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Report on the technical review of the fourth biennial report of Estonia

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 Estonia, 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 15 to 19 June 2020 remotely.

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Contents

Abbreviations and acronyms

AD	activity data
AEA	annual emission allocation
Annex II Party	Party included in Annex II to the Convention
AR4	Fourth Assessment Report of the Intergovernmental Panel on Climate Change
BR	biennial report
CH_4	methane
CHP	combined heat and power
CO_2	carbon dioxide
CO_2 eq	carbon dioxide equivalent
CTF	common tabular format
EEDP 2030	Estonian Energy Sector Development Plan 2030
EERC	Estonian Environmental Research Centre
EFDP	Estonian Forestry Development Plan
ERDP	Estonian Rural Development Plan
ERT	expert review team
ESD	European Union effort-sharing decision
ESR	European Union effort-sharing regulation
EU	European Union
EUA	European Union allowance
EU ETS	European Union Emissions Trading System
F-gas	fluorinated gas
GDP	gross domestic product
GHG	greenhouse gas
GWP	global warming potential
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_3	nitrogen trifluoride
NIR	national inventory report
NMVOC	non-methane volatile organic compound
NO	not occurring
non-ETS	not covered by the European Union Emissions Trading System
N_2O	nitrous oxide
PaMs	policies and measures
PFC	perfluorocarbon
SF_6	sulfur hexafluoride
UNFCCC reporting guidelines on BRs	"UNFCCC biennial reporting guidelines for developed country Parties"
UNFCCC reporting guidelines on NCs	"Guidelines for the preparation of national communications by Parties included in Annex I to the Convention, Part II: UNFCCC reporting guidelines on national communications"
WAM	'with additional measures'
WEM	'with measures'
WOM	'without measures'

I. Introduction and summary

A. Introduction

1. This is a report on the centralized technical review of the BR4[1] of Estonia. 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 Estonia, which provided comments that were considered and incorporated with revisions into this final version of the report.

3. The review was conducted together with the review of one other Party included in Annex I to the Convention from 15 to 19 June 2020 remotely[2] by the following team of nominated experts from the UNFCCC roster of experts: David Bartholomew Fredericks (Guyana), Newton Paciornik (Brazil), Duška Šaša (Croatia), Adrian Schilt (Switzerland), David Glen Thistlethwaite (United Kingdom of Great Britain and Northern Ireland) and Clement Madalitso Tikiwa (Malawi). Mr. Paciornik and Mr. Schilt were the lead reviewers. The review was coordinated by Marion Vieweg-Mersmann and Karin Simonson (secretariat).

B. Summary

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

1. Timeliness

5. The BR4 was submitted on 31 December 2019, before the deadline of 1 January 2020 mandated by decision 2/CP.17. The CTF tables were also submitted on 31 December 2019.

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 Estonia in its BR4 mostly adheres to the UNFCCC reporting guidelines on BRs.

Table 1
Summary of completeness and transparency of mandatory information reported by Estonia in its fourth biennial report

Section of BR	*Completeness*	*Transparency*	*Reference to description of recommendation(s)*
GHG emissions and removals	Complete	Transparent	
Quantified economy-wide emission reduction target and related assumptions, conditions and methodologies	Complete	Transparent	
Progress in achievement of targets	Complete	Mostly transparent	Issues 1–2 in table 4 Issue 10 in table 9

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

[2] Owing to the circumstances related to the coronavirus disease 2019, the technical review of the BR submitted by Estonia had to be conducted remotely.

Section of BR	*Completeness*	*Transparency*	*Reference to description of recommendation(s)*
Provision of support to developing country Parties[a]	NA	NA	NA

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

[a] Estonia is not an Annex II Party and is therefore not obliged to adopt measures and fulfil obligations defined in Article 4, paras. 3–5, of the Convention.

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[3] excluding emissions and removals from LULUCF decreased by 50.4 per cent between 1990 and 2018, whereas total GHG emissions including net emissions or removals from LULUCF decreased by 53.5 per cent over the same period. Total GHG emissions in Estonia (excluding LULUCF) decreased from 40,277.31 kt CO_2 eq in 1990 to 19,974.14 kt CO_2 eq in 2018. The changes in total emissions were driven mainly by factors such as structural changes following Estonia's independence from the former Soviet Union, the transition from a planned economy to a market economy and the implementation of reforms. Other drivers that have influenced emission reduction trends in Estonia include the introduction of energy efficiency measures pursuant to the EU directive on energy end-use efficiency and energy services, increased share of renewable energy from 16.1 per cent in 2006 to 24.6 per cent in 2010, further increasing to 29.2 per cent in 2017, and the replacement (in 2007) of high-GWP foam-blowing agent HFC-134a with low-GWP foam-blowing agent HFC-152a.

8. Other factors responsible for the downward trend in Estonia's GHG emissions include the decline of emissions from the agriculture sector, which dropped by 48.9 per cent between 1990 and 2017 owing to uncompetitive agricultural products produced for the EU market, leading to a decline in emissions from the use of agrochemicals. The 2007–2008 financial crisis led to the devaluation of the currency and higher prices, resulting in lower levels of consumption and waste generation and consequently reducing emissions from these sources, with increased CH_4 recovery from landfills.

9. Table 2 illustrates the emission trends by sector and by gas for Estonia. Note that information in this paragraph and table 2 is based on Estonia's 2020 annual submission, version 1, which has not yet been subject to review. All emission data in subsequent chapters are based on Estonia's BR4 CTF tables unless otherwise noted. The emissions reported in the 2020 annual submission differ from the data reported in CTF table 1 mostly in the energy and agriculture sectors, with differences in total emissions excluding LULUCF ranging from 0.1 per cent (2015) to 1.4 per cent (2009) due to updated data and revised methodologies. The LULUCF sector shows the largest difference, with a 9.1 per cent increase in emission removals for 1990 and a 2.3 per cent increase in emission removals for 2017, mostly due to updated AD.

[3] In this report, the term "total GHG emissions" refers to the aggregated national GHG emissions expressed in terms of CO_2 eq excluding LULUCF, unless otherwise specified.

Table 2
Greenhouse gas emissions by sector and by gas for Estonia for 1990–2018

	GHG emissions (kt CO_2 eq)					*Change (%)*		*Share (%)*	
	1990	*2000*	*2010*	*2017*	*2018*	*1990–2018*	*2017–2018*	*1990*	*2018*
Sector									
1. Energy	36 237.60	14 848.09	18 708.38	18 512.80	17 590.08	–51.5	–5.0	90.0	88.1
A1. Energy industries	29 130.38	12 027.10	15 194.40	14 709.39	13 797.84	–52.6	–6.2	72.3	69.1
A2. Manufacturing industries and construction	2 506.62	580.39	512.80	646.01	688.27	–72.5	6.5	6.2	3.4
A3. Transport	2 468.50	1 672.42	2 267.96	2 427.47	2 404.70	–2.6	–0.9	6.1	12.0
A4. and A5. Other	2 081.83	540.95	710.10	713.71	682.79	–67.2	–4.3	5.2	3.4
B. Fugitive emissions from fuels	50.27	27.23	23.11	16.22	16.48	–67.2	1.6	0.1	0.1
C. CO_2 transport and storage	NO	NO	NO	NO	NO	–	–	–	–
2. IPPU	963.29	694.88	537.97	638.79	625.28	–35.1	–2.1	2.4	3.1
3. Agriculture	2 706.50	1 141.12	1 278.40	1 443.21	1 437.79	–46.9	–0.4	6.7	7.2
4. LULUCF	–1 626.32	–3 204.83	–3 739.50	–1 834.63	–1 990.18	22.4	8.5	NA	NA
5. Waste	369.93	562.45	494.31	328.70	320.99	–13.2	–2.3	0.9	1.6
6. Other[a]	NO	NO	NO	NO	NO	–	–	–	–
Gas[b]									
CO_2	36 907.24	15 244.19	18 784.96	18 635.87	17 710.95	–52.0	–5.0	91.6	88.7
CH_4	1 901.29	1 238.03	1 243.70	1 129.42	1 117.41	–41.2	–1.1	4.7	5.6
N_2O	1 468.78	682.57	813.13	923.86	912.19	–37.9	–1.3	3.6	4.6
HFCs	NO	79.15	175.54	231.90	231.03	–	–0.4	–	1.2
PFCs	NO	NO	NO	NO	NO	–	–	–	–
SF_6	NO	2.61	1.73	2.44	2.56	–	4.9	–	0.0
NF_3	NO	NO	NO	NO	NO	–	–	–	–
Total GHG emissions excluding LULUCF	**40 277.31**	**17 246.55**	**21 019.06**	**20 923.49**	**19 974.14**	**–50.4**	**–4.5**	**100.0**	**100.0**
Total GHG emissions including LULUCF	**38 650.99**	**14 041.71**	**17 279.56**	**19 088.86**	**17 983.96**	**–53.5**	**–5.8**	**–**	**–**

Source: GHG emission data: Estonia's 2020 annual submission, version 1.
[a] Estonia reported emissions in the category other as "NO".
[b] Emissions by gas without LULUCF and including indirect CO_2 considered under the direct CO_2 emissions in subcategory 2.D.3 (calculated from NMVOC emissions from solvents and road paving with asphalt).

10. In brief, Estonia's national inventory arrangements were established in accordance with paragraph 43 of its Atmospheric Air Protection Act. The changes in these arrangements since the BR3 include the appointment of EERC as the institution with overall responsibility for maintaining the national system and coordinating the inventory preparation process. The institution is also responsible for carrying out final quality control and quality assurance, and for submitting the final inventory to the European Commission and UNFCCC on behalf of the Ministry of the Environment.

2. Assessment of adherence to the reporting guidelines

11. The ERT assessed the information reported in the BR4 of Estonia 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

12. For Estonia the Convention entered into force on 25 October 1994. Under the Convention Estonia 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.

13. The target for the EU and its member States is formalized in the EU 2020 climate and energy package. The legislative package regulates emissions of CO_2, CH_4, N_2O, HFCs, PFCs and SF_6 using GWP values from the AR4 to aggregate the GHG emissions of the EU until 2020. Emissions and removals from the LULUCF sector are not included in the quantified economy-wide emission reduction target under the Convention. The EU generally allows its member States to use units from the Kyoto Protocol mechanisms for compliance purposes, subject to a number of restrictions in terms of origin and type of project and up to an established limit. Operators and airline operators can use such units to fulfil their requirements under the EU ETS, and member States can use such units for their national ESD targets, within specific limitations.

14. The EU 2020 climate and energy package includes the EU ETS and the ESD (see paras. 27–28 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 ESD 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.

15. The European Commission set out its vision for a climate-neutral EU in November 2018, and in December 2019 presented the European Green Deal as a road map with actions for making the EU economy sustainable. The European Council endorsed in December 2019 the objective of making the EU climate-neutral by 2050. As part of the European Green Deal, the Commission proposed in March 2020 to enshrine the 2050 climate-neutrality target into the first European Climate Law. The European Green Deal calls for increased ambition in the 2030 emission reduction target to at least 50 per cent below the 1990 level. Member States will set out any increased ambition in the update of their NECPs.

16. Estonia has a national target to limit its emission growth to 11 per cent above the 2005 level by 2020 for sectors under the ESD. This target has been translated into binding quantified AEAs for 2013–2020. Estonia's AEAs change from 6,296.99 kt CO_2 eq in 2013 to 6,023.72 kt CO_2 eq in 2020.[4]

17. Estonia also reported on its longer-term emission reduction target to reduce GHG emissions by approximately 70 per cent by 2030 and by 80 per cent by 2050 in comparison with the 1990 level (see also para. 26 below).

2. Assessment of adherence to the reporting guidelines

18. The ERT assessed the information reported in the BR4 of Estonia 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.

[4] 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

19. Estonia 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. Estonia 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.

20. Estonia provided information on a set of PaMs similar to those previously reported, with a few exceptions. Estonia also provided information on 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. In 2018 the single national entity, the Ministry of the Environment, appointed EERC as the institution responsible for the compilation of the BR and its submission to the UNFCCC on its behalf. During the review, Estonia also noted that the Government set up a new climate and energy committee in July 2019 to establish climate and energy policy positions and coordinate activities across ministries and other competent bodies for climate policy implementation.

21. The package of PaMs outlined in the BR4 is similar to that in the BR3, although some significant PaMs in the BR3 that addressed oil shale power station conversions have now been completed. For a number of PaMs or groups of PaMs, the mitigation impact assessment has been significantly revised in the BR4, mostly due to changes in underlying assumptions, such as the availability of biomass and wind capacity additions, while there is also a notable increase in the number of planned measures in the agriculture sector (over 12 new measures planned and scheduled to launch in 2020).

22. In its reporting on its PaMs, Estonia provided the estimated emission reduction impacts for many of its PaMs. The reporting of estimated reduction impacts of its PaMs varies significantly across sectors, with mitigation impacts assessed for all PaMs in the energy and IPPU sectors and for 14 out of 16 transport sector PaMs (whether adopted, implemented or planned). Conversely, no mitigation impacts were presented for the 30 PaMs listed under the agriculture and LULUCF sectors (of which 17 are implemented and 13 planned), and quantified mitigation impacts were given for one of the four waste sector PaMs.

23. Where estimated impacts were not provided, this was in most cases due to a lack of quantifiable AD under the reported measures. With regard to measures in the LULUCF sector, an interim report on the EFDP 2020 is still under preparation. The ERDP for 2014–2020 is reviewed annually, but GHG emissions cannot be estimated from the tracked indicators. It is not clear to the ERT how the measures within these government programmes have been tracked to assess their impact and cost-effectiveness, but the ERT notes that through the described review processes Estonia gathers some evidence, such as the number of activities conducted and number of beneficiaries, on the implemented PaMs that may be useful in terms of quantifying the emission reduction impacts of measures. In most cases the mitigation impacts are reported for individual PaMs, although in a few cases, Estonia estimated the impacts of PaMs as groups in line with its reporting under the 2030 NECP.

24. Estonia did not report on its self-assessment of compliance with its emission reduction targets or national rules for taking action against non-compliance. The BR4 reporting of Estonia's quantified economy-wide emission reduction target focused predominantly on the overarching EU-wide mechanisms, targets and accounting rules. At the national level, Estonia clarified that the Ministry of the Environment provides an annual report (in Estonian) on the execution of its development plan, but the BR4 did not provide details of how the ministry assesses national performance. For example, there was no evaluation of the performance of individual PaMs or of sector plans and programmes (e.g. to identify where further action may be warranted), nor was there an evaluation of progress towards or compliance with national targets, other than those under EU mechanisms.

25. The key overarching related cross-sectoral policy in the EU is the 2020 climate and energy package, adopted in 2009, which includes the revised EU ETS and the ESD. The package is supplemented by renewable energy and energy efficiency legislation and legislative proposals on the 2020 targets for CO_2 emissions from cars and vans, the carbon capture and storage directive, and the general programmes for environmental conservation, namely the 7th Environment Action Programme and the clean air policy package. The 2030 climate and energy framework, adopted in 2014, includes more ambitious targets that will be updated as part of the European Green Deal.

26. The achievement of the Energy Union objectives and targets is ensured through a combination of Union initiatives and national policies set out in integrated NECPs. The NECPs are periodically updated to reflect changes to EU policy, such as the implementation of the European Green Deal. Estonia's NECP specifies that its key objectives are GHG emission reductions of approximately 70 per cent by 2030 and 80 per cent by 2050, with 1990 as the base year; a 13 per cent reduction in GHG emissions by 2030 compared with the 2005 level in sectors under the ESR; a 42 per cent share of renewable energy in total final consumption by 2030; ensuring that total final energy consumption remains at 32–33 TWh in 2030; a 14 per cent reduction in primary energy consumption compared with the consumption level in recent years; and several qualitative measures related to energy security, electricity grid connectivity and research and development. To achieve these objectives, the Estonian NECP lists 71 measures in the areas of agriculture, energy, transport, forestry, building stock, waste management and industry.

27. 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_2O emissions from chemical industry, PFC emissions from aluminium production and CO_2 emissions from some industrial processes that were not covered in the previous phases of the EU ETS (since 2013). Auctioning is the default method for allocating allowances; however, harmonized rules for free allocations, based on benchmark values achieved by the most efficient 10 per cent of installations, are still in place as a safeguard for the international competitiveness of industrial sectors at risk of carbon leakage. For 2030, an emission reduction target of 43 per cent below the 2005 level has been set for the EU ETS.

28. The ESD became operational in 2013 and covers 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. Estonia has a domestic ESD target to limit growth of GHG emissions to 11 per cent above the 2005 level by 2020. During the review, Estonia confirmed that it expects to meet its ESD target; the ERT notes that Estonia's ESD emissions to date (2013–2017) stand at 97.3 per cent of its national ESD limit for the first five years of the commitment period, indicating that the Party is just on track to meet its target. The ESR, 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. Collectively, the national targets are expected to deliver a GHG emission reduction of 30 per cent by 2030 compared with the 2005 level. Estonia has an ESR target of reducing its GHG emissions by 13 per cent by 2030 compared with the 2005 level.

29. Estonia highlighted the EU-wide mitigation actions that are under development, such as the ambition to set a long-term target for climate neutrality in Europe by 2050, as set out in the European Commission's 2050 long-term strategy. The ERT notes that the European Commission proposed the European Climate Law in March 2020 under the European Green Deal. Among the mitigation actions that will have a significant impact on future emissions

are those that will be prescribed in the EU legal acts as part of the 2030 climate and energy framework.

30. Estonia introduced national-level policies to achieve its targets under the ESD and domestic emission reduction targets. The key policies reported are set out under Estonia's Low Carbon Development Strategy 2050. Sector-specific PaMs are established under national plans and programmes such as the EEDP 2030, the Second National Energy Efficiency Action Plan, the National Transport Development Plan for 2014–2020, the ERDP for 2014–2020, the EFDP 2020 and the Estonian Waste Management Plan for 2014–2020. The mitigation effect of PaMs in the energy and transport sectors is expected to be the most significant, including support for renewable and energy-efficient electricity production, investment support for wind parks, and increasing the share of biofuels in transport. Other policies that were reported in the BR3 with an expected mitigation impact of 881.40 kt CO_2 eq are the completed PaMs around more efficient use of oil shale, which involved the reconstruction of several oil shale power plants in recent years. The impact of these measures is now reflected in the reduced fuel consumption reported in the GHG inventory.

31. The ERT notes that a mitigation action of particular interest is the application of spatial and land-use measures for urban transport, which aims to improve the efficiency of the transport system through a range of sub-measures that cover planning decisions, parking policies, the restructuring of city streets and the development of telecommunications to reduce transport demand. This combination of sub-measures is expected to lead to significant emission savings out to 2030 and beyond, with the aim of promoting behavioural change and reducing demand and reliance on private cars. This measure also aims to achieve emission reductions in the transport sector, which, as Estonia noted during the review, is expected to make the largest contribution in terms of achieving the Party's 2030 ESR emission reduction targets.

32. Estonia highlighted the domestic mitigation actions that are under development, such as the Transport and Mobility Development Plan 2021–2030, the Estonian agriculture and fisheries strategy 2030 and the EFDP 2021–2030. Among the mitigation actions that provide a foundation for significant additional action are the additional development of the heat economy, which aims to renovate central boiler houses and heat networks and transition consumers to local and individual home heating systems, and the introduction of additional spatial and land-use measures for urban transport (see para. 31 above). Table 3 provides a summary of the reported information on the PaMs of Estonia.

Table 3
Summary of information on policies and measures reported by Estonia

Sector	*Key PaMs*	*Estimate of mitigation impact in 2020 (kt CO_2 eq)*	*Estimate of mitigation impact in 2030 (kt CO_2 eq)*
Policy framework and cross-sectoral measures	Low Carbon Development Strategy 2050	NA	NA
Energy			
Transport	Increasing the share of biofuels in transport	242.00	370.30
	Road usage fees for heavy-duty vehicles	94.60	268.30
	Spatial and land-use measures for urban transport energy savings to increase and improve the efficiency of the transport system	54.90	133.30
	Transport and Mobility Development Plan 2021–2030	NE	NE
Renewable energy	Support for renewable and efficient CHP-based electricity production	548.31	565.01
	Investment for construction of wind parks	219.44	861.70
	Investment in diversification of non-agricultural economic activity in rural regions[a]	NE	NE
Energy efficiency	Development of the heat economy	70.86	337.81

Sector	*Key PaMs*	*Estimate of mitigation impact in 2020 (kt CO_2 eq)*	*Estimate of mitigation impact in 2030 (kt CO_2 eq)*
	Additional development of the heat economy	147.09	701.05
	EEDP 2030	NE	NE
IPPU	Prohibitions, restrictions and obligations under EU regulation 517/2014 on F-gases and the EU directive on emissions from air-conditioning systems in motor vehicles (directive 2006/40/EC)	2.61	101.76
Agriculture	ERDP for 2014–2020 (agriculture sub-measures)	NE	NE
	Climate Change Mitigation and Adaptation Action Plan in the Agriculture Sector 2012–2020	NE	NE
	Estonian Organic Farming Development Plan 2014–2020	NE	NE
LULUCF	EFDP 2020	NE	NE
	ERDP for 2014–2020 (forestry and land use sub-measures)	NE	NE
Waste	Estonian Waste Management Plan for 2014–2020	NE	NE
	Limiting the percentage of biodegradable waste going to landfill and increasing the reuse and recycling of waste materials	4.69	59.95
	Reducing landfilling waste	NE	NE
	Estonian Environmental Strategy 2030	NE	NE

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

[a] To produce renewable energy, including bioenergy, solar and wind.

33. The ERT noted that Estonia reported minimal information in the BR4 regarding how the mitigation impacts of PaMs in any sector are assessed and how this analysis is coordinated by organizations to ensure a complete and consistent approach to the assessment of PaMs, for example, by applying consistent methods and assumptions to minimize gaps and double counting when analysing the impact of sector strategies, programmes and plans, or of individual PaMs. During the review, Estonia clarified that the mitigation impacts of PaMs are primarily derived from environmental impact assessments during the policy development phase and from research that is subject to quality assurance/quality control prior to the approval of sector strategies, programmes and plans. The ERT notes that EERC plays a key role in harmonizing, as far as practicable, the analysis of PaMs and projection methods used with the data and methods that are available for compiling and reporting the national GHG inventory, drawing, where possible, on national models, parameters and research that best reflect national circumstances.

34. Regarding the integration between the analysis of PaMs and the projections as reported in the BR4, the ERT notes that for several sectors, the projections approach is based on national models in accordance with the Intergovernmental Panel on Climate Change inventory methods, with expert judgments used to forecast future emission trends. In some cases, the reporting does not specify whether the mitigation impacts of PaMs presented in the BR4 are included in the sector projections or describe how this is done, nor does it explain whether qualitative analysis or expert judgment is applied for the PaMs and sectors where no quantitative mitigation impact estimates are available, such as agriculture and LULUCF. In other sectors the reporting is more explicit; for example, the BR4 text clearly describes the modelling approach for projections in the energy sector and explains that the mitigation impacts of corresponding PaMs are taken into account for the WEM and WAM scenarios.

35. The ERT notes that 2020 is a key transition point for Estonia, as many of the national plans and programmes that underpin its suite of PaMs are drawing to a close, while new plans and programmes, typically covering 2021–2030, are being developed, taking into

consideration the recently introduced ESR and wider EU and national mitigation targets that have either been recently agreed or are under development. Estonia clarified during the review that, looking ahead, there is no formal strategy to specifically address ESR targets at the sector level (e.g. by setting specific-sector targets), but noted that in terms of the 13 per cent reduction target for non-ETS sectors by 2030, the transport sector is expected to make the biggest contribution. The ERT notes that, given that mitigation impact estimates for PaMs were previously limited in several key non-ETS sectors, such as agriculture, forestry and LULUCF, Estonia faces the challenge of reviewing previous sector plans (e.g. the ERDP, the EFDP, the National Transport Development Plan) and formulating rigorous quantitative plans for PaMs within the strategy documents under development, which include the Transport and Mobility Development Plan 2021–2030, the Estonian agriculture and fisheries strategy 2030 and the EFDP 2021–2030. This challenge is likely to extend to the development of national methodologies for some emissions sources and for the assessment of some PaMs, in addition to the gathering and synthesis of granular AD with a view to tracking, evaluating, updating and reporting the impacts of PaMs and progress against targets.

36. The ERT notes that Estonia is well placed to address this forward-looking challenge, as it already has at its disposal a well-developed suite of implemented and planned PaMs, although many of them need more quantitative analysis, in addition to a new cross-Government climate and energy committee, established in July 2019, to help drive and coordinate action. During the review, Estonia clarified that several PaMs that are expected to have significant mitigation impacts out to 2030, such as the additional development of the heat economy, the additional reconstruction of private houses and apartment buildings, and additional spatial and land-use measures for urban transport, are not yet funded measures, despite the BR4 stating 2020 and 2021 as the implementation dates for these PaMs. The ERT notes that a number of these key PaMs will have a notable lead time for their implementation, where securing funding and initiating implementation appears to be a priority. Furthermore, Estonia outlined several longer-term PaMs during the review week, including an aspiration to decarbonize the gas supply grid in the Baltic states and Finland and research carbon capture use and storage and technologies for use in the Estonian shale oil and power sectors. The ERT notes that the impacts of these PaMs are likely to be pivotal in terms of realizing the Party's long-term climate-neutrality aspirations, while ensuring progress in coordinating, researching and developing more specific plans and PaMs will be a key challenge for the Party over the next few years.

(b) Policies and measures in the energy sector

37. **Energy efficiency.** Estonia's EEDP 2030 sets out a series of priorities on improving the energy efficiency of heat supply, most notably in relation to Estonia's district heating systems, but also with regard to the delivery of heat to commercial and private properties. These cross-cutting energy efficiency PaMs aimed at developing the heat economy are among the national PaMs that are expected to have the greatest impact on mitigating GHG emissions by 2030. The District Heating Act empowers local decision makers to analyse existing heat systems and develop local alternative heat solutions, while specific measures laid out in the EEDP 2030 aim to renovate heat networks, reduce losses and (where appropriate) replace inefficient district heating systems with local and individual home heating systems. Performance benchmarks are set for district heating schemes, whereby financial support is available for replacing district heating systems with up to 1.2 MWh of heat sold per metre of pipe. The planned measure under the EEDP 2030 on the additional development of the heat economy, which, as Estonia clarified during the review, will only be agreed subject to additional funding under the EEDP 2030, may go further by extending support to district heating systems with heat sales up to 1.6 MWh per metre. According to projections, this planned measure is expected to have the second highest mitigation impact in 2030 of all of the PaMs in the BR4. As it applies to non-ETS sectors, it may therefore play a key role in achieving Estonia's 2030 ESR target. Energy efficiency PaMs targeting individual sectors are discussed below.

38. **Energy supply and renewables.** Historically, Estonia has been highly dependent on power generated from oil shale reserves, which was a key factor when the country came 14th

in a global ranking measuring countries' CO_2 emissions from fuel combustion per capita.[5] The Party has, however, made significant progress in recent years and upgraded several large power station units, converting them from conventional pulverized combustion technology to circulating fluidized bed combustion technology, opening up more opportunities to switch to biomass fuel.

39. The EEDP 2030 forecasts a further decline in GHG emissions from oil shale as a result of the restructuring of the electricity production system in Estonia and the significant development of renewable energy sources, while also estimating that electricity consumption will reach 10 TWh by 2030. The 2018 Electricity Market Act sets out the support available for new production units, including subsidies of EUR 53.70/MWh for renewable energy sources up to 100 MW and biomass-fired CHP, and EUR 32/MWh for efficient CHP from waste, peat or oil shale retort gas, or for efficient CHP (any fuel) of up to 10 MW.

40. Furthermore, according to the EEDP 2030, renewable sources are expected to deliver at least 60 per cent of the country's heat by 2030, with estimated primary energy use of up to 19 TWh/year by the same year. A fiscal measure involving investment in the construction of wind parks is expected to deliver the highest mitigation impact of all the PaMs by 2030. Its scope has been extended since the BR3 to encompass all current and planned wind farms, with generation projected to grow to 2,500 GWh by 2030 according to the projections of the Ministry of Economic Affairs and Communications and to 7,000 GWh by 2040 according to the projections calculated using the Balmorel model, up from around 670 GWh in 2018.

41. **Residential and commercial sectors.** Estonia plans to mitigate emissions primarily through the use of economic instruments aimed at accelerating the reconstruction of residential and commercial buildings and by implementing regulations on nearly zero-energy buildings, as required by the EU directive on the energy performance of buildings (directive 2010/31/EU).

42. The individual PaMs set performance targets, for example, the measure on the "reconstruction of public and commercial buildings" seeks to reconstruct 10 per cent of buildings to energy efficiency class D by 2030, while the equivalent measure for private houses and apartments aims to reconstruct 10 per cent of private houses and 15 per cent of apartment buildings to energy efficiency class E by 2030. Some planned PaMs under the EEDP 2030 are additional and more ambitious in terms of the number of buildings and energy efficiency classes. During the review, Estonia indicated that it plans to evaluate the implemented measures at the end of 2020 and then reassess the planned measures and the funding available. The ERT notes that early action would most likely be needed to deliver any significant GHG reductions by 2030, given the large number of stakeholders that need to be engaged and the actions that need to be implemented across the national building stock to deliver such improvements.

43. **Transport sector.** Estonia noted during the review that to achieve the 2030 ESR target, significant mitigation impacts will be needed in the transport sector. The BR4 presents an extensive range of PaMs that seek to achieve emission reductions, including through fuel switching, behaviour change, modal shift, demand management and better land-use planning for more efficient national transport infrastructure. The measure on increasing the share of biofuels is projected to deliver the most significant mitigation impact by 2030 (more than 370 kt CO_2 eq), involving a phased increase in the share of renewables, including biofuel and electricity, in the transport sector from 10 per cent in 2020 to 14 per cent in 2030. During the review, Estonia further indicated that some PaMs primarily targeting the agriculture and waste sectors also aim to develop the national supply of biomethane for use in vehicles with a view to achieving further emission savings, while a drive to increase electric vehicle use is also planned.

44. PaMs related to demand management and modal shift include road usage fees for heavy-duty vehicles (implemented) and developing railway infrastructure (planned). These PaMs seek to ensure that the delivery of goods is less reliant on road transport and to develop alternative transport solutions that are more efficient or upgrade existing systems, including

[5] According to the International Energy Agency report *CO_2 Emissions from Fuel Combustion 2017* and population data from the World Bank World Development Indicators.

the construction of Rail Baltic. The projected mitigation impact of these PaMs is 366 kt CO_2 eq in 2030. Other modal shift and demand management PaMs that will contribute to mitigation impacts by 2030 include the promotion of economical driving, the development of convenient and modern public transport, and railway electrification.

45. The policy to implement spatial and land-use measures in urban transport systems by carrying out actions that will involve extensive planning and restructuring in terms of the transport network has the potential to achieve a significant mitigation impact. This policy, which has already been implemented (and considered in the WEM projections scenario) and may be further extended (with additional impacts considered in the WAM scenario), aims to implement new parking policies, restructure city streets and change the way surrounding land is used with the aim of disincentivizing the use of private cars and providing efficient alternatives, in addition to improving telecommunication systems to reduce travel demand. The extended (i.e. WAM) policy incorporates even more measures to promote behavioural change, such as more remote working, car sharing and innovative rental schemes. The ERT notes that it may be difficult to determine the direct impact of these measures in terms of GHG mitigation as emission reductions are achieved through changes to behaviour and transport patterns.

46. **Industrial sector.** Estonia has implemented industrial sector policies primarily aimed at improving energy efficiency in manufacturing through education and awareness-raising, and through the wider energy sector policies that use financial incentives to open up the electricity market, promote efficient CHP and encourage uptake of renewable energy solutions. The measures are predominantly under the Second National Energy Efficiency Action Plan. The 2019 Energy Sector Organisation Act mandates regular energy audits for larger companies. Estonia has identified key sectors where savings can be delivered, including mining, food and drink, wood, paper and pulp, and mineral industries. Several of these sectors offer the opportunity to generate biogas or biofuels and improve operational efficiency through investment support, although until now Estonia has reported biogas that is produced or planned to be produced in the agriculture and waste sectors only. In addition, many industrial operators are able to access financial support for developing smaller cogeneration CHP, which is promoted through the EEDP 2030 as part of a national strategy to decentralize energy production and increase Estonia's energy security.

(c) Policies and measures in other sectors

47. **Industrial processes.** Since 2015, Estonia has been implementing measures to mitigate industrial process emissions under EU regulation 517/2014 on F-gases and the EU directive on emissions from air-conditioning systems in motor vehicles (directive 2006/40/EC), with the aim of phasing down F-gas consumption. The measures combine a ban on products and F-gas fluids with high GWPs with the introduction of new obligations to decommission and service equipment responsibly. Although Estonia has not imposed significantly stricter requirements than those imposed by the EU regulation, it supports the EU action via project-based educational and training measures that ensure that plant operators, service engineers and others handling F-gas equipment are aware of good practice, available technologies and substitute high-GWP F-gases and equipment, and can work to minimize leakage during manufacture, commissioning, servicing and decommissioning. The ERT notes that although the impacts of these regulations may be tracked at EU level through reported F-gas fluid production, imports and exports, determining national progress will require data gathering and the identification of routes into and out of the Estonian economy for F-gas fluids to avoid the illegal import of banned or regulated materials, including within products.

48. **Agriculture.** Although Estonia has an extensive series of PaMs relating to the agriculture sector, it does not yet have any quantified estimates of their GHG mitigation impacts. Studies carried out in 2018 and 2019 looked at the potential GHG mitigation impacts of a range of measures, including choice of fertilizers, use of cover crops, no-till farming and improving manure management, and these are anticipated to feed into future plans for the sector. During the review, Estonia indicated that in many cases, there is a need to develop national models and parameters (e.g. emission factors) and improve AD gathering to enable the evaluation and appraisal of PaMs and subsequently track their effectiveness.

49. The ERDP for 2014–2020 outlines national-level PaMs that typically comprise investment grants or awareness-raising activities and broadly aim to foster carbon conservation and sequestration in both agriculture and forestry. The ERDP aims to deliver a range of agri-environmental measures, including improvements to the management of cropland and soils and minimizing soil degradation, agricultural soil leaching and water nitrogen pollution, thereby improving the sustainability and long-term productivity of agricultural systems. In addition, the ERDP seeks to support economic diversification in rural areas by taking steps such as promoting investment in farm infrastructure (e.g. improved manure management and storage) and supporting the development of renewable energy resources (e.g. biomass and biogas generation). Other ERDP PaMs are educational and communication measures, for example, providing advisory services to aid knowledge transfer, building technical and environmental awareness in agricultural enterprises and communicating opportunities to access grants and other subsidies.

50. In addition to the ERDP measures, the EU Common Agricultural Policy greening measure aims to promote farming practices that maintain permanent grassland, ensure soil and water quality and achieve crop diversification, while the EU nitrates directive underpins action on fertilizer, manure and silage management aimed at reducing nitrogen releases to water courses. Furthermore, Estonia is implementing a series of specific farming initiatives that are not primarily focused on GHGs, but will nonetheless have an impact on this area, such as organic production measures, animal welfare measures, the Estonian Dairy Strategy (which primarily aims to increase milk production) and the Estonian Sheep Farming Development Plan 2018–2023.

51. **LULUCF.** The LULUCF sector currently acts as a carbon sink, but is projected to become a source of GHG emissions by 2035, indicating the importance of this sector for Estonia in terms of mitigating national emissions and realizing long-term (EU) climate-neutrality aspirations. A total of 12 PaMs are outlined in the BR4 (11 implemented and 1 planned), with no reported estimates of their mitigation impact, and with responsibilities across the agriculture, LULUCF and forestry sectors shared between the Ministry of Rural Affairs and the Ministry of the Environment. An ongoing review is assessing the effectiveness of the EFDP, which has not yet provided results. As the period of the EFDP 2020 will end in 2020, a final report will be prepared, which will assess the implementation of the measures as a whole. The results of this assessment will also inform the development of the EFDP 2021–2030. The ERT notes that modelling the complex carbon fluxes across different land uses, soils, crops, wetlands, biomass and forestry presents a challenge and is prone to uncertainty, while input from Estonian working groups and high levels of coordination among the Ministry of the Environment, the Ministry of Rural Affairs and EERC will help to meet the challenge of preparing cost-effective sector plans and programmes. The BR4 specifies a focus on forest management and management practices for peat soils, cropland and grassland.

52. The implemented PaMs mainly derive from the EFDP 2020, which aims to ensure productivity of forests and enable efficient use of forests, setting specific target levels to increase carbon sequestration through forest management activities such as regeneration, cleaning and thinning, and by facilitating biomass use in energy generation. The plan sets out a series of indicators with target levels, including targets for increasing growing stock (from 442 million to 450 million m^3), the annual area of regeneration felling (from 22,400 to 34,500 ha/year) and woody biomass energy production (from 22 to 30 PJ/year) between the base year and 2020. The EFDP is complemented by the ERDP, which provides co-finance for private forestry support measures and aims to support rural development in a manner that enhances the competitiveness of agriculture while improving climate action and the sustainable management of natural resources.

53. Estonia is implementing measures to sequester carbon through timely forest regeneration, including grants for managed private forests to supply tree species that are suitable for the habitat, and to monitor and restore forests in the event of damage (e.g. fire, pests). Several measures aim to promote the generation of biomass resources on a national level by encouraging timber production and by seeking to offset the use of fossil fuels, and one measure aims to protect 10,000 ha of vulnerable habitats such as fenland, bogs and other

wetlands. The ERT notes that measures aimed at grassland and grazing land management are not explicitly reported in the BR4.

54. **Waste management.** Waste sector PaMs arise from the 2018 Waste Act and the Estonian Waste Management Plan for 2014–2020, with a primary focus on reducing biodegradable waste sent to landfill and promoting activities to reuse and recycle key household waste streams such as paper, metal, plastic and glass. Targets have been set for the percentage of biodegradable waste in total municipal waste sent to landfills (45 per cent in 2010, 30 per cent in 2013 and 20 per cent by 2020). The BR4 indicates that Estonia achieved a 57 per cent rate in 2011, down to 48 per cent in 2014, indicating that this target was not being met by the PaMs in place. The Estonian Waste Management Plan also sets additional national targets for 2020, including a 13 per cent recycling rate for biodegradable waste in municipal waste, a 20 per cent share of biodegradable waste in total landfilled municipal solid waste and a 50 per cent recycling rate for municipal solid waste. The ERT notes that quantitative estimates of mitigation impacts were provided for one out of the four waste management PaMs presented in the BR4, namely the measure to limit the amount of biodegradable waste sent to landfills and increasing reuse and recycling, which is expected to deliver modest emission reductions by 2020, but more significant reductions by 2035.

55. The Estonian Waste Management Plan aims to improve the resource efficiency of the Party's economy through various initiatives, including the development of tools to disseminate information and provide support to local decision makers and improvements to national monitoring of the sector. The information provided in the BR4 indicates that to implement the measure "promoting the prevention and reduction of waste generated, including reducing the hazard of waste", further investments are required and regulations need to be developed. The construction of a waste-to-energy plant in 2013, with a capacity of 260 kt/year of mixed municipal waste, has helped to reduce waste to landfill, but has also led to the import of waste to utilize the plant's installed capacity.

56. A more forward-looking policy area which involves a more holistic approach to waste management is the development of the circular economy, which strives to design material flows through the economy to minimize losses and maximize efficient use of resources. By the end of 2021, Estonia intends to develop a strategic document and action plan to consider PaMs that promote key themes such as life-cycle design; selection of sustainable materials; long-life, repairable and modular products; and supply chain optimization with a view to promoting local resource use and ultimately creating more scope for recycling or reusing materials. The ERT notes that structuring and implementing a circular economy design will take time and may involve some regional cooperation, although it has potential to lead to emission savings across many sectors.

(d) Response measures

57. Estonia reported on its assessment of the economic and social consequences of its response measures. The Party's initiatives aimed at minimizing adverse impacts include the provision of support to other countries, including developing countries, to implement energy efficiency and renewable energy measures that reduce GHG emissions. Measures aim to enhance know-how and green technology solutions. Estonia has made a long-term commitment to support Ukraine with financing of EUR 160,000; Georgia and the Republic of Moldova for 2013–2018 with financing of EUR 150,000 and EUR 200,000, respectively; and Belarus for 2018–2019 with financing of EUR 60,000. Since 2009, Estonia has also contributed to the Eastern Europe Energy Efficiency and Environment Partnership fund, which supports activities in Armenia, Azerbaijan, Belarus, Georgia, the Republic of Moldova and Ukraine.

(e) Assessment of adherence to the reporting guidelines

58. The ERT assessed the information reported in the BR4 of Estonia and identified issues relating to 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 Estonia

No.	*Reporting requirement, issue type and assessment*	*Description of the finding with recommendation or encouragement*
1	Reporting requirement specified in paragraph 6 Issue type: transparency Assessment: recommendation	The ERT noted that in its BR4 and CTF table 3, Estonia did not provide mitigation impact estimates for many of its PaMs in sectors such as IPPU, agriculture, energy, transport and LULUCF. In addition, in the BR4 the mitigation estimates provided for some PaMs were significantly different from those reported in the previous BR (e.g. the estimated mitigation impacts of PaMs related to support for renewable and efficient CHP-based electricity production and investment to support wind parks) and/or were provided for groups of PaMs (e.g. the development of the heat economy, which includes three sub-measures) instead of per mitigation action as in the BR3, without Estonia clarifying these observed changes. During the review, Estonia explained that: (a) The mitigation impacts of some PaMs had not been estimated owing to a lack of clarity on the estimation methodology in some areas and a lack of quantifiable AD in others; (b) The estimates of emissions from electricity generation have changed significantly between the BR3 and BR4 as a result of changes to input data in the model used; (c) The aggregation level of the PaMs is in accordance with the information reported on the PaMs in Estonia's 2030 NECP. The information is not specifically prepared for reporting PaMs in the BR4, and decisions are made by the relevant ministries to handle certain PaMs as groups. The ERT recommends that Estonia include in its next BR further information on the mitigation impacts of its PaMs or explain why this may not be possible owing to Estonia's national circumstances. The ERT notes that custom footnotes could be used in this respect. The ERT further recommends that Estonia provide transparent information on the estimates provided, clarifying any differences in the approach compared to the previous BR.
2	Reporting requirement specified in paragraph 7 Issue type: transparency Assessment: recommendation	In the BR4, Estonia reported on the changes to its domestic institutional arrangements in 2018, when EERC was appointed as the institution responsible for compiling the BR and submitting it to the UNFCCC on behalf of the Ministry of the Environment. However, the BR4 did not provide information on the Party's national arrangements, for example, changes in the roles and responsibilities of different ministries and organizations, with respect to domestic compliance; monitoring, reporting and verification; and evaluation of progress. During the review, Estonia provided additional information on changes to its institutional framework, noting that in July 2019 a new government climate and energy committee was set up. Its tasks include, among others, establishing climate and energy policy positions and coordinating activities of the Estonian competent bodies responsible for implementing climate and energy policy. Further, Estonia clarified the roles and responsibilities of a number of key organizations in Estonia, including EERC, the Ministry of the Environment, the Ministry of Economic Affairs and Communications and the Ministry of Rural Affairs, regarding the development, coordination and provision of technical support to inform mitigation impact assessments for PaMs. The ERT recommends that Estonia provide in its next BR transparent information on the changes in its domestic institutional arrangements, including institutional, legal, administrative and procedural arrangements used for domestic compliance, monitoring, reporting, archiving of information and evaluation of the progress towards its economy-wide emission reduction target, including, for example, descriptions of the new roles and responsibilities of the various ministries.

Note: Item listed under reporting requirement refers to the relevant paragraph of the UNFCCC reporting guidelines on BRs. The reporting on the requirements not included in this table is considered to be complete, 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. Estonia reported that it does not intend to use units from market-based mechanisms to meet its commitment under the ESD. It reported in CTF tables 4 and 4(b) that it did not use any units from market-based mechanisms in 2016 or 2017. Given that the contribution of LULUCF activities is not included in the joint EU target under the Convention, reporting of contributions of LULUCF activities is not applicable for Estonia. The ERT noted that the transparency of reporting could be improved by using the notation key "NA" in the relevant cells in CTF table 4. Table 5 illustrates Estonia'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 Estonia to achieve its target

Year	*ESD emissions (kt CO_2 eq)*	*AEA (kt CO_2 eq)*	*Use of units from market-based mechanisms (kt CO_2 eq)*[a]	*Annual AEA surplus/deficit (kt CO_2 eq)*[b]	*Cumulative AEA surplus/deficit (kt CO_2 eq)*
2013	5 752.96	6 296.99	NA	544.03	544.03
2014	6 083.09	6 321.31	NA	238.22	782.25
2015	6 144.41	6 345.64	NA	201.22	983.47
2016	6 218.05	6 369.96	NA	151.91	1 135.38
2017	6 205.02	5 928.97	NA	–276.06	859.33

Sources: Estonia's BR4 and CTF table 4(b).
[a] The use of "NA" indicates that the Party stated in its BR that it does not intend to use market-based mechanisms to achieve its target.
[b] A positive number (surplus) indicates that ESD emissions were lower than the AEA, while a negative number (deficit) indicates that ESD emissions were greater than the AEA.

60. In assessing the progress towards achieving the 2020 joint EU target, the ERT noted that Estonia's emission reduction target for the ESD is 11 per cent above the base-year level (see para. 16 above). In 2017, Estonia's emissions covered by the ESD were 4.7 per cent (276.06 kt CO_2 eq) above the AEA under the ESD. Estonia has a cumulative surplus of 859.33 kt CO_2 eq with respect to its AEAs between 2013 and 2017.

61. The ERT noted that, while Estonia's 2017 and 2018 emissions (not yet reviewed) were greater than its AEA for those years, the Party's cumulative emissions for 2013–2017 stand at 97 per cent of its total AEAs for this period. This suggests that Estonia is currently just on track to meet its target under the ESD. During the review, Estonia clarified that its projections up until 2020 indicate that its 2013–2020 target will be met. The ERT notes that achieving future ESR targets for 2021–2030 may be more challenging without making use of the flexibility mechanisms under the ESR.

(b) Assessment of adherence to the reporting guidelines

62. The ERT assessed the information reported in the BR4 of Estonia 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.

3. Projections overview, methodology and results

(a) Technical assessment of the reported information

63. Estonia reported updated projections for 2020 and 2030 relative to actual inventory data for 2017 under the WEM scenario in CTF table 6 and provided WEM projections for the additional years 2025, 2035 and 2040 in the main text of the BR4. The WEM scenario reported by Estonia includes implemented and adopted PaMs.

64. In addition to the WEM scenario, Estonia reported the WAM scenario. The WAM scenario includes planned PaMs. Estonia provided a definition of its scenarios, explaining that its WEM scenario includes all currently implemented PaMs, such as those impacting fuel consumption for electricity production and the reconstruction rate of buildings, as well as those mitigating emissions in the transport sector, while its WAM scenario also includes a number of planned PaMs which, for instance, further increase energy efficiency in buildings or lower emissions from the transport sector. The definitions indicate that the scenarios were prepared according to the UNFCCC reporting guidelines on BRs. The ERT notes that while in some cases PaMs are considered in a direct and explicit way in the models applied (see para. 34 above), in other cases, implemented, adopted and planned PaMs are indirectly considered, forming part of the information basis used for the expert judgments from which key underlying assumptions are derived before they are used to calculate emission projections (e.g. in the agriculture sector).

65. The projections are presented on a sectoral basis, using the same sectoral categories as those used in the reporting on mitigation actions, and on a gas-by-gas basis for CO_2, CH_4, N_2O, PFCs, HFCs and SF_6 (treating PFCs and HFCs collectively in each case) as well as NF_3 for 2020 and 2030 in CTF table 6 and for the additional years 2025, 2035 and 2040 in the main text of the BR4. The projections are also provided in an aggregated format for each sector and for a Party total using GWP values from the AR4.

66. Estonia's projections include emissions of indirect CO_2 in accordance with the reporting in the NIR (i.e. indirect CO_2 emissions calculated from NMVOC emissions from solvents and road paving with asphalt are considered under the direct CO_2 emissions in the common reporting format subcategory 2.D.3). Emission projections related to fuel sold to ships and aircraft engaged in international transport were reported separately and were not included in the totals.

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

67. The methodology used for the preparation of the projections is similar to that used for the preparation of the emission projections for the NC7, with several methodological developments. Estonia briefly summarized the changes since the submission of its NC7 in the assumptions, methodologies, models and approaches used in the projection scenarios. The changes relate to the shift of the starting point for projections from 2014 to 2016, the replacement of the model used to project transport emissions by the EEDP 2030 and adjustments to underlying assumptions (see para. 80 below for further details).

68. Estonia reported in CTF table 5 the key variables and assumptions used in the preparation of its projection scenarios. To prepare its projections, Estonia relied on key underlying assumptions relating to population, energy prices, economic development indicators and energy consumption, as well as development in the agriculture and waste sectors. The assumptions were updated on the basis of the most recent economic developments known at the time of the preparation of the projections (see para. 80 below). Estonia expects that its population will decrease slightly by 2030. Compared with 2016 figures, GDP is projected to increase by 14 per cent by 2020 and by 46 per cent by 2030. For its projections, Estonia assumed that carbon prices in the EU ETS will increase from EUR 5.50/EUA in 2016 to EUR 26.00/EUA in 2020 and EUR 34.70/EUA in 2030. The import prices for coal and natural gas are projected to increase by about 70 per cent and 40 per cent, respectively, in 2016–2030. The projections for final energy consumption depend on the scenario and sector, for instance, there is a projected increase under the WEM scenario for the transport sector, and a projected decrease for services under both the WEM and WAM scenarios. Activities in the agriculture sector, such as the number of livestock, are projected to increase, while the amount of waste disposed in landfills is projected to decrease.

69. Estonia provided information on sensitivity analyses. The Party established a separate sensitivity scenario for each sector, changing important assumptions from the reference scenario (i.e. the WEM scenario). In the energy sector, the sensitivity scenario was based on installing one additional shale oil power plant instead of three, substantially reducing projected emissions from shale oil production and consumption (as the electricity that would have been produced from shale oil gas is imported instead). In the IPPU and waste sectors, the sensitivity scenarios were based on alternative projections for population and GDP, as

recommended by the European Commission for reporting on GHG projections. In the agriculture sector, more conservative projections for the number of dairy cows were considered for the sensitivity scenario. Projected total emissions are most sensitive to the assumptions related to the application of solid heat carrier technology (i.e. the number of shale oil power plants), while GDP, population and animal numbers play a secondary role, although they have significant effects in the waste and agriculture sectors, respectively.

(c) Results of projections

70. The projected emission levels under different scenarios and information on the quantified economy-wide emission reduction target are presented in table 6 and figure 1.

Table 6
Summary of greenhouse gas emission projections for Estonia

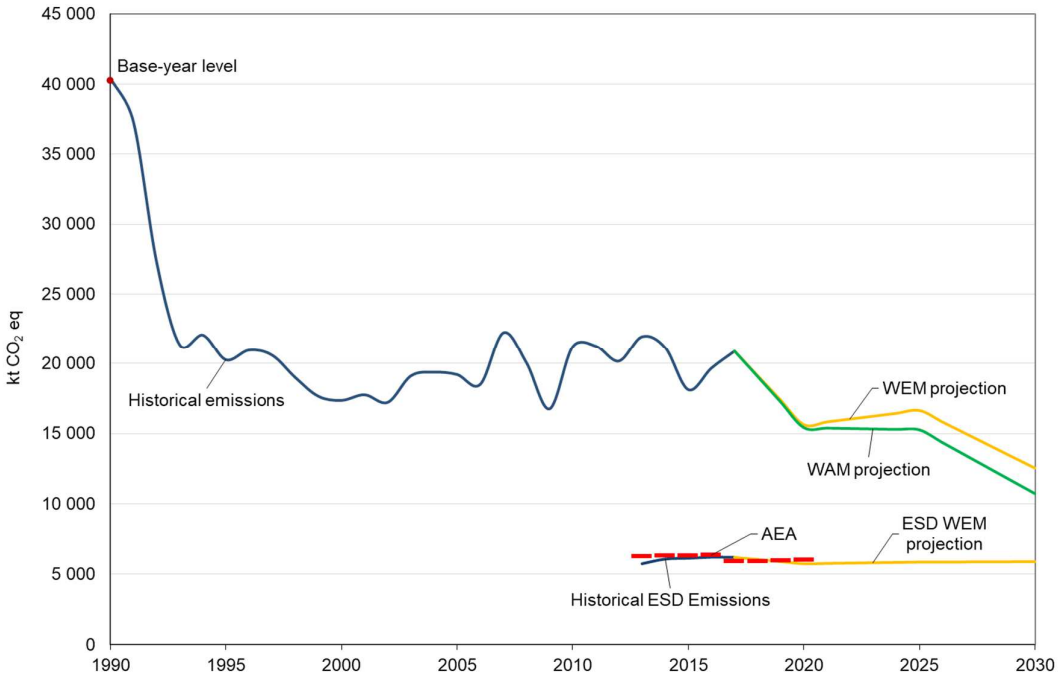
	Total GHG emissions		*Emissions under the ESD*	
	GHG emissions (kt CO_2 eq per year)	*Change in relation to 1990 level (%)*	*ESD emissions (kt CO_2 eq per year)*	*Comparison to 2020 AEA (%)*
2020 AEA under the ESD[a]	NA	NA	6 023.72	100.0
Inventory data 1990	40 431.51	NA	NA	NA
Inventory data 2017	20 879.88	–48.4	6 205.02	3.0
WEM projections for 2020	15 628.77	–61.3	5 751.27	–4.5
WAM projections for 2020	15 419.72	–61.9	NE	NE
WEM projections for 2030	12 539.21	–69.0	5 896.90	NA
WAM projections for 2030	10 724.78	–73.5	NE	NA

Source: Estonia's BR4 and CTF table 6. ESD emissions and projections data provided by Estonia during the review.

Note: The projections are for GHG emissions excluding LULUCF and including indirect CO_2.

[a] 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. Estonia's target under the ESD is 11 per cent above the 2005 level by 2020.

Figure 1
Greenhouse gas emission projections reported by Estonia



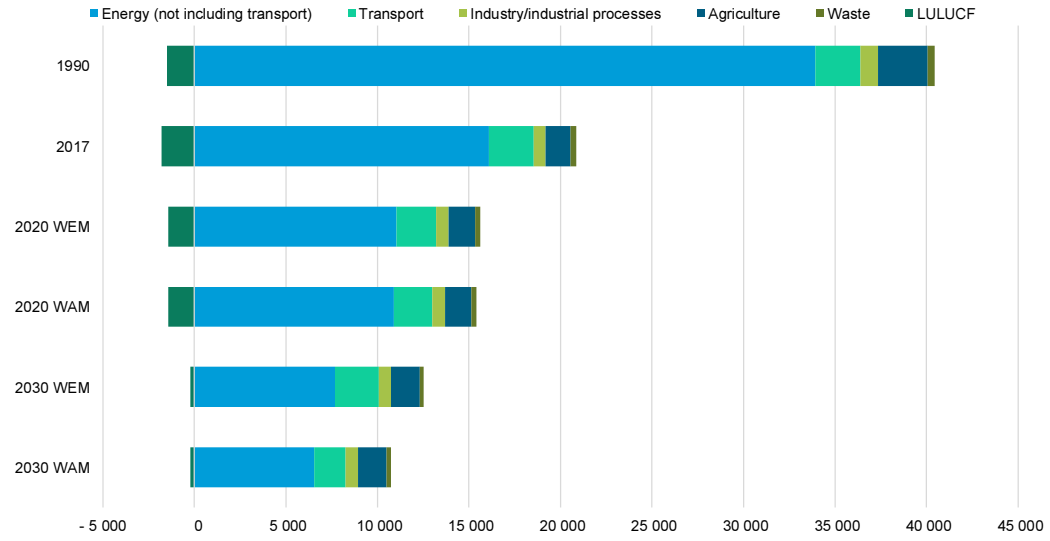
Sources: EU transaction log (AEAs) and Estonia's BR4 and CTF tables 1 and 6. ESD emissions and projections data provided by Estonia during the review.

71. Estonia's total GHG emissions excluding LULUCF and including indirect CO_2 in 2020 and 2030 are projected under the WEM scenario to decrease by 61.3 and 69.0 per cent, respectively, below the 1990 level. Under the WAM scenario, emissions in 2020 and 2030 are projected to be lower than those in 1990 by 61.9 and 73.5 per cent, respectively. The ERT notes that Estonia's total emissions are projected to increase by 6.5 per cent between 2020 and 2025 under the WEM scenario and to decrease by 1.0 per cent under the WAM scenario in the same period, followed by substantial decreases between 2025 and 2030 under both the WEM and WAM scenarios. The increase in emissions between 2020 and 2025 under the WEM scenario is related to three additional shale oil production plants and an additional refinery. Furthermore, the number of vehicles and total mileage travelled are expected to increase.

72. Estonia's target under the ESD is to limit its ESD emission growth to 11 per cent above the 2005 level by 2020 (see para. 16 above). Estonia's AEAs, which correspond to its national emission target for ESD sectors, change from 6,296.99 kt CO_2 eq in 2013 to 6,023.72 kt CO_2 eq for 2020. The projected level of emissions under the WEM scenario is 4.5 per cent below the AEAs for 2020. The ERT noted that the Party's cumulative surplus for 2013–2017 was 2.7 per cent below the AEAs for the same period, which suggests that Estonia is currently just on track to meet its target under the ESD under the WEM scenario.

73. Estonia presented the WEM and WAM scenarios by sector for 2020 and 2030, as summarized in figure 2 and table 7. Estonia also provided WEM and WAM scenarios by sector for the additional years 2025, 2035 and 2040 in its BR4.

Figure 2
Greenhouse gas emission projections for Estonia presented by sector



Source: Estonia's BR4 CTF table 6.

Table 7
Summary of greenhouse gas emission projections for Estonia presented by sector

	GHG emissions and removals (kt CO_2 eq)					*Change (%)*			
		2020		*2030*		*1990–2020*		*1990–2030*	
Sector	*1990*	*WEM*	*WAM*	*WEM*	*WAM*	*WEM*	*WAM*	*WEM*	*WAM*
Energy (not including transport)	33 920.20	11 034.73	10 891.99	7 689.93	6 557.13	–67.5	–67.9	–77.3	–80.7
Transport	2 477.19	2 180.97	2 114.66	2 395.05	1 714.05	–12.0	–14.6	–3.3	–30.8
Industry/industrial processes	963.29	680.59	680.59	666.88	666.26	–29.3	–29.3	–30.8	–30.8
Agriculture	2 700.91	1 439.25	1 439.25	1 572.14	1 572.14	–46.7	–46.7	–41.8	–41.8
LULUCF	–1 489.54	–1 402.56	–1 402.56	–208.24	–208.24	–5.8	–5.8	–86.0	–86.0
Waste	369.93	293.23[a]	293.23	215.21	215.21	–18.2	–20.7	–41.8	–41.8

	GHG emissions and removals (kt CO_2 eq)					*Change (%)*			
		2020		*2030*		*1990–2020*		*1990–2030*	
Sector	*1990*	*WEM*	*WAM*	*WEM*	*WAM*	*WEM*	*WAM*	*WEM*	*WAM*
Other	–	–	–	–	–	–	–	–	–
Total GHG emissions excluding LULUCF	**40 431.51**	**15 628.77**	**15 419.72**	**12 539.21**	**10 724.78**	**–61.3**	**–61.9**	**–69.0**	**– 73.5**

Source: Estonia's BR4 CTF table 6.
[a] The value for the waste sector under the WEM scenario for 2020 was corrected by Estonia during the review.

74. According to the projections reported for 2020 under the WEM scenario, the most significant emission reductions were expected to occur in the energy sector, amounting to projected reductions of 67.5 per cent between 1990 and 2020. All sectors show lower values for GHG emissions by 2020 compared with the 1990 level, which is due to a large extent to the significant decrease in GHG emissions between 1990 and 1993 as a consequence of major structural changes to the economy after Estonia regained its independence from the former Soviet Union. Indeed, between 1995 and 2020, emissions from transport, industry/industrial processes and agriculture were projected to increase by 37.7, 7.3 and 5.0 per cent, respectively. The overall decrease in emissions between 1995 and 2020 stems almost exclusively from the energy sector, with a minor contribution from the waste sector. The pattern of projected emissions reported for 2030 under the WEM scenario remains the same.

75. If additional measures are considered (i.e. under the WAM scenario), the patterns of emission reductions by 2020 presented by sector remain the same. Projections under the WAM scenario indicate a larger decrease of emissions from the energy sector in 1990–2030 (80.7 per cent instead of 77.3 per cent under the WEM scenario). A stronger decrease is also projected for the transport sector over the same period under the WAM scenario (30.8 per cent instead of 3.3 per cent under the WEM scenario) as a result of additional PaMs such as road usage fees for cars and heavy-duty vehicles, additional improvement of the traffic system and various other measures affecting emissions from the transport sector (for additional details see paras. 43–45 above and CTF table 3).

76. Estonia presented the WEM and WAM scenarios by gas for 2020 and 2030, as summarized in table 8. Estonia also provided WEM and WAM scenarios by gas for the additional years 2025, 2035 and 2040 in its BR4.

Table 8
Summary of greenhouse gas emission projections for Estonia presented by gas

	GHG emissions and removals (kt CO_2 eq)					*Change (%)*			
		2020		*2030*		*1990–2020*		*1990–2030*	
Gas	*1990*	*WEM*	*WAM*	*WEM*	*WAM*	*WEM*	*WAM*	*WEM*	*WAM*
CO_2[a]	37 066.77	13 427.10	13 217.78	10 384.72	8 628.14	–63.8	–64.3	–72.0	–76.7
CH_4	1 895.51	1 064.19	1 064.03	1 066.87	1 025.09	–43.9	–43.9	–43.7	–45.9
N_2O	1 469.23	902.36	902.79	951.19	935.12	–38.6	–38.6	–35.3	–36.4
HFCs	–	232.56	232.56	133.42	133.42	–	–	–	–
PFCs	–	–	–	–	–	–	–	–	–
SF_6	–	2.56	2.56	3.01	3.01	–	–	–	–
NF_3	–	–	–	–	–	–	–	–	–
Total GHG emissions without LULUCF	**40 431.51**	**15 628.77**	**15 419.72**	**12 539.21**	**10 724.78**	**–61.3**	**–61.9**	**–69.0**	**–73.5**

Source: Estonia's BR4 CTF table 6.
[a] Estonia included indirect CO_2 emissions in its projections.

77. For 2020, substantial reductions were projected for CO_2, CH_4 and N_2O emissions: 63.8, 43.9 and 38.6 per cent between 1990 and 2020, respectively. The largest contribution in absolute terms comes from CO_2 (23,639.67 kt). Reductions of 831.32 and 566.87 kt CO_2 eq are projected for CH_4 and N_2O emissions, respectively, between 1990 and 2020. As noted

in paragraph 74 above, Estonia's GHG emissions decreased substantially between 1990 and 1993. From 1993 up until 2020, the downward trend in CO_2 and CH_4 emissions was projected to continue, with CH_4 emissions eventually reaching a stable level, while historical and projected trends for N_2O emissions show a rise from the year 2000, although the level remains substantially below the 1990 level for the full projected period.

78. Under the WEM scenario, the pattern for emission reductions for 2030 remains the same, with the most significant reductions projected for CO_2, followed by CH_4 and N_2O: 26,682.05 kt CO_2 eq (72.0 per cent), 828.64 kt CO_2 eq (43.7 per cent) and 518.04 kt CO_2 eq (35.3 per cent) between 1990 and 2030, respectively. Compared with the WEM scenario projections for 2020, an additional significant reduction of emissions is projected for CO_2, while emissions of CH_4 are projected to remain relatively stable and emissions of N_2O are projected to increase slightly between 2020 and 2030.

79. If additional measures are considered (i.e. under the WAM scenario), the patterns of emission reductions by 2020 presented by gas remain the same. By 2030, CO_2 emissions are projected to be lower under the WAM scenario compared with the WEM scenario, with the former projecting a decrease of 28,438.63 kt CO_2 eq (76.7 per cent) between 1990 and 2030. The main reason for the additional decrease in CO_2 emissions under the WAM scenario is the assumption that only one additional shale oil production plant is built instead of three. In addition, higher energy efficiency in buildings and further measures in district heating lead to lower emissions under the WAM scenario compared with the WEM scenario. CH_4 and N_2O emissions are projected to be very similar under the WEM and WAM scenarios for 2030.

80. The ERT noted that Estonia's latest projections, as presented in its BR4, include some updates since the BR3. The updates concern the methodology applied, the starting point for projections and some main assumptions (see BR4 section 5.2.8). The ERT notes that the projected total emissions (without LULUCF) for 2030 presented in the BR4 are 26.4 and 29.4 per cent lower under the WEM and WAM scenarios, respectively, than the values presented in the BR3. During the review, Estonia further explained the revisions made since the BR3. In the BR3, seven additional shale oil production plants were expected to be built under the WEM and WAM scenarios, while in the BR4, three plants were expected to be built under the WEM scenario, with only one new plant expected under the WAM scenario. Further, the scenarios in the BR3 relied on maximum production volumes in the mineral industry, an assumption that was substantially revised downward for the projections in the BR4. These changes had the most significant impact on the projections of total emissions. While the projections presented in the BR4 are based on a slightly higher projected population and a slightly lower annual GDP growth rate by 2030 compared with the projections presented in the BR3, the changes in these parameters did not significantly influence total projected emissions.

(d) Assessment of adherence to the reporting guidelines

81. The ERT assessed the information reported in the BR4 of Estonia and identified issues relating to completeness and transparency and thus adherence to the UNFCCC reporting guidelines on BRs. The findings are described in table 9.

Table 9
Findings on greenhouse gas emission projections reported in the fourth biennial report of Estonia

No.	*Reporting requirement, issue type and assessment*	*Description of the finding with recommendation or encouragement*
1	Reporting requirement[a] specified in paragraph 28 Issue type: completeness Assessment: encouragement	The Party did not report a WOM scenario in its BR4. During the review, Estonia explained that, although it had not yet been able to compile a WOM scenario owing to a lack of available resources and information, it would look into the possibility of doing so for the next submission. The ERT encourages Estonia to include in its next submission a WOM scenario, or provide a detailed explanation as to why this may not be possible owing to its national circumstances.

No.	*Reporting requirement, issue type and assessment*	*Description of the finding with recommendation or encouragement*
2	Reporting requirement[a] specified in paragraph 32 Issue type: transparency Assessment: encouragement	In its BR4, the Party used 2016 as the starting point for projections, whereas 2017 would have been the latest year for which inventory data were available when the report was compiled. The ERT noted that inventory data up until 2017 were used in some sections of the BR4. During the review, Estonia explained that the NIR and the projections are compiled at the same time. The established work process, which needs to respect Estonia's obligations under the EU monitoring mechanism regulation, does not make it possible to use the latest inventory year to be included in the projections. Estonia also stated that no differences are expected to result from 2017 replacing 2016 as the starting point, because when the projections for the BR4 were compiled, all methodological changes that had been implemented in the 2019 NIR and affect the years up until 2017 had already been taken in consideration. The ERT encourages Estonia to use the latest year for which inventory data are available as the starting point for the WEM and WAM projections, or to provide a clear explanation for choosing another starting point.
3	Reporting requirement[a] specified in paragraph 35 Issue type: completeness Assessment: encouragement	Estonia did not report emission projections of the indirect GHGs carbon monoxide, nitrogen oxides, NMVOCs and sulfur oxides. During the review, the Party referred the ERT to the *Estonian Informative Inventory Report*, which provides projections of nitrogen oxides, NMVOCs and sulfur oxides for 2020, 2025 and 2030. The ERT reiterates the encouragement from the previous review report for the Party to include projections of carbon monoxide, nitrogen oxides, NMVOCs and sulfur oxides in its next submission.
4	Reporting requirement[a] specified in paragraph 37 Issue type: transparency Assessment: encouragement	The ERT noted that, while Estonia states in its BR4 that no additional PaMs are planned in the waste sector, the values for the WEM and WAM projections for the waste sector provided in tables 5.11 and 5.12 of the BR4 and in CTF tables 6(a) and 6(c) are inconsistent. During the review, Estonia explained that an error had occurred when the tables were compiled and confirmed that the correct values for the WEM and WAM projections for the waste sector are 293.23 kt CO_2 eq for 2020, 247.68 kt CO_2 eq for 2025 and 215.21 kt CO_2 eq for 2030. The ERT encourages Estonia to ensure that information on projections provided for all sectors is correct and consistent across the CTF tables and the corresponding BR tables in its next submission.
5	Reporting requirement[a] specified in paragraph 38 Issue type: transparency Assessment: encouragement	In its BR4, Estonia reported diagrams illustrating the projections for total emissions and the projections for all sectors (including the most relevant subsectors). However, the diagrams do not completely illustrate the information addressed in paragraphs 34–37 of the UNFCCC reporting guidelines on NCs, as required by paragraph 38 of those guidelines. The diagrams included do not show, for instance, projections on a gas-by-gas basis, projections for international transport or projections for carbon monoxide, nitrogen oxides, NMVOCs and sulfur oxides. During the review, Estonia provided additional diagrams showing historical and projected emissions for international bunkers and projected total emissions on a gas-by-gas basis. The ERT encourages Estonia to include in its next submission diagrams illustrating the information addressed in paragraphs 34–37 of the UNFCCC reporting guidelines on NCs, such as projections for the different gases and international transport and projections for carbon monoxide, nitrogen oxides, NMVOCs and sulfur oxides.
6	Reporting requirement[a] specified in paragraph 43 Issue type: transparency Assessment: encouragement	Parties should provide a brief explanation of each model or approach used, as requested by paragraph 43(a–e) in the UNFCCC reporting guidelines on NCs. While Estonia provided some of this information in its BR4, a number of points listed under paragraph 43 remain unaddressed, such as the model or approach used to produce the emission projections for international bunkers, the original purpose of the models or approaches used and the strengths and weaknesses of each model or approach. During the review, Estonia provided further information on the models and approaches used, explaining for example that projections for international transport

No.	Reporting requirement, issue type and assessment	Description of the finding with recommendation or encouragement
		are based on the assumption that emissions will remain at the level of the past five years. In addition, Estonia provided further insight into the models and approaches used, explaining, for example, that the Balmorel model used for the energy sector projections is a tool for analysing the electricity and CHP sectors with an international perspective, allowing for a combination of operation and investment optimization at the cost of a complex user interface. The ERT reiterates the encouragement from the previous review report for the Party to increase the transparency of its reporting by including in its next submission information on the approach used to produce the emission projections for international bunkers, and include the information outlined in paragraph 43(a–e) of the UNFCCC reporting guidelines on NCs for each model or approach used, such as a description of the type of model or approach, its original purpose and its strengths and weaknesses, and an explanation of how the model or approach used accounts for any overlap or synergies that may exist between different PaMs.
7	Reporting requirement[a] specified in paragraph 45 Issue type: transparency Assessment: encouragement	Estonia's reporting on the main differences in the assumptions, methods employed, and results between projections in the current and previous submission (BR4 section 5.2.8) is not sufficient in terms of enabling a general understanding of the main differences. In particular, BR4 table 5.19 presents BR3 WEM and WAM total emissions including LULUCF (contradicting the table labelling, which states that emissions are without LULUCF), making it impossible to draw a comparison with the BR4 WEM and WAM total emissions without LULUCF. During the review, Estonia confirmed the inconsistency in BR4 table 5.19. Further, the Party provided the corrected values and additional information on the main differences (see para. 80 above). The ERT encourages Estonia to provide consistent information in its next report with regard to the main differences in the assumptions, methods employed and results between projections in the current and previous submission with a view to giving the reader a general understanding of changes made to projections.
8	Reporting requirement[a] specified in paragraph 46 Issue type: transparency Assessment: encouragement	Estonia reported on the sensitivity of the projections to underlying assumptions in its BR4. However, the information provided in figure 5.10, for example, is inconsistent with the respective figure caption. Moreover, Estonia did not transparently explain the rationale behind the choice of parameters that are used for the sensitivity analysis, and the BR4 does not include a qualitative discussion of the results from the sensitivity analysis and its implications on the reported projections. During the review, the Party explained that rather than showing the WAM scenario, as indicated in the figure caption, figure 5.10 and its integrated table shows the WEM scenario together with the sensitivity scenario. Estonia further pointed out that projected emissions are most sensitive to the assumptions related to the application of the solid heat carrier technology, while GDP, population and livestock numbers play a secondary role. The ERT encourages Estonia to provide consistent information with regard to the sensitivity analysis and to discuss the implications of the results of the sensitivity analysis in its next submission.
9	Reporting requirement[a] specified in paragraph 47 Issue type: completeness Assessment: encouragement	Estonia reported comprehensive information on key variables and assumptions in CTF table 5 of its BR4, but in some cases left cells for historical years blank (e.g. for GDP growth rate, GDP, carbon price and fuel import prices). During the review, Estonia explained that only parameters that were actually used in inventory and projection calculations were reported. The ERT encourages Estonia to improve its reporting by including values for historical years for the key variables and assumptions in CTF table 5 of its next BR, or by providing a clear explanation as to why some values were omitted from the table. In the case of the latter, the ERT noted that reporting "NA" for historical years could help to increase transparency.
10	Reporting requirement[a] specified in paragraph 48	Estonia provided information on relevant factors and activities for each sector for projected years only in its BR4, but did not report this information for the historical years 1990–2017. Further, the information provided in the BR4 was not sufficient to communicate a general understanding of emission trends in each sector for historical and projected years, as the major changes in GHG emissions were not explained by

No.	*Reporting requirement, issue type and assessment*	*Description of the finding with recommendation or encouragement*
	Issue type: transparency Assessment: recommendation	underlying factors and activities. For example, the BR4 did not present a clear narrative to explain why, under the WEM scenario, the emissions from the energy sector are projected to increase between 2020 and 2025, followed by a decrease thereafter. During the review, Estonia confirmed that the BR4 does not include information on factors and activities for each sector for historical years and provided further information on factors and activities driving emission trends in each sector for historical and projected years. The ERT reiterates the recommendation from previous review reports for the Party to improve the transparency of its reporting by providing information describing the factors and activities driving emission trends in each sector from 1990 onward and by commenting on the trends and drivers for historical and projected years with a view to facilitating a general understanding of emission trends.

Note: 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.

[a] 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.

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

82. Estonia is not an Annex II Party and is therefore not obliged to adopt measures and fulfil obligations defined in Article 4, paragraphs 3–5, of the Convention. However, Estonia provided information in its BR4 on its provision of support to developing country Parties. The ERT commends Estonia for reporting this information and suggests that it continue to do so in future BRs.

83. In climate financing, Estonia's objective for 2015–2020 is to channel EUR 5 million from the auctioning revenues of EU ETS allowances to international climate cooperation and 100 per cent of the revenues from EU ETS aviation auctions to funding innovative climate projects and start-ups targeting least developed countries and small island developing States. In 2017 the Party supported Georgia and the Republic of Moldova and in 2018 Belarus through the Eastern European Energy Efficiency and Environment Partnership. In 2017, Estonia also financially supported Fiji's Presidency of the twenty-third session of the Conference of the Parties. In 2018 further projects supported various adaptation and mitigation actions across different sectors in Georgia, Kenya, the Republic of Moldova, Ukraine and Uzbekistan.

III. Conclusions and recommendations

84. The ERT conducted a technical review of the information reported in the BR4 and CTF tables of Estonia 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 Estonia towards achieving its target; and the Party's provision of support to developing country Parties.

85. Estonia's total GHG emissions excluding LULUCF covered by its quantified economy-wide emission reduction target were estimated to be 50.4 per cent below its 1990 level, whereas total GHG emissions including LULUCF were 53.5 per cent below its 1990 level, in 2018. By 1993 emissions dropped to below 50 per cent of the 1990 level, with the trend then exhibiting an inconsistent trough between 1994 and 2009. Thereafter, emissions remained at approximately 50 per cent of the 1990 level. The changes in total emissions without LULUCF were driven mainly by macroeconomic changes, which saw Estonia transition from a planned to a market-based economy. This, combined with the effective and

continuous increase of the contribution of renewable energy to total energy consumption (up 13.1 per cent in the last seven years), were the main factors behind this decrease.

86. Under the Convention, Estonia committed to contributing to the achievement of the joint EU quantified economy-wide emission reduction target of a 20 per cent reduction in emissions below the 1990 level by 2020. The target covers all sectors and CO_2, CH_4, N_2O, HFCs, PFCs and SF_6, expressed using GWP values from the AR4. Emissions and removals from the LULUCF sector are not included.

87. Under the ESD, Estonia has a target of limiting its emission growth to 11 per cent above the 2005 level by 2020. The 2013–2020 progression in Estonia's AEAs (its national emission target under the ESD) is 6,296.99 to 6,023.72 kt CO_2 eq.

88. In addition to its ESD target, Estonia reported a longer-term target of reducing GHG emissions by approximately 70 per cent by 2030 and by 80 per cent by 2050 compared with the 1990 level. Estonia reported on the EU joint 2030 targets under the ETS and ESR. Estonia has an ESR target of a 13 per cent reduction in GHG emissions in 2030 compared with the 2005 level.

89. In 2017, Estonia's ESD emissions were 4.7 per cent (276.06 kt CO_2 eq) above the AEA. The Party did not make use of market-based mechanisms. Estonia has a cumulative surplus of 859.33 kt CO_2 eq with respect to its AEAs.

90. The GHG emission projections provided by Estonia in its BR4 correspond to the WEM and WAM scenarios. Under these scenarios, emissions were projected to be 61.3 and 61.9 per cent below the 1990 level by 2020, respectively. According to the projections under the WEM scenario, ESD emissions were estimated to reach 5,751.27 kt CO_2 eq by 2020. The projected level of emissions under the WEM scenario is 4.5 per cent below the AEAs for 2020. The ERT noted that the Party's cumulative surplus for 2013–2017 was 2.7 per cent, which suggests that Estonia is currently just on track to meet its target under the ESD under the WEM scenario.

91. Estonia's main policy framework relating to energy and climate change is based on the EU 2020 climate and energy package. Key legislation supporting Estonia's climate change goals includes the Low Carbon Development Strategy 2050, the EEDP 2030, the Second National Energy Efficiency Action Plan, the National Transport Development Plan 2014–2020, the ERDP for 2014–2020, the EFDP 2020 and the Estonian Waste Management Plan for 2014–2020. The mitigation actions with the most significant mitigation impact that contribute to Estonia's 2020 target are the provision of financial support for renewable and efficient CHP electricity production, investment support for wind power generation, and increasing the share of biofuel use in the transport sector. Estonia has a diverse portfolio of PaMs across all sectors and has increased the number of reported measures by including those from its 2020 NECP.

92. For the post-2020 period, Estonia is guided by the implementation of the EU Energy Union strategy and plans to focus on increasing renewable energy supply; increasing the efficiency of electricity generation; renovating buildings, central boiler houses and heat networks to improve energy efficiency, notably for heat; further increasing uptake of alternative fuels (including biofuels) across transport and implementing measures to manage transport demand and promote modal shift; reducing F-gas emissions; ensuring the sustainable management of resources across agriculture and forestry; and protecting soils and wetlands. Estonia also plans to encourage behaviour change by educational, training and awareness-raising measures in many sectors.

93. Estonia is not an Annex II Party and is therefore not obliged to adopt measures and fulfil obligations defined in Article 4, paragraphs 3–5, of the Convention. However, Estonia provided information on its provision of support to developing country Parties. Climate change related official development assistance was provided to Fiji in support of its Presidency of the Conference of the Parties, as well as energy efficiency measures in Georgia and the Republic of Moldova in 2017. In 2018, support was provided for various adaptation and mitigation actions across different sectors for both Parties included in Annex I to the Convention and Parties not included in Annex I to the Convention, including Belarus, Georgia, Kenya, the Republic of Moldova, Ukraine and Uzbekistan.

94. In the course of the review, the ERT formulated the following recommendations for Estonia to improve its adherence to the UNFCCC reporting guidelines on BRs and improve the transparency of its reporting in its next BR by:

(a) Providing further information on the mitigation impacts of its PaMs or explain why this may not be possible owing to Estonia's national circumstances, and transparent information on the estimates provided, clarifying any differences in the approach compared with the previous BR (see issue 1 in table 4);

(b) Providing more detailed information on changes in its domestic institutional arrangements, including institutional, legal, administrative and procedural arrangements used for domestic compliance, monitoring, reporting, archiving of information and evaluation of the progress towards its economy-wide emission reduction target, including, for example, descriptions of the new roles and responsibilities of the various ministries (see issue 2 in table 4);

(c) Providing information describing the factors and activities driving emission trends in each sector from 1990 onward and commenting on the trends and drivers for historical and projected years with a view to facilitating a general understanding of emission trends (see issue 10 in table 9).

Annex

Documents and information used during the review

A. Reference documents

2019 GHG inventory submission of Estonia. Available at https://unfccc.int/documents/194747.

2020 GHG inventory submission of Estonia. Available at https://unfccc.int/documents/223674.

BR3 of Estonia. Available at https://unfccc.int/documents/198840.

BR4 of the EU. Available at https://unfccc.int/BRs.

BR4 of Estonia. Available at https://unfccc.int/BRs.

BR4 CTF tables of Estonia. 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". FCCC/SBSTA/2014/INF.6. Available at http://unfccc.int/resource/docs/2014/sbsta/eng/inf06.pdf.

ERDP for 2014–2020. Available at https://www.agri.ee/en/objectives-activities/estonian-rural-development-plan-erdp-2014-2020.

Estonian National Development Plan of the Energy Sector until 2030. Available at https://www.mkm.ee/sites/default/files/ndpes_2030_eng.pdf.

European Green Deal. Available at 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.

International Energy Agency. 2018. *CO_2 emissions from fuel combustion 2017*. Available at https://www.iea.org/subscribe-to-data-services/co2-emissions-statistics.

National Energy and Climate Plan of Estonia. Available at https://ec.europa.eu/energy/sites/ener/files/documents/ee_final_necp_main_en.pdf.

Report on the individual review of the annual submission of Estonia submitted in 2018. FCCC/ARR/2018/EST. Available at https://unfccc.int/sites/default/files/resource/arr2018_EST.pdf.

Report on the technical review of the third biennial report of Estonia. FCCC/TRR.3/EST. Available at https://unfccc.int/documents/180319.

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

World Bank. *World Development Indicators. Population data.* Available at https://databank.worldbank.org/source/world-development-indicators.

B. Additional information provided by the Party

Responses to questions during the review were received from Cris-Tiina Pärn (EERC), including additional material. The following documents[1] were provided by Estonia:

Estonian Environment Agency. 2020. *Estonian Informative Inventory Report 1990-2018. Submitted under the Convention on Long-Range Transboundary Air Pollution*. Available at https://www.keskkonnaagentuur.ee/sites/default/files/estonia_iir_2020.pdf

Ministry for Rural Affairs. 2018. *Monitoring report of the Estonian Rural Development Plan 2014–2020*. Available at https://www.agri.ee/et/eesmargid-tegevused/eesti-maaelu-arengukava-mak-2014-2020/seire-ja-hindamine (Estonian only).

Ministry of Environment. *Report on the Execution of the Development Plan of the Area of Government of the Ministry of the Environment for 2018*. Available at https://www.envir.ee/sites/default/files/kem_tegevuskava_taitmise_aruande_lisa_2018.pdf (Estonian only). Ministry of Environment. *Report on the Execution of the Development Plan of the Area of Government of the Ministry of the Environment for 2018. Annex. Available at* https://www.envir.ee/sites/default/files/kem_tegevuskava_taitmine_aruanne_2018.pdf (Estonian only).

[1] Reproduced as received from the Party.