



---

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

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 Sweden, 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 Sweden, 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 Stockholm from 18 to 22 September 2023.



## Contents

	<i>Page</i>
Abbreviations and acronyms .....	3
I. Introduction and summary .....	4
A. Introduction .....	4
B. Summary.....	4
II. Technical review of the information reported in the eighth national communication and fifth biennial report .....	8
A. National circumstances relevant to greenhouse gas emissions and removals .....	8
B. Greenhouse gas inventory information .....	9
C. Quantified economy-wide emission reduction target and related assumptions, conditions and methodologies.....	11
D. Information on policies and measures .....	13
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 .....	17
F. Projections .....	18
G. Provision of financial, technological and capacity-building support to developing country Parties .....	24
H. Vulnerability assessment, climate change impacts and adaptation measures .....	29
I. Research and systematic observation.....	30
J. Education, training and public awareness.....	32
III. Conclusions and recommendations .....	32
Annexes	
I. Assessment of adherence to the reporting guidelines for the eighth national communication of Sweden .....	36
II. Assessment of adherence to the reporting guidelines for the fifth biennial report of Sweden .....	38
III. Documents and information used during the review .....	40

## Abbreviations and acronyms

ACTRIS Sweden	Aerosol, Clouds and Trace Gases Research Infrastructure Sweden
AEA	annual emission allocation
AR	Assessment Report of the Intergovernmental Panel on Climate Change
BECCS	bioenergy with carbon capture and storage
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
GDP	gross domestic product
GHG	greenhouse gas
GWP	global warming potential
HFC	hydrofluorocarbon
ICOS	Integrated Carbon Observation System
LULUCF	land use, land-use change and forestry
N <sub>2</sub> O	nitrous oxide
NA	not applicable
NC	national communication
NE	not estimated
NF <sub>3</sub>	nitrogen trifluoride
NO	not occurring
non-Annex I Party	Party not included in Annex I to the Convention
OECD	Organisation for Economic Co-operation and Development
PaMs	policies and measures
PFC	perfluorocarbon
QA	quality assurance
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”
SEK	Swedish kronor
SF <sub>6</sub>	sulfur hexafluoride
SIDA	Swedish International Development Cooperation Agency
SITES	Swedish Infrastructure for Ecosystem Science
TIMES	The Integrated Market Allocation–Energy Flow Optimization Model System
UNFCCC reporting guidelines on BRs	“UNFCCC biennial reporting guidelines for developed country Parties”
UNFCCC reporting guidelines on CTF tables	“Common tabular format for ‘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”
WEM	‘with measures’
WOM	‘without measures’

## I. Introduction and summary

### A. Introduction

1. This is a report on the in-country technical review of the NC8 and BR5 of Sweden. 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 Sweden, which provided comments that were considered and incorporated, as appropriate, with revisions into this final version of the report.

3. The review was conducted from 18 to 22 September 2023 in Stockholm by the following team of nominated experts from the UNFCCC roster of experts: Kevin Adams (United States of America), Branca Americano (Brazil), Mostafa Hasaneen (Egypt), Katarzyna Jabłońska (Poland), Takashi Morimoto (Japan) and Tian Wang (China). Takashi Morimoto and Tian Wang were the lead reviewers. The review was coordinated by Ruta Bubniene and Andrea Nuesse (secretariat).

### B. Summary

4. The ERT conducted a technical review of the information reported in the NC8 of Sweden in accordance with the UNFCCC reporting guidelines on NCs,<sup>1</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>2</sup> and of the information reported in the BR5 of Sweden in accordance with the UNFCCC reporting guidelines on BRs.<sup>3</sup>

#### 1. Timeliness

5. The NC8 was submitted on 3 March 2023, after the deadline of 31 December 2022 mandated by decision 6/CP.25, and resubmitted on 25 July 2023, before the review. The NC8 was resubmitted on 8 October 2023 to address issues raised during the review. The resubmission included changes to national circumstances, PaMs and financial, technological and capacity-building support. Detailed information on improvements related to the resubmission is provided in paragraph 13(a), (c–e) below. Unless otherwise specified, the information and values from the latest submission are used in this report.

6. Sweden did not inform the secretariat about its difficulties with making a timely NC8 submission. In accordance with decision 13/CP.20, a Party should inform the secretariat thereof by the due date of the submission in order to facilitate the arrangement of the review process. The ERT noted with great concern the delay in the submission and recommended that Sweden make its next submission on time.

7. The BR5 was submitted on 3 March 2023, after the deadline of 31 December 2022 mandated by decision 6/CP.25. The CTF tables were submitted on 6 March 2023. The BR5 and the CTF tables were resubmitted on 6 September 2023, before the review. The BR5 and the CTF tables were then resubmitted on 8 October 2023 to address issues raised during the review. The resubmission of 8 October 2023 included changes to mitigation actions and their

---

<sup>1</sup> Decision 6/CP.25, annex.

<sup>2</sup> Decision 15/CMP.1, annex, and decision 3/CMP.11, annex III.

<sup>3</sup> Decision 2/CP.17, annex.

effects, estimates of emission reductions and removals, and financial, technological and capacity-building support. Detailed information on improvements related to the resubmission is provided in paragraph 13(b–d) below. Unless otherwise specified, the information and values from the latest submission are used in this report.

8. Sweden did not inform the secretariat about its difficulties with making a timely BR5 submission. In accordance with decision 13/CP.20, a Party should inform the secretariat thereof by the due date of the submission in order to facilitate the arrangement of the review process. The ERT noted with great concern the delay in the submission.

## 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 Sweden in its NC8 are presented in tables 1–2. The information reported mostly adheres to the UNFCCC reporting guidelines on NCs.

10. Sweden made improvements to the reporting in its NC8 compared with that in its NC7, including by addressing some recommendations and encouragements from the previous review report. The ERT noted that the Party has improved:

(a) The transparency of the GHG inventory information reported by providing additional information on the sectoral breakdown of GHG emissions and further details on the national system for the GHG inventory;

(b) The transparency of the information reported on PaMs by recalculating the mitigation impact for certain groups of PaMs, which in some cases resulted in higher GHG emission reduction effects than previously expected (e.g. the collection of PaMs in the residential and commercial/institutional sector, emission performance standards for new vehicles and a CO<sub>2</sub>-based annual vehicle tax), and presenting the estimates for groups of PaMs as separate rows in CTF table 3;

(c) The transparency of the information reported on projections by providing recalculated projections based on updated key assumptions;

(d) The completeness of the information reported on financial, technological and capacity-building support, in particular with regard to finance and the steps taken to respond to the needs and priorities of developing countries, providing enhanced sectoral information, and efforts to assist developing countries in meeting the costs of adaptation; and with regard to technology, by including detailed textual information on its efforts to promote technology development and transfer and information on how Sweden has supported the development and enhancement of the endogenous capacities and technologies of non-Annex I Parties, and by identifying clearly public and private sector activities;

(e) The completeness of the information reported on education, training and public awareness by including an explanation of the extent of civil society involvement in the preparation of the NC.

Table 1  
**Assessment of completeness and transparency of mandatory information reported by Sweden 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	Complete	Transparent	–
Projections and the total effect of PaMs	Mostly complete	Mostly transparent	Issues 3–5 in table I.1
Vulnerability assessment, climate change impacts and adaptation measures	Complete	Transparent	–

<i>Section of NC</i>	<i>Completeness</i>	<i>Transparency</i>	<i>Reference to description of recommendation</i>
Financial resources and transfer of technology	Mostly complete	Mostly transparent	Issues 1–2 in table I.2
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 Sweden 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	Complete	Transparent	–
National registry	Complete	Transparent	–
Supplementarity relating to the mechanisms pursuant to Articles 6, 12 and 17	Complete	Transparent	–
PaMs in accordance with Article 2	Complete	Transparent	–
Domestic and regional programmes and/or arrangements and procedures	Complete	Transparent	–
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 Sweden in its BR5 are presented in table 3. The information reported mostly adheres to the UNFCCC reporting guidelines on BRs.

12. Sweden made improvements to the reporting in its BR5 compared with that in its BR4, including by addressing some recommendations and encouragements from the previous review report. The ERT noted that the Party has improved:

(a) The transparency of the GHG inventory information reported by providing additional information on the sectoral breakdown of GHG emissions and further details on the national system for the GHG inventory;

(b) The transparency of the information reported on PaMs by recalculating the mitigation impact for certain groups of PaMs, which in some cases resulted in higher emission reduction effects than previously expected (e.g. the collection of PaMs in the residential and commercial/institutional sector, emission performance standards for new vehicles and a CO<sub>2</sub>-based annual vehicle tax);

(c) The transparency of the information reported on projections by providing recalculated projections based on updated key assumptions;

(d) The completeness of the information reported on the provision of financial, technological and capacity-building support, in particular with regard to finance and the steps taken to respond to the needs and priorities of developing countries, providing enhanced

sectoral information, and efforts to assist developing countries in meeting the costs of adaptation; and with regard to technology, by including detailed textual information on its efforts to promote technology development and transfer and information on how Sweden has supported the development and enhancement of the endogenous capacities and technologies of non-Annex I Parties, and by identifying clearly public and private sector activities.

Table 3

**Summary of completeness and transparency of mandatory information reported by Sweden 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	Complete	Transparent	–
Provision of support to developing country Parties	Mostly complete	Mostly transparent	Issues 1 and 3 in table II.2

*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, BR5 and CTF tables resubmitted during the review improved:

(a) The information reported on national circumstances, specifically on factors in the industry that affect GHG emissions and removals;

(b) The information reported on the contribution of the LULUCF sector to Sweden’s progress in the achievement of the quantified economy-wide emission reduction targets;

(c) The transparency of the information reported on the estimated mitigation impacts of PaMs by reporting “NE” in the relevant column in CTF table 3 for those PaMs that did not have an estimated mitigation impact;

(d) The information reported on financial, technological and capacity-building support by clarifying the financial support that it considered to be new and additional, providing further information on the assumptions and methodologies used, providing further information on how it responds to the needs and priorities of developing country Parties, providing further information on how it supports developing countries in meeting the costs of adaptation, resolving inconsistencies in information provided across textual and tabular formats, utilizing all the pre-determined categories for labelling information within its CTF tables, providing further information on the timelines of programmes related to technology development and transfer, and providing further information on how its technology development and transfer activities support the development of endogenous capacities and technologies as well as the private sector;

(e) The reporting of the supplementary information related to the Kyoto Protocol by including descriptions of the process used and the key sources identified for its national system and of measures taken to safeguard, maintain and recover data of its national registry; a list of the information publicly accessible by means of the user interface to the national registry; and a description of provisions for making information on legislative arrangements and enforcement and administrative procedures publicly accessible.

## **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. Since 1990, the population of Sweden has been growing by 0.6 per cent each year, on average, with a total population of 10.4 million as at the end of 2020. From 1990 to 2019, the economy grew by an average of 2.2 per cent per year. While the coronavirus disease 2019 pandemic caused a reduction in GDP of 2.8 per cent, in 2020 the country's GDP was SEK 4.98 trillion, or close to SEK 481,000 per capita, placing Sweden among the richest countries in the world. Natural resources, such as forests and iron ore, provide the basis for industrial production and, together with the country's engineering industry, have created a strongly export-oriented economy.

16. Sweden's energy system is partly based on domestic sources of renewable energy such as wind and biomass, while a large proportion of the energy supplied is dependent on imported nuclear fuel for electricity production and imported oil for the transport system. Between 1990 and 2019, the share of renewable energy in Sweden rose from 33 to 56 per cent, and the share of biofuels (including waste and peat) in production grew from 25 to 79 per cent owing to the implementation of CO<sub>2</sub> and energy taxes. Between 2010 and 2020, final energy use was stable. Over the same period, the industry and the residential property and services sectors experienced a decrease in energy use of 8 and 13 per cent respectively owing to an increase in energy efficiency, while energy use in domestic transport increased by nearly 50 per cent over the same period.

17. Sweden has a mixed industry, which is based more on raw materials than many other countries. For example, Sweden's extensive forest industry (wood products, paper and pulp) and the iron and steel industry are based on domestic natural resources, and 75 per cent of the total emissions from the industry sector were from 15 of the largest industrial plants. Historically, emissions from energy use (about a third of total emissions from the industry sector) have decreased more significantly than process-related emissions (also contributing about a third of total GHG emissions from the industry sector) owing to a transition of the fuels used as well as improvements in energy efficiency. Increased forest growth and demand for raw materials from the forest sector led to a continuous increase in felling between 1990 and 2019.

18. The reduced landfilling of waste and improved collection of landfill gas have contributed to a decrease in GHG emissions from the waste sector between 2010 and 2020: owing to Sweden's policy objectives and associated instruments, landfilling of municipal waste decreased sharply in this time. In 2020 just under 1 per cent of municipal waste went to landfill. The recovery of household waste materials has increased by 57 per cent between 2001 and 2020. Waste incineration accounted for 18.6 TWh (roughly 25 per cent) of the total heat energy supplied in 2020, while 136 GWh of landfill gas was collected from 53 waste treatment plants, 83 GWh of which was used for energy (80 GWh for heating and 3 GWh for electricity) and the remaining 53 GWh was flared to further reduce CH<sub>4</sub> emissions.

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

19. The ERT assessed the information reported in the NC8 of Sweden 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>4</sup>

### 1. Technical assessment of the reported information

20. Sweden 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 Sweden's 2023 annual submission, which used GWP values from the AR5. Total GHG emissions excluding emissions and removals from LULUCF decreased by 23,661.6 kt CO<sub>2</sub> eq, or 33.1 per cent, between 1990 and 2021, while total GHG emissions including net emissions or removals from LULUCF decreased by 19,036.96 kt CO<sub>2</sub> eq or 75.7 per cent over the same period. Emissions peaked in 1996 (77,239.00 Mt CO<sub>2</sub> eq) and have generally been on a downward trend, reaching a low point of 46,214.03 kt CO<sub>2</sub> eq in 2020. The main drivers for the decreasing trend in Sweden's GHG emissions were the transition from oil-fuelled heating in residential and commercial properties to electricity (heat pumps) and district heating (using an increasing share of biofuels over time), which have resulted in the highest emission reductions in absolute terms, as well as fluctuations in production levels of manufacturing industries following changes in the economic development of specific industries, such as the iron and steel industry. Along with the decrease in landfilling of waste, there has been an increase in the use of biofuels in industry and district heating production. Between 2019 and 2020, total GHG emissions decreased by 8.7 per cent, largely owing to the pandemic.

21. The energy sector contributed the largest share of total GHG emissions in 2021, accounting for 69.4 per cent of total emissions excluding LULUCF. Emissions from the energy sector have decreased by 36.5 per cent between 1990 and 2021. In 2021, 99.8 per cent of energy sector emissions came from fuel combustion, with only 0.2 per cent from fugitive emissions from fuels. The transport sector was the largest contributor to emissions from fuel combustion, accounting for 46.6 per cent, followed by energy industries (27.1 per cent), manufacturing industries and construction (19.0 per cent) and other sectors (7.3 per cent). Industrial processes contributed the second largest share of total GHG emissions, accounting for 14.6 per cent, followed by agriculture (14.0 per cent) and waste (2.1 per cent). Among these sectors, the waste sector experienced a particularly large decrease, with a reduction in emissions of 3.1 Mt CO<sub>2</sub> eq, or 76.0 per cent, between 1990 and 2021.

22. Table 4 illustrates the emission trends by sector and by gas for Sweden based on Sweden's 2023 annual submission. The emissions reported in the 2023 annual submission differ from the data reported in CTF table 1 in that the GHG emissions reported in the 2023 annual submission cover the period until 2021 and were recalculated using GWP values from the AR5, whereas the Party reported in its BR5 and NC8 historical GHG emissions up until 2020 that are based on GWP values from the AR4 (i.e. the same as the emissions reported in CTF table 1 of the 2022 annual submission).

Table 4

#### Greenhouse gas emissions by sector and by gas for Sweden 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	52 272.03	49 362.26	47 342.36	31 962.96	33 174.94	–38.9	3.8	73.1
A1. Energy industries	9 857.85	8 878.69	12 965.07	7 548.46	8 960.71	–23.4	18.7	13.8	18.7
A2. Manufacturing industries and construction	10 858.44	11 365.64	8 601.22	6 191.38	6 300.65	–43.0	1.8	15.2	13.2
A3. Transport	20 038.31	20 474.95	21 129.13	15 366.39	15 439.43	–23.3	0.5	28.0	32.3
A4. and A5. Other	11 090.94	8 161.23	3 752.17	2 361.27	2 423.07	–78.7	2.6	15.5	5.1

<sup>4</sup> GHG emission data in this section are based on Sweden's 2023 annual submission, version 1, which uses GWP values from the AR5. All emission data in subsequent chapters are based on Sweden's BR5 CTF tables unless otherwise noted.

	GHG emissions (kt CO <sub>2</sub> eq)					Change (%)		Share (%)		
	1990	2000	2010	2020	2021	1990–2020	2020–2021	1990	2021	
	B. Fugitive emissions from fuels	426.49	481.75	894.77	495.45	51.08	16.2	–89.7	0.6	0.1
C. CO <sub>2</sub> transport and storage	NO	NO	NO	NO	NO	–	–	–	–	
2. Industrial process and product use	7 427.72	8 117.52	8 162.27	6 377.51	6 976.00	–14.1	9.4	10.4	14.6	
3. Agriculture	7 646.31	7 319.96	6 736.43	6 796.75	6 673.59	–11.1	–1.8	10.7	14.0	
4. LULUCF	–46 335.48	–48 205.97	–50 288.00	–41 286.62	–41 710.84	10.9	–1.0	NA	NA	
5. Waste	4 132.25	3 549.37	2 134.59	1 076.81	992.17	–73.9	–7.9	5.8	2.1	
6. Other <sup>a</sup>	0.00	0.00	0.00	0.00	0.00	–	–	0.0	0.0	
<i>Gas<sup>b</sup></i>										
CO <sub>2</sub>	57 509.90	54 930.07	53 120.37	36 686.49	38 524.79	–36.2	5.0	80.5	80.6	
CH <sub>4</sub>	8 297.44	7 658.11	5 833.33	4 588.71	4 519.68	–44.7	–1.5	11.6	9.5	
N <sub>2</sub> O	5 049.23	4 574.92	4 123.63	3 953.38	3 850.11	–21.7	–2.6	7.1	8.1	
HFCs	5.95	725.37	1 063.67	888.59	840.83	14 837.2	–5.4	0.0	1.8	
PFCs	510.94	338.22	169.24	58.65	41.69	–88.5	–28.9	0.7	0.1	
SF <sub>6</sub>	104.85	122.42	65.40	38.21	39.61	–63.6	3.7	0.1	0.1	
NF <sub>3</sub>	NO	NO	NO	NO	NO	–	–	–	–	
<b>Total GHG emissions excluding LULUCF</b>	<b>71 478.31</b>	<b>68 349.11</b>	<b>64 375.65</b>	<b>46 214.03</b>	<b>47 816.70</b>	<b>–35.3</b>	<b>3.5</b>	<b>100.0</b>	<b>100.0</b>	
<b>Total GHG emissions including LULUCF</b>	<b>25 142.83</b>	<b>20 143.14</b>	<b>14 087.65</b>	<b>4 927.41</b>	<b>6 105.87</b>	<b>–80.4</b>	<b>23.9</b>	<b>NA</b>	<b>NA</b>	

Source: GHG emission data: Sweden's 2023 annual submission, version 6 April 2023.

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

<sup>b</sup> Emissions by gas without LULUCF. The Party did not report indirect CO<sub>2</sub> emissions.

23. In brief, Sweden's national inventory arrangements were established in accordance with the Kyoto Protocol, the UNFCCC Annex I inventory reporting guidelines (decision 24/CP.19) and the EU monitoring mechanism regulation (regulation 525/2013/EC). In addition, the national ordinance on climate reporting (2014:1434), which specifies the roles and responsibilities of related government agencies, came into force in 2014. It covers not only the preparation of the GHG inventory but also the reporting of PaMs and projections. There have been no changes in these arrangements since the NC7 and BR4.

## 2. Assessment of adherence to the reporting guidelines

24. The ERT assessed the information reported in the NC8 and BR5 of Sweden 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

25. Sweden 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 all the elements mandated by paragraph 30 of the annex to decision 15/CMP.1. The NC8 also contains a reference to the description of the national system

provided in the report mandated by decision 2/CMP.8, submitted in 2017,<sup>5</sup> and in the national inventory report of the 2022 annual submission. Since the BR4 and NC7, there have been no changes to the national system, which has been in operation since 2006.

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

26. The ERT assessed the information reported in the NC8 of Sweden 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.

**4. National registry**

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

27. In its NC8 Sweden 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. The description includes all the elements mandated by paragraph 32 of the annex to decision 15/CMP.1.

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

28. The ERT assessed the information reported in the NC8 of Sweden 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.

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

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

29. Sweden reported information on its economy-wide emission reduction target in its BR5. For Sweden the Convention entered into force on 21 March 1994. Under the Convention Sweden 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.

30. The target for the EU and its member States is formalized in the EU 2020 climate and energy package. The legislative package regulates emissions of CO<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 under the Convention.

31. The EU-wide targets 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 became operational in 2013 and covers sectors outside the EU ETS, including transport (excluding aviation and international maritime transport), residential and commercial buildings, agriculture, small industry and waste. The ESD is regulated through targets for each member State that add 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.

<sup>5</sup> Sweden's report to facilitate the calculation of the assigned amount pursuant to Article 3, paras. 7 bis, 8 and 8 bis, of the Kyoto Protocol for the second commitment period (2013–2020), available at <https://unfccc.int/process/transparency-and-reporting/reporting-and-review-under-the-kyoto-protocol/second-commitment-period/initial-reports>.

32. The EU generally allows 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 can use such units to fulfil their requirements under the EU ETS, and member States can use such units for their national ESD targets, within specific limitations.

33. 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 national energy and climate plans.

34. Sweden has a national target of reducing its emissions to 17 per cent below the 2005 level by 2020 for ESD sectors. This target has been translated into binding quantified AEAs for 2013–2020. Sweden’s AEAs change following a linear path from 41,685.10 kt CO<sub>2</sub> eq in 2013 to 36,080.17 kt CO<sub>2</sub> eq in 2020. Sweden’s ESD target under the EU was met, as ESD emissions amounted to 29,384.09 kt CO<sub>2</sub> eq in 2020.<sup>6</sup> Under the ESR, Sweden has a national target of reducing emissions from covered sectors to 50 per cent below the 2005 level by 2030.

35. In addition to its ESD target, for non-ETS sectors, excluding the LULUCF sector, Sweden committed to achieving a domestic target of a 40 per cent reduction in emissions below the 1990 level by 2020 (28,700.00 kt CO<sub>2</sub> eq), of which one third can be reduced by emission reductions in other countries. It is more ambitious than Sweden’s target under the joint EU target and its commitments under the ESD. Sweden’s ESD emissions amounted to 29,384.09 kt CO<sub>2</sub> eq in 2020 and were 684.09 kt CO<sub>2</sub> eq higher than the domestic target. Sweden stated in the *Report for Sweden on Climate Policies and Measures and on Projections* that this 2020 target for the non-ETS sectors has been met by using 684.09 kt of temporary certified emission reductions from the Swedish portfolio of credits from clean development mechanism activities under the Kyoto Protocol. In addition, under this domestic target, renewable energy sources should provide at least 50 per cent of total energy consumed, and at least 10 per cent of energy consumed in the transport sector should come from renewable energy sources by 2020. Sweden has also set an energy efficiency target of a 20 per cent reduction in energy intensity between 2008 and 2020.

36. Sweden also reported on its longer-term targets of reducing emissions from sectors not covered by the EU ETS by 63 per cent by 2030 compared with the 1990 level and by at least 75 per cent by 2040. The Party has also set a target of reducing GHG emissions from domestic transport by at least 70 per cent below the 2010 level by 2030. Sweden’s target is to release net zero GHG emissions into the atmosphere by 2045 and to achieve negative emissions thereafter. The Party highlighted that achieving net zero emissions would equate to an emission reduction of at least 85 per cent below the 1990 level by 2045 and that supplementary measures may contribute 15 per cent of this target. These supplementary measures include increased carbon sinks in the LULUCF sector, verified international credits and BECCS. The effect of the supplementary measures will be calculated in accordance with internationally agreed regulations.

## 2. Assessment of adherence to the reporting guidelines

37. The ERT assessed the information reported in the BR5 of Sweden 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.

---

<sup>6</sup> According to the EU transaction log.

## D. Information on policies and measures

### 1. Technical assessment of the reported information

38. Sweden provided in its NC8 and BR5 information on its PaMs<sup>7</sup> implemented, adopted and planned to fulfil its commitments under the Convention. Sweden's set of PaMs is similar to that previously reported, with a few exceptions. Sweden updated the list of PaMs to include some planned and adopted PaMs that were not included in its previous reports, such as the establishment of a national centre for carbon dioxide capture and storage, and the development of the national strategy for electrification.

39. Sweden 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. Sweden 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.

40. Sweden's assessment of the economic and social consequences of its response measures includes procedures related to the identification of negative effects and impact assessment. Concerning effects on other countries, these procedures are part of Sweden's Policy for Global Development.

41. Sweden reported on its actions to identify and review its own policies and practices that encourage activities that lead to greater levels of emissions. Sweden improved the assumptions, methodologies and models used for estimating the mitigation impact of its policies and practices. Assumptions are based on available data and expert knowledge to ensure a realistic level of emission reductions for its PaMs. Various government agencies are responsible for providing the data.

42. In its reporting on PaMs, Sweden provided estimated emission reduction impacts for a few of its PaMs individually, in addition to reporting estimated emission reductions for several groups of PaMs. Where individual estimated impacts were not provided, the Party supplied an explanation applicable to all PaMs, marking cells in CTF table 3 as "NE". The Party explained during the review that, in some cases, impacts were estimated for groups of PaMs owing to limitations in the models used. Sweden has not yet been able to single out the effect of individual PaMs given the interactions between several instruments and the difficulty in distinguishing the effect of a single instrument. As it is also very difficult to estimate the share of technological development in Sweden, an assumption regarding this share was developed for the TIMES-Nordic model. Furthermore, the Party explained that distinguishing the effects of policy instruments from the impacts of other external changes, such as energy prices, is often a complicated process.

43. The Party described its general methodology for estimating the impacts of its PaMs, which is the TIMES-Nordic energy system model, in which a scenario based on policy instruments in place in 1990 is compared with a scenario reflecting the actual development of policy instruments. The results of the model show that economic instruments introduced after 1990 have played an important role in reducing CO<sub>2</sub> emissions.

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

<sup>7</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.

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 national energy and climate plans 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 national energy and climate plans are periodically updated to reflect changes to EU policy, such as the implementation of the European Green Deal. Sweden’s national energy and climate plan specifies that Sweden’s target is to release net zero GHG emissions into the atmosphere by 2045 and to achieve net negative emissions thereafter by reducing emissions from activities in Sweden by 85 per cent below the 1990 level by 2045. Other targets include reducing emissions from sectors not covered by the EU ETS by at least 63 per cent below the 1990 level by 2030 and by at least 75 per cent by 2040; reducing emissions from domestic transport by at least 70 per cent by 2030 compared with the 2010 level; increasing efficient energy use by 50 per cent by 2030 compared with the 2005 level; and ensuring that 100 per cent of electricity produced is from renewable energy sources by 2040.

46. Sweden introduced national-level policies to achieve its targets under the ESD, the ESR and domestic emission reduction targets. The key policies reported are the energy tax, the CO<sub>2</sub> tax, the EU ETS and the electricity certificates system. The mitigation effect of this group of measures is the most significant, amounting to a reduction of 15,490.00 kt CO<sub>2</sub> eq below the 1990 level by 2020. The ERT highlighted the policy mix accelerating the technology shift in the steel industry as being of particular interest, the central components of which include financing through the Industrial Leap programme, CO<sub>2</sub> pricing through the EU ETS and dialogue within the Fossil-Free Sweden initiative.

47. Sweden 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. Key mitigation actions which will help to achieve these longer-term targets are the country’s CO<sub>2</sub> tax, the Climate Leap and Industrial Leap programmes, support for BECCS and the Fossil-Free Sweden initiative. In particular, CO<sub>2</sub> emission performance standards for new vehicles and the EU ETS are playing an increasingly important role in Sweden. Table 5 provides a summary of the reported information on the PaMs of Sweden.

48. Industrial Leap is a government scheme that aims to support the development of technology and processes to reduce process-related GHG emissions in Swedish industry. The Government’s Fossil-Free Sweden initiative, launched in 2015, is aimed at strengthening the dialogue between the Government and the business sector, municipalities and civil society to make Sweden one of the world’s first fossil-free welfare States. Climate Leap is a comprehensive investment support scheme for municipalities, companies, organizations and others which provides investments to support measures that reduce the impact of climate change.

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

<i>Sector</i>	<i>Key PaMs</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 Leap	NE	NE
	EU ETS	NE	NE
	Energy tax	NE	NE
	CO <sub>2</sub> tax	NE	NE
	Fossil-Free Sweden initiative	NE	NE
Energy	Production of electricity and district heating	15 490	6 200
	Initiatives for wind power	NE	NE

<i>Sector</i>	<i>Key PaMs</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>
	Financial support for solar power	NE	NE
Residential and commercial/institutional sector	Collection of PaMs (energy tax, CO <sub>2</sub> tax, building regulations, energy declarations, the ecodesign directive (2009/125/EC), mandatory energy labelling)	1 140	1 000
Industrial emissions from combustion, and processes and product use	Collection of PaMs (EU regulation on fluorinated GHGs and Best Available Techniques reference document, EU regulation on mobile air-conditioning systems in cars, Swedish regulation on fluorinated gases and ozone-depleting substances)	700	NE
Transport	Support scheme for BECCS	NE	1 000–2 000
	Energy tax, CO <sub>2</sub> tax	2 300	NE
	Emission performance standards for new vehicles, CO <sub>2</sub> -based annual vehicle tax	3 000	8 000
Agriculture	Climate Leap	NE	900
	Emission reduction obligation	NE	4 000–6 000
LULUCF	Measures under the Rural Development Programme	NE	NE
	Support for biogas production	NE	NE
Waste	Forestry Act and Swedish National Forest Programme	NE	NE
	Support for rewetting of wetlands	NE	80–180
	Rules on municipal waste planning and on producer responsibility for certain products, landfill tax, bans on landfill of combustible waste and of organic waste	1 900	2 200

*Note:* The estimated mitigation impacts are estimates of emissions of CO<sub>2</sub> eq avoided in a given year as a result of the implementation of mitigation actions.

49. Sweden's main policy framework relating to energy and climate change is the National Climate Policy Framework, which consists of a Climate Act, national climate targets and a Climate Policy Council. The framework is the most important climate reform in Sweden's history and ensures a continuous climate policy, efficient implementation of PaMs and the achievement of longer-term targets.

50. Sweden's main PaMs combine CO<sub>2</sub> pricing, support schemes and legislation, with the most significant PaMs being the EU ETS and the CO<sub>2</sub> tax. The CO<sub>2</sub> tax has contributed the most to Sweden's emission reduction efforts since the early 1990s and remains the main climate policy instrument addressing Swedish industry. More recently, Sweden has placed a particular emphasis on newly launched measures such as Climate Leap, Industrial Leap, the support scheme for BECCS and the Fossil-Free Sweden initiative, which are the key national PaMs with the most significant GHG emission reduction effect and could be replicable by other Parties.

## 2. Assessment of adherence to the reporting guidelines

51. The ERT assessed the information reported in the NC8 and BR5 of Sweden 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. Domestic and regional programmes and legislative arrangements and procedures related to the Kyoto Protocol**

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

52. In its NC8, Sweden reported that no specific legislation or administrative procedures have been introduced for the implementation of the Kyoto Protocol, but that the existing legislative and administrative framework has been effective in fulfilling Sweden's commitment under the Kyoto Protocol. The Swedish Parliament adopted the National Climate Policy Framework in 2017, which consists of a Climate Act, national climate targets and a Climate Policy Council. The Climate Act imposes a responsibility on the current and future Government to pursue a climate policy based on the national climate targets and to provide clear feedback on progress.

53. The Swedish Environmental Protection Agency is responsible for the environmental quality objective "Reduced Climate Impact", which is one of 16 such objectives adopted by the Parliament, and for Sweden's regular climate reporting to the UNFCCC and the EU. SIDA, the Swedish Transport Administration, the Swedish Transport Agency, the Swedish Forest Agency, the Swedish Board of Agriculture and the Swedish National Board of Housing, Building and Planning also have key roles in developing and implementing Sweden's climate strategy.

54. For the second commitment period of the Kyoto Protocol, from 2013 to 2020, Sweden committed to contributing to the joint EU effort to reduce GHG emissions by 20 per cent below the base-year level (see paras. 31–33 above).

55. Sweden has provisions in place to make information on legislative arrangements and administrative procedures related to compliance and enforcement publicly accessible at the website of the Swedish Environmental Policy Framework. The ERT noted that an overview of the Climate Act, the Swedish climate targets, supplementary measures to achieve the targets, and the Climate Policy Council is publicly accessible on the Internet.

56. Sweden 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.

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

57. The ERT assessed the information reported in the NC8 of Sweden 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.

### **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**

58. In the NC8 Sweden 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.

59. Sweden has made efforts to minimize the risk of adverse impacts in accordance with the Kyoto Protocol. For example, all policy areas in Sweden should interact in a coherent manner to effectively contribute to equitable and sustainable global development under Sweden's Policy for Global Development. During the decision-making process on PaMs at the national and EU level an impact assessment is conducted, including an assessment of the risk of adverse effects on other countries, taking into account both positive and negative impacts. Moreover, Sweden has developed a comprehensive climate strategy covering many types of measures and most sectors, both within and outside the country.



60. The NC8 includes information on how Sweden 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. Sweden voluntarily participates in the Carbon Offsetting and Reduction Scheme for International Aviation and has been implementing measures based on the Energy Efficiency Design Index and mandatory Ship Energy Efficiency Management Plan, which were adopted in 2013 and strengthened in 2020 by the International Maritime Organization.

61. Further information on how Sweden 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 submission. Sweden reported information in the national inventory report on what it prioritized in implementing its commitments under Article 3, paragraph 14. An impact assessment is conducted during the decision-making process on PaMs to be implemented in Sweden to ensure that all policy areas interact to contribute effectively to equitable and sustainable global development (see para. 59 above).

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

62. The ERT assessed the information reported in the NC8 of Sweden 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**

63. Sweden reported in its BR5 that it did not use units from market-based mechanisms under the Kyoto Protocol and other market-based mechanisms under the Convention 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.

64. For 2019, Sweden reported in CTF table 4 annual total GHG emissions excluding LULUCF of 50,810.59 kt CO<sub>2</sub> eq, which is 28.9 per cent below the 1990 level. Emissions from sectors relating to the target under the ESD amounted to 31,679.70 kt CO<sub>2</sub> eq.

65. For 2020, Sweden reported in CTF table 4 annual total GHG emissions excluding LULUCF of 46,284.75 kt CO<sub>2</sub> eq, which is 35.2 per cent below the 1990 level. Emissions from sectors relating to the target under the ESD amounted to 29,384.09 kt CO<sub>2</sub> eq.

66. Given that the contribution of LULUCF activities is not included in the joint EU target under the Convention, reporting thereon is not applicable to Sweden. The ERT noted that the transparency of Sweden's reporting could be improved by reporting "NA" in the relevant cells in CTF table 4. Table 6 illustrates Sweden'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 Sweden**  
(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	35 278.78	41 685.10	–	–	6 406.32	6 406.32
2014	34 522.65	41 044.88	–	–	6 522.23	12 928.55
2015	33 897.18	40 404.66	–	–	6 507.48	19 436.03
2016	32 612.25	39 764.43	–	–	7 152.19	26 588.22

<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>
2017	32 530.54	37 801.20	–	–	5 270.66	31 858.88
2018	31 400.23	37 227.53	–	–	5 827.29	37 686.17
2019	31 679.70	36 653.85	–	–	4 974.15	42 660.32
2020	29 384.09	36 080.17	–	–	6 696.08	49 356.40

*Sources:* Sweden’s BR5 and BR5 CTF table 4(b) and the EU transaction log (AEAs), which use GWP values from the AR4.

*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

67. The ERT assessed the information reported in the BR5 of Sweden 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

68. 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, Sweden committed to reducing its emissions under the ESD to 17 per cent below the 2005 level by 2020 (see para. 34 above). This target has been translated into binding quantified AEAs for 2013–2020. In 2020 Sweden’s ESD emissions were 18.6 per cent (29,384.09 kt CO<sub>2</sub> eq) below the AEA. Sweden has a cumulative surplus of 49,356.40 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.

69. 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, Sweden has met its 2020 commitment under the Convention through its contribution to achieving the joint EU target.

## F. Projections

### 1. Projections overview, methodology and results

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

70. Sweden reported in its BR5 and NC8 updated projections for 2025–2040 relative to actual inventory data for 2020 under the WEM scenario using GWP values from the AR4. The WEM scenario reported by Sweden includes PaMs implemented and adopted until 2020.

71. The projections are presented on a sectoral basis, using different sectoral categories from 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, PFCs, HFCs and SF<sub>6</sub> (treating PFCs and HFCs collectively in each case) for 2025–2040. The projections are also provided in an aggregated format for each sector and for a Party total using GWP values from the AR4. Sweden reported on factors and activities affecting emissions for each sector.

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

72. The methodology used for the preparation of the projections is identical to that used for the preparation of the emission projections for the NC7. Sweden provided information on changes since the submission of its NC7 in the assumptions used for the projection scenarios, such as annual change in GDP, fossil fuel prices and carbon prices under the EU ETS.

Although Sweden did not clearly state the changes in the methodologies, models and approaches used for the preparation of the projections in its NC8, it provided supporting information during the review confirming that there have been no changes since the NC7.

73. To prepare its projections, Sweden relied on key underlying assumptions, including those relating to GDP, fossil fuel prices, carbon prices under the EU ETS, electricity prices and renewable electricity production under the electricity certificates system since 2012. The assumptions were updated on the basis of the most recent economic developments known at the time of the preparation of the projections.

74. Sensitivity analyses were conducted for a number of important assumptions, such as 30 per cent lower fossil fuel prices, 30 per cent lower economic growth for the energy sector, and a 10 per cent lower vehicle mileage for the transport sector compared with the WEM scenario. The results of the analysis showed that the projected GHG emissions applying lower fossil fuel prices in 2030 and 2040 would be approximately 700.00 kt CO<sub>2</sub> eq and 3,100.00 kt CO<sub>2</sub> eq higher respectively than the WEM scenario projections. The GHG emissions projected under the lower economic growth scenario in 2030 and 2040 are estimated to be approximately 300.00 kt CO<sub>2</sub> eq and 600.00 kt CO<sub>2</sub> eq lower respectively than under the WEM scenario projections. Under the lower vehicle mileage scenario, GHG emissions in 2030 and 2040 are projected to be approximately 300.00 kt CO<sub>2</sub> eq and 500.00 kt CO<sub>2</sub> eq lower respectively than under the WEM scenario projections. In addition, Sweden conducted a sensitivity analysis for the LULUCF sector to assess the impact of a positive climate effect on the projected emissions. The results showed that net removals without a positive climate effect are projected to be approximately 11,300.00 kt CO<sub>2</sub> eq lower in 2040 compared with the WEM scenario projections with a positive climate effect.

### (c) Results of projections

75. The projected emission levels under different scenarios are presented in table 7 and figure 1. According to the WEM scenario, GHG emissions are projected to amount to 43,229.08 kt CO<sub>2</sub> eq in 2030 and 39,400.00 kt CO<sub>2</sub> eq in 2040, a decrease of 39.5 and 44.9 per cent respectively below the 1990 level.

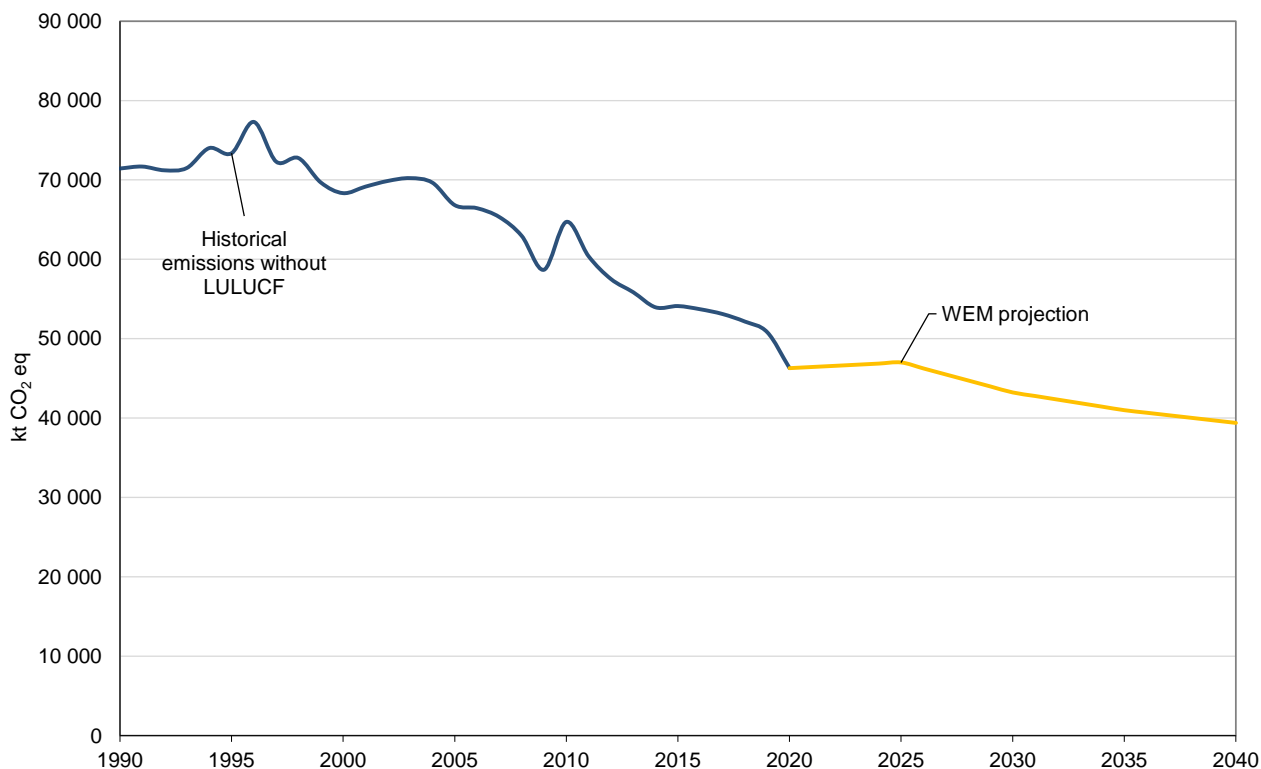
Table 7  
Summary of greenhouse gas emission projections for Sweden

	<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	71 441.56	NA	NA
Inventory data 2020	46 284.75	–35.2	NA
WEM projections for 2030	43 229.08	–39.5	–6.6
WEM projections for 2040	39 400.00	–44.9	–14.9

*Sources:* Sweden's BR5 and BR5 CTF table 6, which use GWP values from the AR4.

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

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



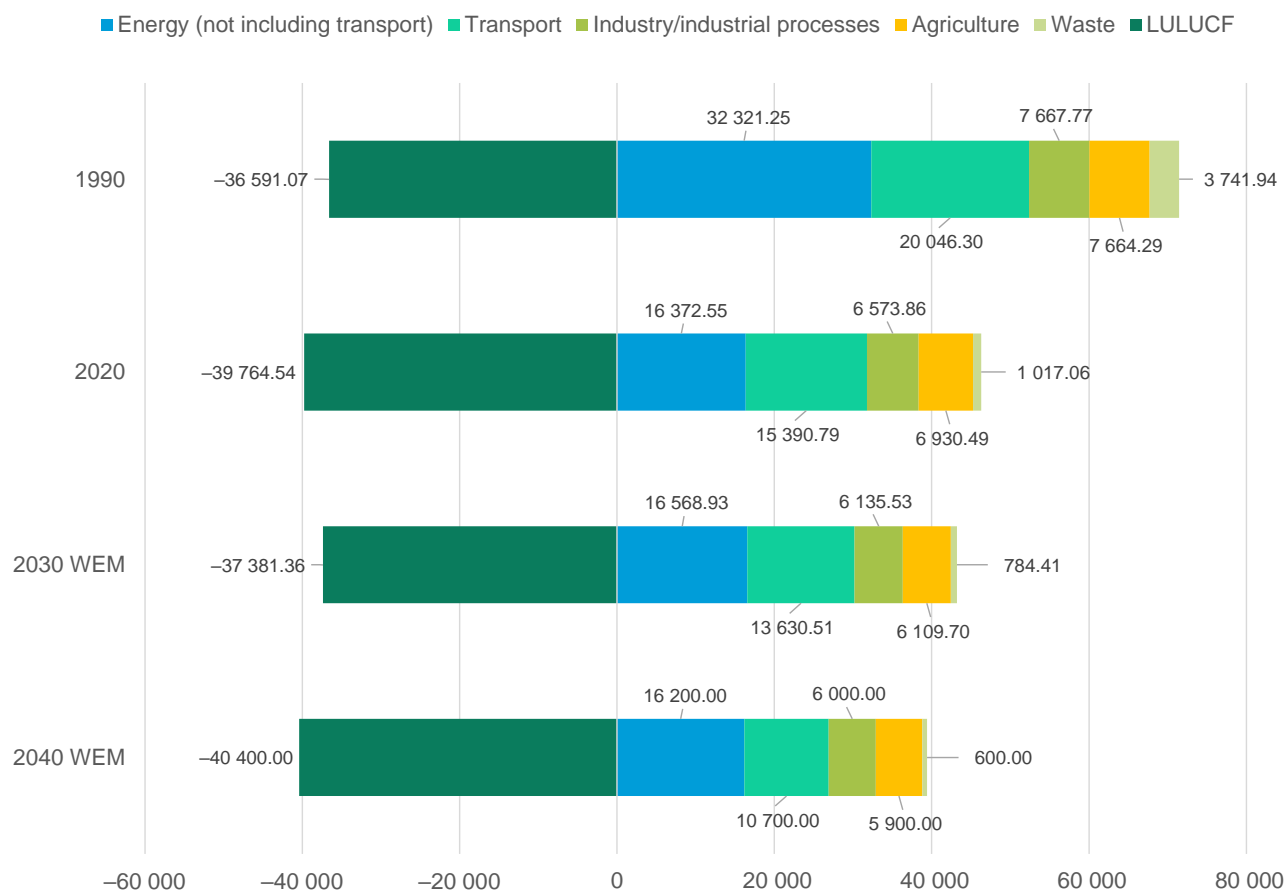
Sources: Sweden’s NC8, BR5 and BR5 CTF tables 1 and 6 (total GHG emissions excluding LULUCF and excluding indirect CO<sub>2</sub>), which use GWP values from the AR4.

76. Sweden’s total GHG emissions excluding LULUCF are projected under the WEM scenario to decrease by 39.5 and 44.9 per cent respectively below the 1990 level in 2030 and 2040. When including LULUCF, total GHG emissions are projected under the WEM scenario to decrease by 83.2 and 102.9 per cent respectively below the 1990 level in 2030 and 2040.

77. Sweden presented the WEM scenario by sector for 2030 and 2040, as summarized in figure 2 and table 8.

Figure 2  
Greenhouse gas emission projections for Sweden presented by sector

(kt CO<sub>2</sub> eq)



Source: Sweden's BR5 CTF table 6, which uses GWP values from the AR4.

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

Sector	GHG emissions and removals (kt CO <sub>2</sub> eq)			Change (%)	
	1990	2030 WEM	2040 WEM	1990–2030 WEM	1990–2040 WEM
Energy (not including transport)	32 321.25	16 568.93	16 200.00	-48.7	-49.9
Transport	20 046.30	13 630.51	10 700.00	-32.0	-46.6
Industry/industrial processes	7 667.77	6 135.53	6 000.00	-20.0	-21.8
Agriculture	7 664.29	6 109.70	5 900.00	-20.3	-23.0
LULUCF	-36 591.07	-37 381.36	-40 400.00	-2.2	-10.4
Waste	3 741.94	784.41	600.00	-79.0	-84.0
Other	–	–	–	–	–
<b>Total GHG emissions including LULUCF</b>	<b>34 850.50</b>	<b>5 847.73</b>	<b>-1 000.00</b>	<b>-83.2</b>	<b>-102.9</b>
<b>Total GHG emissions excluding LULUCF</b>	<b>71 441.56</b>	<b>43 229.08</b>	<b>39 400.00</b>	<b>-39.5</b>	<b>-44.9</b>

Source: Sweden's BR5 CTF table 6, which uses GWP values from the AR4.

78. 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, amounting to projected reductions of 48.7 per cent between 1990 and 2030. The pattern of projected emissions reported for 2040 under the same scenario changes slightly owing to new PaMs targeting energy efficiency and the renewable energy sector. Other PaMs expected to have an effect on emissions include support for solar power, a national strategy for

sustainable wind power expansion, support for storage of self-produced electricity, tax subsidies for installation of green technology and for microproduction of renewable electricity, and policy instruments in the electricity and district heating sector. LULUCF removals are projected to increase by 2.2 and 10.4 per cent between 1990 and 2030 and 1990 and 2040 respectively.

79. Sweden presented the WEM scenario by gas for 2030 and 2040, as summarized in table 9.

Table 9

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

Gas <sup>a</sup>	GHG emissions and removals (kt CO <sub>2</sub> eq)			Change (%)	
	1990	2030 WEM	2040 WEM	1990–2030 WEM	1990–2040 WEM
CO <sub>2</sub>	57 580.09	34 963.12	31 700.00	–39.3	–44.9
CH <sub>4</sub>	7 414.81	3 363.64	3 100.00	–54.6	–58.2
N <sub>2</sub> O	5 769.66	4 368.39	4 300.00	–24.3	–25.5
HFCs	6.49	461.35	300.00	7 008.6	4 522.5
PFCs	568.78	42.98	40.00	–92.4	–93.0
SF <sub>6</sub>	101.73	29.60	20.00	–70.9	–80.3
NF <sub>3</sub>	NO	NO	NO	–	–
<b>Total GHG emissions without LULUCF</b>	<b>71 441.56</b>	<b>43 229.08</b>	<b>39 400.00</b>	<b>–39.5</b>	<b>–44.9</b>

Source: Sweden's BR5 CTF table 6, which uses GWP values from the AR4.

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

80. During the review, Sweden provided additional information on the updated WEM scenario projections until 2045. The updated WEM scenario projections incorporate the increased rate of electrification in the transport sector and the shift of technology and fuel in industry.

81. During the review, the Party explained that a '1990 scenario' was developed including CO<sub>2</sub> emissions in the energy sector using the TIMES-Nordic optimization model until 2050. The Party outlined its overall approach to assessing the effects of its PaMs using this model, which assumes that policy instruments had remained at their 1990 level and were applied throughout the modelling period. The assessment also considers economic instruments and key assumptions related to energy demand and fuel prices.

82. Sweden provided in its NC8 the projected emissions covered under the EU ETS and the ESR for 2030 and 2040. The projected emissions under the ESR amount to 26,100 kt CO<sub>2</sub> eq for 2030 and 22,500 kt CO<sub>2</sub> eq for 2040. Sweden set a national target of reducing emissions under the ESR by at least 63 per cent by 2030 compared with the 1990 level, and by at least 75 per cent by 2040. Comparing the projected emissions under the ESR with the national targets, Sweden determined that no more than 8 and 2 per cent respectively of the emission reductions would need to be met through supplementary measures in order to achieve these targets. The additional reductions may be achieved through supplementary measures, including an increase in carbon sinks in the LULUCF sector, verified international carbon credits and BECCS.

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

83. The ERT assessed the information reported in the NC8 and BR5 of Sweden and identified issues relating to completeness and 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.1 and II.1.

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

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

84. In its NC8 Sweden presented the estimated and expected total effect of implemented and adopted PaMs in accordance with the WEM scenario, compared with a situation without such PaMs. Information is presented in terms of GHG emissions avoided or sequestered by sector, for 2015, 2020, 2025, 2030 and 2035, except for the agriculture sector. Table 10 lists only those PaMs for which the estimated and expected total effect of PaMs was quantified for 2025, 2030 and 2035. A description of the PaMs whose effect was not quantified was presented in chapter 4 of the NC8.

85. Sweden reported that the total estimated effect of its implemented and adopted PaMs is 28,300 kt CO<sub>2</sub> eq in 2025, 23,900 kt CO<sub>2</sub> eq in 2030 and 23,800 kt CO<sub>2</sub> eq in 2035. According to the information reported in the NC8, PaMs implemented in the electricity and district heating sector will deliver the largest emission reductions in 2025, but those in the transport sector will deliver the largest emission reductions in 2030 and 2035. Table 10 provides an overview of the total effect of PaMs as reported by Sweden.

Table 10  
**Projected effects of Sweden’s planned, implemented and adopted policies and measures in 2025, 2030 and 2035**  
 (kt CO<sub>2</sub> eq)

Sector	2025		2030		2035	
	Effect of implemented and adopted measures	Effect of planned measures	Effect of implemented and adopted measures	Effect of planned measures	Effect of implemented and adopted measures	Effect of planned measures
Electricity and district heating	15 100	NE	6 200	NE	3 200	NE
Residential and services	1 000	NE	1 000	NE	1 000	NE
Transport	10 000	NE	14 000	NE	16 600	NE
Industry	200	NE	500	NE	700	NE
Agriculture	NE	NE	NE	NE	NE	NE
Land-use change and forestry	NE	NE	NE	NE	NE	NE
Waste	2 000	NE	2 200	NE	2 300	NE
<b>Total</b>	<b>28 300</b>	<b>NE</b>	<b>23 900</b>	<b>NE</b>	<b>23 800</b>	<b>NE</b>

Source: Sweden’s NC8, which uses GWP values from the AR4.

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

86. The ERT assessed the information reported in the NC8 of Sweden and identified issues relating to completeness and transparency, and thus adherence to the UNFCCC reporting guidelines on NCs. The findings are described in table I.1.

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

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

87. In the NC8 Sweden reported that it does not plan to use market-based mechanisms to meet its Kyoto Protocol target. Although Sweden has supported over 90 projects in developing countries through clean development mechanism and joint implementation projects and through multilateral carbon funds, which corresponded to emission reductions of approximately 31 Mt CO<sub>2</sub> eq as at the end of 2020, it decided to cancel all international credits received up until the end of 2019. The ERT notes that reporting on the supplementarity of such mechanisms is therefore not relevant for Sweden.

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

88. The ERT assessed the information reported in the NC8 of Sweden 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**

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

90. Sweden has provided support that it considers to be “new and additional”. In the context of Sweden’s efforts to continue channelling 1 per cent of gross national income to official development assistance, Sweden considers all climate-related support to be “new and additional”. Sweden has an extensive and continuous QA process in place to determine the climate-specific character of the resources provided.

91. Sweden reported on the support that it has provided to non-Annex I Parties, distinguishing between support for mitigation and adaptation activities, as well as cross-cutting support. For its bilateral support, Sweden uses the OECD DAC Rio markers to distinguish between mitigation and adaptation support. For its multilateral support, Sweden identified its contributions to the Least Developed Countries Fund and the Adaptation Fund as adaptation support, and other multilateral support as cross-cutting.

92. Sweden’s national approach to tracking the provision of support, including information on indicators, delivery mechanisms used and allocation channels tracked, is the same as that used for the NC7 and BR4. The approach is comprehensive and detailed and prioritizes QA. These efforts are coordinated by the Swedish Environmental Protection Agency with inputs from other ministries and agencies, including SIDA, the Swedish Energy Agency, the Ministry of Foreign Affairs and Swedfund (Sweden’s development finance institution).

93. Sweden’s methodology and underlying assumptions used for collecting and reporting information on financial support differ across channels and are aligned with those of other EU member States. For its bilateral support, Sweden uses the OECD DAC Rio markers and applies standard coefficients to attribute support across themes in order to track the synergies between mitigation and adaptation while minimizing over-counting and ensuring that there is no double counting. For its multilateral support, Sweden attributes the climate-specific share of core general support provided to relevant multilateral institutions using imputed multilateral shares of climate-specific finance calculated by OECD DAC. Since its NC7 and BR4, Sweden has continued to engage in efforts among EU member States to improve the harmonization of reporting on financial support. Sweden uses the same underlying data for reporting to both the EU and the UNFCCC and any discrepancies between data sets are due to continued QA efforts over time.

94. Sweden reported that it experiences challenges in the tracking and monitoring of support and continues to take steps to overcome such challenges. With regard to tracking support, Sweden noted the challenges it faces in systematically collecting, tracking and compiling data from multiple ministries and agencies, as well as the resource-intensive nature of performing QA. With regard to monitoring, Sweden noted that it is difficult and resource-intensive to collect detailed information on the implementation and results of projects.

#### **(b) Financial resources**

95. Sweden 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 disbursed, allocation channels and annual contributions. Sweden’s support strategy is informed by the principles of the Busan Partnership for Effective Development Cooperation, as well as national ownership by recipient countries.



96. Sweden described how it seeks to ensure that the resources it provides to non-Annex I Parties effectively address their adaptation and mitigation needs. During the review, Sweden emphasized that it is committed to aligning its development cooperation with the goals of the Paris Agreement and noted that, in line with the principles of the Busan Partnership for Effective Development Cooperation, its approach to climate support focuses on ownership, results, partnerships and transparency. Sweden also noted that SIDA follows a multidimensional approach to addressing poverty, which includes assessing climate aspects, and uses the nationally determined contributions and national adaptation plans of non-Annex I Parties as a basis for integrating countries' priorities and investment needs into its strategies and portfolios. Table 11 summarizes the information reported by Sweden on its provision of financial support.

Table 11

**Summary of information on provision of financial support by Sweden in 2019–2020**

(Millions of United States dollars)

<i>Allocation channel of public financial support</i>	<i>Disbursement in 2019–2020</i>
Official development assistance	11 020.00
Climate-specific contributions through multilateral channels, including:	672.35
Global Environment Facility	84.25
Least Developed Countries Fund	27.86
Adaptation Fund	27.86
Green Climate Fund	209.76
Trust Fund for Supplementary Activities	0.61
Financial institutions, including regional development banks	322.01
Climate-specific contributions through bilateral, regional and other channels	971.28

*Sources:* Sweden's BR5 CTF tables and NC8.

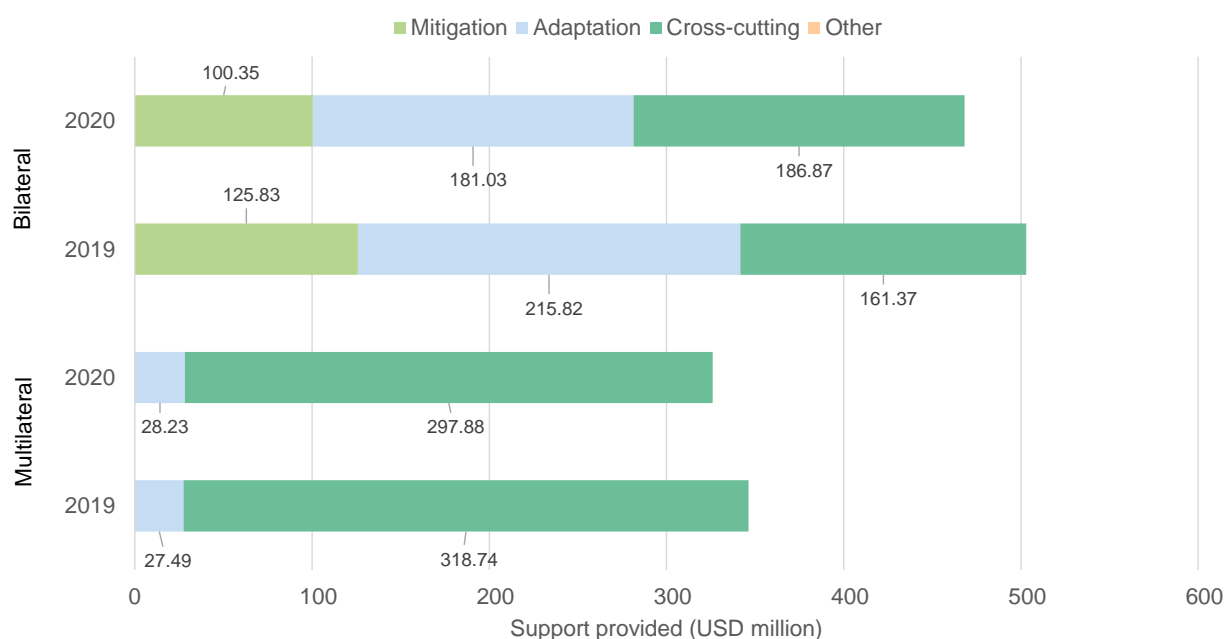
97. Sweden's climate-specific public financial support<sup>8</sup> totalled USD 1.64 billion in 2019–2020, representing an increase of 38.3 per cent since the BR4 (2017–2018).<sup>9</sup> With regard to future financial pledges aimed at enhancing the implementation of the Convention by developing countries, Sweden has pledged to double climate aid to SEK 15 billion by 2025 compared with the 2019 level.

98. Sweden contributed through multilateral channels USD 672.35 million in 2019–2020. The contributions were made to specialized multilateral climate change funds, including the Global Environment Facility, the Least Developed Countries Fund, the Adaptation Fund and the Green Climate Fund, as well as through financial institutions including regional development banks. Since its BR4, Sweden's contributions through multilateral channels have risen significantly, driven by contributions to the Green Climate Fund in 2019 and 2020, as well as the strong climate-related performance of the World Bank in 2020. 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>8</sup> For the remainder of this chapter, the term "financial support" means climate-specific financial support, unless otherwise noted.

<sup>9</sup> Comparisons with data from previous years have been calculated directly without adjusting for inflation.

Figure 3  
Provision of support by Sweden in 2019–2020



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

Table 12  
Summary of information on channels of financial support reported by Sweden  
(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) (%)
Detailed information by type of channel				
Multilateral channels				
Mitigation	0.00	0.00	–	–
Adaptation	55.72	66.15	–15.8	8.3
Cross-cutting	616.62	348.70	76.8	91.7
Other	0.00	0.00	–	–
<b>Total multilateral</b>	<b>672.34<sup>b</sup></b>	<b>414.86</b>	<b>62.1</b>	<b>100.0</b>
Bilateral channels				
Mitigation	226.18	197.62	14.5	23.3
Adaptation	396.85	343.95	15.4	40.9
Cross-cutting	348.24	232.18	50.0	35.9
Other	0.00	0.00	–	–
<b>Total bilateral</b>	<b>971.28</b>	<b>773.75</b>	<b>25.5</b>	<b>100.0</b>
<b>Total multilateral and bilateral</b>	<b>1 643.62</b>	<b>1 188.61</b>	<b>38.3</b>	<b>100.0</b>

Sources: Sweden's BR5 CTF tables 7, 7(a) and 7(b), and the report on the technical review of the BR4 of Sweden for 2017–2018 data.

<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.

<sup>b</sup> Differs from the value in table 11 owing to rounding of the amounts allocated to the different types of support.

99. Sweden reported detailed information on the total financial support provided through bilateral and regional channels (USD 971.28 million) in 2019–2020. During the reporting period, Sweden placed a particular focus on African countries, notably Burkina Faso, Kenya, Mozambique and Somalia. Mozambique, for example, received the most bilateral support in both 2019 and 2020, totalling USD 47 million.

100. 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 23.3, 40.9 and 35.9 respectively. Sweden included highly detailed subsectoral information for support provided in 2019–2020 through bilateral and regional channels, with the highest proportion of financing allocated to general environmental protection, cross-cutting multisectoral activities, energy and agriculture. The ERT noted that all financial support reported by Sweden was in the form of grants, excluding other official flows related to the cancellation of certified emission reductions.

101. Sweden demonstrated an advanced capacity for reporting on private finance mobilized at the activity level, identifying a number of guarantees provided by SIDA and the corresponding private finance mobilized, as well as several portfolio companies invested in by Swedfund using equity and debt instruments. Sweden explained that it uses the methodology outlined by OECD DAC in official reporting directives to attribute finance mobilized and provided numerous examples of successful private finance mobilization activities for mitigation and adaptation activities in non-Annex I Parties. For example, in 2020, Swedfund invested USD 12 million in the Solar Energy Transformation Fund, which contributes to improving energy access and climate change mitigation in sub-Saharan Africa through off-grid solar energy plant, mobilizing a further USD 2.2 million from other development finance institutions, philanthropic sources and private investors.

102. A further example of Sweden’s support is the Inclusive Green Economy programme, which works in Ethiopia, Kenya, Rwanda, Uganda and the United Republic of Tanzania to shift towards an inclusive green economy by enhancing governmental capacities to successfully combine environmentally friendly and economically successful policies. Sweden also provides support for the Rwandan National Climate and Environment Fund, which aims to mobilize domestic and international investments in climate action by supporting efforts to improve the skills of national stakeholders and civil society organizations in designing project proposals and developing bankable projects for future financing under the Fund.

103. Sweden has also been a champion for and placed continuous focus on activities that emphasize gender equality integration. Sweden uses the OECD DAC Rio marker for gender equality for tracking and reporting on gender equality integration throughout its bilateral climate-related support, and considers all activities marked as contributing to both climate and gender objectives to be gender integrated. In 2020, for example, 79 per cent of climate-related support provided to SIDA was considered to be gender integrated. Sweden was also a strong proponent of gender-responsive action through its multilateral support, including contributing to the development and adoption of the Gender Policy of the Green Climate Fund in 2019.

**(c) Technology development and transfer**

104. Sweden 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. One example of support provided for the deployment and enhancement of the endogenous capacities and technologies of non-Annex I Parties is Sweden’s partnership with India, including through the India–Sweden Innovations Accelerator, which has led to more than 50 Swedish small and medium-sized enterprises entering the Indian market, resulting in the introduction of 15 Swedish innovative technologies for sustainable energy systems between 2017 and 2020. As part of efforts under the India–Sweden Innovations Accelerator, a number of workshops have been organized to showcase how Swedish green energy solutions can be adapted and used in an Indian context.

105. Sweden explained in its NC8 that its provision of technology transfer support is often integrated with capacity-building support and includes support related to mitigation and adaptation technologies, covers a range of sectors and both hard and soft technologies, and supports actors across multiple regions and contexts.

106. Since its last NC and BR, Sweden has planned and implemented additional measures and activities. Sweden 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 notable example is the support provided by SIDA through its Demo Environment challenge fund, which is aimed at increasing technology development and transfer to developing countries, including to enhance the ability of communities to adapt to climate change. The Demo Environment challenge fund has been particularly successful owing to its early-stage project support facility, including for feasibility studies and demonstrations, which has assisted with creating new business opportunities, knowledge and skills that have enabled the dissemination of clean technologies beyond direct programme partners.

107. Sweden noted that it experiences challenges with regard to tracking and monitoring technology development and transfer activities, particularly for multi-year initiatives where it can be difficult and resource-intensive to identify specific activities implemented under larger-scale initiatives and their results.

**(d) Capacity-building**

108. Sweden 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. One notable example is Sweden's partnership with Bosnia and Herzegovina, where support was provided to develop the country's Environmental Strategy and related action plans, thereby contributing directly to building capacities to promote climate resilience and disaster risk reduction.

109. Sweden has supported climate-related capacity development activities relating to adaptation and mitigation. Since the BR4, the focus of Sweden's support has remained the same. Sweden noted that, through SIDA, capacity-building efforts have been integrated into the core of development operations at the organizational, individual and institutional framework level. This includes initiatives where building capacities related to climate change is the main objective, as well as activities in other sectors where efforts are made to integrate climate change considerations.

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

110. The ERT assessed the information reported in the NC8 and BR5 of Sweden and identified issues relating to completeness and 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.

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

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

111. In its NC8 Sweden reported its activities, actions and programmes undertaken in fulfilment of its commitments under Article 10 of the Kyoto Protocol. Sweden 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. SIDA plays a key role in providing and mobilizing financial, technological and capacity-building support to developing countries. It provides the majority of Sweden's financial support and has mainstreamed capacity-building aspects throughout its operations. When a support project is designed, the needs, priorities and strategies of recipient countries and organizations are considered through a collaboration between SIDA and the implementing partner.

112. Sweden provided information on its implementation of Article 11 of the Kyoto Protocol. Sweden has exceeded the United Nations international development aid goal of 0.7 per cent of gross national income and continues to channel 1 per cent of gross national income to official development assistance. The Party described how its contributions are "new and additional" (see para. 90 above).

113. Sweden reported on its financial contributions to the Adaptation Fund, which consisted of USD 13,744,977.80 disbursed in 2019 and USD 14,115,092.29 disbursed in 2020.

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

114. The ERT assessed the information reported in the NC8 of Sweden 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**

115. In its NC8 Sweden 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. Sweden provided a comprehensive description of climate change vulnerability and expected impacts on physical systems (e.g. shrinkage of glaciers, decrease in snow cover, longer growing season and more intense rainfall), biodiversity systems (changes in species distribution, changes in the lifecycle of many species, sudden disruptions of biodiversity and species distribution, invasive alien species) and socioeconomic systems (agriculture and food security, energy, transport, building infrastructure, insurance and businesses).

116. Sweden is addressing adaptation matters through efforts at the national, regional and municipal level. At the national level, the National Adaptation Strategy was adopted in 2018, which identifies priority areas for adaptation action, including landslides, erosion, flooding, high temperatures and water shortage. In 2020, the Government initiated the Climate Change and Sustainable Development – Research and Innovation for Climate Change Adaptation and Mitigation programme focusing on research in sustainable land use, biodiversity conservation, water management and energy transition. The Climate Adaptation Action Plan 2030, adopted in 2021, outlines measures to foster resilience, such as improved water management, sustainable land practices, biodiversity protection and enhanced infrastructure design. In addition, the report of the National Expert Council for Climate Adaptation, published in 2022, provides vital recommendations, as well as prioritization of adaptation measures, an assessment of societal impacts and an evaluation of national progress in climate change adaptation efforts. At the regional level, the county administrative boards are responsible for coordinating regional adaptation actions and supporting local actors in their adaptation work, while municipalities are responsible for many operations at the local level such as physical planning and infrastructure for water, emergency services, health and social care, schools and childcare. Many municipalities have their own adaptation strategies and plans.

117. Sweden has identified numerous areas of vulnerability and proposed corresponding adaptation measures. The vulnerability assessment report, prepared in 2005 and reviewed in 2015, proposes adaptation actions that are revised every five years by the Swedish National Expert Council for Climate Adaptation, which submits a report on its recommendations to the Government. The first such report was submitted in 2022. Table 13 summarizes the information on vulnerability and adaptation to climate change presented in the NC8 of Sweden.

Table 13

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

<i>Vulnerable area</i>	<i>Examples/comments/adaptation measures reported</i>
Agriculture	Vulnerability: Increased need for irrigation, risk of pests, diseases and invasive non-native species affecting crops, livestock and other agricultural products.

<i>Vulnerable area</i>	<i>Examples/comments/adaptation measures reported</i>
	Adaptation: Promoting sustainable land-use practices, improving water management, promoting greater diversity of crops and plant varieties, extending the use of integrated pest management practices and introducing agroforestry.
Dam safety	Vulnerability: Possible dam failure due to increases in run-off and extreme floods. Adaptation: The Swedish Dam Safety Authority is responsible for ensuring the safety of dams in the country. It conducts regular inspections of dams and requires dam owners to develop emergency plans in case of dam failure.
Forestry	Vulnerability: Increased risk of forest fires, pests and diseases. Adaptation: Promoting sustainable forest management practices, protecting and sustainably managing biodiversity and supporting research and innovation in forestry. Sweden presented some case studies of adaptation actions, such as the trialling of an agroforestry farm in Uppland, the development of a climate adaptation plan for Malmö, and implementation by the Swedish Transport Administration of an initiative to plant trees close to railway tracks to decrease the risk of damage caused by landslides, erosion and flooding, thereby increasing the robustness of the transport system.
Infrastructure	Vulnerability: Flooding, landslides, erosion and rising sea levels. Adaptation: Stabilizing and reinforcing measures to counter landslides, and measures to manage stormwater through delay and retention of water flows such as dams, reservoirs and rain gardens, as well as through removal of impervious surfaces.

118. Sweden provided a detailed description of international adaptation activities, including through its participation in the Consultative Group on International Agricultural Research, which is a global research partnership working to adapt agriculture to climate change, and the Consortium of Humanities Centers and Institutes, which provides support for humanities research. SIDA supports many initiatives in developing countries, including by providing funding for initiatives on forest management and climate in South-East Asia. Sweden also provided information on bilateral cooperation with developing countries on adaptation, such as its involvement in the Belmont Forum on Ocean Sustainability, the International Science Programme, the Grand Challenges in Africa initiative within the African Academy of Sciences, the Science Granting Councils Initiative in Africa, The World Academy of Sciences and the Organization for Women in Science for the Developing World.

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

119. The ERT assessed the information reported in the NC8 of Sweden 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.

### **I. Research and systematic observation**

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

120. Sweden 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. Sweden has a well-established general policy and provided information on funding relating to research and systematic observation and both domestic and international activities.

121. Sweden participates in several international research networks that provide open access to data. The Party did not identify any specific barriers to free and open international exchange of data and information. Since 2012, all environmental monitoring data are free to use, reuse, distribute and aggregate.

122. Sweden has developed research strategies and implemented several research projects that support innovation in mitigation and adaptation and is undertaking an extensive range of climate research initiatives. Developments since the NC7 include the Strategic Innovation

Programmes initiative, a public–private partnership that invests in strategic research and innovation; and the Government’s Innovation Partnership, which is structured into four programmes addressing climate-neutral industry, skills supply and lifelong learning, digital transformation of industry, and health and life sciences, all while enhancing Sweden’s competitiveness. In Sweden, research and systematic observation are funded through various sources, with companies and foundations playing a significant role. After the pandemic, the Government decided to increase funding for research and innovation through the research and innovation bill “Research, freedom, future”, proposing a 10-year research programme with a 10 per cent increase in core funding in 2021–2024.

123. Sweden participates in many research initiatives at the national, regional (i.e. Nordic and European collaboration) and global level. For example, at the national level, the Swedish Energy Agency, Formas (a Swedish research council for sustainable development) and Vinnova (the Swedish Agency for Innovation Systems) jointly co-finance a total of 17 Strategic Innovation Programmes where businesses, academia and organizations collaborate to develop sustainable products and services. At the global level, besides its involvement in the activities of the Intergovernmental Panel on Climate Change, Sweden collaborates with many organizations, such as the World Climate Research Programme, the International Science Council, the International Arctic Science Committee, the Scientific Committee on Antarctic Research, the International Ocean Discovery Program and the International Institute for Applied Systems Analysis. Sweden reported on its national research infrastructures, namely ICOS Sweden, SITES and ACTRIS Sweden, which collectively contribute to global observation systems and national data management efforts. ICOS Sweden focuses on GHG measurements, providing high-quality data for a comprehensive understanding of GHG emission balances. SITES conducts systematic terrestrial and limnological field research to study climate-related land use. ACTRIS Sweden collaborates with ICOS Sweden and SITES, specializing in research on aerosols, clouds and trace gases.

124. In terms of activities related to systematic observation, Sweden plays a vital role in coordinating Arctic and Antarctic observations through the International Arctic Science Committee and the Scientific Committee on Antarctic Research. Furthermore, the Swedish Meteorological and Hydrological Institute and Stockholm University participate in the Integrated Arctic Observation System project (known as INTAROS), working towards a unified and enhanced Arctic observation system.

125. Sweden reported on several initiatives to support developing countries in the area of systematic observation; for example, the Rossby Centre at the Swedish Meteorological and Hydrological Institute has prepared regional climate change projections for many different world regions including Africa, the Middle East and North Africa, South Asia, and South and Central America. Results from these scenarios are also used by climate scientists and for work related to climate change adaptation in developing countries. The Swedish Government also co-funds the Western Indian Ocean Marine Science Association, which undertakes research in modelling the effects of climate change on the distribution of fishery species in the ocean.

126. The ERT noted that the significant outcomes achieved by Sweden in research and systematic observation reflect the institutional arrangements that ensure a long-term, predictable and stable policy framework, providing the necessary support for science and innovation.

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

127. The ERT assessed the information reported in the NC8 of Sweden 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.

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

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

128. In its NC8 Sweden provided information on its actions relating to education, training and public awareness. Sweden provided information on the general policy on education, training and public awareness; the integration of sustainable development into syllabuses and curricula of 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. Since the NC7, Sweden has conducted a public awareness survey with comprehensive coverage of climate change related themes, which will assist institutions in better directing their actions.

129. The ERT noted that the comprehensive coverage of various themes using many different channels greatly contributes to a better understanding and use of information on climate change. Conclusions drawn from the numerous surveys conducted indicate a high level of public awareness, with an engaged public that is keen to be well informed. In addition to government agencies and research institutes, a wide spectrum of civil society organizations is actively engaged in climate discussions and in proposing and implementing related actions.

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

130. The ERT assessed the information reported in the NC8 of Sweden 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**

131. The ERT conducted a technical review of the information reported in the NC8 of Sweden 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 Sweden.

132. The information provided in the NC8 includes all elements of the supplementary information under Article 7, paragraph 2, of the Kyoto Protocol. Sweden reported on the national system, the national registry, supplementarity relating to the 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 Sweden in its 2022 annual submission.

133. The ERT conducted a technical review of the information reported in the BR5 and BR5 CTF tables of Sweden 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; and the progress of Sweden towards achieving its target and the Party's provision of support to developing country Parties.

134. In its NC8 Sweden reported on its key national circumstances related to GHG emissions and removals, including 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. Electricity production in Sweden is largely based on hydropower and nuclear power, with an increasing share of wind power. Sweden's industry, which makes use of domestic resources,



is focused on extracting and processing raw materials such as forest products (wood products, paper and pulp), as well as iron and steel.

135. Sweden's total 2021 GHG emissions excluding LULUCF were estimated to be 33.1 per cent below its 1990 level using GWP values from the AR5. Emissions peaked in 1996 and have been on a downward trend since the late 1990s. The changes in total emissions were driven mainly by factors such as the transition from oil-fuelled heating in buildings to heat pumps and district heating, as well as the increased use of biofuels in road transport and the reduction in landfilling of waste.

136. As reported in the BR5, under the Convention Sweden 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 covers 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 are not included. Under the ESD Sweden has a target of reducing its emissions by 17 per cent below the 2005 level by 2020. Sweden has met this target (see para. 34 above).

137. In addition to its ESD target, Sweden committed to achieving a domestic target of a 40 per cent reduction in emissions below the 1990 level by 2020 (see para. 35 above).

138. 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. Sweden also has longer-term targets of reducing emissions from sectors not covered by the EU ETS by 63 per cent below the 1990 level by 2030 and by at least 75 per cent by 2040. Sweden's target is to release net zero GHG emissions into the atmosphere by 2045 and to achieve negative emissions thereafter.

139. 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 Sweden 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 do not exceed its AEA for 2020 (see para. 34 above).

140. The GHG emission projections provided by Sweden in its NC8 and BR5 correspond to the WEM scenario. Under the WEM scenario, emissions in 2030 are projected to be 39.5 per cent below the 1990 level and 6.6 per cent below the 2020 level. The emissions in 2040 are projected to be 44.9 per cent below the 1990 level and 14.9 per cent below the 2020 level.

141. Sweden's main policy framework relating to energy and climate change is the National Climate Policy Framework. The Party described the mitigation actions that it has implemented to help it achieve its 2020 and longer-term targets, which include reducing emissions from domestic transport by at least 70 per cent by 2030 compared with the 2010 level; reducing emissions from sectors not covered by the EU ETS by at least 63 per cent below the 1990 level by 2030 and by at least 75 per cent by 2040; releasing net zero emissions into the atmosphere by 2045 at the latest and net negative emissions thereafter; and reducing emissions from activities in Sweden by 85 per cent below the 1990 level by 2045. Sweden's main PaMs combine taxes, support schemes and legislation, with the most significant PaMs being the EU ETS and the country's CO<sub>2</sub> tax. The CO<sub>2</sub> tax contributed the most to Sweden's emission reduction efforts since the early 1990s and the EU ETS is currently the main climate policy instrument addressing Swedish industry. More recently, Sweden has placed a particular emphasis on new measures such as Climate Leap, Industrial Leap and the Fossil-Free Sweden initiative and BECCS – the key national PaMs which are projected to deliver a significant GHG emission reduction impact and could be replicable by other Parties.

142. Sweden has continued to provide and mobilize climate financing for developing countries. It has increased its contributions by 38.3 per cent since the BR4; its public financial support in 2019–2020 totalled USD 1.64 billion. For those years, Sweden provided 58.7 per cent of its support for cross-cutting activities that supported both mitigation and adaptation objectives, 27.5 per cent for adaptation and 13.8 per cent for mitigation. The largest share of

Sweden's bilateral support through SIDA went to projects and programmes targeted at general environmental protection, cross-cutting multisectoral activities, energy and agriculture. An example of this support is the Inclusive Green Economy programme, which operates in Ethiopia, Kenya, Rwanda, Uganda and the United Republic of Tanzania to promote the shift towards an inclusive green economy by enhancing governmental capacities to combine environmentally friendly and economically successful policies.

143. Sweden continued to provide support for technology development and transfer and capacity-building. Priority for technological support was given to projects and programmes in both mitigation and adaptation (e.g. in Burkina Faso and India). Over time, Sweden's focus on industry transitions and innovation has increased. Priority for capacity-building support was given to projects and programmes in mitigation and adaptation (e.g. in Rwanda and Zambia). Over time, the focus has remained the same, with capacity-building efforts built into the core of the development operations of SIDA.

144. In its NC8 Sweden provided information on the expected impacts of climate change in the country; the adaptation policies covering local, regional and national vulnerabilities to address the impact of climate change on the physical, biological and socioeconomic systems; and an outline of the action taken to implement Article 4, paragraph 1(b) and (e), of the Convention with regard to adaptation. Sweden has a climate adaptation structure in place that addresses challenges on physical systems (e.g. wildfires, droughts, heatwaves), biodiversity systems (e.g. changes in species distribution, invasive species) and socioeconomic systems (e.g. food security, energy, building infrastructure). This structure integrates actions across governmental institutions at all levels, as well as across public–private partnerships, scientific institutes and other non-governmental organizations, whose participation in many regional and global initiatives is noteworthy.

145. In its NC8 Sweden provided information on its activities relating to research and systematic observation. Sweden is leading and participating in a wide range of high-quality research efforts at the national, regional and global level and provides open access to data. In the field of research and systematic observation, Sweden has put in place institutional arrangements that ensure a long-term, predictable and stable policy framework, providing the necessary support for science and innovation.

146. In its NC8 Sweden provided information on its actions relating to education, training and public awareness. Regular surveys are conducted, which confirm a high level of public awareness, thereby demonstrating the success of education efforts undertaken in Sweden. The public and non-governmental organizations across society are well informed on the topic of climate change and participate actively, contributing to the discussion in many ways through multiple approaches.

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

- (a) To improve the completeness of its reporting by:
  - (i) Providing information on the estimated total effect of implemented and adopted PaMs in the agricultural sector (see issue 3 in table I.1);
  - (ii) Providing information on the total effect of PaMs in terms of GHG emissions avoided or sequestered by gas (see issue 5 in table I.1);
  - (iii) Providing information on the support it has provided for the purpose of assisting non-Annex I Parties in relation to any economic or social consequences of response measures (see issue 1 in table I.2);
- (b) To improve the transparency of its reporting by:
  - (i) Ensuring consistency between the values reported for the total effect of implemented and adopted PaMs in the chapter of the NC on projections and the total estimated mitigation impacts in the chapter on PaMs (see issue 4 in table I.1);
  - (ii) Providing additional information on the measures and programmes related to technology transfer implemented or planned since the previous NC, including in

particular for activities reported in multiple reports to the UNFCCC (see issue 2 in table I.2);

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

148. In the course of the review of Sweden'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 support Sweden has provided for the purpose of assisting non-Annex I Parties in relation to any economic and social consequences of response measures (see issue 1 in table II.2);

(b) To improve the transparency of its reporting by providing more detailed information on the measures and programmes related to technology transfer implemented or planned, including in particular, for activities reported in multiple reports to the UNFCCC (see issue 3 in table II.2);

(c) To improve timeliness of its reporting (see para. 7 above).

## Annex I

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

Tables I.1–I.2 summarize the ERT assessment of adherence to the UNFCCC reporting guidelines on NCs for Sweden’s NC8.

Table I.1

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

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 25 Issue type: completeness Assessment: encouragement	Sweden did not report WOM scenario projections in its NC8 and did not provide an explanation for doing so. During the review, Sweden explained that the WOM scenario projections were not included because it needs advanced models which are not available owing to resource constraints. The ERT noted that the existing TIMES-Nordic optimization model was developed to cover CO <sub>2</sub> emissions and the energy sector and could be expanded. The ERT encourages the Party to improve the completeness of its reporting by providing WOM scenario projections or an adequate explanation for not doing so in its next NC. One option could be to prepare the WOM scenario projections by expanding the TIMES-Nordic model to cover all gases and sectors using an available integrated model such as the Global Change Assessment Model or the National Energy Modelling System.
2	Reporting requirement specified in paragraph 32 Issue type: completeness Assessment: encouragement	In its NC8, Sweden did not report projections of indirect GHG emissions, although the activity data required to estimate these projections are available. During the review, Sweden explained that the projections were not included in the NC8 in order to avoid double reporting. Information on the projections on air pollution, including indirect GHG emissions, can be found in reports submitted under the Convention on Long-range Transboundary Air Pollution and to the EU under the directive on the reduction of national emissions of certain atmospheric pollutants (2016/2284). The ERT encourages the Party to improve the completeness of its reporting by including projections of indirect GHG emissions in its next NC.
3	Reporting requirement specified in paragraph 36 Issue type: completeness Assessment: recommendation	Sweden did not include in its NC8 the estimated total effect of implemented and adopted PaMs in the agriculture sector, although five implemented PaMs in the agriculture sector were reported in the “Summary of policies and measures” in chapter 4. During the review, Sweden explained that it is aware of the recommendations made in the previous review report to expand the analysis of mitigation effects to include the total effect of implemented and adopted PaMs in the agriculture sector and explained that, owing to resource constraints, this task has not yet been prioritized but it aims to do so for future submissions. The ERT reiterates the recommendation made in the previous review report that Sweden include the estimated total effect of implemented and adopted PaMs in the agriculture sector.
4	Reporting requirement specified in paragraph 36 Issue type: transparency Assessment: recommendation	The ERT noted an inconsistency regarding the estimates of the total effect of implemented and adopted PaMs reported in its NC8 on projections (table 5.20) and on PaMs (table 4.6). During the review, Sweden acknowledged the discrepancies and indicated that it will make efforts to provide consistent data using the same method in future submissions to improve consistency. The ERT recommends that Sweden ensure consistency between the values reported for the total effect of implemented and adopted PaMs in the chapter of the NC on projections and the total estimated mitigation impacts in the chapter on PaMs.

<i>No.</i>	<i>Reporting requirement, issue type and assessment</i>	<i>Description of the finding with recommendation or encouragement</i>
5	Reporting requirement specified in paragraph 37 Issue type: completeness Assessment: recommendation	Sweden reported the estimated aggregated effects of PaMs implemented by sector in NC8 table 5.20, but the aggregated effects of PaMs by gas were not reported. During the review, Sweden explained that it did not have the necessary resources to prioritize the development of these data and that it is mainly CO <sub>2</sub> that is affected. However, Sweden acknowledged that improvements could be made in reporting by gas, and that it intends to provide this information in future submissions. The ERT reiterates the recommendation made in the previous review report that Sweden report the total effect of PaMs in terms of GHG emissions avoided or sequestered by gas.
6	Reporting requirement specified in paragraph 40 Issue type: completeness Assessment: encouragement	Sweden did not report information on the strengths and weaknesses of the models or approaches used for the projections and on overlaps and synergies between PaMs. During the review, Sweden explained that information on strengths and weaknesses and overlaps and synergies was not available, and that it intends to provide this information in future submissions. The ERT reiterates the recommendation made in the previous review report that encourages Sweden to improve the completeness of its reporting by presenting information on the strengths and weaknesses of the models or approaches used for the projections and on overlaps and synergies between PaMs.
7	Reporting requirement specified in paragraph 42 Issue type: transparency Assessment: encouragement	Sweden did not explicitly explain in its NC8 the changes in the methods used for the projections since its previous NC, although the changes in the key assumptions were clearly described. During the review, Sweden explained that there have not been any changes in the methods used for the projections since the previous NC. The ERT encourages Sweden to improve the transparency of its reporting by stating the changes, if any, in the methods used for the projections since the previous NC, or confirming that there have not been any changes.

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

<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 52 Issue type: completeness Assessment: recommendation	Sweden did not include information in its NC8 on the financial support it has provided for the purpose of assisting non-Annex I Parties with regards to any economic and social consequences of response measures. During the review Sweden acknowledged that its reporting could be improved in this area. The ERT recommends that Sweden include information on the support it has provided for the purpose of assisting non-Annex I Parties in relation to any economic and social consequences of response measures.
2	Reporting requirement specified in paragraph 58 Issue type: transparency Assessment: recommendation	In its NC8, Sweden provided information on measures and programmes related to technology transfer implemented or planned since its previous NC but did not clearly specify which activities have been implemented since its previous NC, noting that some activities were reported previously. During the review, Sweden noted that it was challenging to provide specific activity-level information for multi-year programming which spans multiple reporting cycles. The ERT recommends that Sweden enhance its reporting of information on the measures and programmes related to technology transfer implemented or planned since the previous NC, including in particular for activities reported in multiple reports to the UNFCCC.

*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.

## Annex II

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

The BR5 of Sweden 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.2 summarize the ERT assessment of adherence to the UNFCCC reporting guidelines on BRs for Sweden’s BR5.

Table II.1  
Findings on projections reported in the fifth biennial report of Sweden

No.	<i>Reporting requirement and issue type</i>	<i>Description of the finding with recommendation or encouragement</i>
1	Reporting requirement <sup>a</sup> specified in paragraph 25 Issue type: completeness Assessment: encouragement	Sweden did not report WOM scenario projections in its BR5 and did not provide an explanation for this.  During the review, Sweden explained that the WOM scenario projections were not included because it needs advanced models to do so and that there are difficulties in reporting on the WOM scenario using the existing models.  The ERT encourages the Party to provide WOM scenario projections or an adequate explanation for not doing so in its next submission. One option could be to expand on the WOM scenario results from the TIMES-Nordic optimization model, which provides an example of the contribution of one gas (CO <sub>2</sub> ) and one sector (energy), to cover all gases and sectors using an available integrated model such as the Global Change Assessment Model or the National Energy Modelling System.
2	Reporting requirement <sup>a</sup> specified in paragraph 32 Issue type: completeness Assessment: encouragement	Sweden did not report projections of indirect GHG emissions in the BR5 and CTF tables.  During the review, Sweden explained that in order to avoid double reporting, information on the projections of air pollution, including indirect GHG emissions, can be found in reports submitted under the Convention on Long-range Transboundary Air Pollution and to the EU under the directive on the reduction of national emissions of certain atmospheric pollutants (2016/2284) and are not included in the BR.  The ERT encourages the Party to include projections of indirect GHG emissions in future submissions, as the information is available based on the same activity data as those used to prepare the projections of GHG emissions.
3	Reporting requirement specified in paragraph 40 Issue type: completeness Assessment: encouragement	Sweden did not report information on the strengths and weaknesses of the models or approaches used for the projections and on overlaps and synergies between PaMs.  During the review, Sweden explained that information on strengths and weaknesses and overlaps and synergies was not available, and that it intends to provide this information in future submissions.  The ERT reiterates the recommendation made in the previous review report that encourages Sweden to present information on the strengths and weaknesses of the models or approaches used for the projections and on overlaps and synergies between PaMs.

<sup>1</sup> The COP, 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>
4	Reporting requirement <sup>b</sup> specified in paragraph 12  Issue type: transparency  Assessment: encouragement	Sweden did not explicitly explain in its BR5 the changes in the models or methodologies used for the projections since its previous BR, although the changes in the key assumptions were clearly described.  During the review, Sweden explained that there have not been any changes in the models or methodologies used since the previous BR.  The ERT encourages Sweden to include information on any changes in the models or methodologies used for the projections since the previous BR or confirming that there have not been any changes.

*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.

<sup>a</sup> 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.

<sup>b</sup> Item listed under reporting requirement refers to the relevant paragraph of the UNFCCC reporting guidelines on BRs.

Table II.2

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

<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 17  Issue type: completeness  Assessment: recommendation	Sweden did not include information in its BR5 on the financial support it has provided for the purpose of assisting non-Annex I Parties in relation to any economic and social consequences of response measures.  During the review, Sweden acknowledged that its reporting could be improved in this area.  The ERT recommends that Sweden include information on the support it has provided for the purpose of assisting non-Annex I Parties with regards to any economic and social consequences of response measures.
2	Reporting requirement specified in paragraph 20  Issue type: transparency  Assessment: encouragement	The ERT noted an inconsistency between the information reported in the textual part of the NC8/BR5 and that reported in tabular format in CTF table 7(b). For some cases of financial assistance provided, Sweden reported the relevant instruments in CTF table 7(b) as “other”, while stating in the textual part of the NC8/BR5 and in the relevant CTF table documentation boxes that all assistance reported is in the form of grants.  During the review, Sweden confirmed that all financial support reported is in the form of grants, excluding the cancellation of certified emission reductions.  The ERT encourages Sweden to report consistent textual and tabular information on financial instruments used for providing bilateral support, in particular when it relates to “other” instruments such as cancelled certified emission reductions.
3	Reporting requirement specified in paragraph 22  Issue type: transparency  Assessment: recommendation	In its BR5, Sweden provided information on measures and programmes related to technology transfer implemented or planned since its previous BR but did not clearly specify which activities have been implemented since its previous BR, noting that some activities were reported previously.  During the review, Sweden noted that it was challenging to provide specific activity-level information for multi-year programming which spans multiple reporting cycles.  The ERT recommends that Sweden enhance its reporting of information on the measures and programmes related to technology transfer implemented or planned, including in particular, for activities reported in multiple reports to the UNFCCC.

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

2023 GHG inventory submission of Sweden. Available at <https://unfccc.int/ghg-inventories-annex-i-parties/2023>.

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

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

BR5 of Sweden. 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 decision 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>.

National energy and climate plans of Sweden. Available at [https://commission.europa.eu/energy-climate-change-environment/implementation-eu-countries/energy-and-climate-governance-and-reporting/national-energy-and-climate-plans\\_en](https://commission.europa.eu/energy-climate-change-environment/implementation-eu-countries/energy-and-climate-governance-and-reporting/national-energy-and-climate-plans_en).

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

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

Report for Sweden on climate policies and measures and on projections. 2023. Available at <https://www.naturvardsverket.se/4acd41/contentassets/caf14fb0008a41d29b9d51228f874fc/b/report-for-sweden-march-2023.pdf>.

Report on the individual review of the annual submission of Sweden submitted in 2022. FCCC/ARR/2022/SWE. Available at <https://unfccc.int/documents/628120>.

Report on the technical review of the BR4 of Sweden. FCCC/TRR.4/SWE. Available at <https://unfccc.int/documents/228403>.



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 Joel Bengtsson (Swedish Environmental Protection Agency).

---