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## Report on the technical review of the third biennial report of Denmark

Developed country Parties were requested by decision 2/CP.17 to submit their third biennial report to the secretariat by 1 January 2018. This report presents the results of the technical review of the third biennial report of Denmark, conducted by an expert review team in accordance with the “Guidelines for the technical review of information reported under the Convention related to greenhouse gas inventories, biennial reports and national communications by Parties included in Annex I to the Convention”.

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## Abbreviations and acronyms

AEA	annual emission allocation
AR4	Fourth Assessment Report of the Intergovernmental Panel on Climate Change
BR	biennial report
CHP	combined heat and power
CH <sub>4</sub>	methane
CO <sub>2</sub>	carbon dioxide
CO <sub>2</sub> eq	carbon dioxide equivalent
CTF	common tabular format
DAC	OECD Development Assistance Committee
DKK	Danish kroner
ERT	expert review team
ESD	effort-sharing decision
EU	European Union
EU ETS	European Union Emissions Trading System
F-gas	fluorinated gas
GDP	gross domestic product
GHG	greenhouse gas
HFC	hydrofluorocarbon
ICAO	International Civil Aviation Organization
IMO	International Maritime Organization
IPCC	Intergovernmental Panel on Climate Change
IPPU	industrial processes and product use
LULUCF	land use, land-use change and forestry
NA	not applicable
NC	national communication
NE	not estimated
NF <sub>3</sub>	nitrogen trifluoride
NIR	national inventory report
NO	not occurring
non-Annex I Party	Party not included in Annex I to the Convention
non-ETS sectors	sectors not covered by the European Union Emissions Trading System
N <sub>2</sub> O	nitrous oxide
OECD	Organisation for Economic Co-operation and Development
PaMs	policies and measures
PFC	perfluorocarbon
PSO	public service obligation
SF <sub>6</sub>	sulfur hexafluoride
UNFCCC reporting guidelines on BRs	“UNFCCC biennial reporting guidelines for developed country Parties”
UNFCCC reporting guidelines on NCs	“Guidelines for the preparation of national communications by Parties included in Annex I to the Convention, Part II: UNFCCC reporting guidelines on national communications”
WAM	‘with additional measures’
WEM	‘with measures’
WOM	‘without measures’

## I. Introduction and summary

### A. Introduction

1. This is a report on the in-country technical review of the BR3<sup>1</sup> of Denmark. 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 Denmark, which provided comments that were considered and incorporated as appropriate into this final version of the report.

3. The review was conducted from 24 to 29 September 2018 in Copenhagen by the following team of nominated experts from the UNFCCC roster of experts: Ms. Diana Barba (Colombia), Mr. Luis Caceres Silva (Ecuador), Mr. Damien Fahey (Ireland), Mr. Ross Hunter (United Kingdom of Great Britain and Northern Ireland) and Mr. Miguel Angel Taboada (Argentina). Mr. Caceres Silva and Mr. Hunter were the lead reviewers. The review was coordinated by Ms. Veronica Colerio and Mr. James Howland (UNFCCC secretariat).

### B. Summary

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

#### 1. Timeliness

5. The BR3 was submitted on 1 January 2018, as per the deadline of 1 January 2018 mandated by decision 2/CP.17. It was resubmitted on 21 January 2018. The CTF tables were submitted on 1 January 2018 and resubmitted on 10 October 2018 to address issues raised during the review.

#### 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 Denmark in its BR3 mostly adheres to the UNFCCC reporting guidelines on BRs.

Table 1

**Summary of completeness and transparency of mandatory information reported by Denmark in its third biennial report**

<i>Section of BR</i>	<i>Completeness</i>	<i>Transparency</i>	<i>Reference to description of recommendations</i>
GHG emissions and trends	Complete	Transparent	–
Assumptions, conditions and methodologies related to the attainment of the quantified economy-wide emission reduction target	Complete	Transparent	–
Progress in achievement of targets	Complete	Mostly transparent	Issue 1 in table 4

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

<i>Section of BR</i>	<i>Completeness</i>	<i>Transparency</i>	<i>Reference to description of recommendations</i>
Provision of support to developing country Parties	Mostly complete	Mostly transparent	Issue 1 in table 10; issue 1 in table 14; issue 1 and 2 in table 15

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

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

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

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

7. Total GHG emissions<sup>2</sup> excluding emissions and removals from LULUCF decreased by 26.9 per cent between 1990 and 2016, whereas total GHG emissions including net emissions or removals from LULUCF decreased by 24.3 per cent over the same period. Table 2 illustrates the emission trends by sector and by gas for Denmark.

Table 2

**Greenhouse gas emissions by sector and by gas for Denmark for the period 1990–2016**

<i>Sector</i>	<i>GHG emissions (kt CO<sub>2</sub> eq)</i>					<i>Change (%)</i>		<i>Share (%)</i>	
	<i>1990</i>	<i>2000</i>	<i>2010</i>	<i>2015</i>	<i>2016</i>	<i>1990–2016</i>	<i>2015–2016</i>	<i>1990</i>	<i>2016</i>
1. Energy	53 709.77	54 883.34	50 752.34	35 963.52	37 577.50	–30.0	4.5	76.1	72.8
A1. Energy industries	26 531.59	26 303.96	24 471.95	13 110.76	14 263.94	–46.2	8.8	37.6	27.6
A2. Manufacturing industries and construction	5 526.14	6 042.50	4 524.96	3 949.64	4 030.18	–27.1	2.0	7.8	7.8
A3. Transport	10 979.21	12 699.04	13 651.44	12 929.98	13 248.96	20.7	2.5	15.6	25.7
A4. and A5. Other	10 156.27	8 748.33	7 536.47	5 581.65	5 615.39	–44.7	0.6	14.4	10.9
B. Fugitive emissions from fuels	516.56	1 089.50	567.52	391.48	419.03	–18.9	7.0	0.7	0.8
C. CO <sub>2</sub> transport and storage	NO	NO	NO	NO	NO	–	–	–	–
2. IPPU	2 344.09	3 643.88	2 060.01	2 050.02	2 185.73	–6.8	6.6	3.3	4.2
3. Agriculture	12 710.75	11 299.02	10 445.38	10 428.09	10 570.07	–16.8	1.4	18.0	20.5
4. LULUCF	4 788.95	3 526.68	–799.32	4 222.81	5 414.38	13.1	28.2	–	–
5. Waste	1 833.90	1 561.39	1 234.67	1 176.42	1 286.23	–29.9	9.3	2.6	2.5
6. Other	NO	NO	NO	NO	NO	–	–	–	–
Indirect CO <sub>2</sub>	1 163.11	796.51	458.95	302.29	286.94	–75.3	–5.1	–	–

<sup>2</sup> In this report, the term “total GHG emissions” refers to the aggregated national GHG emissions expressed in terms of CO<sub>2</sub> eq excluding LULUCF, unless otherwise specified. Values in this paragraph are calculated on the basis of the 2018 annual submission, version 1.

Sector	GHG emissions (kt CO <sub>2</sub> eq)					Change (%)		Share (%)	
	1990	2000	2010	2015	2016	1990– 2016	2015– 2016	1990	2016
	Gas <sup>a</sup>								
CO <sub>2</sub>	54 893.65	55 640.36	50 818.14	36 625.42	38 427.33	–30.0	4.9	77.8	74.4
CH <sub>4</sub>	7 667.67	7 958.34	7 398.76	6 942.01	7 057.37	–8.0	1.7	10.9	13.7
N <sub>2</sub> O	7 994.78	6 998.50	5 246.20	5 251.55	5 367.22	–32.9	2.2	11.3	10.4
HFCs	NA, NE, NO	711.71	974.71	690.80	671.53	–	–2.8	–	1.3
PFCs	NO, NA	22.57	18.66	4.94	4.00	–	–19.2	–	0.0
SF <sub>6</sub>	42.41	56.15	35.93	103.33	92.07	117.1	–10.9	0.1	0.2
NF <sub>3</sub>	NA, NO	NA, NO	NA, NO	NA, NO	NA, NO	–	–	–	–
<b>Total GHG emissions without LULUCF</b>	<b>70 598.51</b>	<b>71 387.63</b>	<b>64 492.40</b>	<b>49 618.05</b>	<b>51 619.52</b>	<b>–26.9</b>	<b>4.0</b>	<b>100.0</b>	<b>100.0</b>
<b>Total GHG emissions with LULUCF</b>	<b>75 387.46</b>	<b>74 914.31</b>	<b>63 693.07</b>	<b>53 840.86</b>	<b>57 033.90</b>	<b>–24.3</b>	<b>5.9</b>	<b>–</b>	<b>–</b>
<b>Total GHG emissions without LULUCF, including indirect CO<sub>2</sub></b>	<b>71 761.62</b>	<b>72 184.14</b>	<b>64 951.35</b>	<b>49 920.34</b>	<b>51 906.46</b>	<b>–27.7</b>	<b>4.0</b>	<b>–</b>	<b>–</b>
<b>Total GHG emissions with LULUCF, including indirect CO<sub>2</sub></b>	<b>76 550.57</b>	<b>75 710.82</b>	<b>64 152.03</b>	<b>54 143.15</b>	<b>57 320.83</b>	<b>–25.1</b>	<b>3.9</b>	<b>–</b>	<b>–</b>

Source: GHG emission data: Denmark's 2018 annual submission, version 1.

<sup>a</sup> Emissions by gas without LULUCF and without indirect CO<sub>2</sub>.

8. The decrease in total emissions was driven mainly by the decline in emissions in the energy (those emissions not related to transport), waste and agriculture sectors.

9. Total Danish GHG emissions have exhibited a downward trend since the mid-1990s. The transport sector's share of total emissions, however, grew steadily from 1990 owing to rising transport needs in the wake of economic development until the global financial crisis of 2008, when the upward trend of emissions from transport was broken. An increased focus on the energy efficiency of cars was an important factor contributing to the change in this trend.

10. The summary information provided on GHG emissions was consistent with the information reported in the 2017 annual submission.

11. In brief, The Danish Centre for Environment and Energy, part of Aarhus University, is the responsible entity for producing the Danish GHG emission inventories. The inventories work is done in cooperation with Danish ministries, research institutes, organizations and private enterprises. In the BR3, Denmark reported no changes in inventory arrangements since the BR2.

## 2. Assessment of adherence to the reporting guidelines

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

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

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

13. For Denmark, the Convention entered into force on 21 March 1994. Under the Convention Denmark committed to contributing to the achievement of the joint EU economy-wide emission reduction target of 20 per cent below the 1990 level by 2020. The EU offered to move to a 30 per cent reduction target on the condition that other developed countries commit to a comparable target and developing countries contribute according to their responsibilities and respective capabilities under a new global climate change agreement.

14. The target for the EU and its member States is formalized in the EU 2020 climate and energy package. The legislative package regulates emissions of CO<sub>2</sub>, CH<sub>4</sub>, N<sub>2</sub>O, HFCs, PFCs and SF<sub>6</sub> using global warming potential values from the AR4 to aggregate the GHG emissions of the EU until 2020. Emissions and removals from the LULUCF sector are not included in the quantified economy-wide emission reduction target under the Convention. The EU generally allows its member States to use units from the Kyoto Protocol mechanisms as well as new market mechanisms for compliance purposes, subject to a number of restrictions in terms of origin and type of project and up to an established limit. Companies can make use of such units to fulfil their requirements under the EU ETS.

15. The EU 2020 climate and energy package includes the EU ETS and the ESD (see chapter II.C.1(a) below). The EU ETS covers mainly point emissions sources in the energy, industry and aviation sectors. An EU-wide emissions cap has been put in place for the period 2013–2020 with the goal of reducing emissions by 21.0 per cent below the 2005 level by 2020. Emissions from non-ETS sectors are regulated through member State specific targets that add up to a reduction at the EU level of 10 per cent below the 2005 level by 2020.

16. Under the ESD, Denmark has a target of reducing its total emissions to 20 per cent below the 2005 level by 2020 for non-ETS sectors. National emission targets for non-ETS sectors for 2020 have been translated into binding quantified AEAs for the period 2013–2020. Denmark's AEAs change following a linear path from 36,829 kt CO<sub>2</sub> eq in 2013 to 32,063 kt CO<sub>2</sub> eq in 2020.<sup>3</sup>

17. Denmark has already committed to reducing emissions by 39 per cent below the 2005 level by 2030 under a new iteration of the ESD. Alongside the revised ESD, a new suite of EU targets has been proposed for the period 2020–2030 (see para. 25 below).

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

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

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

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

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

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

19. Denmark provided information on its package of PaMs implemented, adopted and planned, by sector and by gas, in order to fulfil its commitments under the Convention and its Kyoto Protocol. Denmark reported on its policy context and legal and institutional arrangements put in place to implement its commitments and monitor and evaluate the effectiveness of its PaMs.

20. Denmark provided information on a set of PaMs similar to those previously reported. The only change related to Denmark's institutional, legal, administrative and procedural arrangements used for domestic compliance, monitoring, reporting, archiving of information and evaluation of the progress made towards its target is that in October 2016, the Ministry of Energy, Utilities and Climate replaced the Danish Energy Agency in its role of supporting the Minister for Energy, Utilities and Climate with regard to matters relating to climate change.

21. Denmark reported on its self-assessment of compliance with emission reduction targets and national rules for taking action against non-compliance. To assess compliance with member States' contributions towards the EU target, a universal monitoring and review process is already in place for all EU member States (Monitoring Mechanism Regulation; EU regulation 525/2013), which is described in detail in the BR3 of the EU.<sup>4</sup> The Ministry of Energy, Utilities and Climate (see para. 20 above) has the responsibility to assess the status of Denmark's fulfilment of national GHG reduction targets and international climate obligations. Denmark's Climate Council (see para. 28 below) is tasked with providing recommendations to the Government on the basis of the status of Denmark's fulfilment of national GHG reduction targets and international climate obligations.

22. The key overarching related cross-sectoral policy in the EU is the 2020 climate and energy package, adopted in 2009, which includes the revised EU ETS and the ESD. The package is supplemented by renewable energy and energy efficiency legislation and legislative proposals on the 2020 targets for CO<sub>2</sub> emissions from cars and vans, the carbon capture and storage directive, and the general programmes for environmental conservation, namely the 7th Environment Action Programme and the clean air policy package.

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

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

25. Denmark highlighted the EU-wide mitigation actions that are under development, namely the 2030 climate and energy package. This package incorporates four separate EU targets: (1) a binding target of at least a 40 per cent reduction in GHG emissions by 2030

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<sup>4</sup> Available at <https://unfccc.int/process-and-meetings/transparency-and-reporting/reporting-and-review-under-the-convention/national-communications-and-biennial-reports-annex-i-parties/third-biennial-reports-annex-i>.



compared with the 1990 level; (2) a binding target to increase the share of renewable energy to at least 27 per cent of energy consumption by 2030; (3) an indicative target of a 27 per cent improvement in energy efficiency by 2030; and (4) an indicative target for supporting the completion of an internal energy market by achieving electricity interconnection of 10 per cent by 2020 and 15 per cent by 2030. This package of measures has been approved by the European Council and was awaiting final approval by the European Parliament at the time of the review.

26. The 2030 EU target for reducing GHG emissions by at least 40 per cent comprises, like the 2020 package, two components: the EU ETS and the ESD. For the EU ETS, the EU has committed to reducing GHG emissions by 43 per cent below the 2005 level. For the ESD, Denmark has committed to reducing its GHG emissions by 39 per cent below the 2005 level by 2030, which represents a significantly greater contribution to the target compared with the average across EU member States. Denmark has also committed to reaching a target of 50 per cent of renewables in its energy use by 2030. According to the information provided during the review on the Danish Energy Agreement 2018 (see para. 29) the political parties to the energy agreement have allocated funding that sets a course towards a renewable energy share of approximately 55 per cent by 2030.

27. Denmark's overarching policy for climate change is contained within the Government Platform, which was adopted in 2016. This platform encompasses a number of climate change related actions, including commitments to reduce GHG emissions, to move further towards having energy generation and use being based on renewables and to implement all EU climate policies. In many cases, for example reducing GHG emissions and fossil fuel-based energy use, Denmark has committed to undertaking greater action than many other EU member States.

28. While Denmark views its climate change policy and targets as being driven primarily by EU climate policies, the Climate Change Act (Act No. 716 of 25 June 2014) is important supporting domestic legislation. This Act mandates the establishment of an independent Climate Council to advise the Government on climate change issues, requires annual climate policy reporting to the Danish Parliament and implements a process for setting national GHG targets. It should be noted that the previous national climate change targets for 2020 have been abolished by the current Government. Denmark now aims to achieve EU targets for 2020 and 2030 and to achieve the Government's long-term target of becoming a climate neutral society by 2050.

29. The Danish energy agreements comprise another key overarching national policy framework. The current agreement describes policies, commitments and actions to be implemented in the energy sector between 2012 and 2020. During the review, Denmark provided information on the recently completed Energy Agreement 2018 for the period 2020–2030, under which climate policy related to the energy sector will further evolve. It includes, for example, targets for greater GHG emission reductions, reducing energy use, improving energy efficiency and greater use of energy from renewable sources. A key area of enhanced focus in the 2018 agreement compared with the 2012 agreement is research into the development and implementation of smart grids. The new agreement also aligns Danish domestic energy policy with EU-level energy policy. It should be noted, however, that at the time of launch of the Energy Agreement 2018, the Danish Government had made funding commitments for policies only up to 2024, but with an annual reserve of DKK 400–500 million for the period 2025–2030, allocated for additional investments in green energy sources, if continued subsidies for renewable energy remain necessary. This includes the procurement of two additional 800 MW offshore wind farms, leading to a total capacity of 2,400 MW under the agreement.

30. Denmark introduced national-level policies to achieve its targets under the ESD and domestic emission reduction targets. The quantitative impacts of key policies are reported as a series of groups rather than individually. The ERT noted that Denmark's approach of grouping together large numbers of PaMs for analysis made it difficult to assess which individual PaMs have the most significant impact on GHG emissions and removals. Denmark reported on how it periodically updates its PaMs to reduce greater levels of emissions and on the PaMs that have been discontinued since the previous submission. The mitigation effects of the implementation of policies focusing on energy efficiency and the use of renewables

are the most significant. Compared with a situation without implementation since 1990, these two groups of policies are expected to contribute GHG emission reductions of 16.94 and 22.81 Mt CO<sub>2</sub> eq/year in 2020, respectively. Key individual policies include the reduction of fertilizer use in the agriculture sector and the implementation of comprehensive tax regimes in the energy sector. Compared with a situation without implementation until 2001, these policies are expected to contribute GHG emission reductions of 1.90 and 1.20 Mt CO<sub>2</sub> eq/year, respectively, in 2020.

31. Denmark did not highlight any specific domestic mitigation actions that are under development. All PaMs included in the BR3 have been either adopted or implemented. It should, however, be noted that the Government Platform 2016 and Energy Agreement 2018 are significant new packages of policies that set the direction for enhanced action to reduce GHGs in Denmark in the future. During the review, the Party informed the ERT that a new national Climate and Air Proposal was due to be published. This plan will set out policies for each sector alongside the overall pathway that Denmark will follow in order to achieve its targets under the ESD to 2030. The ERT noted the importance of this forthcoming plan. Table 3 provides a summary of the reported information on the PaMs of Denmark.

Table 3

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

<i>Sector</i>	<i>Key PaMs</i>	<i>Estimate of mitigation impact by 2020 (kt CO<sub>2</sub> eq)</i>	<i>Estimate of mitigation impact by 2030 (kt CO<sub>2</sub> eq)</i>
Energy	Energy taxes (except for mineral oil)	1 000.00	1 000.00
	Heat pumps as an energy service	–	–
Transport	Energy efficiency of passenger cars	550.00	550.00
	Investments in a new metro line and in bicycle transport facilities	–	–
Renewable energy	All renewable energy mitigation actions since 1990 (policy group)	22 805.00	24 060.00
Energy efficiency	All energy efficiency mitigation actions since 1990 (policy group)	16 944.00	18 793.00
IPPU	No PaMs were reported	NA	NA
Agriculture	Ammonia Action Plan	–	–
LULUCF	All LULUCF mitigation actions since 1990 (policy group)	1 740.00	1 740.00
Waste	Statutory ban on landfilling combustible waste	333.00	333.00
	Subsidy programme for biocovers for landfills	300.00	173.00

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

32. The description in the BR3 of the baseline against which the quantified effects of PaMs in 2020 and 2030 are measured is not transparent. The description indicates that the baseline is derived from three different analyses described separately in annexes B2, B3 and B4 to the NC7 and referenced in the BR3, but there is no explanation of how these analyses have been integrated. During the review, Denmark provided further information on this matter as well as confirmation that the baseline used is a WOM scenario for 1991–2035 without measures since 1990.

33. When quantifying the effects of PaMs, Denmark applies a ‘frozen policy’ approach. Under this approach, the effects of PaMs are applicable only in the future years for which specific budgets for their implementation have been committed. After this point, a

standardized economic modelling approach is applied wherein the most cost-effective option for achieving an outcome is automatically selected. An example of this is in the energy sector: PaMs included in the Energy Agreement 2012, while relevant beyond 2020, have funding committed only to 2020. Beyond 2020, the modelling approach for energy use would select the reintroduction of fossil fuels rather than the use of renewable energy sources, which it projects to be more expensive. The ERT considers that this can lead to artificial results because it is highly likely that additional budget commitments will be made in the future and hence the scenario presented is unlikely to be accurate.

34. Limited information is provided in the BR3 on the costs of implementing policies. What is provided is predominantly an overview of budgets allocated to different policies or overarching strategies, for example to the 2012 and 2018 Energy Agreements and the National Green Climate Fund. However, during the review, Denmark highlighted the report *Catalogue of Danish Climate Change Mitigation Measures* and more recent iterations of the analysis contained within it, which provide a significant amount of information on the costs of a wide range of policies.

35. Denmark provided in its BR3 limited information of the way in which progress made by its PaMs to mitigate GHG emissions is monitored and evaluated over time and the related institutional arrangements.

36. The Party provided limited information relating to policies and practices which encourage activities that lead to greater levels of anthropogenic GHG emissions than would otherwise occur. The transition of funding for renewables from PSO schemes to direct funding from the national budget, which will reduce energy costs and as a consequence increase power consumption and potentially increase GHG emissions in the short term, is described in the NC7 and referenced in the BR3. Denmark also informed the ERT that exploration for oil, gas and minerals in Greenland is expected to expand in the future, potentially leading to nearly a fourfold increase in Greenland's GHG emissions.

37. In its BR3 Denmark did not provide any information regarding the non-GHG mitigation benefits of PaMs. During the review, the Party provided the ERT with information outlining the co-benefits, particularly for air pollution, that could be expected from all policies that lead to a reduction in the combustion of fossil fuels. An analysis of co-benefits was undertaken in the *Catalogue of Danish Climate Change Mitigation Measures* report highlighted by Denmark during the review, and updates to it, but the method of analysis and the non-GHG parameters are not included in the report. The Party noted that the forthcoming national Climate and Air Proposal (see para. 31 above) is likely to include a new assessment of co-benefits and trade-offs specific to climate change and air quality policies.

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

38. **Energy supply.** Policies in the energy supply sector are guided largely by the energy agreements, of which the 2012 version primarily drove the policies reported in the BR3. The major overarching policies expected to be achieved by 2020 are to incorporate at least 35 per cent renewables in final energy consumption, to achieve 70 per cent of electricity generation from renewable sources and to reduce gross final energy demand by 8 per cent. The Energy Agreement 2012 includes policies that have been committed to and funded to 2020. Details of the Energy Agreement 2018, including information on the policies that have been committed and funded to 2024, were provided by Denmark during the review.

39. To achieve the targets in energy supply, various taxes and subsidies have been implemented, including taxes on the use of fossil fuels (including coal, oil and gas) for heat generation and energy products, a long-standing tax on electricity consumption and subsidies for renewable fuels. Key measures are taxes on fossil fuels for heating, the indirect subsidy for heat generation from CHP plants and the subsidy for electricity from wind, biomass and solar power. In 2015, total subsidies provided for environmentally friendly electricity production were DKK 8.0 billion, divided between wind power (DKK 4.7 billion), small-scale CHP (DKK 2.3 billion) and biomass (DKK 1.0 billion).

40. Another key policy in energy supply is the EU ETS, which covers all large emitters of GHGs in Denmark, including coal-fired power stations. By ensuring all qualifying installations are covered by this scheme and by diligent monitoring by the Danish Energy

Agency of their compliance, Denmark contributes to the EU-wide reduction in GHG emissions.

41. The ERT noted the significant progress Denmark continues to make in decarbonizing its energy supply sector. The holistic move away from dependence on fossil fuels, particularly for electricity and heat generation, that has taken place since the early 1990s is a significant achievement. However, the ERT also noted that offshore oil and gas extraction is planned to continue in the future, as well as the intention to significantly increase onshore exploration in Greenland. There is no clear policy reported in the BR3 regarding the minimization or management of GHG emissions from fossil fuel extraction.

42. **Renewable energy sources.** Renewable energy sources feature strongly in the Energy Agreement 2018 (see para. 38 above), which aims to achieve renewable electricity production in Denmark above 100 per cent of electricity consumption. Renewable energy sources are incentivized via a suite of tax-based policies, aimed largely at disincentivizing the use of fossil fuels, and subsidies.

43. The generation of electricity from wind power is a key policy in the renewable energy sector and the Danish Government continues to subsidize its large-scale roll-out, particularly offshore. The largest wind farm in Denmark, the 400 MW Kreigers Flak installation, is due to be commissioned in 2021. The subsidies are implemented through PSO schemes, whereby any additional costs for wind-powered electricity generation compared with that from fossil fuels are recovered from customers. During the review, the Party highlighted that the Government and a majority in Parliament agreed in 2016 to move funding for wind power from PSO schemes to direct funding from the national budget, thus reducing prices to consumers (see para. 36 above).

44. Another notable policy is the Biomass Agreement, a voluntary agreement with large electricity generation plants to facilitate their use of biomass to replace the existing use of fossil fuels. The Danish Government also supports the development and demonstration of new renewable energy technologies. Part of this support is ensuring there is a domestic market within which these technologies can thrive and promoting innovative research. Recent advancements have been focused on smart grids, which ensure the variable supply from some renewable sources can be managed to provide seamless supply.

45. **Energy efficiency.** Energy efficiency policies encompass a range of mechanisms. Through building rating and appliance labelling, the Danish Government aims to raise consumers' awareness of energy consumption and enable them to make informed choices. During the review, Denmark provided details of the Energy Efficiency PSO, a requirement on energy companies to ensure their customers achieve a certain level of energy savings. The ERT noted that a substantial reduction in funding for this policy is planned in 2020, reducing the budget available from DKK 1.5 billion to DKK 500 million over a three-year cycle. The Better Houses policy supports home retrofits and aims to provide a one-stop shop for homeowners via Better Houses Consultants, who guide homeowners in prioritizing upgrades, with the goal of eventual highly efficient deep refurbishment.

46. Fiscal measures are in place that provide subsidies to homeowners wishing to implement more efficient energy systems. These measures include a programme to replace old oil-burning heaters with modern energy-efficient and low-emission systems. Another measure promotes the use of heat pumps for supplying energy to homes, particularly in rural areas, by providing innovative financial solutions to promote the use of heat pumps, such as homeowners paying for the heat produced by such systems rather than for the up-front installation costs.

47. **Residential and commercial sectors.** Many of the policies focused on the residential and commercial sectors have already been described in paragraphs 38–46 above relating to energy supply and energy efficiency. Both of these sectors have benefited from policies focused on building improvements and the installation of modern heating systems. District CHP and heating systems have promoted the use of renewable energy. In addition, the use of energy in the form of fossil fuels and electricity is subject to significantly high taxes, which helps to further suppress overall energy use in these sectors. A policy is in place requiring businesses to undertake mandatory energy audits every four years.

48. In the residential sector, the amount of energy required to heat each square metre of building space has been declining for many years, owing primarily to increases in energy efficiency. However, during the review, Denmark informed the ERT that this trend has reversed to some extent over the past three years, with heating energy use per square metre of building space now rising. The reason behind this is unknown, but the Ministry of Energy, Utilities and Climate has indicated that investigating the cause is a key research priority.

49. During the review, the Party highlighted some recent analysis that had been done by the Danish Energy Agency to investigate the impact of the increasing number of ‘hyperscale’ data centres in Denmark. These centres, part of the business sector, are expected to increase in number significantly to 2030 and will place additional requirements on the national electricity supply system – current estimates suggest that they could use as much as 15 per cent of supply by 2030.

50. **Transport sector.** GHG emissions in road transport rose steadily until 2007/2008 before beginning a steady decline. However, the trend has again been slightly upward in the three most recent reporting years. While the efficiency of vehicles has improved substantially owing to the implementation of EU regulations for new vehicles and vehicle taxation dependent on fuel efficiency, the overall number of vehicles and total kilometres travelled in Denmark have risen. Vehicles are heavily taxed in Denmark, with taxes levied on new vehicle purchases, on annual use and on fuel (diesel and gasoline). Substantial reductions in these taxes are in place for plug-in hybrid and battery electric vehicles, which has resulted in some penetration of these vehicles into the fleet, although this is relatively minor. During the review, the Party reported this figure to be approximately 2,500 such vehicles per year, but subsequently explained that it reached approximately 5,000 vehicles in 2018.

51. The high level of taxation and the structure of taxation rewarding fuel efficiency contribute to reducing the number of vehicles and increasing fuel efficiency and thereby contribute to achieving emission reductions from this sector. While successful in achieving emission reductions, this current structure may present an issue that may need to be addressed to achieve future deep emission reductions in this sector. Government revenue from vehicle taxation is very substantial, with this revenue being crucial to supporting a wide range of public services. With the current structure of taxation, further substantial reductions in emissions (e.g. by introducing further tax reductions for low- or zero-emission vehicles) is expected to reduce revenue significantly. Looking beyond 2020, the road transport sector will produce an increasingly large proportion of Denmark’s overall emissions and in order to meet targets that are likely to be confirmed for this period, examination and potential reform of the vehicle taxation system may be required to further reduce emissions and increase the number of low-emission vehicles.

52. Policies have been implemented for other transport sectors. These include large-scale projects to electrify parts of the national rail infrastructure and increase the speed of trains, to further develop the national network of bicycle lanes and, in Copenhagen, to expand the metro system and incorporate a further 24 stations into the network. This latter project will significantly improve public transport infrastructure in the city.

53. The BR3 includes information on how Denmark promotes and implements the decisions of ICAO and IMO to limit emissions from aviation and marine bunker fuels. The Party reported that it has cooperated with other countries in the discussions on the development of the road map and initial IMO strategy for the reduction of GHG emissions, and that it welcomes the implementation of ICAO’s Carbon Offsetting and Reduction Scheme for International Aviation.

54. **Industrial sector.** GHG emissions from combustion in large industrial installations are covered by the EU ETS. In addition, the Biomass Agreement has facilitated the increased use of a range of biofuels for combustion activities in larger heat and power generation installations. Smaller scale industrial combustion is subject to a range of taxes and subsidies focused on disincentivizing the use of fossil fuels and incentivizing the use of renewable fuels or energy sources. Support services and audits further support the reduction of emissions from industrial combustion activities. These policies are detailed under energy supply and energy efficiency in paragraphs 38–46 above. During the review, Denmark informed the ERT that emissions from industrial combustion had decreased substantially over the past five years

owing to a switch from the use of oil to natural gas, renewables and electricity alongside efficiency improvements, particularly those resulting from the implementation of regular audits.

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

55. **Industrial processes.** Emissions from the industrial processes sector as a proportion of total national GHG emissions are relatively small in Denmark, contributing only approximately 4 per cent in 2016. The only large industrial installation in this sector remaining in Denmark is a cement manufacturing plant, which contributes approximately half of the total emissions for the sector.

56. Large-scale industrial activities are subject to the requirements of the EU ETS. Denmark has also implemented the EU F-gas regulation, which regulates the import, sale and use of F-gases.

57. **Agriculture.** Emissions from agriculture account for 80 per cent of Denmark's total emissions of CH<sub>4</sub>, and the total quantity of these emissions has decreased by only 1.1 per cent since 1990. However, this small reduction masks some very significant trends in the dairy and pig farming sector. Production in these sectors has increased significantly since 1990, in terms of both number of animals and production per animal. During the review, the Party explained that some 20 million pigs per year pass through the Danish agriculture system and milk production per animal is among the highest values in the world. Some advanced and complex GHG emission reduction measures were implemented in the agriculture sector during the period 1990–2016. Biogas plants have been widely installed on large farms and there is a policy in place to subsidize the use of biogas in the energy sector. Focus has recently been placed on reducing the retention time prior to transfer of manure to biogas plants in order to further reduce emissions. The Environmental Approval Act for Livestock Holdings (Act No. 1572, 20 December 2006, revised in 2011) provides for strict requirements and the provision of advice on manure management when constructing new animal housing or renovating existing stock. Measures include acidification and cooling of manure and the installation of air filters.

58. Emissions of N<sub>2</sub>O in the agriculture sector have decreased by 28.5 per cent since 1990. The activities that contribute to these emissions are primarily the application of mineral and organic fertilizers to agricultural soils and manure management. While the focus of Action Plans for the Aquatic Environment I and II, the Action Plan for Sustainable Agriculture and the Ammonia Action Plan has been on water and air pollution, they have produced significant co-benefits for N<sub>2</sub>O emissions. Policies implemented in the agriculture sector relevant to N<sub>2</sub>O emissions include strict controls on the amount of fertilizer applied and on the practices associated with its application, and strict requirements for manure management such as the covering of slurry storage systems. The ERT noted the extreme accuracy with which fertilizer use in Denmark is tracked and the potential use of these data for tracking the effectiveness of policies in this sector.

59. **LULUCF.** LULUCF was a net source in 2015, contributing 4,154 kt CO<sub>2</sub> eq in 2015. A key policy for this sector is the subsidies for landowners from the national Government for afforestation. Increasing forested area is also a key component of the Government's management of State-owned land. During the review, Denmark informed the ERT that approximately 1,900 ha of land per year is afforested. The Party also explained that municipal governments have an important role in the implementation of forestry plans. A government policy for the planting of windbreaks, which is focused on promoting biodiversity, is also in place and is a major contributor to annual afforestation.

60. **Waste management.** Waste management is a small sector in Denmark in terms of GHG emissions, contributing approximately only 2 per cent to annual total emissions. A key measure since 1997 has been the ban on organic waste in landfills. Emissions of CH<sub>4</sub> from landfill sites are now steadily declining as a result of this policy. In addition, Waste 21, Denmark's waste management plan, set targets for 2004 of 64 per cent of all waste to be recycled, 24 per cent to be incinerated and only 12 per cent to be landfilled. These targets were already achieved in 2000. The most recent waste strategy, Denmark Without Waste,

focuses on the increased use of waste as a resource and on waste prevention, aiming at an estimated reduction of 820,000 t waste being incinerated by 2022.

61. Policies have also been implemented for the management of landfills, including capturing CH<sub>4</sub> from both closed and open landfills and the roll-out of biocovers, which enable the biological processing of CH<sub>4</sub> into CO<sub>2</sub>, at suitable landfills.

**(d) Response measures**

62. Regarding reporting on the assessment of the economic and social consequences of its response measures, Denmark stated that proposals for new response measures to put before the Parliament are in most cases accompanied by an assessment of the consequences in relation to socioeconomic cost. Denmark also indirectly referenced information in its 2011 NIR that outlines how Denmark is implementing its commitments under Article 3, paragraph 14, of the Kyoto Protocol in such a way as to minimize adverse social, environmental and economic impacts on developing country Parties.

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

63. The ERT assessed the information reported in the BR3 of Denmark and identified issues relating to completeness, transparency and 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 third biennial report of Denmark**

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 Party provided inconsistent information in its NC7 and BR3 regarding PaMs it has implemented or plans to implement since its last BR to achieve its target for 2020 under the ESD. The NC7 listed four new PaMs, while the BR3 listed three.  During the review, Denmark clarified that three new PaMs, HO-6, AG-12 and AG-13, had been implemented since the BR2, and one PaM, AG-11, that was implemented prior to the BR2 and has since expired was newly included in the analysis portfolio.  The ERT recommends that Denmark report accurately on the PaMs it has implemented since the last BR or cross-reference the relevant documents.
2	Reporting requirement specified in paragraph 8  Issue type: completeness  Assessment: encouragement	The Party reported only limited information regarding the assessment of the economic and social consequences of response measures, and the information was very difficult to find via multiple references.  During the review, Denmark indicated that this information is in the 2011 NIR. In chapter 15 of the 2017 NIR, which is referenced in the BR3, it is stated that there have been no changes to the information reported in the 2011 NIR related to this topic.  The ERT encourages Denmark to include in its next BR clear information on the assessment of the economic and social consequences of its response measures, or provide a reference to the relevant document in which this information can be found with reasonable effort.

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

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

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

64. For 2014 Denmark reported in CTF table 4 annual total GHG emissions for Denmark only (i.e. not Greenland and the Faroe Islands) excluding LULUCF of 53,481.70 kt CO<sub>2</sub> eq,

which is 25.8 per cent below the 1990 base-year level. In 2014 emissions from non-ETS sectors relating to the target under the ESD amounted to 32.64 kt CO<sub>2</sub> eq.

65. For 2015 Denmark reported in CTF table 4 annual total GHG emissions for Denmark only (i.e. not Greenland and the Faroe Islands) excluding LULUCF of 50,957.05 kt CO<sub>2</sub> eq, which is 29.3 per cent below the 1990 base-year level. In 2015, emissions from non-ETS sectors relating to the target under the ESD amounted to 32.52 kt CO<sub>2</sub> eq.

66. On its use of units from LULUCF activities, Denmark reported in CTF tables 4 and 4(a) that in 2014 and 2015 it did not use any units to offset its total GHG emissions. Denmark reported that it does not intend to use units from any market-based mechanisms. It reported in CTF tables 4 and 4(b), using the notation key “NA”, that it did not use any units from market-based mechanisms in 2014 and 2015 towards the achievement of its 2020 target. Table 5 illustrates Denmark’s total GHG emissions, the contribution of LULUCF and the use of units from market-based mechanisms to achieve its target.

Table 5

**Summary of information on the use of units from market-based mechanisms and land use, land-use change and forestry by Denmark<sup>a</sup> to achieve its target**

<i>Year</i>	<i>Emissions excluding LULUCF (kt CO<sub>2</sub> eq)</i>	<i>Contribution of LULUCF (kt CO<sub>2</sub> eq)<sup>b</sup></i>	<i>Emissions including contribution of LULUCF (kt CO<sub>2</sub> eq)</i>	<i>Use of units from market-based mechanisms (kt CO<sub>2</sub> eq)</i>
1990	72 087.13	NA	NA	NA
2010	65 618.31	NA	NA	NA
2011	60 453.87	NA	NA	NA
2012	55 631.49	NA	NA	NA
2013	57 463.58	NA	NA	NA
2014	53 481.70	NA	NA	NA
2015	50 957.05	NA	NA	NA

*Sources:* Denmark’s BR3 and CTF tables 1, 4, 4(a)I, 4(a)II and 4(b).

*Note:* In this table, the CO<sub>2</sub> emissions from international aviation as reported in the GHG inventory are included as a proxy for CO<sub>2</sub> emissions from international aviation activities reported by aviation entities registered in the Danish quota register.

<sup>a</sup> Emissions are for Denmark only. Greenland and the Faroe Islands are not part of EU territory, and therefore the EU target is not applicable to these parts of the Kingdom of Denmark.

<sup>b</sup> The EU’s unconditional commitment to reduce GHG emissions by 20 per cent below the 1990 level by 2020 does not include emissions/removals from LULUCF.

67. In assessing the progress towards the achievement of the 2020 target, the ERT noted that Denmark’s emission reduction target under the Convention for non-ETS sectors is 20.0 per cent below the 2005 (base-year) level (see para. 16 above). As discussed above, in 2015 Denmark’s annual total GHG emissions excluding LULUCF were 29.3 per cent (21,130.08 kt CO<sub>2</sub> eq) below the base-year level. In addition, the ERT noted that the contribution of LULUCF is excluded from the target and Denmark has not used any market-based mechanisms.

68. The ERT noted that Denmark is making progress towards its emission reduction target by implementing mitigation actions that are delivering significant emission reductions. On the basis of the results of the projections under the WEM scenario (see para. 88 below), the ERT also noted that Denmark is making progress towards achieving its target under the Convention.

69. In CTF table 4, Denmark included international aviation in its total GHG emissions, because international aviation is included under the EU ETS and therefore is part of the EU’s and Denmark’s economy-wide emission reduction target. The ERT noted that in taking this



approach, the Party's reporting is in line with the EU's reporting of its economy-wide emission reduction target, as submitted in the EU's BR3.

70. Looking towards 2030, Denmark faces a significant challenge in reducing its emissions in line with targets. While decarbonization of the energy system is expected to continue beyond 2020, the importance of sectors other than energy, for which emission reductions are more difficult to address, will likely grow during the period 2020–2030. The ERT noted in particular the challenges associated with achieving emission reductions in the road transport and agriculture sectors. There also remains some uncertainty as to the contribution to emissions that oil, gas and mineral production in Denmark and Greenland will make during this period.

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

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

**3. Projections overview, methodology and results**

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

72. Denmark reported updated projections for 2020 and 2030 relative to actual inventory data for 1990, 1995, 2000, 2005, 2010 and 2015 under the WEM scenario. The WEM scenario reported by Denmark includes implemented and adopted PaMs until 2017 with projected effects until 2035. The Party provided comprehensive and well-organized information on its projections from 2016 to 2035.

73. Denmark provided a definition of its scenarios, explaining that its WEM scenario includes all PaMs implemented, adopted and funded after 1990. The purpose of the WEM scenario is to assess how energy consumption and GHG emissions will evolve in the future if no new policy is introduced. This is often referred to as a 'frozen policy' or a 'business as usual' scenario. In addition to the WEM scenario, Denmark reported the WOM scenario. The WOM scenario excludes all PaMs implemented, adopted or planned after 1990. The definitions indicate that the scenarios were prepared according to the UNFCCC reporting guidelines on BRs.

74. The projections are presented on a sectoral basis, using the same sectoral categories as those used in the reporting on mitigation actions, and on a gas-by-gas basis for CO<sub>2</sub>, CH<sub>4</sub>, N<sub>2</sub>O, PFCs, HFCs and SF<sub>6</sub>, with the exception that PFCs, HFCs and SF<sub>6</sub> are grouped in the WOM scenario, for 1990–2035. The projections are also provided in an aggregated format for each sector as well as for a Party total using global warming potential values from the AR4.

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

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

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

77. The methodology used for the preparation of the projections is very similar to that used for the preparation of the emission projections for the BR2. Denmark reported supporting information further explaining the methodologies and the changes made since the BR2 during the review. The methodologies used for the BR2 and BR3 are the same, with updates to key parameters such as forecasted GDP, populations and fuel prices.

78. To prepare its projections, Denmark relied on the following key underlying assumptions: GDP growth, population, international fuel prices and EU ETS carbon prices. These variables and assumptions were reported in CTF table 5. Denmark's population is assumed to grow steadily from 5.7 million in 2015 to 6.1 million in 2030. GDP is assumed

to increase from EUR 249 billion in 2015 to EUR 305 billion in 2030. The international fuel prices are sourced from the International Energy Agency's projected fuel prices (from the *World Energy Outlook 2016*<sup>5</sup> New Policies Scenario). The EU ETS carbon prices are derived from a fixed point in 2016.

79. The projections of end-user energy consumption by the business and domestic sectors are based on ADAM<sup>6</sup> and EMMA<sup>7</sup> projections. EMMA is a macroeconomic model that describes final energy consumption broken down into a number of sectors and seven types of energy. In EMMA, energy consumption in the business sector is determined by three factors: production, energy prices and taxes, and energy efficiencies and trends. The projection of production by businesses is based on the latest ADAM projection from the Ministry of Finance. The projection of fuel for electricity and heat production is derived from the Danish Energy Agency's RAMSES<sup>8</sup> simulation model, which uses as its basis the demand for electricity and district heating. In the projection, electricity and heat production are divided between existing and possible new production plants on the basis of technical specifications and prices of fuel and CO<sub>2</sub> allowances. The model also determines electricity prices on the Nordic market and the degree of electricity exchange with the other Nordic countries. Industrial and local small-scale CHP production is not projected in the RAMSES model, therefore a separate (bottom-up) projection is made for this production.

80. The projections of emissions from other sectors (primarily from the extraction of oil and gas and from oil refineries) are based on information on expansion plans and ad hoc assumptions. For these sectors, the projections include both fuel combustion emissions and fugitive emissions.

81. For the projections of space heating by households, the TIMES-DK model is used. The TIMES-DK model is included in the IntERACT hybrid energy–economy model. That is, the technical TIMES-DK model is linked with a macroeconomic model in order to model the development in demand of final energy services.

82. The projection of the use of energy by the transportation sector is based on the Danish Energy Agency's transport model with input from the Danish Transport and Construction Agency on developments in transport performance for road transport and energy consumption by railways, taking into account economic projections from the Ministry of Finance. Assumptions are made with respect to developments in energy efficiency, the share of biofuels and the penetration of electric cars. Projected energy use by rail transport, domestic sea shipping and domestic aviation is based on the average energy used in the past three years. Energy use by foreign aviation is projected according to the growth rate from the latest EU PRIMES model baseline.

83. The assumptions related to the expected development of livestock production and agricultural area are based on estimates provided by University of Copenhagen, Department of Food and Resource Economics, and were derived using AGMEMOD.<sup>9</sup>

84. CH<sub>4</sub> emissions within the waste sector are calculated by means of a first-order decay model that is equivalent to using the IPCC tier 2 methodology (2018 NIR). The model calculations are performed using national waste statistics on landfill waste categories. The projections of GHG emissions are based on the official activity data projections available, for example from using the models mentioned in paragraphs 79–83 above.

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<sup>5</sup> Summary available at <https://www.iea.org/newsroom/news/2016/november/world-energy-outlook-2016.html>.

<sup>6</sup> Annual Danish Aggregate Model.

<sup>7</sup> EMMA (Energy and Environmental Models for ADAM) is a macroeconomic model used in the 2017 Energy Projection. EMMA was used for projections of energy consumption and assessments of economic measures in the climate and energy area (<https://ens.dk/service/fremskrivninger-analyser-modeller/modeller>).

<sup>8</sup> RAMSES is the techno-economic model describing the production of electricity and district heating in an arbitrary number of areas, currently the Nordic countries, which is used for energy projections in Denmark (<https://ens.dk/en/our-services/projections-and-models/models>).

<sup>9</sup> Agriculture Member States Modelling.

85. Denmark provided information in CTF table 5 on assumptions and key variables used in the preparation of the projection scenarios, such as population, GDP and fuel prices. The associated methodologies and key parameters are outlined, sector by sector, via references to chapter 5 and annex C2 of Denmark's NC7. Denmark also provided information on sensitivity analyses.

86. Sensitivity analyses were conducted for a number of important assumptions, such as discount rates, energy prices, energy taxes and number of cattle. Sensitivity was presented qualitatively for each sector and quantitatively for the energy and agriculture sectors. When sensitivities are taken into account, projected non-ETS emissions for 2020 could be between 0.75 Mt CO<sub>2</sub> eq lower and 0.75 Mt CO<sub>2</sub> eq higher than the WEM projection. For 2030, projected non-ETS emissions could be between 1.50 Mt CO<sub>2</sub> eq lower and 1.50 Mt CO<sub>2</sub> eq higher than the WEM projection.

### (c) Results of projections

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

Table 6

#### Summary of greenhouse gas emission projections for Denmark<sup>a</sup>

	<i>GHG emissions (kt CO<sub>2</sub> eq per year)</i>	<i>Changes in relation to base-year<sup>b</sup> level (%)</i>	<i>Changes in relation to 1990 level (%)</i>
Kyoto Protocol base year <sup>c</sup>	69 978.07	NA	NA
Quantified emission limitation or reduction commitment under the Kyoto Protocol (2013–2020) <sup>d</sup>	NA	NA	NA
Quantified economy-wide emission reduction target under the Convention <sup>e</sup>	NA	NA	NA
Inventory data 1990 <sup>f</sup>	70 356.40	NA	NA
Inventory data 2015 <sup>f</sup>	48 331.15	NA	–31.3
WOM projections for 2020 <sup>g</sup>	88 224.81	NA	25.4
WEM projections for 2020 <sup>g</sup>	45 090.06	NA	–35.9
WOM projections for 2030 <sup>g</sup>	97 854.55	NA	39.1
WEM projections for 2030 <sup>g</sup>	51 269.36	NA	–27.1

<sup>a</sup> Emission projections are for Denmark only. Greenland and the Faroe Islands are not part of EU territory, and therefore the EU target is not applicable to these parts of the Kingdom of Denmark.

<sup>b</sup> “Base year” in this column refers to the base year used for the target under the Kyoto Protocol, while for the target under the Convention it refers to the base year used for that target.

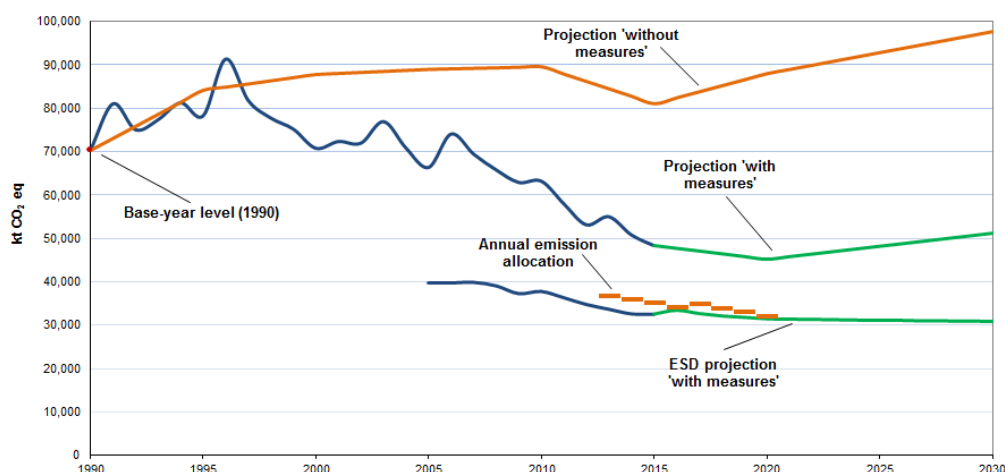
<sup>c</sup> The Kyoto Protocol base-year level of emissions is provided in the initial review report, contained in document FCCC/IRR/2016/DNK.

<sup>d</sup> The Kyoto Protocol target for the second commitment period (2013–2020) is a joint target of the EU and its 28 member States and Iceland. The target is to reduce emissions by 20 per cent compared with the base-year (1990) level by 2020. The target for non-ETS sectors is 20.0 per cent for Denmark under the ESD. The value presented in this line is based on annex II to European Commission decision 2013/162/EU and as adjusted by Commission implementing decision 2013/634/EU, which established the assigned amount for the EU member States and divided by eight (years) to calculate the annual emission level.

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

<sup>f</sup> From Denmark's BR3 CTF table 6.

<sup>g</sup> From Denmark's BR3.

Greenhouse gas emission projections reported by Denmark<sup>a</sup>

Sources: (1) data for 1990–2015: Denmark’s 2017 annual inventory submission, version 1; total GHG emissions excluding LULUCF; (2) data for 2016–2030: Denmark’s BR3 CTF tables 6(a) and 6(b); total GHG emissions excluding LULUCF; projections were provided for EU ETS and non-ETS sectors by the Party during the review.

<sup>a</sup> Emission projections are for Denmark only. Greenland and the Faroe Islands are not part of EU territory, and therefore the EU target is not applicable to these parts of the Kingdom of Denmark.

88. Denmark’s total GHG emissions excluding LULUCF in 2020 and 2030 are projected to be 45,090.06 and 51,269.36 kt CO<sub>2</sub> eq, respectively, under the WEM scenario, which represents a decrease of 35.9 and 27.1 per cent, respectively, below the 1990 level. The 2020 projections suggest that Denmark will continue contributing to the achievement of the EU target under the Convention (see para. 15 above).

89. Denmark’s target for non-ETS sectors is to reduce its total emissions by 20.0 per cent below the 2005 level by 2020 (see para. 16 above). Denmark’s AEAs, which correspond to its national emission target for non-ETS sectors, change linearly from 36,829 kt CO<sub>2</sub> eq in 2013 to 32,063 kt CO<sub>2</sub> eq for 2020. According to the projections under the WEM scenario, emissions from non-ETS sectors are estimated to reach 31,449 kt CO<sub>2</sub> eq by 2020. The projected level of emissions under the WEM scenario is 1.9 per cent below the AEAs for 2020. The ERT noted that this suggests that Denmark expects to meet its target under the WEM scenario.

90. In a change since its BR2, Denmark no longer has a domestic emission reduction target, so progress towards that is not reported. Denmark presented the WEM scenario by sector for 2020 and 2030, as summarized in table 7.

Table 7  
Summary of greenhouse gas emission projections for Denmark<sup>a</sup> presented by sector

Sector	GHG emissions and removals (kt CO <sub>2</sub> eq)					Change (%)			
	1990	2020		2030		1990–2020		1990–2030	
		WEM	WAM	WEM	WAM	WEM	WAM	WEM	WAM
Energy (not including transport)	42 885.12	19 422.34	NA	25 807.26	NA	–54.7	NA	–39.8	NA
Transport	10 733.72	12 324.91	NA	12 028.68	NA	14.8	NA	12.1	NA
Industry/industrial processes	2 343.35	1 909.93	NA	1 824.22	NA	–18.5	NA	–22.2	NA
Agriculture	12 630.82	10 572.11	NA	10 701.52	NA	–16.3	NA	–15.3	NA

Sector	GHG emissions and removals (kt CO <sub>2</sub> eq)					Change (%)			
	2020		2030			1990–2020		1990–2030	
	1990	WEM	WAM	WEM	WAM	WEM	WAM	WEM	WAM
LULUCF	4 902.13	2 443.58	NA	2 122.58	NA	–50.2	NA	–56.7	NA
Waste	1 763.38	860.77	NA	907.69	NA	–51.2	NA	–48.5	NA
<b>Total GHG emissions without LULUCF</b>	<b>70 356.40</b>	<b>45 090.06</b>	<b>NA</b>	<b>51 269.36</b>	<b>NA</b>	<b>–35.9</b>	<b>NA</b>	<b>–27.1</b>	<b>NA</b>

Source: Denmark's BR3 CTF table 6.

<sup>a</sup> Emission projections are for Denmark only. Greenland and the Faroe Islands are not part of EU territory, and therefore the EU target is not applicable to these parts of the Kingdom of Denmark.

91. According to the projections reported for 2020 under the WEM scenario, the most significant emission reductions are expected to occur in the energy sector, followed by the LULUCF, agriculture, waste and IPPU sectors, amounting to projected reductions of 23,462.78 kt CO<sub>2</sub> eq (54.7 per cent), 2,458.71 kt CO<sub>2</sub> eq (50.2 per cent), 2,058.71 kt CO<sub>2</sub> eq (16.3 per cent), 902.61 kt CO<sub>2</sub> eq (51.2 per cent) and 433.42 kt CO<sub>2</sub> eq (18.5 per cent) between 1990 and 2020, respectively. The only sector in which emissions increase in this period is transport, by 1,591.19 kt CO<sub>2</sub> eq (14.8 per cent).

92. The pattern of projected emissions reported for 2030 under the same scenario changes due to Denmark's 'frozen policy' approach. For the 2020–2030 period, a significant increase in emissions of 32.9 per cent is projected for the energy sector and relatively small increases are projected for agriculture (1.2 per cent) and waste (5.5 per cent). For the same period, projected emissions indicate a decrease of 2.4 per cent for transport, 4.5 per cent for IPPU and 13.1 per cent for LULUCF.

93. The reduction in the use of fossil fuels means that energy-related CO<sub>2</sub> emissions will be reduced significantly towards 2020. The decrease is closely linked to the implementation of the Energy Agreements of 2008 and 2012, and is also attributable to the deployment of and conversion to renewables and to decreased energy consumption as a consequence of energy efficiency improvements. In 2030, emissions under the WEM scenario are expected to increase, primarily owing to Denmark's 'frozen policy' approach, as many of the elements of the energy policy framework that currently keep emissions low do not have funding allocated out to 2030. These include support schemes for new renewable energy capacity and energy-saving efforts. The ERT noted the introduction of the new Energy Agreement 2018, which will seek to ensure the continued progress in reducing emissions between 2021 and 2030.

94. Denmark presented the WEM scenario by gas for 2020 and 2030, as summarized in table 8.

Table 8  
Summary of greenhouse gas emission projections for Denmark<sup>a</sup> presented by gas

Gas	GHG emissions and removals (kt CO <sub>2</sub> eq)					Change (%)			
	2020		2030			1990–2020		1990–2030	
	1990	WEM	WAM	WEM	WAM	WEM	WAM	WEM	WAM
CO <sub>2</sub>	54 807.93	32 685.73	NA	39 004.86	NA	–40.4	NA	–28.8	NA
CH <sub>4</sub>	7 624.36	6 517.55	NA	6 651.00	NA	–14.5	NA	–12.2	NA
N <sub>2</sub> O	7 881.70	5 414.54	NA	5 472.81	NA	–31.3	NA	–30.6	NA
HFCs	NA, NO	427.98	NA	123.47	NA	–	NA	–	NA
PFCs	NO, NA	2.68	NA	1.10	NA	–	NA	–	NA

Gas	GHG emissions and removals (kt CO <sub>2</sub> eq)					Change (%)			
	2020		2030			1990–2020		1990–2030	
	1990	WEM	WAM	WEM	WAM	WEM	WAM	WEM	WAM
SF <sub>6</sub>	42.41	41.58	NA	16.12	NA	-2.0	NA	-62.0	NA
NF <sub>3</sub>	NO, NA	NA, NO	NA	NA, NO	NA	-	NA	-	NA
<b>Total GHG emissions without LULUCF</b>	<b>70 356.40</b>	<b>45 090.06</b>	<b>NA</b>	<b>51 269.36</b>	<b>NA</b>	<b>-35.9</b>	<b>NA</b>	<b>-27.1</b>	<b>NA</b>

Source: Denmark’s BR3 CTF table 6.

<sup>a</sup> Emission projections are for Denmark only. Greenland and the Faroe Islands are not part of EU territory, and therefore the EU target is not applicable to these parts of the Kingdom of Denmark.

95. For 2020 the most significant reductions are projected for CO<sub>2</sub> and N<sub>2</sub>O emissions: 22,122 kt CO<sub>2</sub> eq (40.4 per cent) and 2,467 kt CO<sub>2</sub> eq (31.3 per cent) between 1990 and 2020, respectively.

96. For 2030 the most significant reductions are projected for CO<sub>2</sub> and N<sub>2</sub>O emissions: 15,803 kt CO<sub>2</sub> eq (28.8 per cent) and 2,409 kt CO<sub>2</sub> eq (30.6 per cent) between 1990 and 2030, respectively.

97. The projected trend between 2020 and 2030 indicates an increase in CO<sub>2</sub> emissions of 19.3 per cent, CH<sub>4</sub> emissions of 2.0 per cent and N<sub>2</sub>O emissions of 1.1 per cent. F-gas emissions are projected to decrease by 70.1 per cent (331 kt CO<sub>2</sub> eq).

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

98. The ERT assessed the information reported in the BR3 of Denmark and identified issues relating to completeness, transparency and 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 third biennial report of Denmark**

No.	Reporting requirement, issue type and assessment	Description of the finding with recommendation or encouragement
1	Reporting requirement <sup>a</sup> specified in paragraph 28  Issue type: completeness  Assessment: encouragement	Denmark did not report projections for a WAM scenario.  During the review, Denmark explained that its planned policies were generally implemented in a short time frame, which it believes limits the opportunity to create a WAM scenario.  The ERT reiterates the encouragement made in the previous review report for Denmark to include in its next BR a WAM scenario, in accordance with the UNFCCC reporting guidelines on NCs and BRs, which will provide additional insight into potential measures that could be used to further mitigate emissions.
2	Reporting requirement <sup>a</sup> specified in paragraph 35  Issue type: completeness  Assessment: encouragement	Denmark did not report projections for indirect GHGs such as carbon monoxide, nitrogen oxides, non-methane volatile organic compounds and sulfur oxides.  During the review, Denmark explained that data on indirect GHGs are compiled as part of its air pollutant reporting obligations and could be included in the next BR.  The ERT encourages Denmark to include in its next BR emission projections for indirect GHGs.
3	Reporting requirement <sup>a</sup> specified in paragraph 43  Issue type: transparency	Denmark did not provide in the BR3 a detailed summary of the strengths and weaknesses of all of the models and approaches it used for preparing its projections other than the information provided on ADAM/EMMA and RAMSES.  During the review, Denmark provided information on the strengths and weaknesses of the TIMES-DK, the National Traffic Model and PRIMES modelling software it also used to prepare its projections.

<i>No.</i>	<i>Reporting requirement, issue type and assessment</i>	<i>Description of the finding with recommendation or encouragement</i>
	Assessment: encouragement	The ERT encourages Denmark to include in its next BR a complete description of the strengths and weaknesses of the models and approaches it used for preparing its projections for each sector.

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

<sup>a</sup> Paragraph number listed under reporting requirement refers to the relevant paragraph of the UNFCCC reporting guidelines on NCs.

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

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

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

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

100. Denmark provided details on what “new and additional” support it has provided and clarified how this support is “new and additional” (see para. 108 below for further information on “new and additional” financial resources).

101. Denmark reported the financial support that it has provided to non-Annex I Parties, distinguishing between support for mitigation and adaptation activities and recognizing the capacity-building elements of such support. It explained how it tracks finance for adaptation and mitigation using, for bilateral public climate finance, the OECD DAC Creditor Reporting System with its Rio Markers as the basis for reporting on climate change relevant activities. The Rio Markers on adaptation and mitigation are markers that indicate policy objectives in relation to each project or programme that is reported to OECD’s Creditor Reporting System. The markers are assigned on the basis of well-defined guidelines and technical eligibility criteria agreed by OECD DAC.

102. In the BR3, Denmark reported that it does not have a dedicated system for tracking technology transfer and capacity-building support and explained that most climate support has a capacity element, and many projects and programmes also have elements of technology transfer. As an interim measure, key examples of capacity-building and technology transfer are identified “manually” during the report preparation process.

103. The BR3 includes information on the national approach to tracking the provision of support, indicators, delivery mechanisms used and allocation channels tracked. In the BR3, Denmark explained that there are two minor differences between the methodologies used for the BR2 and BR3. The first is that projects receiving a score of “Principal” in one of the Rio Markers (e.g. adaptation) and a score of “Significant” in the other (e.g. mitigation) were classified as “Cross-cutting”, as reported in the BR2. In the BR3, for 2015 and 2016, such projects have been classified as 100 per cent in pursuit of the Rio Marker scored as “Principal” (either mitigation or adaptation). The second difference is that core funding for all multilateral climate funds was reported in the BR2 in the “Core/general” column of CTF tables 7 and 7(a). In the BR3, for 2015 and 2016, core finance for all multilateral climate funds other than the Global Environment Facility, and core finance for the Global Green Growth Institute, has been classified as climate specific.

104. Denmark described the methodology and underlying assumptions used for collecting and reporting information on financial support, including underlying assumptions and indicators. The methodology used for preparing information on international climate support is based on the OECD DAC Creditor Reporting System with its Rio Markers on climate change mitigation and adaptation. Denmark included information on how it has refined its approach to tracking climate support and methodologies. These changes include providing more detailed information for bilateral projects and including climate-specific funding that is going through multilateral institutions.

105. The Climate Envelope is the main mechanism through which Denmark provides public support to developing countries. It is programmed jointly by the Ministry of Foreign Affairs and the Ministry of Energy, Utilities and Climate. The Government of Denmark presented in 2017 its future strategy for development cooperation and humanitarian action, which will shift from the current strategy to a geographically differentiated and more coordinated approach to development assistance.

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

106. The ERT assessed the information reported in the BR3 of Denmark and identified an issue relating to transparency and adherence to the UNFCCC reporting guidelines on BRs. The findings are described in table 10.

Table 10

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

No.	<i>Reporting requirement, issue type and assessment</i>	<i>Description of the finding with recommendation or encouragement</i>
1	Reporting requirement specified in paragraph 14  Issue type: completeness  Assessment: recommendation	The Party did not provide a description in its BR3 of its national approach for tracking provision of technological and capacity-building support to non-Annex I Parties, including information on indicators and delivery mechanisms used and allocation channels tracked.  During the review, Denmark explained that including these elements in the Creditor Reporting System of OECD DAC would demand a significant amount of work in terms of adjusting the system and providing guidelines and training for its users. As an interim measure, key examples of capacity-building and technology transfer are identified “manually” during the report preparation process.  The ERT reiterates the recommendation made in the previous review report that Denmark include in its next BR information on the national approach for tracking capacity-building and technology transfer elements in its support.

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

**2. Financial resources**

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

107. Denmark reported information on the provision of financial support required under the Convention and its Kyoto Protocol, including on financial support provided, committed and pledged, allocation channels and annual contributions.

108. Denmark indicated what “new and additional” financial resources it has provided and clarified how it has determined such resources as being “new and additional”. Denmark’s definition for the BR3 is that newly committed (for reporting on commitments) or disbursed (for reporting of disbursement) finance for climate change adaptation or mitigation activities within the reporting period that was not reported to the UNFCCC in the previous reports is considered “new and additional”.

109. Denmark described how its resources address the adaptation and mitigation needs of non-Annex I Parties. It also described how those resources assist non-Annex I Parties to mitigate and adapt to the adverse effects of climate change, facilitate economic and social response measures, and contribute to technology development and transfer and capacity-building related to mitigation and adaptation. Denmark reported information on the assistance that it has provided to developing country Parties that are particularly vulnerable to the adverse effects of climate change to help them to meet the costs of adaptation to those adverse effects. Denmark explained that it addresses this through its focus on least developed countries, which received 60 per cent of its bilateral country-specific climate finance between 2013 and 2016. Denmark explained how these elements were incorporated into representative projects.



110. With regard to the most recent financial contributions aimed at enhancing the implementation of the Convention by developing countries, Denmark reported that its climate finance has been allocated on the basis of priority areas and programmes, such as adaptation and mitigation related action that contributes to sustainable development, activities and programmes that address the underlying causes of vulnerability and contribute to building resilience against crises, natural disasters and the impacts of climate change, the integration of adaptation and emission reduction considerations into national planning, and policy preparation and implementation, including in support of nationally determined contributions. Some recent projects include adaptation of rural infrastructure to the impacts of climate change in Bangladesh, accelerating green transformation of the agricultural sector with a focus on small-holder farmers in Ethiopia, and construction of a grid-connected large-scale wind farm in the Plurinational State of Bolivia. Table 11 includes some of the information reported by Denmark on its provision of financial support.

Table 11

**Summary of information on provision of financial support by Denmark in 2015–2016**

(Millions of United States dollars)

<i>Allocation channel of public financial support</i>	<i>Year of disbursement</i>	
	<i>2015</i>	<i>2016</i>
Official development assistance	2 494.30	2 235.00
Climate-specific contributions through multilateral channels, including:	16.12	15.10
Global Environment Facility	0	0
Least Developed Countries Fund	0	6.57
Green Climate Fund	14.86	7.43
Trust Fund for Supplementary Activities	0.15	0
Other	1.10	1.10
Financial institutions, including regional development banks	20.55	19.79
United Nations bodies	5.46	8.84
Climate-specific contributions through bilateral, regional and other channels	137.42	148.36

*Sources:* (1) Query Wizard for International Development Statistics, available at <http://stats.oecd.org/qwids/>; (2) BR3 CTF tables.

111. Denmark reported on its climate-specific public financial support, totalling USD 179.55 million in 2015 and USD 192.09 million in 2016. Between 2015 and 2016, the Party's total support increased by 7.0 per cent, comprising an increase of 16.8 per cent for mitigation, an increase of 132.5 per cent for adaptation, a decrease of 9.3 per cent for cross-cutting issues, and a decrease of 82.8 per cent for other. In 2015 and 2016, the largest share of Denmark's support was for cross-cutting issues (63.0 per cent in 2015 and 53.4 per cent in 2016), followed by mitigation (24.5 per cent in 2015 and 26.8 per cent in 2016) and, with a much lower share, adaptation (8.8 per cent in 2015 and 19.2 per cent in 2016).

112. During the reporting period, Denmark placed a particular focus on countries in Southern Asia, South-Eastern Asia and Africa, including Afghanistan, Bangladesh, Burkina Faso, Indonesia, Kenya, Mali, Nigeria, Uganda and Viet Nam. Bolivia was the only Central or South American country included in the 10 countries receiving the biggest contributions. The ERT noted that Denmark reported in CTF table 7(b) its bilateral support allocated to Annex I Parties in 2015 and 2016. Information on financial support from the public sector provided through multilateral and bilateral channels and the allocation of that support by priority is presented in table 12.

Table 12

**Summary of information on channels of financial support used in 2015–2016 by Denmark**

(Millions of United States dollars)

<i>Allocation channel of public financial support</i>	<i>Year of disbursement</i>				<i>Share (%)</i>	
	<i>2015</i>	<i>2016</i>	<i>Difference</i>	<i>Change (%)</i>	<i>2015</i>	<i>2016</i>
Support through bilateral and multilateral channels allocated for:						
Mitigation	44.07	51.46	7.39	16.8	24.5	26.8
Adaptation	15.86	36.86	21.01	132.5	8.8	19.2
Cross-cutting	113.20	102.67	-10.54	-9.3	63.0	53.4
Other	6.42	1.10	-5.32	-82.8	3.6	0.6
<b>Total</b>	<b>179.55</b>	<b>192.09</b>	<b>12.54</b>	<b>7.0</b>	<b>100.0</b>	<b>100.0</b>
Detailed information by type of channel						
Multilateral channels						
Mitigation	8.97	15.61	6.64	74.0	21.3	35.7
Adaptation	2.88	9.21	6.33	219.6	6.8	21.1
Cross-cutting	23.85	17.80	-6.05	-25.4	56.6	40.7
Other	6.42	1.10	-5.32	-82.8	15.2	2.5
<b>Total</b>	<b>42.13</b>	<b>43.73</b>	<b>1.60</b>	<b>3.8</b>	<b>100.0</b>	<b>100.0</b>
Bilateral channels						
Mitigation	35.09	35.85	0.75	2.1	25.5	24.2
Adaptation	12.97	27.65	14.68	113.1	9.4	18.6
Cross-cutting	89.35	84.87	-4.48	-5.0	65.0	57.2
Other	0	0	-	-	-	-
<b>Total</b>	<b>137.42</b>	<b>148.36</b>	<b>10.95</b>	<b>8.0</b>	<b>100.0</b>	<b>100.0</b>
Multilateral compared with bilateral channels						
Multilateral	42.13	43.73	1.60	3.8	23.5	22.8
Bilateral	137.42	148.36	10.95	8.0	76.5	77.2
<b>Total</b>	<b>179.55</b>	<b>192.09</b>	<b>12.54</b>	<b>7.0</b>	<b>100.0</b>	<b>100.0</b>

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

113. The BR3 includes detailed information on the financial support provided through multilateral, bilateral and regional channels in 2015 and 2016. More specifically, Denmark contributed through multilateral channels, as reported in the BR3 and in CTF table 7(a), USD 42.13 and 43.72 million for 2015 and 2016, respectively. The contributions were made to specialized multilateral climate change funds, such as the Least Developed Countries Fund, the Green Climate Fund and the Trust Fund for Supplementary Activities. Denmark also

provided finance through multilateral financial institutions such as the International Finance Corporation and the Inter-American Development Bank.

114. The BR3 and CTF table 7(b) also include detailed information on the total financial support provided through the bilateral (USD 137.42 and 148.36 million) channel in 2015 and 2016, respectively.

115. The BR3 provides information on the types of support provided. In terms of the focus of public financial support, as reported in CTF table 7 for 2015, the shares of the total public financial support allocated for mitigation, adaptation and cross-cutting projects were 24.5, 8.8 and 63.0 per cent, respectively. In addition, 23.5 per cent of the total public financial support was allocated through multilateral channels and 76.5 per cent through bilateral channels. In 2016, the shares of total public financial support allocated for mitigation, adaptation and cross-cutting projects were 26.8, 19.2 and 53.4 per cent, respectively. Furthermore, 22.8 per cent of the total public financial support was allocated through multilateral channels and 77.2 per cent through bilateral channels.

116. The ERT noted that in 2015 a majority of financial contributions made through multilateral channels were allocated to energy. Some funds were allocated for activities that are cross-cutting across mitigation and adaptation and for other activities, as reported in CTF table 7(a). The corresponding allocations for 2016 were directed mostly to the energy and agriculture sectors.

117. The ERT noted that in 2016 a majority of financial contributions made through bilateral and regional channels were allocated to agriculture and energy. Some funds were allocated for activities that are cross-cutting across mitigation and adaptation and for other activities, as reported in CTF table 7(b). The corresponding allocations for 2016 were directed mostly to the energy and agriculture sectors.

118. CTF tables 7(a) and 7(b) include information on the types of financial instruments used in the provision of assistance to developing countries, which are grants only.

119. In the BR3 Denmark clarified that private finance is mainly mobilized for offering venture capital and advice to climate investors that focus on sustainable development, including energy efficiency, resource use, environmental impacts and climate change. It reported on how it uses public funds to promote private sector financial support for developing countries, which it sees as pivotal to effectively increasing mitigation and adaptation efforts in developing countries, mainstreaming sustainable practices and building local markets for clean energy services.

120. In the BR3, Denmark stated that for the first time in 2015 and 2016 it applied Rio Markers to private climate finance mobilized by public finance through the Danish Development Finance Institution (also known as the Investment Fund for Developing Countries), which manages a number of investment vehicles that also involve private investors, such as the Danish Climate Investment Fund.

121. Denmark reported on the difficulty in collecting information and reporting on private financial flows leveraged by bilateral climate finance for mitigation and adaptation activities in non-Annex I Parties, including the challenge of separating private from official finance. During the review, Denmark provided information on three PaMs that promote the scaling up of private investment in mitigation and adaptation activities in developing countries: the establishment of special funding facilities, the Danish Climate Investment Fund and the Danish Sustainable Development Fund, which aim to leverage private capital from institutional investors, the strengthening of the efforts of multilateral development banks to mobilize private investments in mitigation and adaptation in developing countries, and the support and development of enabling policies and regulations conducive to attracting and accelerating private investments in mitigation and adaptation.

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

122. The ERT assessed the information reported in the BR3 of Denmark and identified an issue relating to completeness and adherence to the UNFCCC reporting guidelines on BRs. The finding is described in table 13.

Table 13

**Findings on financial resources from the review of the third biennial report of Denmark**

No.	<i>Reporting requirement, issue type and assessment</i>	<i>Description of the finding with recommendation or encouragement</i>
1	Reporting requirement specified in paragraph 19  Issue type: completeness  Assessment: encouragement	The Party reported on programmes that have promoted private investment in its BR3; however, the ERT could not find information on the PaMs that promote the scaling up of private investment in mitigation and adaptation activities in developing country Parties. The ERT noted that this is not in accordance with the UNFCCC reporting guidelines on BRs.  During the review, Denmark provided information on three PaMs that promote the scaling up of private investment in mitigation and adaptation activities in developing countries (see para. 121 above).  The ERT encourages Denmark to improve the completeness of its reporting by including in its next BR information on PaMs that promote the scaling up of private investment in mitigation and adaptation activities in developing country Parties.

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

### 3. Technology development and transfer

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

123. Denmark provided information on steps, measures and activities related to technology transfer, access and deployment benefiting developing countries, including information on activities undertaken by the public and private sectors. Denmark provided 12 examples of how it is practising an integrated approach to capacity-building and technology transfer as part of its overall climate support portfolio.

124. The ERT took note of the information provided in CTF table 8 on recipient countries, target areas, measures and focus sectors of technology transfer programmes. Denmark supported programmes both directly in countries and through the programmes of international agencies and funds.

125. Support was provided to Bangladesh (for the adaptation of rural infrastructure to the impacts of climate change, energy efficiency audits and the implementation of energy efficiency measures and technologies in a number of private sector companies in various sectors), Bolivia (for forests, energy, cleaner technologies, and mitigation and adaptation), Ethiopia (for the thematic programme Greening Agricultural Transformation in Ethiopia), Indonesia (for reducing emissions through a three-year strategic partnership programme focusing on energy planning, integrating renewable energy into the energy mix and increasing energy efficiency), Kenya (for the management and reform of Kenya's natural capital base, especially in the sectors of water, environment and agriculture, and activities to enhance private sector and community engagement in climate interventions through the use of technology innovation to reduce vulnerability to climate change and contribute to a low-carbon development path), and Mozambique (for adaptation and building climate change resilience in collaboration with the central government, municipalities and civil society organizations).

126. Denmark also supported programmes and initiatives such as the Climate Technology Centre and Network, the UNEP DTU Partnership<sup>10</sup> and the Energy Sector Management Assistance Program administrated by the World Bank.

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

127. The ERT assessed the information reported in the BR3 of Denmark and identified issues relating to completeness and adherence to the UNFCCC reporting guidelines on BRs. The findings are described in table 14.

<sup>10</sup> The partnership, formerly known as the UNEP Risoe Centre, operates under a tripartite agreement between Denmark's Ministry of Foreign Affairs, the Technical University of Denmark (DTU) and the United Nations Environment Programme (UNEP).

Table 14

**Findings on technology development and transfer from the review of the third biennial report of Denmark**

<i>No.</i>	<i>Reporting requirement, issue type and assessment</i>	<i>Description of the finding with recommendation or encouragement</i>
1	Reporting requirement specified in paragraph 21  Issue type: completeness  Assessment: recommendation	The Party reported information on steps, measures and activities related to technology transfer, access and deployment benefiting developing countries in its BR3. However, the steps taken to support the development and enhancement of the endogenous capacities and technologies of developing countries were not reported.  During the review, Denmark explained that much of the capacity-building it supports is inherently endogenous.  The ERT recommends that Denmark improve the completeness of its reporting by including in its next BR information on the support provided for the development and enhancement of the endogenous capacities and technologies of non-Annex I Parties.
2	Reporting requirement specified in paragraph 21  Issue type: completeness  Assessment: encouragement	The Party did not report success and failure stories in relation to technology transfer in its BR3.  During the review, Denmark acknowledged the lack of success and failure stories related to technology transfer and indicated that it would strive to provide such information, where feasible, in future submissions.  The ERT encourages Denmark to improve the completeness of its reporting by including in its next BR success and failure stories in relation to technology transfer.

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

**4. Capacity-building****(a) Technical assessment of the reported information**

128. In the BR3 and CTF table 9, Denmark supplied information on how it has provided capacity-building support for mitigation, adaptation and technology, stating that capacity-building is part of most of the activities supported by the country. Numerous projects included in the technology development and transfer reporting in CTF table 8 have a capacity-building component, including support to improve modelling and energy planning and integration of renewable energy in the energy system in Indonesia, and help to improve Mexico's frameworks for introducing renewable energy and energy efficiency interventions.

129. Denmark reported that it has supported climate-related capacity development activities relating to adaptation and mitigation sectors.

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

130. The ERT assessed the information reported in the BR3 of Denmark and identified issues relating to transparency and adherence to the UNFCCC reporting guidelines on BRs. The findings are described in table 15.

Table 15

**Findings on capacity-building from the review of the third biennial report of Denmark**

<i>No.</i>	<i>Reporting requirement, issue type and assessment</i>	<i>Description of the finding with recommendation or encouragement</i>
1	Reporting requirement specified in paragraph 23  Issue type: transparency	The Party reported information on support provided for capacity-building but did not explain how Denmark has identified or responded to the existing and emerging capacity-building needs of non-Annex I Parties.  During the review, Denmark explained that the existing and emerging capacity-building needs of developing countries are determined through consultations and

No.	<i>Reporting requirement, issue type and assessment</i>	<i>Description of the finding with recommendation or encouragement</i>
	Assessment: recommendation	dialogue with the partner countries and relevant stakeholders in those countries, and authority-to-authority cooperation between relevant Danish and partner country institutions. Capacity-building elements are also identified through relevant international processes, including the UNFCCC.  The ERT reiterates the recommendation made in the previous review report that Denmark improve the transparency of its reporting by including in its next BR, to the extent possible, information on how it has identified and responded to the existing and emerging capacity-building needs of non-Annex I Parties.
2	Reporting requirement specified in CTF Table 9  Issue type: transparency  Assessment: recommendation	The Party did not report on the capacity-building component of programmes and projects in the relevant column in CTF table 9, which gives only a general description of each programme or project.  During the review, Denmark indicated that it faced challenges in distinguishing the capacity-building component, as it is an integral part of the most projects, and that it would strive to be more specific in describing the capacity-building elements of programmes and projects in its future reporting.  The ERT recommends that Denmark provide in CTF table 9 of its next BR a description of the capacity-building component of each programme and project reported.

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

### III. Conclusions and recommendations

131. The ERT conducted a technical review of the information reported in the BR3 and CTF tables of Denmark 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; progress made by Denmark in achieving its target; and the Party's provision of support to developing country Parties.

132. Denmark's total GHG emissions excluding LULUCF covered by its quantified economy-wide emission reduction target were estimated to be 26.9 per cent below its 1990 level, whereas total GHG emissions including LULUCF were 24.3 per cent below its 1990 level, in 2016. Emission decreases were driven by improvements in energy efficiency and the replacement of fossil fuels with renewable energy. Those factors outweighed increases in emissions from transport.

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

134. Under the ESD, Denmark has a target of reducing its emissions by 20.0 per cent below the 2005 level by 2020. The 2015–2020 linear progression in Denmark's AEA (its national emission target for non-ETS sectors) is 35,021–32,063 kt CO<sub>2</sub> eq. Denmark no longer has a domestic target.

135. Denmark's main policy framework relating to energy and climate change is the Government Platform, implemented in 2016, and the Energy Agreement 2012, recently supplanted by the Energy Agreement 2018, which focuses on meeting the 2030 goals. Key

legislation supporting Denmark's climate change goals includes the Danish Climate Change Act (2014). The mitigation actions with the most significant mitigation impact are those related to energy efficiency and renewable energy.

136. For 2015 Denmark reported in CTF table 4 total GHG emissions excluding LULUCF of 50,957.05 kt CO<sub>2</sub> eq. Denmark reported that it does not intend to use units from market-based mechanisms to achieve its target.

137. The GHG emission projections provided by Denmark in the BR3 correspond to the WEM and WOM scenarios. Under these scenarios, emissions are projected to be 35.9 per cent below and 25.4 per cent above the 1990 level by 2020, respectively. According to the projections under the WEM scenario, Denmark's emissions from non-ETS sectors are estimated to reach 31,449 kt CO<sub>2</sub> eq by 2020. The projected level of emissions under the WEM scenario is 1.9 per cent below the AEAs for 2020. On the basis of the reported information, the ERT concludes that Denmark expects to meet its 2020 target for non-ETS sectors.

138. The ERT noted that Denmark is making progress towards its emission reduction target by implementing mitigation actions that deliver significant emission reductions.

139. Denmark continued to provide climate financing to developing countries in line with its climate finance programme, Climate Envelope, which is the main mechanism through which the Party provides public support to developing countries. This mechanism is programmed jointly by the Ministry of Foreign Affairs and the Ministry of Energy, Utilities and Climate. Denmark presented in 2017 its future strategy for development cooperation and humanitarian action. The Party has reduced the level of its financial support since the BR2; its public financial support in 2015 and 2016 totalled USD 179.55 and 192.09 million per year, respectively. For those years, Denmark provided more support for mitigation than for adaptation. The biggest share of financial support made through bilateral and regional channels went to projects in the agriculture and energy sectors. Some funds were allocated for activities that are cross-cutting across mitigation and adaptation and for other activities, as reported in CTF table 7(b). For 2016, the corresponding support was also directed mostly to the energy and agriculture sectors. Denmark provided information on steps, measures and activities related to technology transfer, access and deployment benefiting developing countries, including information on activities undertaken by the public and private sectors. The Party provided examples of how it is practising an integrated approach to capacity-building and technology transfer as part of its overall climate support portfolio.

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

- (a) To improve the completeness of its reporting by:
  - (i) Providing information on the national approach for tracking capacity-building and technological transfer elements in its support (see issue 1 in table 10);
  - (ii) Providing information on the support provided for the development and enhancement of the endogenous capacities and technologies of non-Annex I Parties (see issue 1 in table 14);
- (b) To improve the transparency of its reporting by:
  - (i) Providing accurate information on the PaMs it has implemented since the last BR or cross-reference the relevant documents (see issue 1 in table 4);
  - (ii) Providing, to the extent possible, information on how it has identified and responded to the existing and emerging capacity-building needs of non-Annex I Parties (see issue 1 in table 15);
  - (iii) Providing in CTF table 9 a description of the capacity-building component of each programme and project reported (see issue 2 in table 15).

## Annex

### Documents and information used during the review

#### A. Reference documents

2018 GHG inventory submission of Denmark. Available at <https://unfccc.int/process-and-meetings/transparency-and-reporting/reporting-and-review-under-the-convention/greenhouse-gas-inventories-annex-i-parties/national-inventory-submissions-2018>.

2017 GHG inventory submission of Denmark. Available at <https://unfccc.int/process/transparency-and-reporting/reporting-and-review-under-the-convention/greenhouse-gas-inventories-annex-i-parties/submissions/national-inventory-submissions-2017>.

BR3 of Denmark. Available at [https://unfccc.int/sites/default/files/resource/8057126\\_Denmark-NC7-BR3-2-NC7-DNK-Denmarks-NC7-and-BR3\\_1January2018-12MB.pdf](https://unfccc.int/sites/default/files/resource/8057126_Denmark-NC7-BR3-2-NC7-DNK-Denmarks-NC7-and-BR3_1January2018-12MB.pdf).

BR3 CTF tables of Denmark. Available at [https://unfccc.int/sites/default/files/resource/35812749\\_Denmark-BR3-3-DNK\\_2018\\_v2.0-BR3sCTFrev1-Approved\\_10October2018.xlsx](https://unfccc.int/sites/default/files/resource/35812749_Denmark-BR3-3-DNK_2018_v2.0-BR3sCTFrev1-Approved_10October2018.xlsx).

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

“Guidelines for 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>.

NC7 of Denmark. Available at [https://unfccc.int/sites/default/files/resource/8057126\\_Denmark-NC7-BR3-2-NC7-DNK-Denmarks-NC7-and-BR3\\_1January2018-12MB.pdf](https://unfccc.int/sites/default/files/resource/8057126_Denmark-NC7-BR3-2-NC7-DNK-Denmarks-NC7-and-BR3_1January2018-12MB.pdf).

Report of the technical review of the second biennial report of Denmark. FCCC/TRR.2/DNK. Available at <https://unfccc.int/sites/default/files/resource/docs/2016/trr/dnk.pdf>.

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

#### B. Additional information provided by the Party

Responses to questions during the review were received from Mr. Erik Rasmussen (Ministry of Energy, Utilities, and Climate), including additional material. The following documents<sup>1</sup> were provided by Denmark:

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<sup>1</sup> Reproduced as received from the Party.



Interministerial working group, 2013, *Catalogue of Danish Climate Change Mitigation Measures*. Available at: [https://ens.dk/sites/ens.dk/files/Analyser/dk\\_climate\\_change\\_mitigation\\_uk.pdf](https://ens.dk/sites/ens.dk/files/Analyser/dk_climate_change_mitigation_uk.pdf).

Danish Ministry of Energy, Utilities and Climate, 2018, *Energy – for a Green Denmark*.

Danish Energy Agency, 2018, *Analysis of Hyperscale Data Centres in Denmark, English Summary Report*.

Muldowney J, et al, Marginal Abatement Cost Curves for Agricultural Climate Policy: State-of-the Art, Lessons Learnt and Future Potential. *Journal of Cleaner Production* 182 (2018) pp. 705-716.

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