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## Report on the technical review of the fourth biennial report of Sweden

Developed country Parties were requested by decision 2/CP.17 to submit their fourth biennial report to the secretariat by 1 January 2020. This report presents the results of the technical review of the fourth 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 took place from 16 to 20 March 2020 remotely.

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## 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 fourth biennial report .....	5
A. Information on greenhouse gas emissions and removals related to the quantified economy-wide emission reduction target .....	5
B. Quantified economy-wide emission reduction target and related assumptions, conditions and methodologies .....	6
C. Progress made towards achievement of the quantified economy-wide emission reduction target .....	8
D. Provision of financial, technological and capacity-building support to developing country Parties.....	21
III. Conclusions and recommendations .....	27
Annex	
Documents and information used during the review .....	30

## Abbreviations and acronyms

AEA	annual emission allocation
AR	Assessment Report of the Intergovernmental Panel on Climate Change
BR	biennial report
CH <sub>4</sub>	methane
CO <sub>2</sub>	carbon dioxide
CO <sub>2</sub> eq	carbon dioxide equivalent
CTF	common tabular format
ERT	expert review team
ESD	European Union effort-sharing decision
EU	European Union
EU ETS	European Union Emissions Trading System
F-gas	fluorinated gas
GHG	greenhouse gas
HFC	hydrofluorocarbon
IPPU	industrial processes and product use
LULUCF	land use, land-use change and forestry
NA	not applicable
NC	national communication
NE	not estimated
NECP	National Energy and Climate Plan
NF <sub>3</sub>	nitrogen trifluoride
non-Annex I Party	Party not included in Annex I to the Convention
non-ETS	not covered by the European Union Emissions Trading System
N <sub>2</sub> O	nitrous oxide
OECD DAC	Development Assistance Committee of the Organisation for Economic Co-operation and Development
PaMs	policies and measures
PFC	perfluorocarbon
SEK	Swedish krona (kronor)
SF <sub>6</sub>	sulfur hexafluoride
Sida	Swedish International Development Cooperation Agency
UNFCCC reporting guidelines on BRs	“UNFCCC biennial reporting guidelines for developed country Parties”
UNFCCC reporting guidelines on CTF tables	common tabular format for the “UNFCCC biennial reporting guidelines for developed country Parties”
UNFCCC reporting guidelines on NCs	“Guidelines for the preparation of national communications by Parties included in Annex I to the Convention, Part II: UNFCCC reporting guidelines on national communications”
WAM	‘with additional measures’
WEM	‘with measures’
WOM	‘without measures’

## I. Introduction and summary

### A. Introduction

1. This is a report on the centralized technical review of the BR4<sup>1</sup> 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” (annex to decision 13/CP.20).

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

3. The review was conducted together with the review of five other Parties included in Annex I to the Convention from 16 to 20 March 2020 remotely<sup>2</sup> by the following team of nominated experts from the UNFCCC roster of experts: Parvana Babayeva (Azerbaijan), Souhila Bouilouta (Algeria), Hakima Chenak (Algeria), Kenel Delusca (Haiti), Ryan Deosaran (Trinidad and Tobago), Craig William Elvidge (New Zealand), Raul Jorge Garrido Vazquez (Cuba), Matej Gasperic (Slovenia), Liviu Gheorghe (Romania), Maria Ana Gonzalez Casartelli (Argentina), Yamikani Idriss (Malawi), Jean Claude Kabamba Lungenyi (Democratic Republic of the Congo), Christopher Manda (Malawi), Tendayi Marowa (Zimbabwe), Naoki Matsuo (Japan), Esther Mertens (Belgium), Detelina Petrova (Bulgaria), Mohan Poudel (Nepal), Janis Rekis (Latvia), Orlando Ernesto Rey Santos (Cuba), Kristina Saarinen (Finland), Mayuresh Sarang (Zimbabwe), Marina Shvangiradze (Georgia) and Robin White (Canada). Mr. Gasperic, Ms. Gonzalez Casartelli, Ms. Petrova, Mr. Rey Santos, Ms. Saarinen and Ms. Shvangiradze were the lead reviewers. The review was coordinated by Hajar Benmazhar, Veronica Colerio, Claudia do Valle Costa, Nalin Srivastava, Sevdalina Todorova and Sina Wartmann (secretariat).

### B. Summary

4. The ERT conducted a technical review of the information reported in the BR4 of Sweden in accordance with the UNFCCC reporting guidelines on BRs (annex I to decision 2/CP.17).

#### 1. Timeliness

5. The BR4 was submitted on 19 December 2019, before the deadline of 1 January 2020 mandated by decision 2/CP.17. The CTF tables were submitted on 3 January 2020.

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

6. Issues and gaps identified by the ERT related to the reported information are presented in table 1. The information reported by Sweden in its BR4 mostly adheres to the UNFCCC reporting guidelines on BRs.

Table 1

**Summary of completeness and transparency of mandatory information reported by Sweden in its fourth biennial report**

<i>Section of BR</i>	<i>Completeness</i>	<i>Transparency</i>	<i>Reference to description of recommendation(s)</i>
GHG emissions and removals	Complete	Transparent	NA

<sup>1</sup> The BR submission comprises the text of the report and the CTF tables, which are both subject to the technical review.

<sup>2</sup> Owing to the circumstances related to the coronavirus disease 2019, the technical review of the BR submitted by Sweden had to be conducted remotely.

<i>Section of BR</i>	<i>Completeness</i>	<i>Transparency</i>	<i>Reference to description of recommendation(s)</i>
Quantified economy-wide emission reduction target and related assumptions, conditions and methodologies	Complete	Transparent	NA
Progress in achievement of targets	Mostly complete	Mostly transparent	Issues 1–2 in table 4 Issue 1 in table 6
Provision of support to developing country Parties	Mostly complete	Mostly transparent	Issues 1–4 in table 13

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

## II. Technical review of the information reported in the fourth biennial report

### A. Information on greenhouse gas emissions and removals related to the quantified economy-wide emission reduction target

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

7. Total GHG emissions<sup>3</sup> excluding emissions and removals from LULUCF decreased by 26.1 per cent between 1990 and 2017, whereas total GHG emissions including net emissions or removals from LULUCF decreased by 75.8 per cent over the same period. Table 2 illustrates the emission trends by sector and by gas for Sweden. Note that information in this paragraph and table 2 is based on Sweden’s 2019 annual submission, version 1. All emission data in subsequent chapters are based on Sweden’s BR4 CTF tables unless otherwise noted. The emissions reported in the 2019 annual submission are the same as reported in CTF table 1.

Table 2  
Greenhouse gas emissions by sector and by gas for Sweden for 1990–2017

<i>Sector</i>	<i>GHG emissions (kt CO<sub>2</sub> eq)</i>					<i>Change (%)</i>		<i>Share (%)</i>	
	<i>1990</i>	<i>2000</i>	<i>2010</i>	<i>2016</i>	<i>2017</i>	<i>1990–2017</i>	<i>2016–2017</i>	<i>1990</i>	<i>2017</i>
1. Energy	52 292.57	49 128.01	47 146.60	36 899.65	36 631.72	–29.9	–0.7	73.3	69.6
A1. Energy industries	9 928.14	8 927.84	13 101.15	9 215.96	9 170.40	–7.6	–0.5	13.9	17.4
A2. Manufacturing industries and construction	10 851.16	11 277.78	8 540.09	6 809.84	6 942.41	–36.0	1.9	15.2	13.2
A3. Transport	19 020.01	19 722.64	20 349.08	17 041.87	16 573.12	–12.9	–2.8	26.7	31.5
A4. and A5. Other	12 112.46	8 804.23	4 250.27	3 129.03	3 083.97	–74.5	–1.4	17.0	5.9
B. Fugitive emissions from fuels	380.80	395.53	906.01	702.94	861.81	126.3	22.6	0.5	1.6
C. CO <sub>2</sub> transport and storage	0.00	0.00	0.00	0.00	0.00	–	–	0.0	0.0
2. IPPU	7 610.53	8 358.17	8 391.01	7 854.36	7 588.43	–0.3	–3.4	10.7	14.4
3. Agriculture	7 658.27	7 774.01	6 820.38	6 870.52	7 186.73	–6.2	4.6	10.7	13.6
4. LULUCF	–34 395.62	–36 595.00	–43 946.70	–44 537.75	–43 727.44	27.1	–1.8	NA	NA
5. Waste	3 742.30	3 222.44	1 924.23	1 318.29	1 253.40	–66.5	–4.9	5.2	2.4

<sup>3</sup> In this report, the term “total GHG emissions” refers to the aggregated national GHG emissions expressed in terms of CO<sub>2</sub> eq excluding LULUCF, unless otherwise specified.

	GHG emissions (kt CO <sub>2</sub> eq)					Change (%)		Share (%)	
	1990	2000	2010	2016	2017	1990– 2017	2016– 2017	1990	2017
	6. Other <sup>a</sup>	0.00	0.00	0.00	0.00	0.00	–	–	0.0
<i>Gas<sup>b</sup></i>									
CO <sub>2</sub>	57 445.98	54 677.64	52 845.02	42 582.49	42 049.89	–26.8	–1.3	80.6	79.9
CH <sub>4</sub>	7 421.50	6 840.14	5 242.79	4 553.62	4 518.22	–39.1	–0.8	10.4	8.6
N <sub>2</sub> O	5 759.20	5 700.59	4 807.24	4 569.04	4 870.19	–15.4	6.6	8.1	9.2
HFCs	6.49	769.55	1 135.92	1 149.02	1 138.31	17 446.4	–0.9	0.0	2.2
PFCs	568.78	375.93	187.79	31.18	36.58	–93.6	17.3	0.8	0.1
SF <sub>6</sub>	101.73	118.78	63.46	57.46	47.09	–53.7	–18.1	0.1	0.1
NF <sub>3</sub>	–	–	–	–	–	–	–	–	–
<b>Total GHG emissions excluding LULUCF</b>	<b>71 303.68</b>	<b>68 482.63</b>	<b>64 282.22</b>	<b>52 942.81</b>	<b>52 660.27</b>	<b>–26.1</b>	<b>–0.5</b>	<b>100.0</b>	<b>100.0</b>
<b>Total GHG emissions including LULUCF</b>	<b>36 908.06</b>	<b>31 887.62</b>	<b>20 335.52</b>	<b>8 405.06</b>	<b>8 932.83</b>	<b>–75.8</b>	<b>6.3</b>	<b>NA</b>	<b>NA</b>

Source: GHG emission data: Sweden's 2019 annual submission, version 1.

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

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

8. The decrease in total emissions was driven mainly by the transition from oil-fuelled heating of residential, commercial and institutional premises to using heat pumps and district heating. Other significant drivers were the increase in the use of biofuels for district heating and in combustion in manufacturing industries, and the reduction in landfill gas emissions from the waste sector.

9. In brief, Sweden's national inventory arrangements were established in accordance with the EU monitoring mechanism regulation (regulation 525/2013). At the national level, the legal basis is provided by the ordinance on climate reporting (2014:1434). There have been no changes in these arrangements since the Party's BR3.

## 2. Assessment of adherence to the reporting guidelines

10. The ERT assessed the information reported in the BR4 of Sweden and recognized that the reporting is complete, transparent and thus adhering to the UNFCCC reporting guidelines on BRs. No issues relating to the topics discussed in this chapter of the review report were raised during the review.

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

### 1. Technical assessment of the reported information

11. 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. The EU offered to move to a 30 per cent reduction target on the condition that other developed countries commit to a comparable target and developing countries contribute according to their responsibilities and respective capabilities under a new global climate change agreement.

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

13. The EU 2020 climate and energy package includes the EU ETS and the ESD (see paras. 24–25 below). The EU ETS covers mainly point emissions sources in the energy, industry and aviation sectors. An EU-wide emission cap has been put in place for 2013–2020 with the goal of reducing emissions by 21 per cent below the 2005 level by 2020. Emissions from non-ETS sectors are regulated through member State specific targets that add up to a reduction at the EU level of 10 per cent below the 2005 level by 2020.

14. The European Green Deal, launched in 2019, represents a commitment by the EU to become climate neutral by 2050, and presents a road map that encompasses all sectors of the economy. It calls for increased ambition in the 2030 emission reduction target to at least 50 per cent below the 2005 level. Member States will translate any increased ambition into action through their revised NECP.

15. Sweden has a national target of reducing its total GHG emissions to 17 per cent below the 2005 level by 2020 for emissions under the ESD. 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.<sup>4</sup>

16. In 2009, Sweden set a national target to reduce GHG emissions by 40 per cent below the 1990 level by 2020. This target applies to non-ETS emissions and does not include the LULUCF sector. It is more ambitious than the Swedish target within the joint EU target and Sweden's commitments under the ESD. In addition, under this national 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. Sweden has chosen to express its national target for improved energy efficiency by 2020 as a 20 per cent reduction in energy intensity between 2008 and 2020.

17. Sweden has also set a long-term target to reduce its GHG emissions. In June 2017, the Parliament adopted an ambitious long-term climate policy. The National Climate Policy Framework consists of a Climate Act, new climate targets and a Climate Policy Council. Sweden aims to reduce GHG emissions by at least 85 per cent by 2045 compared with the 1990 level. Supplementary measures, such as increasing the uptake of CO<sub>2</sub> by forests and other land categories and using bioenergy with carbon capture and storage, may count towards achieving zero net emissions. The target includes the requirements that non-ETS GHG emissions in Sweden should be at least 63 and 75 per cent lower than emissions in 1990 by 2030 and 2040, respectively, and that GHG emissions from domestic transport should be at least 70 per cent below the 2010 level by 2030. The ERT commends Sweden for reporting on its ambitious national targets and plans for a fossil-free Sweden.

18. In its BR4 and CTF tables 2(a–f), Sweden reported a description of its target, including associated conditions and assumptions. CTF tables 2(a–f) have been completed on the basis of the combined target of the EU and its member States to reduce GHG emissions by 20 per cent below the 1990 level by 2020. It should be noted that EU member States do not have specific individual targets under the Convention. Further information on the target and the related assumptions, conditions and methodologies is provided in chapter 2 of the Party's BR4.

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

19. The ERT assessed the information reported in the BR4 of Sweden and recognized that the reporting is complete, transparent and thus adhering to the UNFCCC reporting guidelines on BRs. No issues relating to the topics discussed in this chapter of the review report were raised during the review.

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<sup>4</sup> European Commission decision 2017/1471 amended decision 2013/162/EU to revise member States' AEAs for 2017–2020.

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

### **1. Mitigation actions and their effects**

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

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

21. Sweden provided information on a set of PaMs similar to those previously reported. It indicated that there have been no changes since its previous submission to its institutional, legal, administrative and procedural arrangements used for domestic compliance, monitoring, reporting, archiving of information and evaluation of progress towards its target.

22. In its reporting on its PaMs, Sweden did not provide the estimated emission reduction impacts for most of them. Where estimated impacts were not provided, the Party supplied an explanation applicable to all PaMs. Furthermore, Sweden estimated the impacts of some PaMs as groups rather than individually. It explained that, given the large number of PaMs and the fact that many were introduced with objectives other than climate mitigation, it can be difficult to evaluate the mitigation impact of individual measures. The Party also explained that it is often hard to distinguish the effect of any single instrument, as several of the instruments are designed to interact with each other and are also subject to the impact of external changes, such as energy prices. During the review, Sweden further explained that no assessments of the estimated emission reduction impacts of the PaMs additional to those reported in the BR3 had been conducted.

23. Sweden reported on its self-assessment of compliance with its emission reduction targets but did not report on the national rules for taking action against non-compliance. A monitoring and review process has been established at the EU level (the EU monitoring mechanism regulation) to assess the compliance of each member State in terms of its contribution towards the EU target. In 2015, Sweden established a national system for PaMs and projections aimed at ensuring they are reported to the secretariat in line with the requirements of the UNFCCC process. The national ordinance on climate reporting is the legal basis for ensuring the compliance of Sweden's reporting of PaMs and projections with requirements, for which the Ministry of the Environment is responsible. During the review, Sweden explained that national rules for taking local action against domestic non-compliance are not required, as only the national Government can be held accountable for reaching climate targets under the National Climate Policy Framework, and, as there are no obligations specific to local authorities, the issue of non-compliance is not applicable.

24. 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 2030 climate and energy framework, adopted in 2014, includes more ambitious targets, which are expected to be revised further upwards owing to the European Green Deal.

25. In operation since 2005, the EU ETS is a cap-and-trade system that covers all significant energy-intensive installations (mainly large point emissions sources such as power plants and industrial facilities), which produce 40–45 per cent of the GHG emissions of the EU. It is expected that the EU ETS will guarantee that the 2020 target (a 21 per cent emission reduction below the 2005 level) will be achieved for sectors under the scheme. The third phase of the EU ETS started in 2013 and the system now includes aircraft operations (since 2012) as well as N<sub>2</sub>O emissions from chemical industry, PFC emissions from aluminium production and CO<sub>2</sub> emissions from some industrial processes that were not covered in the previous phases of the EU ETS (since 2013). For 2030, an emission reduction target of 43 per cent below the 2005 level has been set for the EU ETS.



26. The ESD became operational in 2013 and covers non-ETS sectors, including transport (excluding domestic and international aviation, and international maritime transport), residential and commercial buildings, agriculture and waste, together accounting for 55–60 per cent of the GHG emissions of the EU. The aim of the ESD is to decrease GHG emissions in the EU by 10 per cent below the 2005 level by 2020, and it includes binding annual targets for each member State for 2013–2020. The effort-sharing regulation, successor to the ESD, was adopted in 2018. It sets national emission reduction targets for 2030 ranging from 0 to 40 per cent below the 2005 level, and trajectories with annual limits for 2021–2030, for all member States, and keeps many of the flexibilities of the ESD.

27. The 2021–2030 EU-wide policies are operationalized through the NECP. The NECP will be periodically updated to reflect changes to EU policy, such as the implementation of the European Green Deal.

28. Sweden did not highlight in its BR4 any EU-wide mitigation actions that are under development.

29. Sweden introduced national-level policies to achieve its targets under the ESD and domestic emission reduction targets. The key policy reported is the new National Climate Policy Framework, adopted in June 2017 (see para. 17 above).

30. Sweden has introduced a range of cross-sectoral measures to reduce GHG emissions, with an emphasis on general economic instruments, supplemented by targeted climate measures. The main cross-sectoral measures are the energy and CO<sub>2</sub> taxes in the stationary and mobile energy sectors. The energy tax, introduced for petrol in 1924 and diesel in 1937, was increased recently; for example, for diesel it was raised to SEK 0.40 per litre in 2013 and SEK 0.53 per litre in 2016. A CO<sub>2</sub> tax based specifically on fuel fossil carbon content was introduced in 1991 and has increased incrementally from SEK 0.25/kg CO<sub>2</sub> in 1991 to SEK 1.18/kg CO<sub>2</sub> in 2019. Both taxes are adjusted in line with changes in the consumer price index. In 2018, for diesel and petrol, the energy tax was SEK 2.648 and SEK 4.08 per litre, respectively, and the CO<sub>2</sub> tax was SEK 3.292 and SEK 2.66 per litre, respectively.

31. The Swedish Environmental Protection Agency administers grants for local and regional investment in non-ETS sectors to cut GHG emissions through Climate Leap, its local climate investment programme. The grants issued up to and including March 2019 are expected to generate an emission reduction of approximately 1.45 Mt CO<sub>2</sub> eq/year during the lifespan of the investments. Other cross-sectoral PaMs include the Swedish Environmental Code and associated planning legislation and the Fossil Free Sweden initiative.

32. Sweden did not highlight any domestic mitigation actions that are under development. Table 3 provides a summary of the reported information on the PaMs of Sweden.

Table 3

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

<i>Sector</i>	<i>Key PaMs</i>	<i>Estimate of mitigation impact in 2020 (kt CO<sub>2</sub> eq)</i>	<i>Estimate of mitigation impact in 2030 (kt CO<sub>2</sub> eq)</i>
Policy framework and cross-sectoral measures	EU ETS	NE	NE
	Energy tax	NE	NE
	CO <sub>2</sub> tax	NE	NE
	Fossil Free Sweden initiative	NE	NE
Energy	Energy tax, CO <sub>2</sub> tax, electricity certificates system, EU ETS	19.0	14.0
Transport	Energy tax, CO <sub>2</sub> tax	2.3	NE
	Emission performance standards for new vehicles, vehicle taxes, vehicle fuel taxes and GHG emission reduction obligation for petrol and diesel	NE	NE
Renewable energy	Initiatives for wind power	NE	NE
	Support for solar power	NE	NE

<i>Sector</i>	<i>Key PaMs</i>	<i>Estimate of mitigation impact in 2020 (kt CO<sub>2</sub> eq)</i>	<i>Estimate of mitigation impact in 2030 (kt CO<sub>2</sub> eq)</i>
Energy efficiency	Energy tax, CO <sub>2</sub> tax, building regulations, energy declarations, EU directive on eco-design (directive 2009/125/EC), EU directive on mandatory energy labelling (residential and commercial sectors) (directive 2010/30/EU)	0.4	0.4
IPPU	EU F-gas regulation and Swedish regulation on F-gases and ozone-depleting substances	0.7	NE
Agriculture	Measures under the Rural Development Programme	NE	NE
	Support for biogas production	NE	NE
LULUCF	Forestry Act and National Forest Programme	NE	NE
Waste	Rules on municipal waste planning and producer responsibility for certain products, landfill tax (2000), bans on the landfilling of combustible waste (2002) and organic waste (2005)	1.9	NE

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

#### (b) Policies and measures in the energy sector

33. Energy was the largest source of emissions in Sweden in 2017, accounting for 69.6 per cent of its emissions. Emission levels vary from year to year, owing mostly to changes in the weather conditions that influence electricity and heat production. There is a strong policy focus on the energy sector and the 2016 national energy policy framework agreement set targets of 100 per cent renewable electricity production by 2040 and 50 per cent more efficient energy use by 2030, compared with the 2005 level.

34. **Energy efficiency.** Sweden has implemented the EU directive on energy efficiency (directive 2012/27/EU), which means, at the national level, that large enterprises must conduct an energy audit every four years; electricity suppliers must invoice customers on the basis of measured consumption of electricity, if the supplier has access to such measurements; and authorities must follow stricter requirements on using energy more efficiently. In addition, new requirements for measuring energy consumption in apartments have been established.

35. European Parliament and Council directive 2018/2002 of 11 December 2018 amending directive 2012/27/EU on energy efficiency entered into force on 24 December 2018. It sets a headline target of at least 32.5 per cent improved energy efficiency by 2030, requires EU member States to achieve cumulative energy savings in 2021–2030 and includes revised requirements regarding metering and billing of energy. It will be transposed by 25 June 2020, and by 25 October 2020 with regard to metering and billing.

36. **Energy supply and renewables.** The highest mitigation impact in this sector will be achieved by a group of measures that comprises the energy and CO<sub>2</sub> taxes, electricity certificates system and EU ETS. Sweden estimates that these measures will lead to a 19 Mt CO<sub>2</sub> eq emission reduction by 2020 compared with the 1990 level. Other significant PaMs include wind power initiatives and the provision of support for solar power and tax relief for the micro-production of renewable energy.

37. The production of district heating has increased by approximately 50 per cent since 1990 but the associated GHG emissions have remained relatively stable because the expansion has largely been achieved through increased use of biofuels, while the use of oil and coal has declined. The CO<sub>2</sub> tax is one of the main drivers of this trend, but the electricity certificates system has also helped in phasing out fossil fuel use in the sector. The low emissions from electricity generation can be explained by the fact that nuclear power and hydropower account for a major share of electricity production, while additional electricity

in recent years has been produced mainly by biomass-fired combined heat and power plants and wind power plants.

38. **Residential and commercial sectors.** The most significant mitigation impacts are due to the energy and CO<sub>2</sub> taxes, changes in building regulations, the introduction of energy performance certificates, the EU directive on eco-design (directive 2009/125/EC) and the EU directive on mandatory energy labelling (directive 2010/30/EU), which together are expected to result in an estimated 0.4 Mt CO<sub>2</sub> eq emission reduction by 2020 compared with the 1990 level.

39. GHG emissions from the residential, commercial and institutional sectors (heating other than district heating) have fallen significantly since 1990. The energy and CO<sub>2</sub> taxes have made the most significant contribution to reducing the use of fossil fuels in these sectors. The level of taxation on fossil fuel use for heating in the sectors has risen steadily since 1990. The price of oil and the technologies available for substituting fossil fuels have also led to decreasing emissions in the sectors.

40. **Transport sector.** GHG emissions from domestic transport, where road transport dominates, increased after 1990, peaked in 2007 and then declined. The decrease in emissions since 2006 can be attributed to policy instruments introduced both nationally and at the EU level. Emission performance standards for new vehicles, vehicle taxes, vehicle fuel taxes and, most recently, an obligation to reduce GHG emissions from petrol and diesel have had the most significant impact in terms of reducing GHG emissions.

41. The emission reduction obligation, implemented on 1 July 2018, requires petrol and diesel suppliers to gradually increase biofuel blending (e.g. to 21 per cent biodiesel in the fuel mix by 2020). In July 2018, Sweden introduced an innovative system whereby new light vehicles with low CO<sub>2</sub> emissions qualify for a bonus at the time of purchase (e.g. SEK 60,000 for electric cars with zero emissions from the exhaust pipe), while vehicles with high CO<sub>2</sub> emissions are taxed at a higher rate for the first three years after purchase. The Climate Leap programme aims to support infrastructure investments, such as in charging points for electric vehicles and in biogas plants, by municipal authorities, companies and organizations.

42. Sweden introduced a tax on commercial flights from Swedish airports on 1 April 2018 that is designed to reduce the climate impact of aviation. The tax level varies depending on the distance travelled.

43. **Industrial sector.** Total GHG emissions from combustion in manufacturing industries have decreased since 1997 but stabilized in recent years. The primary instruments affecting combustion emissions in the industrial sector are the EU ETS, the energy and CO<sub>2</sub> taxes, the electricity certificates system, the Swedish Environmental Code, the Energy Step programme, energy audits, energy and climate coaches (who provide advisory services to small and medium-sized enterprises) and energy efficiency networks through which enterprises can share experience and lessons learned.

44. The legislation on energy audits in large enterprises aims to promote improved energy efficiency. It requires large enterprises to conduct energy audits, including obtaining information on total energy use, and propose cost-efficient measures to improve energy efficiency. An audit must be conducted at least every four years. Enterprises subject to the legislation that have conducted an energy audit can apply through the Energy Step programme for support to recover the additional costs involved in making investments in increasing energy efficiency.

(c) **Policies and measures in other sectors**

45. **Industrial processes.** GHG emissions from industrial processes show an overall decreasing trend since 2006 but have increased slightly since 2016. IPPU emissions have fallen almost entirely within the scope of the EU ETS since its expansion for the third trading period (2013–2020). Industrial processes are also regulated by the requirement under the Swedish Environmental Code to use best available technology.

46. Industrial Leap is a long-term reform for 2018–2040. It is a Government scheme that supports the development of technology and processes to reduce process-related GHG emissions in Swedish industries. The Government budgeted SEK 300 million for the scheme

in 2018, increased the budget to SEK 500 million in 2019, and has proposed another increase, to SEK 600 million, for 2020–2022. An example of a project funded under the scheme is the Hydrogen Breakthrough Ironmaking Technology initiative, the aim of which is to replace coal with hydrogen in ore-based steel-making.

47. Sweden implemented a regulation on F-gases in 2006 that complements the EU F-gas regulation and includes requirements for cooling, air-conditioning and heat pump equipment such as leakage checks during installation of equipment and in mobile equipment; periodic equipment inspection and reporting of the findings to a supervisory authority; and, upon disposal of equipment, importers taking back, free of charge, any refrigerants that were delivered by them. It is estimated that the measures, including those introduced by the EU regulation, will reduce emissions by 0.7 Mt CO<sub>2</sub> eq each year by 2020 compared with the 1990 level.

48. **Agriculture.** GHG emissions from the agriculture sector declined 6.2 per cent in 2017 compared with the 1990 level even though there are relatively few economic policy instruments directly targeting them. Sweden has introduced measures to reduce fossil fuel use in farming and to reduce emissions from manure, fertilizer management and land use. The Rural Development Programme, launched in 2014, has a budget of SEK 36 billion for undertaking action, including on climate mitigation, such as increasing energy efficiency, producing and using renewable energy (e.g. biogas), improving manure handling, using nitrogen more efficiently and establishing or restoring wetlands. The Rural Network complements the Rural Development Programme by bringing together actors at the local, regional and national level to exchange information and experience.

49. A support scheme established in January 2015 for biogas production through anaerobic digestion of manure provides CH<sub>4</sub> reduction benefits and an alternative to fossil fuel use. The biogas can be used to generate electricity or heat, or as a vehicle fuel. Between January 2015 and September 2018, SEK 176 million was shared among 66 biogas plants.

50. **LULUCF.** The Swedish Forestry Act of 1993 established the twin objectives of producing sustainable yields and protecting the environment. Forest owners are responsible for conducting long-term sustainable forest management by, for example, using harvested wood products or fossil fuel substitutes.

51. The Swedish Environmental Code is aimed at promoting sustainable development through regulations on land drainage and the protection and restoration of peatlands with high carbon stocks. Sweden has set targets for conserving and protecting areas comprising both wetlands and forest land, and such areas are excluded from felling programmes. The nature conservation agreement is governed by civil law and allows a property owner and the State or a municipality to agree on financial compensation for the property owner, for example, to refrain from forestry.

52. The strategy for the National Forest Programme was adopted by the Government in May 2018. The vision is that the country's forests will contribute to job creation and sustainable growth, and to the development of a growing bio-economy. Access to sustainable biomass from Swedish forests has an important role to play in the continuing transition to a fossil-free society. The strategy contributes to Sweden's climate work by setting out goals and measures for increasing the national range of bio-based alternatives to fossil fuels.

53. **Waste management.** Since 1990, CH<sub>4</sub> emissions from landfill sites have declined significantly, owing to increased CH<sub>4</sub> recovery from landfills, reduced landfill disposal of organic materials, and incineration of waste with energy recovery. Demand for waste as a fuel for district heating has also encouraged waste to be incinerated rather than landfilled. PaMs at both the national and the EU level have enabled this decline in emissions.

54. Since 1991, all municipalities in Sweden have been required to have a waste plan; the national waste plan and waste prevention programme provide guidance on developing the municipal waste plans and setting priorities. In 2000, Sweden introduced a tax on landfill waste of SEK 250/t, which was increased gradually to SEK 520/t in 2019. In 2002, a ban on landfilling combustible materials was introduced and a similar ban on landfilling organic materials was implemented in 2005. These initiatives have helped to reduce the adverse effects of landfilling on human health and the environment.

55. Waste management measures reduced GHG emissions by 1.7 Mt CO<sub>2</sub> eq in 2015 compared with the 1990 level and are projected to reduce emissions by 1.9 Mt CO<sub>2</sub> eq by 2020.

**(d) Response measures**

56. Sweden reported on its assessment of the economic and social consequences of its response measures. The Party presented its policy for global development aimed at minimizing adverse impacts, which stipulates that an impact assessment is undertaken when decisions in a given policy area are judged to affect the goal of equitable and sustainable global development.

57. Sweden has not made any changes since its BR3 to its assessment of the economic and social consequences of response measures introduced as part of the country's climate strategy.

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

58. The ERT assessed the information reported in the BR4 of Sweden and identified issues relating to completeness and transparency and thus adherence to the UNFCCC reporting guidelines on BRs. The findings are described in table 4.

Table 4

**Findings on mitigation actions and their effects from the review of the fourth biennial report of Sweden**

No.	Reporting requirement, issue type and assessment	Description of the finding with recommendation or encouragement
1	Reporting requirement specified in CTF table 3  Issue type: transparency  Assessment: recommendation	<p>The Party did not report any estimates of the mitigation impacts of the mitigation actions reported in CTF table 3, leaving all relevant cells blank. A footnote to CTF table 3 explains that the effects of the mitigation actions have not been estimated individually for each mitigation action.</p> <p>The aggregated effect of a number of sets of policy instruments is presented in table 3.2 of the BR4, where Sweden reported the mitigation impact of many PaMs as "NE". Where estimates are provided, they apply to a group of PaMs rather than to any individual measure. Sweden explained in its BR4 that, given the large number of PaMs and the fact that many were introduced with objectives other than climate mitigation, it is difficult to evaluate the mitigation impact of individual measures. The Party also explained that it is hard to separate the effect of any single instrument, as instruments interact with each other and are also affected by external changes, such as energy prices.</p> <p>During the review, Sweden explained that the column for the estimate of mitigation impact in CTF table 3 had been left empty because it was not technically possible to enter "NE" in those cells.</p> <p>The ERT recommends that Sweden improve the transparency of the reporting in its next BR by:</p> <ul style="list-style-type: none"> <li>(a) Reporting consistent information on individual mitigation impacts in CTF table 3 and in the text of the BR, noting that a group of PaMs could be added as a separate row in CTF table 3, clearly detailing which PaMs are included and reporting the impact of the group of PaMs;</li> <li>(b) In cases where the estimated mitigation impacts of some individual mitigation actions are not reported in CTF table 3, providing explanations as to why such information is not reported;</li> <li>(c) In the case of groups of PaMs, explaining the rationale for estimating the impact for each group of mitigation actions rather than for each individual action in the group.</li> </ul>
2	Reporting requirement specified in paragraph 6  Issue type: transparency	<p>The reporting of PaMs in the text of the BR4 is not always consistent with the reporting in CTF table 3. For example, climate change communication reported under cross-cutting measures in the text of the BR4 (p.87) is not reported in CTF table 3, and Government advice and training PaMs reported under LULUCF in CTF table 3 are not reported in the text of the BR4.</p>

No.	Reporting requirement, issue type and assessment	Description of the finding with recommendation or encouragement
	Assessment: recommendation	<p>During the review, Sweden explained that the climate change communication measure reported in the BR4 is actually a set of examples of ongoing activity in the country. Sweden did not therefore consider it to be a single policy instrument, so did not include it in CTF table 3. However, climate and energy advice, which is one example described in the BR4 under the heading “Climate change communication” is a specific policy instrument and was therefore included in CTF table 3. Government advice and training under LULUCF was inadvertently omitted from table 3.2 of the BR4, but is described in the text of the BR4 (p.83), so there can still be said to be consistency between the text of BR4 and CTF table 3.</p> <p>The ERT recommends that Sweden improve the transparency of the reporting in its next BR by providing consistent information on PaMs in CTF table 3 and in the text of the BR.</p>
2	<p>Reporting requirement specified in paragraph 24</p> <p>Issue type: completeness</p> <p>Assessment: encouragement</p>	<p>Sweden did not report in its BR4 on progress towards establishing national rules for taking local action against domestic non-compliance.</p> <p>During the review, Sweden stated that there is no need for national rules for taking local action against domestic non-compliance as the National Climate Policy Framework, including the Climate Act and climate targets, deems the national Government fully responsible for reaching the climate targets. The national Government is therefore responsible for implementing the necessary PaMs to incentivize local authorities and other actors to take action, so local authorities do not have any obligations to fulfil, hence the issue of non-compliance is not applicable.</p> <p>The ERT encourages Sweden to report, to the extent possible, on progress towards establishing national rules for taking local action against domestic non-compliance with emission reduction targets, or to explain in the BR the rationale behind the assumption that such rules are not applicable in Sweden owing to the national legislative arrangements.</p>

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

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

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

59. For 2016, Sweden reported in CTF table 4 annual total GHG emissions excluding LULUCF of 52,942.81 kt CO<sub>2</sub> eq, which is 25.8 per cent below the 1990 level. In 2016, emissions from sectors relating to the target under the ESD amounted to 32,612.25 kt CO<sub>2</sub> eq.

60. For 2017, Sweden reported in CTF table 4 annual total GHG emissions excluding LULUCF of 52,660.27 kt CO<sub>2</sub> eq, which is 26.1 per cent below the 1990 level. In 2017, emissions from sectors relating to the target under the ESD amounted to 32,530.54 kt CO<sub>2</sub> eq.

61. As the contribution from LULUCF activities is not included in the target for the EU under the Convention, Sweden reported this as “NA” in CTF tables 4, 4(a)I and 4(a)II. Sweden reported that it does not intend to use units from market-based mechanisms under the Kyoto Protocol or the Convention. It reported “NE” in CTF tables 4 and 4(b) and that it did not use any units from market-based mechanisms in 2017 towards achieving its 2020 target. Table 5 illustrates Sweden’s ESD emissions and the use of units from market-based mechanisms to achieve its ESD target.

Table 5

**Summary of information on the use of units from market-based mechanisms by Sweden to achieve its target**

<i>Year</i>	<i>ESD emissions (kt CO<sub>2</sub> eq)</i>	<i>AEA (kt CO<sub>2</sub> eq)</i>	<i>Use of units from market- based mechanisms (kt CO<sub>2</sub> eq)</i>	<i>Annual AEA surplus/deficit (kt CO<sub>2</sub> eq)<sup>a</sup></i>	<i>Cumulative AEA surplus/deficit (kt CO<sub>2</sub> eq)</i>
2013	35 278.78	41 685.10	NA	6 406.32	6 406.32
2014	34 522.65	41 044.88	NA	6 522.23	12 928.55
2015	33 897.18	40 404.66	NA	6 507.48	19 436.03
2016	32 612.25	39 764.43	NA	7 152.18	26 588.21
2017	32 530.54	37 801.20	NA	5 270.66	31 858.87
2018	NA	37 227.53	NA	NA	NA
2019	NA	36 653.85	NA	NA	NA
2020	NA	36 080.17	NA	NA	NA

*Sources:* Sweden's BR4 and the EU transaction log (AEAs).

<sup>a</sup> A positive number (surplus) indicates that non-ETS emissions were lower than the AEA, while a negative number (deficit) indicates that non-ETS emissions were greater than the AEA.

62. In assessing the progress towards the achievement of the 2020 joint EU target, the ERT noted that Sweden's emission reduction target for non-ETS sectors is 17.0 per cent below the 1990 level (see para. 14 above). In 2017, Sweden's annual total GHG emissions excluding LULUCF were 26.1 per cent (52,660.27 kt CO<sub>2</sub> eq) below the base-year level without using units from market-based mechanisms. The ERT noted that, in 2017, Sweden's emissions covered by the ESD were 23.9 per cent (32,530.54 kt CO<sub>2</sub> eq) below the AEA for 2005 under the ESD.

63. The ERT noted that Sweden is making progress towards its ESD target by implementing mitigation actions that are delivering significant emission reductions and without using units from the market-based mechanisms under the Convention.

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

64. The ERT assessed the information reported in the BR4 of Sweden and identified an issue relating to completeness and thus adherence to the UNFCCC reporting guidelines on BRs. The finding is described in table 6.

Table 6

**Findings on estimates of emission reductions and removals and on the use of units from market-based mechanisms and land use, land-use change and forestry from the review of the fourth biennial report 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 9  Issue type: completeness  Assessment: recommendation	The Party did not report total emissions excluding LULUCF in CTF table 4, leaving the column empty for all years.  During the review, Sweden explained that because emissions in the LULUCF sector are not included under the Convention target, it reports "NA" in CTF table 4 for its contribution from LULUCF. The Party noted that there is a footnote to CTF table 4 stating that since LULUCF is not included in the EU target, the Party does not report on it.  The ERT recommends that Sweden report total emissions excluding LULUCF for all years in CTF table 4. This shall be reported even if LULUCF is not included in the target under the Convention.

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

### 3. Projections overview, methodology and results

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

65. Sweden reported updated projections for 2020 and 2030 relative to actual inventory data for 2017 under the WEM scenario. The WEM scenario reported by Sweden includes PaMs implemented and adopted until June 2018.

66. Sweden did not report a WOM or WAM scenario in its BR4, and explained that a WAM scenario was not provided because there were no planned measures in Sweden when the projections were being produced.

67. The projections are presented on a sectoral basis, using largely the same sectoral categories as those used in the reporting on mitigation actions, and on a gas-by-gas basis for CO<sub>2</sub>, CH<sub>4</sub>, N<sub>2</sub>O, PFCs, HFCs and SF<sub>6</sub> (treating PFCs and HFCs collectively in each case) for 1990–2035. The projections are also provided in an aggregated format for each sector and for a Party total using global warming potential values from the AR4.

68. The projections are provided in the BR4 in line with the GHG inventory sectors and the Party included projections for the subsectors of energy industries (electricity and heat production, refineries, manufacturing of solid fuels and fugitive emissions), other sectors (commercial, residential, and agriculture, forestry and fisheries), manufacturing industries (iron and steel, chemicals, and non-metallic and other industries), IPPU (F-gases and the industrial sector) and transport (road transport, civil aviation, navigation, railways and international transport). The ERT noted that in the PaMs section of the BR4, Sweden presented measures for industrial combustion aggregated with other measures under the IPPU sector, while in the projections section, industrial combustion projections are provided separately and are accounted for under the energy sector. The ERT considers it would be helpful if Sweden were to report supporting information (e.g. in tabular format) explaining the equivalence between the projections presented for the subsectors and the mitigation actions reported in the PaMs section.

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

70. Emission projections related to fuel sold to ships and aircraft engaged in international transport were reported separately and were not included in the totals. Sweden reported on factors and activities affecting emissions for each sector.

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

71. The methodology used for the preparation of the projections is similar to that used for the preparation of the emission projections for the NC7, but the key assumptions are different. Sweden reported supporting information further explaining the methodologies and the changes made since the NC7. The projections in the BR3 showed estimated reductions in total GHG emissions of 30 per cent between 1990 and 2020 and 36 per cent between 1990 and 2030. For the BR4, slightly different assumptions and assessments based on trends over the last few years were used, and the new projections show estimated decreases in total GHG emissions of 30 per cent between 1990 and 2020, and 35 per cent between 1990 and 2030. A comparison of percentage changes in emissions overall and by sector is provided in the BR4. The difference is due mainly to the use of different assumptions, for instance regarding fossil fuel prices, and assumptions based on trends over the last few years.

72. Sweden reported in CTF table 5 the key variables and assumptions used in the preparation of the projection scenarios. To prepare its projections, Sweden relied on the following key underlying assumptions: annual gross domestic product growth of 2.05 per cent for 2015–2035, crude oil prices of USD 97/barrel in 2020 and USD 121/barrel in 2030, electricity prices of SEK 15.5/kWh in 2020 and SEK 34.7/kWh in 2030, and a population of 10,421,340 in 2020. The main variables and assumptions used were reported in CTF table 5. The assumptions were updated on the basis of the most recent economic developments known at the time of the preparation of the projections.

73. Sweden provided information on sensitivity analyses. Sensitivity analyses were conducted for a number of important assumptions, such as 60 per cent lower fossil fuel prices



and 20 per cent lower economic growth (energy sector, including transport), and 15 per cent lower vehicle mileage and 20 per cent more electric vehicles (additional analysis for the transport sector). The analysis found that with lower fossil fuel prices, emissions would be 1 Mt CO<sub>2</sub> eq higher in 2030 compared with the reference projection. Lower economic growth was projected to result in lower emissions in the energy and transport sectors (0.6 Mt CO<sub>2</sub> lower in 2030). Under the projected lower mileage, emissions were estimated to be 0.9 Mt CO<sub>2</sub> eq lower than under the reference scenario in 2030, and, under the assumption of more electric vehicles, emissions were projected to be 0.5 Mt CO<sub>2</sub> eq lower in 2030 than under the reference scenario.

### (c) Results of projections

74. The projected emission levels under different scenarios and information on the quantified economy-wide emission reduction target are presented in table 7 and figure 1.

Table 7

#### Summary of greenhouse gas emission projections for Sweden

	Total GHG emissions		Emissions under the ESD	
	GHG emissions (kt CO <sub>2</sub> eq per year)	Change in relation to 1990 level (%)	ESD emissions (kt CO <sub>2</sub> eq per year)	Comparison to 2020 AEA (%)
2020 AEA under the ESD <sup>a</sup>	NA	NA	36 080.17	NA
Inventory data 1990	71 303.68	–	NA	NA
Inventory data 2017	52 660.28	–26.1	32 530.54	–23.9
WEM projections for 2020	49 724.40	–30.3	29 400	–18.6
WEM projections for 2030	46 128.85	–35.3	26 000	NA

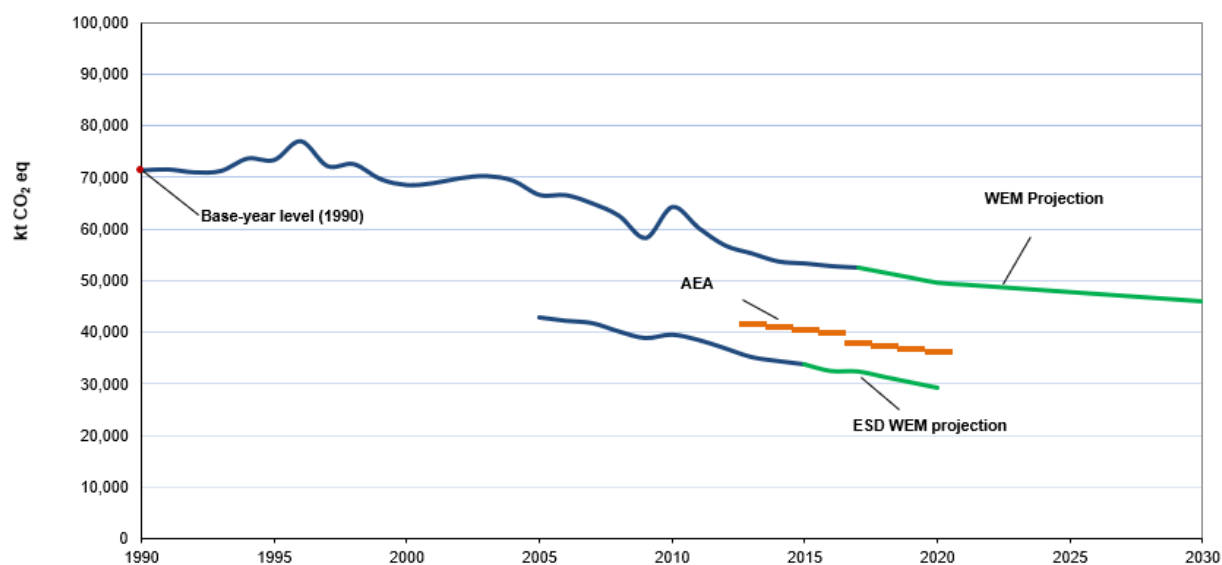
Source: Sweden's BR4 and CTF table 6.

Note: The projections are for GHG emissions excluding LULUCF.

<sup>a</sup> The quantified economy-wide emission reduction target under the Convention is a joint target of the EU and its member States. The target is to reduce emissions by 20 per cent compared with the base-year (1990) level by 2020. Sweden's target under the ESD is 17 per cent below the 2005 level by 2020.

Figure 1

#### Greenhouse gas emission projections reported by Sweden



Sources: EU transaction log (AEAs) and Sweden's BR4 and CTF tables 1 and 6.

75. Sweden's total GHG emissions excluding LULUCF in 2020 and 2030 are projected to be 49,724.40 and 46,128.85 kt CO<sub>2</sub> eq, respectively, under the WEM scenario, which represents a decrease of 30.3 and 35.3 per cent, respectively, below the 1990 level.

76. Sweden's target under the ESD is to reduce emissions by 17.0 per cent below the 2005 level by 2020 (see para. 14 above). Sweden's AEAs, which correspond to its national

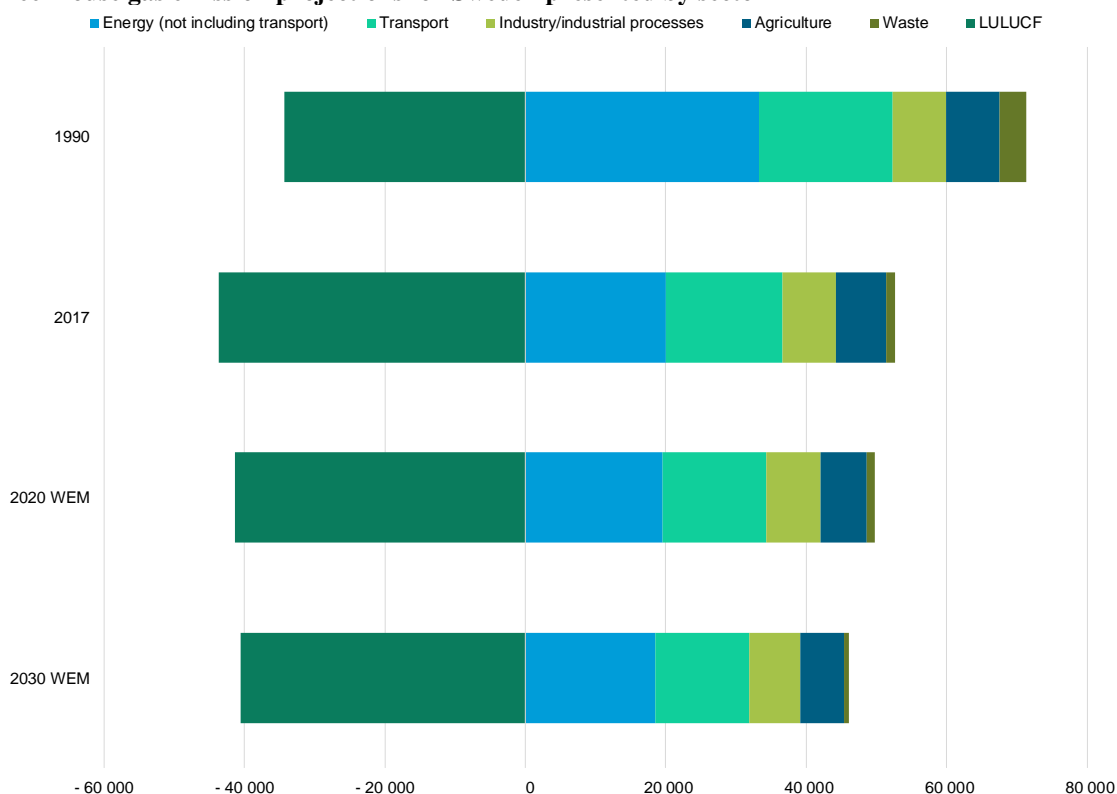
emission target for ESD sectors, change linearly from 41,685.10 kt CO<sub>2</sub> eq in 2013 to 36,080.17 kt CO<sub>2</sub> eq for 2020. According to the projections under the WEM scenario, ESD emissions are estimated to reach 29,400 kt CO<sub>2</sub> eq by 2020. The projected level of emissions under the WEM scenario is 18.6 per cent below the AEAs for 2020. The ERT noted that this suggests that Sweden expects to meet its target under the WEM scenario.

77. In addition to its target under the ESD, Sweden committed itself to achieving a domestic target of a 40 per cent reduction, or approximately 20 Mt CO<sub>2</sub> eq, in emissions below the 1990 level by 2020, of which one third can be achieved through emission reduction in other countries. In 2020, the national target will be 28,600 kt CO<sub>2</sub> eq. Projections indicate that non-ETS emissions will decrease to approximately 29,400 kt CO<sub>2</sub> eq and there will be a gap to the target of approximately 900 kt CO<sub>2</sub> eq in 2020. In June 2017, the Swedish Parliament introduced further emission reduction targets for non-ETS sectors of 63 and 75 per cent below the 1990 level in 2030 and 2040, respectively, of which 8 and 2 per cent, respectively, may be met through supplementary measures. By 2045, Sweden aims to have zero net GHG emissions. The projections forecast non-ETS emissions of 26,000 kt CO<sub>2</sub> eq in 2030, indicating a gap to the target of approximately 9,000 kt CO<sub>2</sub> eq compared with the new 2030 target (17,000 kt CO<sub>2</sub> eq). A new reduction target was also introduced for domestic transport emissions of 70 per cent below the 2010 level by 2030. The projections forecast transport emissions in 2030 to have decreased by approximately 35 per cent below the 2010 level. To meet the new targets, PaMs beyond those included in the current WEM scenario will be required.

78. Sweden presented the WEM scenario by sector for 2020 and 2030, as summarized in figure 2 and table 8.

Figure 2

**Greenhouse gas emission projections for Sweden presented by sector**



Source: Sweden's BR4 CTF table 6.

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	2020	2030	1990–2020	1990–2030
		WEM	WEM	WEM	WEM
Energy (not including transport)	33 272.56	19 508.34	18 491.73	–41.4	–44.4
Transport	19 020.01	14 806.52	13 388.60	–22.2	–29.6
Industry/industrial processes	7 610.53	7 680.80	7 305.31	0.9	–4.0
Agriculture	7 658.27	6 672.90	6 219.54	–12.9	–18.8
LULUCF	–34 395.62	–41 427.91	–40 592.25	20.4	18.0
Waste	3 742.30	1 055.86	723.68	–71.8	–80.7
Other (specify)	–	–	–	–	–
<b>Total GHG emissions excluding LULUCF</b>	<b>71 303.68</b>	<b>49 724.40</b>	<b>46 128.85</b>	<b>–30.3</b>	<b>–35.3</b>

Source: Sweden's BR4 CTF table 6.

79. According to the projections reported for 2020 under the WEM scenario, the most significant emission reductions are expected to occur in the energy sector (excluding transport), amounting to projected reductions of 13,764.22 kt CO<sub>2</sub> eq (41.4 per cent), and in transport, amounting to projected reductions of 4,213.49 kt CO<sub>2</sub> eq (22.2 per cent), between 1990 and 2020. The pattern of projected emissions reported for 2030 under the same scenario remains the same, with projected reductions of 14,780.83 kt CO<sub>2</sub> eq (44.4 per cent) in the energy sector (excluding transport) and 4,213.49 kt CO<sub>2</sub> eq (29.6 per cent) in the transport sector. Most of the reductions in the energy sector (excluding transport) had already occurred by 2017 and were mainly driven by the switch to electric and district heating in residential, commercial and institutional premises. The transport sector is projected to account for the largest proportion of emission reductions from 2017 to 2020 and from 2017 to 2030.

80. Sweden presented the WEM scenario by gas for 2020 and 2030, as summarized in table 9.

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

Gas	GHG emissions and removals (kt CO <sub>2</sub> eq)			Change (%)	
	1990	2020	2030	1990–2020	1990–2030
		WEM	WEM	WEM	WEM
CO <sub>2</sub> <sup>a</sup>	57 445.98	40 000.12	37 668.49	–30.4	–34.4
CH <sub>4</sub>	7 421.50	4 054.61	3 418.14	–45.4	–53.9
N <sub>2</sub> O	5 759.20	4 590.43	4 455.40	–20.3	–22.6
HFCs	6.49	995.01	503.38	15 231.4	7 656.2
PFCs	568.78	45.57	45.57	–92.0	–92.0
SF <sub>6</sub>	101.73	38.66	37.87	–62.0	–62.8
NF <sub>3</sub>	–	–	–	–	–
<b>Total GHG emissions without LULUCF</b>	<b>71 303.68</b>	<b>49 724.40</b>	<b>46 128.85</b>	<b>–30.3</b>	<b>–35.3</b>

Source: Sweden's BR4 CTF table 6.

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

81. For 2020, the most significant reductions are projected for CO<sub>2</sub> emissions: 17,445.86 kt CO<sub>2</sub> eq (30.4 per cent) between 1990 and 2020. CH<sub>4</sub> emissions are projected to decline by 3,366.89 kt CO<sub>2</sub> eq (45.4 per cent) and N<sub>2</sub>O emissions by 1,168.77 kt CO<sub>2</sub> eq (20.3 per cent) over the same period.

82. For 2030 the situation is similar, with the most significant reductions projected for CO<sub>2</sub> emissions: 19,777.49 kt CO<sub>2</sub> eq (34.4 per cent) between 1990 and 2030. CH<sub>4</sub> emissions

are projected to decline by 4,003.36 kt CO<sub>2</sub> eq (53.9 per cent) and N<sub>2</sub>O emissions by 1,303.80 kt CO<sub>2</sub> eq (22.6 per cent) over the same period.

83. There have been significant changes in the projections for the IPPU sector and moderate changes in those for the agriculture sector for 2020 and 2030 since the NC7 and BR3. There have also been significant changes in the projected prices for coal and electricity for 2020 and 2030 since the NC7 and BR3. Moderate changes in the projected crude oil prices for 2020 and 2030 since the NC7 and BR3 can be observed. The electricity certificates system, the EU ETS and the CO<sub>2</sub> tax on heat production have had an impact on the energy markets; in particular, they have promoted the use of biomass in combined heat and power plants. For projections, Sweden has taken into account technological developments such as the improvement in the energy efficiency of new vehicles and of the vehicle fleet as a whole (due to EU requirements to limit emissions from new cars and light-duty vehicles).

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

84. The ERT assessed the information reported in the BR4 of Sweden and identified issues relating to completeness and thus adherence to the UNFCCC reporting guidelines on BRs. The findings are described in table 10.

**Table 10  
Findings on greenhouse gas emission projections reported in the fourth biennial report 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 28  Issue type: completeness  Assessment: encouragement	Sweden did not report WOM or WAM projections in its BR4. The Party stated in its BR4 (p.100) that WAM projections were not provided because there were no planned measures in Sweden when it was producing the projections. However, PaMs are being continuously developed, and new measures have been planned since the projections were produced. The BR4 does not provide an explanation for the Party not reporting a WOM scenario.  During the review, Sweden explained that, according to the UNFCCC reporting guidelines on NCs, Parties can choose whether or not to provide WOM projections.  The ERT reiterates the encouragement from the previous review report for the Party to provide in its future BRs WOM projections, or to provide an explanation in the BR as to why developing such a scenario is not appropriate given the national circumstances. The ERT further encourages Sweden to provide a WAM scenario, given that new measures have been planned since the projections were produced.
2	Reporting requirement specified in paragraph 35  Issue type: completeness  Assessment: encouragement	Sweden did not provide projections of the indirect GHGs carbon monoxide, nitrogen oxides, non-methane volatile organic compounds or sulfur oxides in its BR4.  During the review, Sweden explained that according to the guidelines, providing projections of indirect GHG emissions is not mandatory. In addition, Sweden explained that to avoid duplication of reporting, it does not include the projections for air pollution, including indirect GHG emissions, in the BR because they can be found in reports to the Convention and the EU on Long-Range Transboundary Air Pollution.  The ERT reiterates the encouragement from the previous review report for the Party to provide in the next BR projections of the indirect GHGs carbon monoxide, nitrogen oxides, non-methane volatile organic compounds or sulfur oxides, or include a clear reference to where these projections can be found.
3	Reporting requirement specified in paragraph 43  Issue type: completeness  Assessment: encouragement	The Party did not report in its BR4 a summary of the strengths and weaknesses of the model or approach used for the projections, nor an explanation of how the model or approach used accounts for any overlap or synergies that may exist between different PaMs.  During the review, Sweden explained that, owing to the financial resources required for consultants, and taking into account that the UNFCCC reporting guidelines on NCs include a ‘should’ requirement for the reporting, information on strengths and weaknesses and overlaps and synergies was not reported in its BR4. Sweden hopes to be able to provide this information in the future.  The ERT reiterates the encouragement from the previous review report for the Party to include a summary of the strengths and weaknesses of the model or approach used for the projections and an explanation of how the model or approach used accounts for any overlap or synergies that may exist between different PaMs.

*Note:* Paragraph number 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. The reporting on the requirements not included in this table is considered to be complete, transparent and thus adhering to the UNFCCC reporting guidelines on NCs and on BRs.

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

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

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

85. In its BR4, Sweden reported information on its provision of financial, technological and capacity-building support to non-Annex I Parties.

86. Sweden provided details on how the support it has provided is “new and additional”, including how it has determined resources as being “new and additional”. Sweden’s definition is that climate financing should be considered “new and additional” if it exceeds the international development aid goal of 0.7 per cent of gross national income. Sweden reported that it is one of few OECD DAC members that has exceeded the 0.7 per cent target and has broad parliamentary support to pursue delivering 1 per cent of gross national income as official development assistance. Furthermore, Sweden has contributed to international climate finance through other official channels, such as the Swedish Programme for International Climate Initiatives under the Kyoto Protocol’s flexible mechanism. Sweden has chosen to voluntarily cancel purchased emission reduction units and report them as climate finance. It therefore considers all climate finance provided in 2017–2018 to be “new and additional”.

87. Sweden reported the financial support that it has provided to non-Annex I Parties, distinguishing between support for mitigation and adaptation activities and recognizing the capacity-building elements of such support. It explained how it tracks finance for adaptation and mitigation using the Rio markers.

88. The BR4 does not include information on changes to the national approach to tracking the provision of support, indicators, delivery mechanisms used and allocation channels tracked. The ERT noted that the information reported in the BR4 had already been reported in the Party’s NC7. During the review, Sweden indicated that no changes had occurred since the NC7 and that it would include information on changes, if any, in its next BR.

89. Sweden described the methodology and underlying assumptions used for collecting and reporting information on financial support, including underlying assumptions and indicators. The methodology used for preparing information on international climate support is based on the OECD DAC reporting system, which uses the Rio markers on climate change mitigation and adaptation. Sida uses this system to track the country’s climate finance. Sweden continues to work towards enhancing transparency and enabling climate finance reporting through the International Aid Transparency Initiative.

90. Sweden reported in the BR4 on its efforts to champion gender integration in multilateral climate funds, including through promoting gender policies and gender-responsive action plans. The Party noted that as a result of these efforts, the integration of gender in climate finance is improving over time and is in turn improving the efficiency and long-term sustainability of climate projects. Sweden’s voluntary use of the OECD DAC gender policy markers to track gender integration in climate finance has facilitated an assessment of the level of gender integration in its operations (which is estimated at 87 percent). While this assessment shows a slight increase in gender integration in cross-cutting target areas, the Party noted that there is scope to improve gender integration in its mitigation and adaptation actions. Finally, Sweden noted that its voluntary reporting on gender in the BR4 is intended to improve the tracking of progress and stimulate further integration of gender in climate finance, as well as encourage other Parties to do the same.

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

91. Sweden reported information on its provision of financial support to non-Annex I Parties as required under the Convention, including on financial support provided, committed and pledged, allocation channels and annual contributions. It reported financial contributions related to the implementation of the Convention, including through multilateral institutions such as the Trust Fund for Supplementary Activities, the African Group of Negotiators

working with the Africa Renewable Energy Initiative, the New Climate Economy, the Clean Energy Solutions Center, and the International Institute for Sustainable Development working with Fossil Fuel Subsidy Reform. Sweden indicated that it is the largest per capita donor in the world to the UNFCCC Financial Mechanism.

92. During the review, Sweden described how its resources address the adaptation and mitigation needs of non-Annex I Parties. It explained that Sida ensures that its partner countries are themselves responsible for formulating the goals and objectives of any joint programmes or project, so that the partner countries retain ownership of the programme or project, and because they have the greatest knowledge of their own existing and emerging needs. The Party described how its resources assist non-Annex I Parties in mitigating GHG emissions and adapting to the adverse effects of climate change and any economic and social consequences of response measures, and contribute to technology development and transfer and capacity-building related to mitigation and adaptation. Sweden reported information on the assistance that it has provided to developing country Parties that are particularly vulnerable to the adverse effects of climate change to help them to meet the costs of adaptation to those adverse effects. For example, Sweden supported access to clean energy through the rehabilitation and upgrade of two electric power plants in Mozambique with a total capacity of 100 MW. The project has helped to secure energy access with continued low GHG emissions.

93. With regard to the most recent financial contributions aimed at enhancing the implementation of the Convention by developing countries, Sweden reported that its climate finance has been allocated on the basis of its policy framework, which was adopted in 2016. The Swedish policy framework includes environment and climate change as one of the top priorities of the Government. 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 2017–2018**

(Millions of United States dollars)

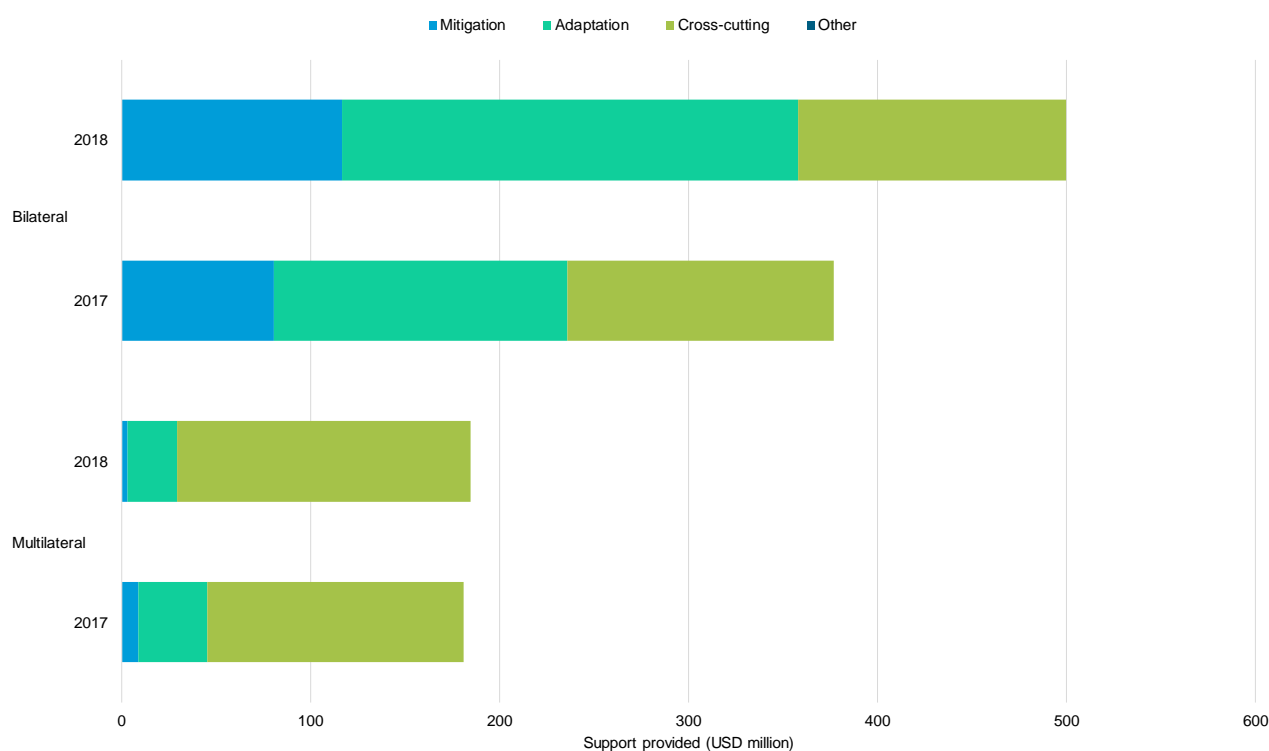
<i>Allocation channel of public financial support</i>	<i>Year of disbursement</i>	
	<i>2017</i>	<i>2018</i>
Official development assistance	5 170.27	6 201.2
Climate-specific contributions through multilateral channels, including:	180.80	184.79
Global Environment Facility	10.12	19.00
Least Developed Countries Fund	15.56	13.15
Adaptation Fund	15.56	13.15
Green Climate Fund	58.10	58.46
Trust Fund for Supplementary Activities	0.42	0.49
Other multinational climate change funds	15.26	3.41
Financial institutions, including regional development banks	65.78	77.13
Climate-specific contributions through bilateral, regional and other channels	376.83	499.84

*Sources:* BR4 CTF tables and Query Wizard for International Development Statistics, available at <http://stats.oecd.org/qwids/>.

94. Sweden reported on its climate-specific public financial support, totalling USD 557.62 million in 2017 and USD 684.64 million in 2018. It has increased its contributions as reported in its local currency by 54 per cent since the BR3. During the reporting period, Sweden placed a particular focus on bilateral adaptation support for developing countries, including Afghanistan, Ethiopia, Kenya, Mali, Mozambique, Somalia and the United Republic of Tanzania, to which it allocated a total of USD 200 million in 2017–2018. 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.

Figure 3  
Provision of financial support by Sweden in 2017–2018



Source: Sweden's BR4 CTF tables 7, 7(a) and 7(b).

Table 12  
Summary of information on channels of financial support used in 2017–2018 by Sweden

(Millions of United States dollars)

Allocation channel of public financial support	Year of disbursement				Share (%)	
	2017	2018	Difference	Change (%)	2017	2018
Detailed information by type of channel						
Multilateral channels						
Mitigation	8.66	2.83	-5.83	-67.4	4.8	1.5
Adaptation	36.52	26.31	-10.21	-28.0	20.2	14.2
Cross-cutting	135.62	155.66	20.05	14.8	75.0	84.2
Other	-	-	-	-	-	-
<b>Total multilateral</b>	<b>180.79</b>	<b>184.80</b>	<b>4.00</b>	<b>2.2</b>	<b>100.0</b>	<b>100.0</b>
Bilateral channels						
Mitigation	80.58	116.41	35.84	44.5	21.4	23.3
Adaptation	155.50	241.50	86.00	55.3	41.3	48.3
Cross-cutting	140.76	141.93	1.17	0.8	37.4	28.4
Other	-	-	-	-	-	-
<b>Total bilateral</b>	<b>376.83</b>	<b>499.84</b>	<b>123.01</b>	<b>32.6</b>	<b>100.0</b>	<b>100.0</b>
<b>Total multilateral and bilateral</b>	<b>557.62</b>	<b>684.64</b>	<b>127.01</b>	<b>22.8</b>	<b>100.0</b>	<b>100.0</b>

Source: Sweden's BR4 CTF tables 7, 7(a) and 7(b).

95. The financial support provided in 2017–2018 and its allocation between adaptation, mitigation and cross-cutting measures shows that emphasis was given to cross-cutting and adaptation support.

96. The BR4 includes detailed information on the financial support provided through multilateral, bilateral and regional channels in 2017 and 2018. More specifically, Sweden contributed through multilateral channels, as reported in the BR4 and CTF table 7(a), USD 181 million and 185 million for 2017 and 2018, respectively. The contributions were made to specialized multilateral climate change funds, such as the Global Environment Facility, the Least Developed Countries Fund, the Adaptation Fund, the Green Climate Fund and the Trust Fund for Supplementary Activities, and other funds such as the Adaptation for Smallholder Agriculture Programme.

97. The BR4 and CTF table 7(b) also include detailed information on the total financial support provided through bilateral channels in 2017 and 2018, respectively (USD 377 million and 500 million).

98. The BR4 provides information on the types of support provided. In terms of the focus of public financial support, as reported in CTF table 7 for 2017, the shares of the total public financial support allocated for mitigation, adaptation and cross-cutting projects were 16.0, 34.4 and 49.6 per cent, respectively. In addition, 32.4 per cent of the total public financial support was allocated through multilateral channels and 67.6 per cent through bilateral, regional and other channels. In 2018, the shares of total public financial support allocated for mitigation, adaptation and cross-cutting projects were 17.4, 39.1 and 43.5 per cent, respectively. Furthermore, 27.0 per cent of the total public financial support was allocated through multilateral channels and 73.0 per cent through bilateral, regional and other channels.

99. The ERT noted that in 2017 a majority of financial contributions made through multilateral channels were allocated to cross-cutting support, as reported in CTF table 7(a). The corresponding allocations for 2018 were also directed mostly to cross-cutting support. For 2017, however, the ERT noted that information was missing regarding the allocation of the majority of financial contributions made through bilateral and regional channels, which were dedicated to unspecified sectors and reported as “NA” in CTF table 7(b). The corresponding allocations for 2018 were also reported mostly as “NA”. In response to a question from the ERT during the review, the Party indicated that the projects categorized as “NA” are those that could not be allocated to an appropriate category in the predetermined list of sectors.

100. CTF tables 7(a) and 7(b) include information on the types of financial instrument used for providing assistance to developing countries. The ERT noted that grants provided in 2017 and 2018 accounted for the total public financial support.

101. Sweden explained that Sida provides guarantees for supporting actors in mobilizing climate finance from private and public sources. The Party’s ordinance for financing development loans and guarantees for development cooperation provide opportunities to expand and leverage available development resources by linking public measures with market finance. Guarantees stimulate the mobilization of both private and public capital. In 2018, Sida provided guarantees of approximately SEK 4.4 billion, which led to approximately SEK 14 billion being mobilized. Sweden explained that private finance is mainly mobilized through Swedfund, its development finance institution. At the end of 2018, Swedfund had 58 investments in companies and funds in 18 countries, and 63 per cent of its investments were in Africa.

102. During the review, Sweden highlighted that, owing to the methodological challenges of tracking mobilized climate finance, none of the figures presented in the BR4 regarding additional climate finance mobilized by Sida’s guarantees or other instruments were included in the CTF tables. Relevant guidelines for presenting, for example, guarantees as grant equivalents are currently being developed within the Total Official Support for Sustainable Development framework of the Organisation for Economic Co-operation and Development. The Party highlighted that it is also encouraging developing countries to enhance regulatory frameworks that incentivize private investment, both domestically and internationally.



103. Sweden helps lenders deal with risks by insuring eligible projects against losses relating to various market risks. A common model is that Sida will cover part of the loss if the borrower fails to repay the loan to the bank. Sida guarantees are based on a set of simple key principles and conditions, namely additionality, risk-sharing, charging a premium that reflects the risk taken and the non-distortionary nature of any loan.

**(c) Technology development and transfer**

104. Sweden provided information on steps, measures and activities related to technology transfer, access and deployment benefiting developing countries, including information on activities undertaken by the public and private sectors. Sweden provided examples of support provided for the deployment and enhancement of the endogenous capacities and technologies of non-Annex I Parties.

105. The ERT took note of the information provided in CTF table 8 on recipient countries, target areas, measures and focus sectors of technology transfer programmes, funding sources, and the activities undertaken and their current status.

106. Sida supports, via the Food and Agriculture Organization of the United Nations and the United Nations Children's Fund, a programme in Guatemala focusing on the recovery of livelihoods affected by drought. The low-cost technologies and projects introduced include rainwater harvest systems for households and communities, manual water pumps, drought-resistant crops, soil moisture retention practices and microwatershed management support. The target group is the most impoverished farmers, and so far, approximately 7,000 families have received support in order to better manage drought.

107. The ERT noted that Sweden reported on the measures it has taken to promote, facilitate and finance the transfer and deployment of climate-friendly technologies. The ERT also noted that the Party reported an example of a success story from 2014 and there was no information on any measures or activities undertaken by the Party that had not been successful. During the review, Sweden highlighted that the example given had started in 2014 but continued until 2018 and concerned cooperation between Swedish small and medium-sized enterprises, the FOV Biogas company and Indian stakeholders. Through this cooperation, over 70 biogas plants have been built in India. The Party pointed out that most programmes face various challenges but that any follow-up does not consider whether or not a programme has failed overall.

108. Sweden provided examples of technology transfer such as the accelerator programmes that support small and medium-sized enterprises with innovative energy solutions. The Party highlighted that technology transfer is often integrated into capacity-building to ensure long-term sustainability. Sweden also reported that climate technology, both for adaptation and mitigation, constitutes an important part of climate action and economic development, and so it is not able to report on climate finance that is solely directed at technology transfer.

109. Sweden has actively participated in various initiatives, networks, working groups and campaigns to promote technology transfer. Sweden supports the Clean Energy Ministerial, a global forum established in 2010 for major economies and forward-leaning countries to work together to share best practices and promote policies and programmes that encourage and facilitate the transition to a global clean energy economy. The initiatives and campaigns of the Clean Energy Ministerial enable low-cost, high-impact technical work that amplifies each government's clean energy deployment efforts and seeks to catalyse public and private action towards ambitious but realistic targets.

110. In its BR4, Sweden supplied information on technology transfer best practices. It reported that, in 2018, it co-hosted the 9<sup>th</sup> Clean Energy Ministerial and 3<sup>rd</sup> Mission Innovation Ministerial with Denmark, the European Commission and the Nordic Council of Ministers. The funding contribution from Sweden amounted to SEK 2 million. Mission Innovation is a global initiative of 24 countries (including Brazil, China and India) and the European Commission on behalf of the EU. The 25 members have committed to seeking to double public investment in the research and development of clean energy and are engaging with the private sector, fostering international collaboration and celebrating innovators.

**(d) Capacity-building**

111. In its BR4 and CTF table 9, Sweden supplied information on how it has provided capacity-building support for mitigation, adaptation and technology that responds to the existing and emerging needs identified by non-Annex I Parties. Sweden described individual measures and activities related to capacity-building support in textual and tabular format. Examples include support given to local governments in Kenya to enable further access to climate financing and support through multilateral institutions such as the World Bank’s Multi-Donor Trust Fund for Integrated Landscape Management in Mozambique. Recipients of support also include regionally owned institutions, such as the Asian Disaster Preparedness Center, and civil society organizations, for instance through the Pan African Climate Justice Alliance working with African civil society organizations. Capacity-building support is also provided in cooperation with national authorities, such as the Swedish Meteorological and Hydrological Institute, which has helped implement the Water and Climate Change Information Services for Ethiopia.

112. Sweden reported that it has supported climate-related capacity development relating to adaptation, mitigation, climate financing and cross-cutting activities. Sweden also reported on how it has responded to the existing and emerging capacity-building needs of non-Annex I Parties by providing extensive support for climate change capacity-building, using various approaches (e.g. building technical capacity, improving institutional sustainability, encouraging the exchange of experience and lessons learned among countries and providing e-learning courses) and in cooperation with different actors such as governments and civil society organizations. The aim of this diversity is to respond to the specific needs and contexts of partner countries and organizations. Sweden highlighted the importance of developing relationships with strategic emerging countries to tackle environmental challenges that are mostly transboundary. The major emerging national economies of Brazil, China, India, Indonesia, the Russian Federation and South Africa have a major impact on global resource use and environmental performance and are, therefore, key actors in global environmental and climate cooperation. Examples of projects carried out by the Swedish Environmental Protection Agency with these countries include developing a methodology for faster diagnosis of urban air environment problems in Brazil and contributing to phasing out the use of fluorocarbons in China and India.

113. In response to the need for climate-smart investment in low- and middle-income countries, Sweden is co-financing a technical assistance programme to build local capacity in relation to green bond markets and to provide technical support for green bond issuance and reporting. The programme establishes regulatory frameworks that ensure finance flows are consistent with a pathway towards low GHG emission and climate-resilient development. Sweden is supporting an important country-driven initiative in Ethiopia to strengthen and accelerate efforts at the national and regional level to generate climate and water information services and early warning systems.

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

114. The ERT assessed the information reported in the BR4 of Sweden and identified issues relating to completeness and transparency and thus adherence to the UNFCCC reporting guidelines on BRs. The findings are described in table 13.

**Table 13  
Findings on provision of support to developing country Parties from the review of the fourth biennial report 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 16  Issue type: transparency  Assessment: recommendation	The Party reported in its BR4 that meeting the existing needs of non-Annex I Parties is weighed into the strategies, achieved by developing programmes and projects in close cooperation with partner countries, and is a fundamental entry point for all contributions from Sida. However, the information provided did not allow the ERT to gain an understanding of how these programmes work to ensure that existing and emerging needs of non-Annex I Parties are met.  During the review, Sweden reported that Sida ensures that its partner countries are themselves responsible for formulating the goals and objectives of any joint

No.	Reporting requirement, issue type and assessment	Description of the finding with recommendation or encouragement
		<p>programme or project, so that the partner countries retain ownership of the programme or project, and because they have the greatest knowledge of their own existing and emerging needs.</p> <p>The ERT recommends that Sweden describes, to the extent possible, how it seeks to ensure that the resources it provides effectively address the needs of non-Annex I Parties regarding climate change adaptation and mitigation</p>
2	<p>Reporting requirement specified in paragraph 18</p> <p>Issue type: transparency</p> <p>Assessment: recommendation</p>	<p>The Party reported “NA” for some financial contributions made through bilateral and regional channels in CTF table 7(b) in the column “Sector”.</p> <p>During the review, the Party indicated that the projects for which the sector was categorized as “NA” were those projects for which there was no appropriate category in the predetermined sector list.</p> <p>The ERT recommends that Sweden, in its next BR, include information in CTF table 7(b) following the relevant sectors consistently with the UNFCCC reporting guidelines on BRs. The sector “other” could be specified in the additional information column.</p>
3	<p>Reporting requirement specified in paragraph 21</p> <p>Issue type: completeness</p> <p>Assessment: recommendation</p>	<p>The Party reported an overview of measures taken to promote, facilitate and finance the transfer of, access to and deployment of climate-friendly technology for the benefit of non-Annex I Parties. However, no information was provided in the BR4 on how Sweden supports the development and enhancement of endogenous capacities and technologies of such Parties.</p> <p>During the review, Sweden pointed out that many of the examples of programmes that it reported in its BR4 include bilateral and multilateral cooperative action on technology development and technology transfer that support the development and enhancement of endogenous capacities and technologies.</p> <p>The ERT reiterates the recommendation from the previous review report for the Party to include explicit information in its next BR on how the Government supports the development and enhancement of endogenous technologies of developing countries.</p>
4	<p>Reporting requirement specified in paragraph 22</p> <p>Issue type: transparency</p> <p>Assessment: recommendation</p>	<p>The Party has improved its reporting by providing more examples of measures and activities related to technology development and transfer support in CTF table 8. However, no information was provided as to when these measures and activities were, or are planned to be, implemented. Sweden did not report in tabular format some of the activities related to technology transfer implemented or planned since its previous BR, only providing a reference to the relevant information in textual format in the BR4. The ERT noted a lack of information on status of implementation, time frame and whether some of the projects had been introduced in the previous reporting period and should therefore not have been reported in the BR4. It was not clear from the information provided in the BR whether the reported measures were the ones implemented since Sweden’s last NC or BR.</p> <p>During the review, Sweden explained that the examples provided were implemented in the reporting period (2017–2018) and concern programmes that run over multiple years and BR reporting periods. The Party indicated that in the BR4 the focus was on examples of activities implemented in 2017–2018.</p> <p>The ERT recommends that Sweden, while reporting on provision of technology development and transfer support in its next BR, provide clear information on measures and activities implemented since its previous NC or BR in both textual and tabular format by including in CTF table 8 only programmes that were planned, transitioned from planned to implemented or were implemented during the reporting period.</p>

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

### III. Conclusions and recommendations

115. The ERT conducted a technical review of the information reported in the BR4 and CTF tables of Sweden in accordance with the UNFCCC reporting guidelines on BRs. The ERT concludes that the reported information mostly adheres to the UNFCCC reporting guidelines on BRs and provides an overview of emissions and removals related to the Party’s

quantified economy-wide emission reduction target; assumptions, conditions and methodologies related to the attainment of the target; the progress of Sweden towards achieving its target; and the Party's provision of support to developing country Parties.

116. Sweden's total GHG emissions excluding LULUCF covered by its quantified economy-wide emission reduction target were estimated to be 26.1 per cent below its 1990 level, whereas total GHG emissions including LULUCF were 75.8 per cent below its 1990 level, in 2017. Emission decreases were driven mainly by the transition from oil-fuelled heating of residential, commercial and institutional premises to using heat pumps and district heating. Other significant drivers were the increase in the use of biofuels for district heating and in combustion in manufacturing industries, and the reduction in landfill gas emissions from the waste sector.

117. Under the Convention Sweden committed to contributing to the achievement of the joint EU quantified economy-wide emission reduction target of a 20 per cent reduction in emissions below the 1990 level by 2020. The target covers all sectors and CO<sub>2</sub>, CH<sub>4</sub>, N<sub>2</sub>O, HFCs, PFCs and SF<sub>6</sub>, expressed using global warming potential values from the AR4. Emissions and removals from the LULUCF sector are not included. The EU generally allows its member States to use units from the Kyoto Protocol mechanisms and new market mechanisms for compliance purposes up to an established limit and subject to a number of restrictions on the origin and the type of project. Companies can make use of such units to fulfil their requirements under the EU ETS.

118. Under the ESD Sweden has a target of reducing its total GHG emissions by 17 per cent below the 2005 level by 2020 for non-ETS sectors. National emission targets for non-ETS sectors for 2020 have been translated into binding quantified AEAs for 2013–2020. Sweden's AEAs change following a linear progression from 41,685.10 kt CO<sub>2</sub> eq in 2013 to 36,080.17 kt CO<sub>2</sub> eq in 2020. In addition, Sweden committed in 2009 to achieving a domestic target of a 40 per cent reduction in GHG emissions below the 1990 level by 2020. This target applies to non-ETS emissions and does not include the LULUCF sector. It is more ambitious than the Swedish target within the joint EU target and Sweden's commitments under the ESD.

119. Sweden's main policy relating to energy and climate change is the National Climate Policy Framework, adopted in June 2017. The Framework consists of a Climate Act, new national climate targets and a Climate Policy Council, and includes ambitious climate change goals for 2030 and a goal of zero net emissions by 2045. Sweden will pursue climate policies that enable it to achieve these national climate targets. Sweden's energy and CO<sub>2</sub> taxes have provided the most significant GHG benefits. Other policies that have delivered significant emission reductions include Climate Leap (the local climate investment programme), the Swedish Environmental Code, planning and building legislation, and the Fossil Free Sweden initiative.

120. In 2017, Sweden's ESD emissions were 23.9 per cent (32,530.54 kt CO<sub>2</sub> eq) below the AEA under the ESD. The ERT noted that Sweden indicated that it does not plan to use market-based mechanisms. Sweden has a cumulative surplus of 31,858.87 kt CO<sub>2</sub> eq with respect to its AEAs for 2013–2017, when its historical emissions were below the annual ESD targets. Sweden is, therefore, considered to be on track towards its target for non-ETS sectors.

121. The GHG emission projections provided by Sweden in its BR4 correspond to the WEM scenario. Under this scenario, emissions are projected to be 30.3 per cent below the 1990 level by 2020. According to the projections under the WEM scenario, emissions from non-ETS sectors are estimated to reach 29,400 kt CO<sub>2</sub> eq by 2020. The projected level of emissions under the WEM scenario is 18.6 per cent below the AEAs for 2020. The ERT noted that this suggests that Sweden expects to meet its target under the WEM scenario.

122. Sweden continues to provide climate financing to developing countries in line with its climate finance programmes. It has increased its contributions by 55 per cent since the BR3; its public financial support in 2017 and 2018 totalled USD 557.62 million and 684.64 million, respectively. For those years, Sweden provided more support for adaptation than for mitigation. The biggest share of financial support went to cross-cutting projects and programmes. Sweden reported on its efforts to champion gender integration in multilateral

climate funds in its BR4, including through the promotion of separate gender policies and gender-responsive action plans.

123. Sweden provided information on support for technology development and transfer and capacity-building. Sweden provided examples of technology transfer such as the accelerator programmes that support small and medium-sized enterprises with innovative energy solutions. The Party highlighted that technology transfer is often combined in an integrated way with capacity-building to ensure the long-term sustainability of the projects. Sweden provided extensive support for climate change capacity-building, using various approaches (e.g. building technical capacity, improving institutional sustainability, encouraging the exchange of experience and lessons learned among countries and providing e-learning courses) and in cooperation with different actors such as governments and civil society organizations.

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

- (a) To improve the completeness of its reporting by:
  - (i) Providing information on total emissions excluding LULUCF in CTF table 4 (see issue 1 in table 6);
  - (ii) Providing information on how it supports the development and enhancement of endogenous technologies of developing countries (see issue 3 in table 13);
- (b) To improve the transparency of its reporting by:
  - (i) Providing more detailed information on individual mitigation impacts of PaMs (see issue 1 in table 4);
  - (ii) Reporting consistent information on PaMs in CTF table 3 and in the text of the BR (see issue 2 in table 4);
  - (iii) Providing, to the extent possible, more detailed information on how it seeks to ensure that the resources it provides effectively address the needs of non-Annex I Parties regarding climate change adaptation and mitigation (see issue 1 in table 13);
  - (iv) Indicating, when reporting on financial support provided, the relevant sectors in CTF table 7(b) (see issue 2 in table 13);
  - (v) Providing, when reporting on provision of technology development and transfer support, clear information on measures and activities implemented since its previous NC or BR in textual and tabular format by including in CTF table 8 only programmes that were planned, transitioned from planned to implemented or were implemented during the reporting period (see issue 4 in table 13).

## Annex

### Documents and information used during the review

#### A. Reference documents

2019 GHG inventory submission of Sweden. Available at <https://unfccc.int/process-and-meetings/transparency-and-reporting/reporting-and-review-under-the-convention/greenhouse-gas-inventories-annex-i-parties/national-inventory-submissions-2019>.

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

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

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

European Green Deal. 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 I: UNFCCC reporting guidelines on annual greenhouse gas inventories”. Annex to decision 24/CP.19. Available at <http://unfccc.int/resource/docs/2013/cop19/eng/10a03.pdf>.

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

“Guidelines for the 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>.

Report on the individual review of the annual submission of Sweden submitted in 2019. FCCC/ARR/2019/SWE. Available at <https://unfccc.int/process-and-meetings/transparency-and-reporting/reporting-and-review-under-the-convention/greenhouse-gas-inventories-annex-i-parties/inventory-review-reports-2019>.

Report on the technical review of the BR3 of Sweden. FCCC/TRR.3/SWE. Available at <https://unfccc.int/process/transparency-and-reporting/reporting-and-review-under-the-convention/national-communications-and-biennial-reports--annex-i-parties/international-assessment-and-review/review-reports>.

“UNFCCC biennial reporting guidelines for developed country Parties”. FCCC/SBSTA/2014/INF.6. 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 and Sara Berggren (Swedish Environmental Protection Agency), including additional material.