compliance. However, this information was not transparently reported in the NC8.</p> <p>During the review, Luxembourg clarified that the national Climate Law, which establishes targets for 2030 and pathways for 2021–2030, was designed to ensure that local action is taken against domestic non-compliance with emission reduction targets.</p> <p>The ERT reiterates the recommendation from the previous review report for Luxembourg to enhance the transparency of its reporting by providing information on the domestic and regional legislative arrangements and enforcement and administrative procedures established pursuant to the implementation of the Kyoto Protocol.</p> <p>The ERT concludes that this potential problem of a mandatory nature does not influence the Party’s ability to fulfil its commitments for the second commitment period of the Kyoto Protocol.</p>

No.	<i>Reporting requirement, issue type and assessment</i>	<i>Description of the finding with recommendation</i>
3	<p>Reporting requirement specified in paragraph 38</p> <p>Issue type: transparency</p> <p>Assessment: recommendation</p>	<p>Luxembourg did not report how its implementation of activities under Article 3, paragraph 3, of the Kyoto Protocol also contributes to the conservation of biodiversity and the sustainable use of natural resources.</p> <p>During the review, the Party clarified that most of the measures listed under the LULUCF sector in the NC8 contribute to the conservation and sustainable use of natural resources and indicated that examples were provided in the NC8, such as wastewater management, support for conversion to and maintenance of organic farming, protection of the total forest area, creation of strictly protected areas in public forests with limited timber harvesting, conservation of high biodiversity trees and deadwood in productive forests and limitations on timber harvesting in fragile natural ecosystems of public forests. The ERT noted that even though this information is included in the NC8, it is not documented in a manner that demonstrates that it satisfies the requirements of this reporting provision. However, the explanation provided by the Party during the review helped to link the relevant information in the NC8 to the reporting provision.</p> <p>The ERT reiterates the recommendation from the previous review report for the Party to explain how the implementation of activities under Article 3, paragraph 3, of the Kyoto Protocol also contributes to the conservation of biodiversity and the sustainable use of natural resources.</p> <p>The ERT concludes that this potential problem of a mandatory nature does not influence the Party’s ability to fulfil its commitments for the second commitment period of the Kyoto Protocol.</p>

*Note:* Item listed under reporting requirement refers to the relevant paragraph of the reporting guidelines for supplementary information. The reporting on the requirements not included in this table is considered to be complete and transparent, and thus adheres to the reporting guidelines for supplementary information.

## Annex II

### Assessment of adherence to the reporting guidelines for the fifth biennial report of Luxembourg

The BR5 of Luxembourg is the final BR under the measurement, reporting and verification system established under the Convention.<sup>1</sup> Nevertheless, ERTs continue to provide recommendations and encouragements to the Parties on completeness, transparency and adherence to the UNFCCC reporting guidelines on BRs. Parties may find these recommendations and encouragements relevant, as appropriate, when preparing their initial biennial transparency report under the enhanced transparency framework of the Paris Agreement. Tables II.1–II.3 summarize the ERT assessment of adherence to the UNFCCC reporting guidelines on BRs for Luxembourg’s BR5.

Table II.1

#### Findings on mitigation actions and their effects from the review of the fifth biennial report of Luxembourg

No.	<i>Reporting requirement and issue type</i>	<i>Description of the finding with recommendation or encouragement</i>
1	Reporting requirement specified in paragraph 8 Issue type: transparency Assessment: encouragement	<p>The ERT noted that the information provided in the BR5 on how the Party minimizes the economic and social consequences of response measures does not clarify the method used by Luxembourg to assess such consequences. The Party indicated that owing to its size, it is unlikely that its policy choices will have adverse economic and social consequences.</p> <p>During the review, the Party clarified that it does not assess the economic and social consequences of response measures using quantitative methods because it considers that its contributions to international climate efforts will not have a negative impact on other countries. The Party considers that the reduction in its GHG emissions will contribute to limiting severe climate change in all countries worldwide. The ERT is of the view that the explanation provided by the Party during the review helps to clarify the method used to assess how it minimizes the economic and social consequences of response measures and noted that including such information will enhance the transparency of its submission.</p> <p>The ERT encourages the Party to clearly report in its next submission the method used for assessing how it minimizes the economic and social consequences of response measures.</p>
2	Reporting requirement specified in CTF table 3 Issue type: completeness Assessment: recommendation	<p>In CTF table 3, Luxembourg reported the mitigation impact for the majority of its mitigation actions as “NE”. In its NC8, which is referenced in the BR5, the Party reported that, in order to improve the transparency and completeness of the reporting on PaMs, the list of PaMs was completely revised for the draft NECP update. The Party also reported that, owing to its limited human resources, it was not able to calculate estimates of the mitigation effect of each individual policy or measure. The ERT noted that the year of implementation and information on gases covered is missing for some PaMs.</p> <p>During the review, the Party provided information on the estimated mitigation impact for some groups of PaMs, as well as for some individual PaMs. The Party also clarified that quantitative estimates are not applicable to some PaMs (e.g. PaMs on training activities) and that the estimated mitigation effect of some PaMs is interlinked and could be affected by the implementation of other PaMs and, therefore, cannot be evaluated for each individual policy or measure. Furthermore, the Party explained that the interlinkages between some PaMs was considered when compiling the projections of GHG emissions and removals, the results of which were presented in NC8 table IV.4-10, which shows the aggregated effect of PaMs by sector.</p>

<sup>1</sup> The Conference of the Parties, by decision 1/CP.24, decided that the final BRs shall be those submitted to the secretariat no later than 31 December 2022 and reaffirmed that, for Parties to the Paris Agreement, following the submission of the final BR, the modalities, procedures and guidelines contained in the annex to decision 18/CMA.1 will supersede the measurement, reporting and verification system established under decision 1/CP.16, paras. 40–47 and 60–64, and decision 2/CP.17, paras. 12–62.

<i>No.</i>	<i>Reporting requirement and issue type</i>	<i>Description of the finding with recommendation or encouragement</i>
3	Reporting requirement specified in paragraph 24 Issue type: transparency Assessment: encouragement	<p>During the review, the Party provided the missing information, that is year of implementation and gases affected.</p> <p>The ERT recommends that Luxembourg improve the completeness of its reporting by providing information on the estimated effects of its mitigation actions. The ERT notes that the Party could improve transparency by including in its next submission the information provided to the ERT during the review, namely by explaining whether some of the PaMs do not have a quantifiable mitigation impact (or the impact can be quantified, but with a very high level of uncertainty). The ERT also notes that the Party could group the PaMs resulting in emission reductions that are interlinked with other PaMs and present the estimated mitigation effect for the group of PaMs, specifying which individual PaMs are included. The ERT also recommends that the Party report year of implementation and gases affected for all PaMs.</p> <p>The ERT noted the information provided in the BR5 on the domestic arrangements established for the self-assessment of compliance with emission reductions. The Party indicated that in order to ensure that local action is taken against domestic non-compliance with emission reduction targets, the national Climate Law establishes provisions for progressive and binding emission targets for five sectors, but did not clarify the respective sectors. The ERT further noted that the Party did not specify which parts of its domestic climate policy and governance arrangements address the issue of self-assessment of compliance with emission reductions.</p> <p>During the review, the Party clarified that the five sectors referred to in the BR5 are the sectors under the Climate Law for which 2030 targets and pathways for 2021–2030 have been established and, further, acknowledged that its description of domestic climate policy and governance arrangements does not transparently explain how the issue of self-assessment of compliance with emission reductions is addressed. The ERT noted that the explanation provided by the Party during the review enhances the transparency of the submission.</p> <p>The ERT encourages the Party to clearly document the sectors to which the provisions for self-assessment of compliance with emission reductions apply, including an explanation of how its domestic climate policy and governance arrangements address the issue of self-assessment of compliance with emission reductions.</p>

*Note:* Item listed under reporting requirement refers to the relevant paragraph of the UNFCCC reporting guidelines on BRs or to the CTF table number from the “Common tabular format for ‘UNFCCC biennial reporting guidelines for developed country Parties’”. The reporting on the requirements not included in this table is considered to be complete and transparent, and thus adheres to the UNFCCC reporting guidelines on BRs.

Table II.2

**Findings on projections reported in the fifth biennial report of Luxembourg**

<i>No.</i>	<i>Reporting requirement and issue type</i>	<i>Description of the finding with recommendation or encouragement</i>
1	Reporting requirement specified in paragraph 32 Issue type: transparency Assessment: encouragement	<p>The Party did not report emission projections for indirect GHGs in its BR5.</p> <p>During the review, Luxembourg explained that projections for indirect GHGs such as nitrogen oxides, sulfur oxides, carbon monoxide and non-methane volatile organic compounds will be reported in the future, as the preparation of these projections has recently been streamlined with preparation of the GHG emission projections by using the same AD, where applicable.</p> <p>The ERT reiterates the encouragement from the previous review report for Luxembourg to improve the completeness of its reporting by providing projections of indirect GHGs.</p>
2	Reporting requirement specified in paragraph 40 Issue type: transparency Assessment: encouragement	<p>The Party provided comprehensive information in its BR5 on the methods used for preparing the projections; however, the ERT noted that the weaknesses of those methods were not reported.</p> <p>During the review, Luxembourg provided information on the weaknesses and limitations of the methods used for the projections. For example, the Party explained that the lack of data limits the level of detail used in the modelling and that a measure on the development of statistics, models and indicators has been included in the draft NECP update to address this issue. Luxembourg also provided supporting information on the limitations and uncertainties of the projection models.</p>

No.	Reporting requirement and issue type	Description of the finding with recommendation or encouragement
		The ERT encourages the Party to report in its next submission on the weaknesses of the projection models used.

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

Table II.3

**Findings on provision of financial, technological and capacity-building support to developing country Parties from the review of the fifth biennial report of Luxembourg**

No.	Reporting requirement and issue type	Description of the finding with recommendation or encouragement
1	Reporting requirement specified in paragraph 19 Issue type: transparency Assessment: encouragement	<p>The Party reported in its BR5 that it is not able to report information on private financial flows leveraged by bilateral climate finance towards mitigation and adaptation activities in non-Annex I Parties, although it mentioned that it provides financial support through ICF, as well as through the Government’s annual budget, in order to attract private sector investment by providing first loss guarantees through initiatives such as the Luxembourg–European Investment Bank Climate Finance Platform and the Forestry and Climate Change Fund. The Party also helps innovative funds and asset managers to set up climate-related funds by providing support grants, including through its International Climate Finance Accelerator and Restoration Seed Capital Facility.</p> <p>During the review, Luxembourg explained its strategic approach to leveraging private financial flows within the ICF framework. The selection process for ICF-supported activities includes evaluating the potential to mobilize private sector funding, focusing on the clarity of the objectives, the expected financial mobilization and the strength of the causal relationship between ICF initiatives and private finance. The Ministry of the Environment, Climate and Biodiversity requires clear objectives and relevant key performance indicators for monitoring and reporting, with a specific emphasis on additionality and direct or indirect leverage of private finance. The evaluation conducted by the Ministry of the Environment, Climate and Biodiversity also assesses the proportion of private finance in total project funding and the role of other donors. Certain ICF funds indirectly support activities that foster a regulatory and policy environment conducive to private finance. However, challenges remain in establishing clear causal links and in ensuring the completeness and consistency of monitoring data, resulting in the Party’s cautious approach to reporting on this area to the UNFCCC.</p> <p>The ERT encourages Luxembourg to improve the transparency of its reporting in its next submission by providing, to the extent possible, information on private financial flows leveraged by bilateral climate finance towards mitigation and adaptation activities in non-Annex I Parties.</p>

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

## Annex III

### Documents and information used during the review

#### A. Reference documents

2022 GHG inventory submission of Luxembourg.

Available at <https://unfccc.int/ghg-inventories-annex-i-parties/2022>.

2023 GHG inventory submission of Luxembourg.

Available at <https://unfccc.int/ghg-inventories-annex-i-parties/2023>.

BR4 CTF tables of Luxembourg. Available at <https://unfccc.int/BR4>.

BR4 of Luxembourg. Available at <https://unfccc.int/BR4>.

BR5 CTF tables of Luxembourg. Available at <https://unfccc.int/BR5>.

BR5 of Luxembourg. Available at <https://unfccc.int/BR5>.

BR5 of the EU. Available at <https://unfccc.int/BR5>.

“Common tabular format for ‘UNFCCC biennial reporting guidelines for developed country Parties’”. Annex to decision 19/CP.18. Available at

<https://unfccc.int/resource/docs/2012/cop18/eng/08a03.pdf>.

“Compilation of economy-wide emission reduction targets to be implemented by Parties included in Annex I to the Convention”. FCCC/SBSTA/2014/INF.6. Available at

<http://unfccc.int/resource/docs/2014/sbsta/eng/inf06.pdf>.

European Green Deal. European Commission document COM(2019) 640 final. Available at [https://ec.europa.eu/info/files/communication-european-green-deal\\_en](https://ec.europa.eu/info/files/communication-european-green-deal_en).

“Guidelines for the preparation of national communications by Parties included in Annex I to the Convention, Part II: UNFCCC reporting guidelines on national communications”.

FCCC/CP/2019/13/Add.1. Available at <https://unfccc.int/documents/210471>.

“Guidelines for the preparation of the information required under Article 7 of the Kyoto Protocol”. Annex to 15/CMP.1. Available at <https://unfccc.int/documents/4253>.

“Guidelines for the preparation of the information required under Article 7 of the Kyoto Protocol”. Annex III to decision 3/CMP.11. Available at <https://unfccc.int/documents/9101>.

“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>.

NC8 of Luxembourg. Available at <https://unfccc.int/NC8>.

NC8 of the EU. Available at <https://unfccc.int/NC8>.

NECP of Luxembourg. Available at [https://energy.ec.europa.eu/system/files/2020-07/lu\\_final\\_necp\\_main\\_en\\_0.pdf](https://energy.ec.europa.eu/system/files/2020-07/lu_final_necp_main_en_0.pdf).

Report on the individual review of the annual submission of Luxembourg submitted in 2022. FCCC/ARR/2022/LUX. Available at <https://unfccc.int/documents/627599>.

Report on the technical review of the BR4 of Luxembourg. FCCC/TRR.4/LUX. Available at <https://unfccc.int/documents/274686>.

Report on the technical review of the NC8 and the technical review of the BR5 of the EU. FCCC/IDR.8/EU–FCCC/TRR.5/EU. Available at <https://unfccc.int/documents/630393>.

“UNFCCC biennial reporting guidelines for developed country Parties”. Annex I to decision 2/CP.17. Available at <http://unfccc.int/resource/docs/2011/cop17/eng/09a01.pdf>.

## B. Additional information provided by the Party

Responses to questions during the review were received from Eric De Brabanter (Ministry of the Environment, Climate and Biodiversity of Luxembourg), including additional material. The following references were provided by Luxembourg and may not conform to UNFCCC editorial style as some have been reproduced as received:

American Meteorological Society. In *Hydrometric Station*. Accessed April 18, 2024. [https://glossary.ametsoc.org/wiki/Hydrometric\\_station?\\_cf\\_chl\\_tk=YWy40sRy3owXkn9RkaGw6FYWUyZXelcJgmKmsaqF9ss-1713446163-0.0.1.1-1621](https://glossary.ametsoc.org/wiki/Hydrometric_station?_cf_chl_tk=YWy40sRy3owXkn9RkaGw6FYWUyZXelcJgmKmsaqF9ss-1713446163-0.0.1.1-1621).

Eickermann, Michael, Juergen Junk, and Carmelo Rapisarda. "Climate Change and Insects." *Insects* 14 (August 1, 2023): 678. <https://doi.org/10.3390/insects14080678>.

Goergen, Klaus, J. Beersma, Lucien Hoffmann, and Juergen Junk. "ENSEMBLES-Based Assessment of Regional Climate Effects in Luxembourg and Their Impact on Vegetation." *Climatic Change* 119 (August 1, 2013). <https://doi.org/10.1007/s10584-013-0756-x>.

Luxembourg Ministry of Environment, Climate and Sustainable Development. 2021. *International Climate Finance Strategy 2021 – 2025*. Available at <https://gouvernement.lu/dam-assets/documents/actualites/2021/07-juillet/26-fci-dieschbourg/Strategie-FCI.pdf>.

Matzarakis, Andreas, Joscha Rammelberg, and Juergen Junk. "Assessment of Thermal Bioclimate and Tourism Climate Potential for Central Europe - The Example of Luxembourg." *Theoretical & Applied Climatology* 114 (January 1, 2012). <https://doi.org/10.1007/s00704-013-0835-y>.