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Report on the individual review of the annual submission of Denmark submitted in 2021*

Note by the expert review team

Summary

Each Party included in Annex I to the Convention must submit an annual inventory of emissions and removals of greenhouse gases for all years from the base year (or period) to two years before the inventory due date (decision 24/CP.19). Parties included in Annex I to the Convention that are Parties to the Kyoto Protocol are also required to report supplementary information under Article 7, paragraph 1, of the Kyoto Protocol with the inventory submission due under the Convention. This report presents the results of the individual review of the 2021 annual submission of Denmark, conducted by an expert review team in accordance with the "Guidelines for review under Article 8 of the Kyoto Protocol". The review took place from 6 to 11 September 2021 remotely.

* In the symbol for this document, 2021 refers to the year in which the inventory was submitted, not to the year of publication.

Contents

Abbreviations and acronyms

2006 IPCC Guidelines	*2006 IPCC Guidelines for National Greenhouse Gas Inventories*
AD	activity data
Annex A source	source category included in Annex A to the Kyoto Protocol
AR	afforestation and reforestation
Article 8 review guidelines	"Guidelines for review under Article 8 of the Kyoto Protocol"
CH_4	methane
CM	cropland management
COD	chemical oxygen demand
CO_2	carbon dioxide
CO_2 eq	carbon dioxide equivalent
Convention reporting adherence	adherence to the "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"
CPR	commitment period reserve
CRF	common reporting format
DKE	country identification code for Denmark's submission under the Kyoto Protocol (mainland Denmark and Greenland)
DNK	country identification code for Denmark's submission under the Convention (mainland Denmark, Greenland and the Faroe Islands)
DNM	country identification code for Denmark's submission under the second commitment period of the Kyoto Protocol (mainland Denmark only)
DOC	degradable organic carbon
DOC_f	fraction of degradable organic carbon that decomposes
DOC_i	degradable organic carbon per waste type
EEA	European Environment Agency
EF	emission factor
EF_{st}	emission factor for methane emissions from septic tanks
EMEP	Cooperative Programme for Monitoring and Evaluation of the Long-range Transmission of Air Pollutants in Europe
EMEP/EEA guidebook	EMEP/EEA air pollutant emission inventory guidebook 2019
ERT	expert review team
Eurostat	statistical office of the European Union
F-gas	fluorinated gas
FM	forest management
FMRL	forest management reference level
GHG	greenhouse gas
GM	grazing land management
HFC	hydrofluorocarbon
IEF	implied emission factor
IPCC	Intergovernmental Panel on Climate Change
IPPU	industrial processes and product use
KP-LULUCF	activities under Article 3, paragraphs 3–4, of the Kyoto Protocol
LNG	liquefied natural gas
$L_{o,i}$	methane generation potential per waste type
LULUCF	land use, land-use change and forestry
N	nitrogen
N_2O	nitrous oxide
NA	not applicable

NE	not estimated
Nex	nitrogen excretion
NF_3	nitrogen trifluoride
NFI	national forest inventory
NIR	national inventory report
NO	not occurring
NO_X	nitrogen oxides
PFC	perfluorocarbon
QA/QC	quality assurance/quality control
RMU	removal unit
RV	revegetation
SEF	standard electronic format
SF_6	sulfur hexafluoride
SIAR	standard independent assessment report
SOC	soil organic carbon
SWDS	solid waste disposal site(s)
UNFCCC Annex I inventory reporting guidelines	"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"
UNFCCC review guidelines	"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"
WDR	wetland drainage and rewetting
Wetlands Supplement	*2013 Supplement to the 2006 IPCC Guidelines for National Greenhouse Gas Inventories: Wetlands*
W_i	amount of waste generated per waste type
Y_m	methane conversion rate

I. Introduction

1. This report covers the review of the 2021 annual submission of Denmark, organized by the secretariat in accordance with the Article 8 review guidelines (adopted by decision 22/CMP.1 and revised by decision 4/CMP.11). In accordance with the Article 8 review guidelines, this review process also encompasses the review under the Convention as described in the UNFCCC review guidelines, particularly in part III thereof, namely the "UNFCCC guidelines for the technical review of greenhouse gas inventories from Parties included in Annex I to the Convention" (annex to decision 13/CP.20). The review took place from 6 to 11 September 2021 remotely[1] and was coordinated by Walters Tubua, Nashib Kafle, Karen Ortega and Roman Payo (secretariat). Table 1 provides information on the composition of the ERT that conducted the review for Denmark.

Table 1
Composition of the expert review team that conducted the review for Denmark

Area of expertise	*Name*	*Party*
Generalist	Phindile Mangwana	South Africa
	Harry Vreuls	Netherlands
Energy	André Amaro	Portugal
	Vincent Camobreco	United States
	Maya Fukuda	Japan
IPPU	Laura Dawidowski	Argentina
	Emma Salisbury	United Kingdom
	Alexander Valencia	Colombia
Agriculture	Abdulkadir Bektas	Türkiye
	Paulo Cornejo	Chile
	Mahmoud Medany	Egypt
LULUCF and KP-LULUCF	Atsuko Hayashi	Japan
	Agustín Inthamoussu	Uruguay
	Doru Leonard Irimie	Romania
Waste	Richard Claxton	United Kingdom
	Violeta Hristova	Bulgaria
	Hiroyuki Ueda	Japan
Lead reviewers	Laura Dawidowski	
	Harry Vreuls	

2. The basis of the findings in this report is the assessment by the ERT of the Party's 2021 annual submission in accordance with the UNFCCC review guidelines and the Article 8 review guidelines.

3. The ERT has made recommendations that Denmark resolve identified findings, including issues [2] designated as problems. [3] Other findings, and, if applicable, the encouragements of the ERT to Denmark to resolve related issues, are also included in this report.

[1] Owing to the circumstances related to the coronavirus disease 2019, the review had to be conducted remotely.
[2] Issues are defined in decision 13/CP.20, annex, para. 81.
[3] Problems are defined in decision 22/CMP.1, annex, paras. 68–69, as revised by decision 4/CMP.11.

4. A draft version of this report was communicated to the Government of Denmark, which provided comments that were considered and incorporated, as appropriate, into this final version of the report.

5. Annex I presents the annual GHG emissions of Denmark, including totals excluding and including LULUCF, indirect CO_2 emissions, and emissions by gas and by sector, and contains background data on emissions and removals from KP-LULUCF, if elected by the Party, by gas, sector and activity.

6. Information to be included in the compilation and accounting database can be found in annex II.

II. Summary and general assessment of the Party's 2021 annual submission

7. Table 2 provides the assessment by the ERT of the Party's 2021 annual submission with respect to the tasks undertaken during the review. Further information on the issues identified, as well as additional findings, may be found in tables 3 and 5.

Table 2
Summary of review results and general assessment of the 2021 annual submission of Denmark

Assessment			*Issue/problem ID#(s) in table 3 or 5[a]*
Date of submission	Original submission: NIR, 15 April 2021; CRF tables (DKE version 1, DNK version 2 and DNM version 1), 15 April 2021; SEF tables (SEF-2020-CP1, SEF-2020-CP2), 15 April 2021		
Review format	Centralized review conducted remotely		
Application of the requirements of the UNFCCC Annex I inventory reporting guidelines and the Wetlands Supplement (if applicable)	Have any issues been identified in the following areas:		
	(a) Identification of key categories?	No	
	(b) Selection and use of methodologies and assumptions?	Yes	W.3, I.6, I.7
	(c) Development and selection of EFs?	No	
	(d) Collection and selection of AD?	Yes	L.12, W.8, KL.6, KL.7
	(e) Reporting of recalculations?	No	
	(f) Reporting of a consistent time series?	Yes	I.4, L.5
	(g) Reporting of uncertainties, including methodologies?	No	
	(h) QA/QC?	QA/QC procedures were assessed in the context of the national system (see supplementary information under the Kyoto Protocol below)	
	(i) Missing categories, or completeness?[b]	Yes	W.15
	(j) Application of corrections to the inventory?	No	
Significance threshold	For categories reported as insignificant, has the Party provided sufficient information showing that the likely level of emissions meets the criteria in paragraph 37(b) of the UNFCCC Annex I inventory reporting guidelines?	NA	The Party did not report any insignificant categories as "NE"
Description of trends	Did the ERT conclude that the description in the NIR of the trends for the different gases and sectors is reasonable?	Yes	
Supplementary information under the Kyoto Protocol	Have any issues been identified related to the following aspects of the national system:		
	(a) Overall organization of the national system, including the effectiveness and reliability of the institutional, procedural and legal arrangements?	No	

Assessment			*Issue/problem ID#(s) in table 3 or 5[a]*
	(b) Performance of the national system functions?	No	
	Have any issues been identified related to the national registry:		
	(a) Overall functioning of the national registry?	No	
	(b) Performance of the functions of the national registry and the adherence to technical standards for data exchange?	No	
	Have any issues been identified related to the reporting of information on assigned amount units, certified emission reductions, emission reduction units and RMUs and on discrepancies in accordance with decision 15/CMP.1, annex, chapter I.E, in conjunction with decision 3/CMP.11, taking into consideration any findings or recommendations contained in the SIAR?	No	
	Have any issues been identified in matters related to Article 3, paragraph 14, of the Kyoto Protocol, specifically problems related to the transparency, completeness or timeliness of the reporting on the Party's activities related to the priority actions listed in decision 15/CMP.1, annex, paragraph 24, in conjunction with decision 3/CMP.11, including any changes since the previous annual submission?	No	
	Have any issues been identified related to the following reporting requirements for KP-LULUCF:		
	(a) Reporting requirements of decision 2/CMP.8, annex II, paragraphs 1–5?	No	
	(b) Demonstration of methodological consistency between the reference level and reporting on FM in accordance with decision 2/CMP.7, annex, paragraph 14?	No	
	(c) Reporting requirements of decision 6/CMP.9?	No	
	(d) Country-specific information to support provisions for natural disturbances in accordance with decision 2/CMP.7, annex, paragraphs 33–34?	NA	
CPR	Was the CPR reported in accordance with decision 18/CP.7, annex; decision 11/CMP.1, annex; and decision 1/CMP.8, paragraph 18?	Yes	
Adjustments	Has the ERT applied any adjustments under Article 5, paragraph 2, of the Kyoto Protocol?	No	
	Has the Party submitted a revised estimate to replace a previously applied adjustment?	NA	Denmark does not have a previously applied adjustment
Response from the Party during the review	Has the Party provided the ERT with responses to the questions raised, including the data and information necessary for assessing conformity with the UNFCCC Annex I inventory reporting guidelines and any further guidance adopted by the Conference of the Parties?	Yes	
Recommendation for an exceptional in-country review	On the basis of the issues identified, does the ERT recommend that the next review be conducted as an in-country review?	No	
Questions of implementation	Did the ERT list any questions of implementation?	No	

[a] Further information on the issues identified, as well as additional findings, may be found in tables 3 and 5.
[b] Missing categories for which methods are provided in the 2006 IPCC Guidelines may affect completeness and are listed in annex III.

III. Status of implementation of recommendations included in the previous review report

8. Table 3 compiles the recommendations from previous review reports that were included in the most recent previous review report, published on 5 May 2021,[4] and had not been resolved by the time of publication of the report on the review of the Party's 2020 annual submission. The ERT has specified whether it believes the Party had resolved, was addressing or had not resolved each issue or problem by the time of publication of this review report and has provided the rationale for its determination, which takes into consideration the publication date of the most recent previous review report and national circumstances.

Table 3
Status of implementation of recommendations included in the previous review report for Denmark

ID#	*Issue/problem classification[a, b]*	*Recommendation made in previous review report*	*ERT assessment and rationale*
General			
G.1	Annual submission (G.2, 2020) (G.3, 2018) Completeness	Estimate and report the following category for Greenland: CO_2, CH_4 and N_2O emissions and removals under forest land – drainage and rewetting (4(II)).	Resolved. The text in NIR section 16.6.11 has not been updated since the previous submission. During the review Denmark informed the ERT that estimated emissions were reported for drained organic soils in forest lands (4(II)) for Greenland and that rewetting does not occur in Greenland. CRF table 4(II) contains data for organic soils for Greenland, but no notation key ("NO") was used for rewetting (see ID# L.18 in table 5).
G.2	Annual submission (G.3, 2020) (G.3, 2018) Completeness	Estimate the following categories for the Faroe Islands: CO_2 emissions from lubricant use (2.D.1) and paraffin wax use (2.D.2), CH_4 emissions from solid waste disposal (5.A) and CH_4 and N_2O emissions from wastewater treatment and discharge (5.D).	Resolved. The Party reported emissions from lubricant use (category 2.D.1), paraffin wax use (category 2.D.2), solid waste disposal on land (category 5.A) and wastewater treatment and discharge (category 5.D) for the Faroe Islands. The methodologies used are described in annex 7 to the NIR.
G.3	QA/QC and verification (G.6, 2020) (G.5, 2018) Convention reporting adherence	Update the quality manual from 2013 and ensure its consistency with the revised UNFCCC Annex I inventory reporting guidelines.	Resolved. The Party reported in its NIR (p.46) that the update to the quality manual was published in 2020, referencing Nielsen et al. (2020).
Energy			
E.1	International bunkers and multilateral operations – liquid	Ensure consistent reporting between CRF tables 1.D and 1.A(b) for jet kerosene consumed in international aviation bunkers (1990–2000) and	Not resolved. The Party continued to report inconsistent values in CRF tables 1.D and 1.A(b) since the Faroe Islands reporting used only the sectoral approach and not the reference approach. During the review, the Party clarified that efforts to improve the

[4] FCCC/ARR/2020/DNK.

ID#	Issue/problem classification[a, b]	Recommendation made in previous review report	ERT assessment and rationale
	fuels – CO_2 (E.6, 2020) (E.7, 2018) Convention reporting adherence	for residual fuel oil consumed in international navigation bunkers.	Faroese inventory are ongoing and that it plans to include the reference approach data in the 2022 submission. In response to the draft review report, Denmark informed the ERT that the reference approach will not be fully implemented for the Faroe Islands before the 2023 submission.
E.2	1.A.3.a Domestic aviation – gasoline – CH_4 (E.7, 2020) Transparency	Revise the incorrect reference to the source of the EFs for CH_4 emissions from piston engine aircraft using aviation gasoline.	Addressing. The Party reported in its NIR (section 3.3.3, p.240) that for piston engine aircraft using aviation gasoline, the CH_4 EFs were derived using volatile organic compound factors from the EMEP/EEA guidebook and a non-methane volatile organic compound/CH_4 split based on an expert judgment. During the review, the Party clarified that the expert judgment used for the non-methane volatile organic compound/CH_4 split was based on conventional gasoline engines used in Danish road transport and that an explanation will be provided in the next NIR.
E.3	1.A.3.d Domestic navigation – liquid and gaseous fuels – CO_2 and CH_4 (E.4, 2020) (E.4, 2018) Comparability	Reallocate emissions from LNG used in ferries from natural gas liquid to gaseous fuels in CRF table 1.A(a).	Not resolved. The Party did not reallocate emissions from LNG used in ferries from natural gas liquid to gaseous fuels in CRF table 1.A(a). During the review, the Party clarified that since the recommendation was received after the 2020 inventory was compiled, it will be implemented in the 2022 submission.
E.4	1.A.3.d Domestic navigation – gaseous fuels – CO_2 and CH_4 (E.5, 2020) (E.5, 2018) Transparency	Elaborate the estimation method of fuel consumption of LNG for ferries in the NIR, including information on the calorific value used.	Resolved. The Party reported in its NIR (section 3.3.3, p.230) information on the AD used for determining fuel consumption of LNG for ferries, including the calorific value.
E.5	1.A.3.d Domestic navigation – other fossil fuels – N_2O (E.8, 2020) Completeness	Estimate N_2O emissions for other fossil fuels (LNG) for the category for 2015 onward by applying a country-specific EF or the default EF provided in the 2006 IPCC Guidelines.	Resolved. The Party reported in CRF table 1.A(a)s3 N_2O emissions for other fossil fuels (LNG) for category 1.A.3.d Domestic navigation for 2015 onward. The IEF (3.96 kg/TJ) is consistent with the default EF from the 2006 IPCC Guidelines (vol. 2, chap. 3).
IPPU			
I.1	2.B.10 Other (chemical industry) – CO_2 (I.7, 2020) Transparency	Correctly describe the methodology used for the category by referring to it as a tier 3 methodology in the relevant text and tables in the NIR.	Resolved. The Party reported in NIR table 4.1.1 (p.312) the methodology used for the category, referring to it as a tier 3 methodology.
I.2	2.B.10 Other (chemical industry) – CO_2	Recalculate emissions from potassium nitrate production for 2018 using the production AD for 2018 and update the reference in the NIR to the source of the historical AD.	Resolved. The Party reported in table 4.11.2 (p.379) and section 4.11.2 (p.380) of its NIR that emissions from potassium nitrate production were recalculated for 2018 using the production AD for 2018, resulting in a 0.8 per cent increase in the CO_2 emission estimates.

ID#	*Issue/problem classification*[a, b]	*Recommendation made in previous review report*	*ERT assessment and rationale*
	(I.8, 2020) Accuracy		
I.3	2.F.1 Refrigeration and air conditioning – HFCs (I.9, 2020) Consistency	Investigate the reasons for the outlier values of the HFC-143a product manufacturing factor for commercial refrigeration reported for 2017–2018 and revise them, as necessary, providing a transparent explanation in the NIR if there continues to be significant inter-annual variation in the values reported.	Addressing. The Party reported in NIR section 4.7.4 (p.355) that European Union F-gas regulation (regulation 517/2014) entered into force on 1 January 2015, placing a ban on the sale and installation of domestic refrigeration appliances containing F-gases with a global warming potential greater than 150. However, for 2015–2019, the Party reported amounts of HFC-125, HFC-134a and HFC-143a, which have global warming potentials of 3,500, 1,430 and 4,470, respectively, as "filled into new manufactured products" in the domestic refrigeration subcategory. The single producer responsible for this consumption confirmed consumption of HFC-134a and HFC-404a for domestic appliances and biomedical coolers and freezers. The NIR does not contain a transparent explanation for the inter-annual variation in the values reported.
I.4	2.F.1 Refrigeration and air conditioning – HFCs (I.3, 2020) (I.12, 2018) Consistency	Ensure consistent reporting of the emissions from laboratory freezers in the CRF tables across the time series and include in the NIR an explanation on the methodology used and allocation of the emissions for this subcategory.	Addressing. The Party reported in its NIR (p.355) that PFC-14 can be used for specialized low-temperature (–60 ºC) freezers for laboratory purposes. Denmark registered the use of PFC-14 for this purpose for 2015–2018 and reported it under subcategory 2.F.1.b Domestic refrigeration. No import of PFCs was reported for 2019 or 2018. The ERT considers that the Party must justify its allocation of emissions from laboratory freezers to subcategory 2.F.1.b Domestic refrigeration or allocate the emissions to subcategory 2.F.1.a Commercial refrigeration.
I.5	2.F.1 Refrigeration and air conditioning – HFCs (I.10, 2020) Consistency	Recalculate the emissions for the subcategory for 2010 onward by correcting the product manufacturing factor values used for the calculation of HFC-125 emissions from commercial refrigeration.	Addressing. The Party reported in NIR section 4.11.4 (p.381) that for all sources of commercial refrigeration emissions, a lower EF was used for manufacturing for 2010 onward. This reduced the contribution to emissions from manufacturing for some sources for 2010–2018 as EFs were lowered from 1.5 to 0.5 per cent. However, it is not clear from the NIR why a lower EF was used for manufacturing for 2010 onward.
Agriculture			
A.1	3.A.1 Cattle – CH_4 (A.5, 2020) Transparency	Include information on the planned revisions for the Karoline model in the Party's description of planned improvements in the NIR.	Not resolved. The Party did not report any planned revisions in NIR section 5.16, page 450, for the category. During the review, the Party explained that related planned improvements are not described in section 5.16 on planned improvements, but a description will be included in the 2022 submission.
A.2	3.B Manure management – N_2O (A.6, 2020) Transparency	Include in the list of planned improvements in the NIR updated information on the verification of total Nex used in the inventory calculations, including the Party's plan to compare it with farmers' N accounts.	Not resolved. The Party did not report any planned revisions in NIR section 5.16, page 450. During the review, the Party clarified that this issue is not described in section 5.16 on planned improvements, but a description will be included in the 2022 submission.
LULUCF			
L.1	4. General (LULUCF) (L.1, 2020) (L.1, 2018)	Research the impact of the land-use conversions prior to 1990 on the estimated emissions and	Resolved. The Party estimated emissions and removals from soils considering the impact of land conversions prior to 1990 by implementing a 30-year transition period for

ID#	Issue/problem classification[a, b]	Recommendation made in previous review report	ERT assessment and rationale
	(L.14, 2016) (L.14, 2015) Accuracy	removals from soils from 1990 onward and revise the reporting allocation and estimates, or, if Denmark considers that a disproportionate amount of effort would be required to estimate these impacts in terms of the likely level of emissions and removals (i.e. if they would be insignificant in terms of the overall level and trend in national emissions), provide justifications in the NIR for this.	all land conversion categories for all reporting years, which are described in its NIR (p.474).
L.2	4. General (LULUCF) (L.2, 2020), (L.2, 2018) (L.15, 2016) (L.15, 2015) Convention reporting adherence	Ensure consistent reporting of the area of organic soils between the NIR and CRF tables 4.A–4.F and improve QC procedures for consistent reporting of the areas of organic soils.	Not resolved. The areas of organic soils reported under cropland are still inconsistent between the NIR and CRF table 4.B. During the review, the Party clarified that it erroneously reported the table for grassland in NIR table 6.19 (p.494), and provided the revised table 6.19, which still contains values that are inconsistent with those reported in DNM CRF table 4.B. The Party clarified that for DNM CRF table 4.B, the areas of organic soils were erroneously subtracted from the areas of mineral soils in forest land converted to cropland, resulting in slightly lower area estimates. However, Denmark stated that the emission estimates given in the CRF table are correct. With regard to QC procedures, the Party stated that since the error occurred in the process of creating the XML import file, it will carry out a final full QC check for the LULUCF sector.
L.3	4. General (LULUCF) (L.3, 2020) (L.12, 2018) Transparency	Ensure that any recalculations in the sector are reported with a relevant explanation and justification in line with paragraph 44 of the UNFCCC Annex I inventory reporting guidelines.	Resolved. The Party reported in its NIR (e.g. sections 6.2.8, 6.3.10 and 6.4.10) the recalculations performed for the 2021 submission. Denmark indicated that the recalculations were mainly performed to implement the 30-year transition period for all land-use conversion categories and all 'land remaining' categories and to implement classification changes between cropland and grassland owing to re-evaluation in the system. During the review, the Party clarified that it implemented a significant change in its approach by using NFI surveys to estimate the carbon stock changes under forest land. The Party also stated that the NIR includes the latest recalculations.
L.4	4.A Forest land – CO_2 (L.7, 2020) (L.16, 2018) Transparency	Include in the NIR synthesized information on the main parameters defining the characteristics used in the calculation of biomass and growing stocks.	Addressing. The Party did not improve its documentation on the main parameters, although some reference information was included in its NIR (section 6.2.4, p.469). During the review, the Party referenced the annual reports published on the NFI (Johannsen et al., 2019; Nord-Larsen and Johannsen, 2016), which include the calculation methods with some parameter values (i.e. wood density, reduction factor) and data for growing stocks by species or by a group of species, but do not cover all the parameter values (e.g. biomass expansion factor) used in the calculation of carbon stock in biomass. The ERT considers that the recommendation has not yet been fully addressed because the Party has not yet included synthesized information on the main parameters, and notes that including in future NIRs information in tabular format on the values for the

ID#	Issue/problem classification[a, b]	Recommendation made in previous review report	ERT assessment and rationale
			biomass expansion factor, root–shoot ratio, wood density by tree species, and areas and volumes by species would resolve this recommendation.
L.5	4.A Forest land – CO_2 (L.17, 2020) Consistency	Ensure time-series consistency by revising the living biomass estimates to address the inconsistency caused by the use of different data sources for the periods before and after 2006.	Addressing. The Party revised the carbon stock change values in living biomass in the time series and there are no sharp increases or outliers. However, the Party did not include information on how it revised the data to address the inconsistency. During the review, the Party clarified that it changed its approach by using NFI surveys to estimate the carbon stock changes under forest land, leading to more accurate estimates for the period after 2007. The Party also clarified that there is no inconsistency between the data provided by the forest census (1881–2000) and the data provided by the NFI (2002 onward) in terms of estimating the carbon stock changes, as they both provide similar information on species and age class for all growth regions. The Party also explained the trend in carbon stock changes in above-ground living biomass in the time series after 2007, which was due to changes in age structure and management (initiatives for regeneration and harvest) in the period, and the IEFs reflect the balance between growth, regeneration, harvest and mortality, which vary over time.
L.6	4.A.1 Forest land remaining forest land – CO_2 (L.8, 2020) (L.7, 2018) (L.5, 2016) (L.5, 2015) (51, 2014) (51, 2013) Transparency	Provide additional information on the area and volume of clear-cutting and the area subject to destructive disturbance, subject to the availability of data.	Not resolved. The Party did not include a description in its NIR related to this issue. During the review, the Party clarified that the area affected by clear-cutting, selective harvesting, disturbances or any other activity related to FM was included in the NFI sampling and was considered in the estimation of carbon pools. The ERT considers that the Party could address the recommendation by including in future NIRs the clarifications provided during the review.
L.7	4.A.1 Forest land remaining forest land – CO_2 (L.18, 2020) Consistency	Take steps to minimize the inter-annual variations in the net carbon stock change in deadwood/ha to the extent possible, in line with the overall uncertainty of the net removals and emissions reported, by implementing the new transition period of 30 years and by aligning the reporting frequency with the frequency of sampling to gather new data on deadwood.	Resolved. The Party revised the values for carbon stock change in deadwood (see ID# L.1 above) in the time series.
L.8	4.A.1 Forest land remaining forest land – CO_2 (L.18, 2020) Transparency	Explain the reasons for any significant inter-annual changes in deadwood/ha in the NIR and provide a justification as to why the changes do not result in underestimation of emissions or overestimation of removals.	Addressing. There are no sharp increases or outliers for 2006–2007 and 2015–2016 following the revision of the time series. However, the Party did not include information on how it revised the data to address the inconsistency. During the review, the Party explained the trend in carbon stock changes in deadwood in the time series after 2007, which was due to changes in age structure and management (initiatives for regeneration and harvest) in the period, and the IEFs reflect the balance between growth, regeneration, harvest and mortality, which vary over time (see ID# L.5 above).

ID#	*Issue/problem classification*[a, b]	*Recommendation made in previous review report*	*ERT assessment and rationale*
			The ERT considers that the Party could address the recommendation by improving the documentation provided in the estimation methodology section of the NIR by explaining how the data it used are consistent across the time series and what is reflected in the data, as clarified during the review.
L.9	4.A.2 Land converted to forest land – CO_2 (L.10, 2020) (L.18, 2018) Transparency	Improve the transparency of the NIR by explaining how land converted to forest land changed over the entire time series.	Addressing. The Party implemented a 30-year transition period for all land conversion categories for all reporting years and reported in its NIR (figure 6.3) forest land areas divided into areas of forest land remaining forest land and land converted to forest land for the full time series. However, the Party did not fully explain how it estimated the area of land converted to forest land for years before 1990. During the review, the Party clarified that forest censuses are available for years before 1990, including 1881, 1888, 1896, 1907, 1923, 1931, 1951, 1965 and 1976, combined with other statistical information from Statistics Denmark and allowing for linear interpolation for years between the data points. The ERT considers that the Party could address the recommendation by including in future NIRs information on the methodologies and resources used for estimating land converted to forest land before 1990, such as the information provided during the review.
L.10	4.A.2 Land converted to forest land – CO_2 (L.19, 2020) Accuracy	Revise the total areas of land converted to forest land reported for each year, starting with the base year, by including the areas of land converted to forest land accumulated over the past 30 years, either by extrapolating land areas before 1990 or by collecting additional historical data on land use since 1960.	Resolved. The Party implemented a 30-year transition period for all land conversion categories for all reporting years and reported this change in the NIR (in the recalculation sections, pp.474, 479, 495 and 508) and reflected it in the CRF tables.
L.11	4.A.2 Land converted to forest land – CO_2 (L.19, 2020) Transparency	Provide transparent information in the NIR on the transition period applied to construct the land-use change matrix, ensuring that the information reported in the NIR reflects the actual methodological approaches applied for estimating emissions and removals as reported in the CRF tables.	Not resolved. The Party did not provide transparent information on how it constructed the whole time series of the land-use change matrix. During the review, the Party clarified the methodologies and resources used to create the land-use matrix for the whole time series (see ID# L.8 above) and correctly included the accumulating years for land conversion categories (e.g. the area of forest land for 1990 includes 1961–1990).
L.12	4.B Cropland – (L.20, 2020) Accuracy	Revise the areas of drained organic soils for 2011–2018 by collecting additional data on drainage status and recalculate the associated emissions.	Not resolved. The previous ERT noted that the area reported for organic soils changes from 2010, with greater amounts of conversion from organic soils to mineral soils each year in more recent years, and assuming a constant area of drained organic soils since 2010 may lead to an overestimation. The current ERT found that the areas of and emissions from drained organic soils reported in CRF table 4.B have been recalculated for the whole time series, leading to a smaller area of organic soils in the time series and a more pronounced decreasing trend for recent years. These differences were due to crops being reclassified between cropland and grassland in the database (the European

ID#	*Issue/problem classification*[a, b]	*Recommendation made in previous review report*	*ERT assessment and rationale*
			Union LIPIS), which resulted in the changes in area. During the review, the Party clarified that it did not collect new AD to improve the overestimations. However, the Party is conducting new research to address this issue.
L.13	4.B Cropland – (L.21, 2020) Accuracy	Recalculate emissions from drained organic soils under cropland by collecting additional data on soils with 6–12 per cent organic content. Include in the NIR data and information from the study by Elsgaard et al. (2012) on calculating the EFs for drained organic soils with organic content greater than 12 per cent, including soil type, percentage of organic content and assumptions made, demonstrating their applicability for all the reporting years.	Not resolved. The Party did not describe the calculation of the EFs for drained organic soils in the NIR, and consequently the ERT remained unable to determine whether the EFs used resulted in accurate emission estimates for organic soils with organic content of 6–12 per cent and above 12 per cent. Moreover, the Party did not recalculate emissions from drained organic soils under cropland by collecting additional data on soils with 6–12 per cent organic content, nor did it include information from the study by Elsgaard et al. (2012) on calculating the EFs for drained organic soils with organic content greater than 12 per cent, including soil type, percentage of organic content and assumptions made. During the review, the Party clarified that it will improve its estimates for soils with 6–12 per cent organic content by resampling in 2021 1,000 plots which were sampled in 2010 and developing a groundwater table map.
L.14	4.B Cropland – CO_2 (L.22, 2020) Convention reporting adherence	Correct the total area of organic soils in cropland reported for 2018 in DNK CRF table 4.B, ensuring consistency between the areas reported in the NIR and in CRF table 4.B.	Not resolved. This is the same issue as issue ID# L.2 above, relating to inconsistent reporting between the table in the NIR and the CRF table. As mentioned above, the Party reported the wrong table in its NIR (table 6.19, p.494), and the areas of the revised table for organic soils in cropland are still inconsistent between the NIR and the CRF tables.
L.15	4.C Grassland – CO_2 (L.23, 2020) Transparency	Include information in the NIR on how the EFs used for drained organic soils in grassland are representative of the drained soils in terms of management practices.	Not resolved. The Party did not include in the NIR any information on how management practices were considered in the use of the EFs for estimating emissions from drained organic soils. During the review, the Party clarified how it collected the area data of organic soils in grassland, explaining that it used the geographic information system overlay made between the annual field map and the soil map to determine the area with different crop codes on organic soils. The ERT considers that since each parcel in the Land Parcel Identification System has a crop code and information on the degree of organic matter held, the EFs to be used are already set within the system. Thus, the ERT considers that the Party has not yet provided information on how the EFs used for drained organic soils in grassland are representative of the drained soils in terms of management practices.
L.16	4(II) Emissions/ removals from drainage and rewetting and other management of organic/mineral soils – CO_2	Include in the NIR information on the methodological approach and the EFs used for calculating off-site emissions from leaching of dissolved organic carbon in cropland, grassland and wetlands.	Not resolved. The Party did not include in its NIR information on the methodological approach and EFs used for calculating off-site emissions from leaching of dissolved organic carbon in cropland. During the review, the Party clarified that it used the default EFs from the Wetlands Supplement and the default value for ditches of 5 per cent of the cultivated area for AD, but the areas reported for categories 3.D, 4.B, 4.C and 4(II) exclude the area for ditches, which is why the results of the ERT calculations differ from those reported by the Party.

ID#	Issue/problem classification[a, b]	Recommendation made in previous review report	ERT assessment and rationale
	(L.24, 2020) Transparency		Therefore, the ERT considers that the Party should include information on the calculation of the AD used to estimate emissions from leaching of dissolved organic carbon.
Waste			
W.1	5.A Solid waste disposal on land – CH_4 (W.2, 2020) (W.4, 2018) (W.3, 2016) (W.3, 2015) (61, 2014) Comparability	Use the notation key "NA" to report CO_2 emissions for solid waste disposal on land.	Resolved. The Party reported "NO" and "NA" in DNM, DKE and DNK CRF table 5.
W.2	5.A Solid waste disposal on land – CH_4 (W.4, 2020) (W.16, 2018) Convention reporting adherence	Correct the erroneous entry of DOC_f in CRF table 5.A.	Addressing. The Party corrected the DOC_f value reported in DNK CRF table 5.A; however, the value was still reported as a fraction rather than a percentage. Denmark intends to correct this in its 2022 submission.
W.3	5.A Solid waste disposal on land – CH_4 (W.6, 2020) Accuracy	Recalculate CH_4 emissions from solid waste disposal in Greenland using the correct values of DOC for dry and wet paper/cardboard in line with the 2006 IPCC Guidelines (vol. 5, chap. 2, table 2.4).	Not resolved. The ERT considers that the recommendation has not yet been addressed because the Party has not yet updated the DOC content for dry and wet paper/cardboard in line with the 2006 IPCC Guidelines (vol. 5, chap. 2, table 2.4). During the review, Denmark stated its intention to correct this in its 2022 submission.
W.4	5.A.1 Managed waste disposal sites – CH_4 (W.7, 2020) Transparency	Include in the NIR a detailed explanation on the Party's choice of oxidation factor for managed SWDS in Denmark.	Resolved. The Party included detailed information justifying its choice of oxidation factor in its NIR (p.532).
W.5	5.A.1 Managed waste disposal sites – CH_4 (W.8, 2020) Transparency	Include in the NIR a detailed description of the parameters used to estimate CH_4 recovery in managed SWDS, including definitions of all input parameters, sources of the input data and the values chosen.	Resolved. The Party described the parameters used to estimate CH_4 recovery in managed SWDS in its NIR (p.547).
W.6	5.A.1 Managed waste disposal sites – CH_4 (W.9, 2020) Convention reporting adherence	Ensure that the references to NIR tables relating to CH_4 recovered from solid waste disposal are correct in the NIR.	Not resolved. The ERT considers that the recommendation has not yet been addressed because the NIR (p.547) still contains a reference to table 7.2.9, which does not appear in the report.

ID#	*Issue/problem classification*[a, b]	*Recommendation made in previous review report*	*ERT assessment and rationale*
W.7	5.A.1 Managed waste disposal sites – CH_4 (W.10, 2020) Convention reporting adherence	Correct the equation used for estimating the CH_4 generation potential by using the correct value for the coefficient (0.33).	Not resolved. The ERT considers that the recommendation has not yet been addressed because the Party has not yet fixed the typographical error ($L_{o,i}/W_i = 0.27 \times DOC_i$) in its NIR (equation 7.2.9, p.550). During the review, Denmark stated its intention to correct this in its 2022 submission.
W.8	5.A.2 Unmanaged waste disposal sites – CH_4 (W.20, 2020) Accuracy	Estimate and report the amount of CH_4 for energy recovery in CRF table 5.B rather than reporting it as "NO".	Not resolved. The ERT considers that the recommendation has not yet been addressed because the Party did not estimate and report the amount of CH_4 for energy recovery from anaerobic digestion at biogas facilities in CRF table 5.B. During the review, Denmark stated that this improvement is planned for its 2022 submission.
W.9	5.B.1 Composting – CH_4 and N_2O (W.11, 2020) Convention reporting adherence	Accurately report the methodological tiers used to estimate CH_4 and N_2O emissions from composting in CRF summary table 3s2, ensuring consistency with the NIR.	Not resolved. The ERT considers that the recommendation has not yet been addressed because the Party has not yet accurately reported the methodological tiers used to estimate CH_4 and N_2O emissions from composting in CRF summary table 3s2 (tier 1 and country-specific methodologies rather than tiers 1 and 2). During the review, Denmark stated its intention to correct this in its 2022 submission.
W.10	5.B.1 Composting – CH_4 and N_2O (W.12, 2020) Convention reporting adherence	Correct the reference in the NIR to the GHGs emitted from composting by clarifying that only CH_4 and N_2O emissions are estimated for composting.	Not resolved. The ERT considers that the recommendation has not yet been addressed because the Party did not correct the typographical error in its NIR (line 3, section 7.3.1) related to the inclusion of CO_2 as a gas emitted from composting. During the review, Denmark stated its intention to correct this in its 2022 submission.
W.11	5.B.1 Composting – CH_4 and N_2O (W.13, 2020) Completeness	Use appropriate splicing techniques, as described in the 2006 IPCC Guidelines (vol. 1, chap. 5), to estimate AD for sludge composting for 1990–1994 and only report a conservative estimate if none of the splicing techniques can be used appropriately for Denmark.	Resolved. The Party recalculated its emissions and reported new data on the amount of sludge composted for 1990–1994 based on interpolation in its NIR (p.556). The Party made additional recalculations impacting the whole time series for this category for both CH_4 and N_2O. EF value updates were made for the waste types garden and park waste, sludge and home composting. These additional recalculations are fully described in the NIR (p.594).
W.12	5.B.1 Composting – CH_4 and N_2O (W.14, 2020) Convention reporting adherence	Correct the category code for wastewater treatment and discharge provided in the NIR.	Resolved. The Party corrected the typographical error in its NIR (p.560).
W.13	5.B.1 Composting – CH_4 and N_2O (W.15, 2020) Transparency	Include detailed information on the estimation of CH_4 and N_2O emissions from composting of garden and park waste and from home composting of garden and vegetable food waste, including detailed equations, descriptions of all the input data and parameters, and references to	Resolved. The Party included detailed information on the country-specific EFs for CH_4 and N_2O emissions from composting of garden and park waste and from home composting of garden and vegetable food waste in its NIR (pp.557–559).

ID#	Issue/problem classification[a, b]	Recommendation made in previous review report	ERT assessment and rationale
		relevant publications justifying the suitability of the equations and parameters used.	
W.14	5.B.1 Composting – CH_4 and N_2O (W.16, 2020) Transparency	Explain why CH_4 and N_2O emissions from biological treatment of waste (category 5.B) are not estimated and reported for Greenland in the NIR.	Not resolved. The ERT considers that the recommendation has not yet been addressed because the Party did not explain why CH_4 and N_2O emissions from biological treatment of waste (category 5.B) were not estimated and reported for Greenland in its NIR, although it provided an explanation to the previous ERT justifying the lack of composting. During the review, Denmark stated its intention to correct this in its 2022 submission.
W.15	5.B.1 Composting – CH_4 and N_2O (W.17, 2020) Completeness	Estimate CH_4 and N_2O emissions from waste composting for the Faroe Islands.	Not resolved. The ERT considers that the recommendation has not yet been addressed because the Party has not yet estimated CH_4 and N_2O emissions from waste composting for the Faroe Islands. In response to a follow-up question on this issue raised during the review, Denmark stated that it was unable to confirm when this improvement is likely to be completed but outlined its intention to provide a status update as part of its 2022 submission.
W.16	5.B.2 Anaerobic digestion at biogas facilities – CH_4 (W.18, 2020) Convention reporting adherence	Ensure that the correct EF value is given in the equation used to estimate emissions from anaerobic digestion of organic waste at biogas facilities.	Not resolved. The ERT considers that the recommendation has not yet been addressed because the Party did not correct the typographical error in its NIR (p.560) related to the incorrect EF being reported for CH_4 emissions from anaerobic digestion of organic waste at biogas facilities (0.42 instead of 0.042). The ERT confirmed that this is only a typographical error; Denmark calculated its emissions using the correct EF and there is no accuracy issue. During the review, Denmark stated its intention to correct this typographical error in its 2022 submission.
W.17	5.B.2 Anaerobic digestion at biogas facilities – CH_4 (W.19, 2020) Accuracy	Recalculate CH_4 emissions from anaerobic digestion of organic waste at biogas facilities for 2018 using the correct net calorific value (50 MJ/kg) instead of the incorrect value used for the 2020 submission (51 MJ/kg).	Resolved. The Party recalculated its inventory using the correct net calorific value of 50 MJ/kg for organic waste at biogas facilities and reported corresponding information in its NIR (table 7.3.6, p.561).
W.18	5.C.1 Waste incineration – CH_4 and N_2O (W.21, 2020) Transparency	Include in the NIR information on how the CH_4 and N_2O EFs for human and animal cremation were derived, including whether the contribution of any emissions from the fuels used was considered when deriving the EFs.	Not resolved. The ERT considers that the recommendation has not yet been addressed because the Party did not explain how the CH_4 and N_2O EFs for human and animal cremation were derived. During the review, Denmark stated its intention to provide an explanation in its 2022 submission.
W.19	5.C.1 Waste incineration – CO_2, CH_4 and N_2O (W.22, 2020) Transparency	Report the AD on the amount of waste incinerated for human cremation as "NE" instead of "NO" in CRF table 5.C and provide a corresponding explanation in a documentation box.	Not resolved. The ERT considers that the recommendation has not yet been addressed because the Party did not report AD on the amount of waste incinerated for human cremation as "NE" instead of "NO" in CRF table 5.C. During the review, Denmark stated its intention to implement this improvement to notation key use in its 2022 submission. The Party also explained that the emissions were included in the estimates but it was unable to present the AD in the units required by the CRF table.

ID#	*Issue/problem classification*[a, b]	*Recommendation made in previous review report*	*ERT assessment and rationale*
W.20	5.C.1 Waste incineration – CO_2, CH_4 and N_2O (W.23, 2020) Transparency	Include in the NIR information on: (a) The derivation of CO_2, CH_4 and N_2O EFs; (b) Analyses of the trends for non-CO_2 EFs; (c) The derivation of the calorific value of incinerated waste, clarifying whether the same calorific value was used for fossil and biogenic waste; (d) The composition of the incinerated waste (if available) and how the fossil share was derived.	Resolved. The Party provided detailed information on trends, EFs and parameters (including net calorific value selection and fossil shares) related to the estimation of CO_2, CH_4 and N_2O emissions from waste incineration in the Faroe Islands in its NIR (presented on p.934, with background information provided in chap. 3, pp.126–127, 132, 137–141, 146 and 148–151, and annex 3A-3, pp.822–824).
W.21	5.D Wastewater treatment and discharge – CH_4 and N_2O (W.27, 2020) Transparency	(a) Ensure that the tier levels of methods used for estimating N_2O emissions are reported correctly in CRF summary table 3s2 for the whole time series; (b) Explain in the NIR the method applied for backcasting direct emissions from industrial wastewater treatment plants.	Resolved. (a) The Party updated its reporting in CRF summary table 3s2 in relation to the methods and EFs used for estimating N_2O emissions from industrial wastewater treatment plants; (b) Denmark also included a more detailed explanation of its methodology in its NIR (pp.566 and 574).
W.22	5.D.1 Domestic wastewater – CH_4 (W.24, 2020) Transparency	Enhance the transparency of the reporting by correcting the units of measurement for the EF (EF_{st}) presented in NIR equation 7.5.6 (kg CH_4/kg COD instead of kg CH_4/kg DOC).	Not resolved. An error remains with regard to the units of measurement presented in NIR equation 7.5.6. The Party explained that it intends to resolve this issue in its 2022 submission.
W.23	5.D.1 Domestic wastewater – CH_4 (W.24, 2020) Transparency	Enhance the transparency of the reporting by: (a) Providing detailed and transparent information on the methodology used to estimate CH_4 emissions from septic tanks; (b) Explaining all the parameters used to estimate CH_4 emissions from septic tanks and including accurate references to justify them; (c) Stating clearly in the NIR that the factor of 10 is based on expert judgment and was applied to make a conservative estimate of the EF for CH_4 emissions from septic tanks in Denmark; (d) Explaining how the revision of CH_4 emissions from septic tanks due to the use of the country-specific CH_4 EF affected uncertainty	Resolved. The Party reported in its NIR (pp.570–571) detailed and transparent information on the methodology used to estimate CH_4 emissions from septic tanks (satisfying points (a)–(c) of the previous review report recommendation). During the review, the Party also explained that this specific recalculation was not of sufficient magnitude to cause a reduction in its uncertainty assessment. This position is considered appropriate by the ERT and no further action is considered necessary in relation to the reporting of information on uncertainty, satisfying point (d) of the previous review report recommendation.

ID#	Issue/problem classification[a, b]	Recommendation made in previous review report	ERT assessment and rationale
		estimates of CH_4 emissions from wastewater handling.	
W.24	5.D.1 Domestic wastewater – CH_4 (W.25, 2020) Accuracy	Consider revising the methodology used to derive the country-specific CH_4 EF for septic tanks with a view to making it accurate and representative of the management practices in Denmark.	Resolved. The Party provided information to justify its selection of a country-specific EF for calculating CH_4 emissions from septic tanks in its NIR (p.570). The EF was adjusted on the basis of an expert judgment to account for the potential real-world age and suboptimal performance of septic tanks in Denmark in comparison with the tank profiles presented in the published literature. The explanation and justification are considered robust on the basis of the information presented.
W.25	5.D.1 Domestic wastewater – CH_4 (W.26, 2020) Accuracy	Estimate CH_4 emissions from septic tanks using existing data on the percentage of scattered houses from relevant data sources (e.g. Eurostat). If no data on the population living in scattered houses are available for 1990–2006, use appropriate splicing techniques as described in the 2006 IPCC Guidelines (vol. 1, chap. 5).	Resolved. The Party explained in its NIR (pp.565 and 570) that national data on the fraction of the population not connected to the sewer system are still missing. The Party justified its retention of the 10 per cent value for scattered housing across the time series by referencing the tier 1 uncertainty attributed to the data and noting that obtaining data on scattered housing to amend this value across the time series would have a negligible impact on the trend. The ERT considers this position to be robust and therefore concludes that it is appropriate to consider this issue resolved.
W.26	5.E Other (waste) – CH_4 (W.28, 2020) Comparability	Report N_2O emissions from accidental fires as "NE" instead of "NA" in CRF tables 5 and summary 2, and correct the reporting in the NIR accordingly.	Not resolved. The ERT considers that the recommendation has not yet been addressed because the Party did not report N_2O emissions from accidental fires as "NE" instead of "NA" in CRF tables 5 and summary two. During the review, Denmark stated its intention to implement this improvement to notation key use in its 2022 submission.
KP-LULUCF			
KL.1	General (KP-LULUCF) – (KL.9, 2020) Transparency	Correct the error in the table showing the relationship between the LULUCF categories and the KP-LULUCF activities by removing the references comparing CM and GM against forest land remaining forest land.	Not resolved. The Party did not correct the information in NIR table 10.5. During the review, the Party clarified that this issue will be addressed in the 2022 submission. In response to the draft review report, Denmark informed the ERT that the correction was unfortunately not made in the 2022 submission but will be addressed in the 2023 submission.
KL.2	General (KP-LULUCF) – CO_2 (KL.10, 2020) Transparency	Include the method and country-specific carbon stock values used to estimate carbon stock changes in litter in areas subject to AR and FM and separately provide the values used for broadleaves and conifers in the NIR and report them as separate subcategories in the corresponding CRF tables.	Not resolved. The Party did not report the requested information in its NIR.
KL.3	AR – CO_2 (KL.2, 2020) (KL.6, 2018) Transparency	Include information to support the geographical location of boundaries of AR activities in the NIR, for both plantations and natural expansion of forests.	Not resolved. The ERT considers that the recommendation has not yet been addressed because the Party has not yet included information to support the geographical location of boundaries of AR activities in the NIR, for both plantations and natural expansion of forests.

ID#	Issue/problem classification[a, b]	Recommendation made in previous review report	ERT assessment and rationale
			During the review, the Party explained that any land changes are the result of a conscious decision; however, it also explained that new forest areas can be established both by planting and/or sowing and by use of natural succession where cultivation or grazing are stopped. The Party also explained that AR data are taken from the NFI, which provides additional information on the geographical location of land subject to AR activities. Thus, the integration of multiple data sources improves overall accuracy and helps to identify potential misclassification of land-use changes. However, the ERT could not find in the referenced documentation information indicating how the Party separated natural expansion of forests and plantations subject to AR activities.
KL.4	Deforestation – CO_2 (KL.3, 2020) (KL.3, 2018) (KL.3, 2016) (KL.3, 2015) (77, 2014) Accuracy	Perform a QA assessment of the approach used to determine the 100-year transition period for deforested lands that were converted to settlements, using independent model verification based on country-specific data relevant to deforestation.	Resolved. The Party now uses a 30-year transition period for all land-use categories instead of a 100-year period.
KL.5	Deforestation – CO_2 (KL.4, 2020) (KL.7, 2018) Transparency	Amend the information to support the geographical location of boundaries of deforestation activities in the NIR, including information on how deforestation (i.e. land-use change) is distinguished from regeneration clear-cuts in forest land (i.e. temporary change in land cover), and how different end uses of deforested land (e.g. settlements versus 'nature restoration') are distinguished from one another.	Not resolved. The ERT considers that the recommendation has not yet been addressed because the Party has not yet included information in the NIR to support the geographical location of boundaries of deforestation activities or explained how deforestation (i.e. land-use change) is distinguished from regeneration clear-cuts in forest land (i.e. temporary change in land cover), and how different end uses of deforested land (e.g. settlements versus 'nature restoration') are distinguished from one another. During the review, the Party explained that areas of deforestation activities were identified through the land-use matrix, using the land-use map that provides specific geographical information on deforested areas. The Party also noted that all temporarily unstocked areas are in the category forest land remaining forest land.
KL.6	CM – CO_2 (KL.11, 2020) Accuracy	Recalculate emissions from drained organic soils reported under CM by collecting AD on the area of drained organic soils for all reporting years in the second commitment period of the Kyoto Protocol.	Not resolved. The Party recalculated the areas of and emissions from drained organic soils for the years under the second commitment period of the Kyoto Protocol (2013–2018) reported in CRF table 4(KP-II) 2, showing a decreasing trend (see ID# L.10 above). During the review, the Party clarified that it did not collect new AD to improve the overestimations. However, the Party is conducting new research to address this issue.
KL.7	CM – CO_2 (KL.12, 2020) Accuracy	Recalculate emissions from drained organic soils under CM by collecting additional data on soils with 6–12 per cent organic content; include in the NIR data and information on calculating the fixed EFs for drained organic soils with organic content greater than 12 per cent, referring to the	Not resolved. The Party did not make any progress on this issue (see ID# L.11 above). During the review, the Party clarified that it will improve its estimates for soils with 6–12 per cent organic content by resampling in 2021 1,000 plots which were sampled in 2010 and developing a groundwater table map.

ID#	Issue/problem classification[a, b]	Recommendation made in previous review report	ERT assessment and rationale
		study by Elsgaard et al. (2012), including soil type, percentage of organic content and assumptions made, and demonstrate their applicability for all reporting years in the second commitment period of the Kyoto Protocol.	

[a] References in parentheses are to the paragraph(s) and the year(s) of the previous review report(s) in which the issue or problem was raised. Issues are identified in accordance with paras. 80–83 of the UNFCCC review guidelines and classified as per para. 81 of the same guidelines. Problems are identified and classified as problems of transparency, accuracy, consistency, completeness or comparability in accordance with para. 69 of the Article 8 review guidelines in conjunction with decision 4/CMP.11.

[b] The reports on the reviews of the 2017 and 2019 annual submissions of Denmark were not available at the time of this review. For this reason, 2017 and 2019 are excluded from the list of review years in which issues could have been identified.

IV. Issues and problems identified in three or more successive reviews and not addressed by the Party

9. In accordance with paragraph 83 of the UNFCCC review guidelines, the ERT noted that the issues and/or problems included in table 4 have been identified in three or more successive reviews, including the review of the 2021 annual submission of Denmark, and had not been addressed by the Party at the time of publication of this review report.

Table 4
Issues and/or problems identified in three or more successive reviews and not addressed by Denmark

ID#	Previous recommendation for issue	Number of successive reviews issue not addressed[a]
General	No issues identified.	
Energy		
E.1	Ensure consistent reporting between CRF tables 1.D and 1.A(b) for jet kerosene consumed in international aviation bunkers (1990–2000) and for residual fuel oil consumed in international navigation bunkers.	3 (2018–2021)
E.3	Reallocate emissions from LNG used in ferries from natural gas liquid to gaseous fuels in CRF table 1.A(a).	3 (2018–2021)
IPPU		
I.4	Ensure consistent reporting of the emissions from laboratory freezers in the CRF tables across the time series and include in the NIR an explanation on the methodology used and allocation of the emissions for this subcategory.	3 (2018–2021)
Agriculture		
A.4	Correct the errors in the NIR and ensure the consistency of the provided information on the atmospheric deposition of N and N content in crop residues between the CRF tables and the NIR and within the NIR.	3 (2018–2021)

ID#	*Previous recommendation for issue*	*Number of successive reviews issue not addressed*[a]
A.5	Provide further explanations to support the halving of the N_2O EFs for cultivated organic soils with 6–12 per cent SOC and relevant references in the next NIR.	3 (2018–2021)
LULUCF		
L.4	Include in the NIR synthesized information on the main parameters defining the characteristics used in the calculation of biomass and growing stocks.	3 (2018–2021)
L.6	Provide additional information on the area and volume of clear-cutting and the area subject to destructive disturbance, subject to the availability of data.	7 (2013–2021)
L.9	Improve the transparency of the NIR by explaining how land converted to forest land changed over the entire time series.	3 (2018–2021)
Waste		
W.2	Correct the erroneous entry of DOC_f in CRF table 5.A.	3 (2018–2021)
KP-LULUCF		
KL.3	Include information to support the geographical location of boundaries of AR activities in the NIR, for both plantations and natural expansion of forests.	3 (2018–2021)
KL.5	Amend the information to support the geographical location of boundaries of deforestation activities in the NIR, including information on how deforestation (i.e. land-use change) is distinguished from regeneration clear-cuts in forest land (i.e. temporary change in land cover), and how different end uses of deforested land (e.g. settlements versus 'nature restoration') are distinguished from one another.	3 (2018–2021)

[a] Reports on the reviews of the 2017 and 2019 annual submissions of Denmark have not yet been published. Therefore, 2017 and 2019 were not included when counting the number of successive years for this table. In addition, as the reviews of the Party's 2015 and 2016 annual submissions were conducted together, they are not considered successive reviews and 2015/2016 is counted as one year.

V. Additional findings made during the individual review of the Party's 2021 annual submission

10. Table 5 presents findings made by the ERT during the individual review of the 2021 annual submission of Denmark that are additional to those identified in table 3.

Table 5
Additional findings made during the individual review of the 2021 annual submission of Denmark

ID#	*Finding classification*	*Description of finding with recommendation or encouragement*	*Is finding an issue/problem?*[a]
General			
G.4	QA/QC and verification	The Party reported in its NIR (p.156) that an updated quality manual for Danish emissions inventories was published in 2020. However, several QA activities, such as performing a verification study and updates of methodological reports, are not conducted as regularly as the manual indicates. During the review Denmark informed the ERT of the continued reduction in the available budget, which has reduced the number of non-obligatory activities, such as QA activities and approach 2 uncertainty analyses, and delayed improvement actions. The ERT encourages the Party to ensure that the budget enables a return to previous levels of QA activities and the operation of the national inventory arrangements in line with decision 24/CP.19, annex I, especially paragraphs 19, 21(b), 22(b) and 24. The ERT also encourages the Party to report in its next annual submission on its planning for a verification study, which is planned in line with a five-year period according to the quality manual (p.40); the previous study was finalized in 2013.	Not an issue/problem
G.5	Other	The Party noted that a draft review report for the 2021 submission was not received prior to the submission due date for the 2022 inventory submission (15 April 2022), and since a review report was not available when the 2022 submission, including the NIR, was being prepared, the outcomes of the review are not fully reflected in the 2022 submission. This includes the chapters on improvements in response to the review process, which could not be updated to reflect the outcomes of the review of the 2021 submission.	Not an issue/problem
Energy			
E.6	1.A.2 Manufacturing industries and construction – Industrial waste – CO_2	The Party reported in table 3.A-4.2 (p.827) of annex 3A-4 to its NIR the CO_2 EF for industrial waste (biomass part) as 79.6 kg/GJ, which differs from the biomass part of waste provided in NIR section 32.5 (pp.137–138) (average of 63.3 kg/GJ). It is not clear how the biomass part of the industrial waste CO_2 EF was derived and whether there is a corresponding fossil CO_2 EF component. During the review, the Party clarified that the fuel category industrial waste was only applied for a cement production company and that the waste applied in the cement industry differs considerably from the waste applied in other plants. This is the reason for applying a separate fuel category for industrial waste consumption. The Party also clarified that the fossil CO_2 emission data applied in the cement industry for industrial waste are based on European Union Emissions Trading System data, but the corresponding time series for fossil industrial waste is considered confidential. The Party noted that an explanation will be included in future NIRs.	Yes. Transparency

ID#	*Finding classification*	*Description of finding with recommendation or encouragement*	*Is finding an issue/problem?*[a]
		The ERT recommends that the Party further clarify the information on EFs in section 3.2.5 of the NIR on methodological issues by describing the industrial waste fuel type and the basis for the EFs, including by explaining how the biomass part of the industrial waste CO_2 EF was derived and whether there is a corresponding fossil CO_2 EF component.	
E.7	1.A.3 Transport – all fuels – CO_2, CH_4, N_2O	The Party reported in NIR table 3.3.3 (p.173) fuel consumption (in PJ) for domestic transport for 2019. The data listed in the table appear to differ from those used to develop road transport results in NIR figure 3.3.4 (p.175) and from the reporting for mobile sources in CRF tables 1.A(a)s2, 1.A(a)s3 and 1.A(a)s4. For example, NIR figure 3.3.4 indicates energy use for two-wheelers as 0 PJ over time, while NIR table 3.3.3 reports fuel consumption for road transport: mopeds and motorcycles as 53.0 PJ for 2019. During the review, the Party clarified that it encountered a copy/paste issue while entering the NIR chapter data in table 3.3.3. The Party clarified that the data in the CRF table are correct.	Yes. Convention reporting adherence
		The ERT recommends that the Party correct the fuel consumption values (in PJ) listed for 2019 in NIR table 3.3.3, as appropriate, to ensure consistency with the values reported for road transport in NIR figure 3.3.4 (p.175) and the reporting for mobile sources in CRF tables 1.A(a)s2, 1.A(a)s3 and 1.A(a)s4.	
IPPU			
I.6	2.F.1 Refrigeration and air conditioning – HFCs	The Party reported in its NIR (p.354) and CRF table 2(II)B-Hs2 that according to Danish law, refrigerants must be emptied from refrigerators and air-conditioning equipment before decommissioning by recovering, reusing or destroying the remaining gases. It is reasonable to assume that this law is upheld in Denmark since waste collection is mandatory and there are no extra charges for getting rid of used equipment. In addition to recycling plants, where companies and individuals can take their waste, there is also a collection scheme where items such as used refrigerators are collected at the roadside to be disposed of. As a result, there is no reason why people would choose to illegally dispose of an appliance given that legal disposal is both free and easy. The amount of HFCs remaining in products at decommissioning was therefore reported as "NO" in the CRF table. During the review, the Party clarified that most of the waste from refrigerators and air-conditioning equipment is exported for treatment abroad (mainly in Germany) and only a small fraction is disposed of in Denmark (through incineration).	Yes. Accuracy
		The ERT noted that the estimations are likely not in accordance with equation 7.14 of the 2006 IPCC Guidelines (vol. 3, chap. 7) because there are emissions at the end of life of equipment.	
		The ERT recommends that the Party estimate the amount of HFCs emitted during system disposal considering the destruction and removal efficiency of incinerators. Given that incinerators' destruction and removal efficiency is over 99.99 per cent for concentrated sources of ozone-depleting substances, the Party could justify the exclusion of emissions at disposal on the basis that they are insignificant and report "NE" instead of "NO". The ERT believes that future ERTs should consider this issue further to ensure that there is no underestimation of HFC emissions for this category.	
I.7	2.F.2 Foam blowing agents – HFCs	The Party reported in its NIR (p.358) and CRF table 2(II)B-Hs2 that F-gases remaining in products at decommissioning (closed-cell products) are destroyed by incineration and hence there are no F-gas emissions related to the disposal of these products. "NO" was therefore reported. However, this is not in accordance with equation 7.7 from the 2006 IPCC Guidelines (vol. 3, chap. 7) because destruction by incineration produces some F-gas emissions owing to the destruction and removal efficiency of incinerators. During the review, the Party clarified that most	Yes. Accuracy

ID#	Finding classification	Description of finding with recommendation or encouragement	Is finding an issue/problem?[a]
		waste from closed-cell products is exported for treatment (mainly in Germany) and only a small amount is disposed of in Denmark (through incineration). HFCs are categorized as hazardous waste under national waste legislation (executive order 2159 of 9 December 2020) and hence there are strict requirements for the collection and disposal of this waste type. The ERT recommends that the Party estimate the amount of HFCs emitted during the decommissioning process considering the destruction and removal efficiency of incinerators. Given that incinerators' destruction and removal efficiency is over 95 per cent for diluted sources of ozone-depleting substances, the Party could justify the exclusion of emissions from the decommissioning process on the basis that they are insignificant and report "NE" instead of "NO". The ERT believes that future ERTs should consider this issue further to ensure that there is no underestimation of HFC emissions for this category.	
Agriculture			
A.3	3.A Enteric fermentation – CH_4	CH_4 emissions from enteric fermentation were not reported for fur-bearing animals in CRF table 3.As1, but the number of fur-bearing animals was estimated for manure management and reported in CRF table 3.B (a)s1, with a population of 2,809,980 animals. Page 399 of the NIR notes that CH_4 emissions from enteric fermentation from fur farming were considered to be negligible. During the review, the Party clarified that the 2006 IPCC Guidelines include a default CH_4 EF for manure management but not for enteric fermentation for fur-bearing animals, indicating that CH_4 emissions from enteric fermentation are not considered applicable by the IPCC. Hence, no CH_4 emissions from enteric fermentation were reported for fur-bearing animals in CRF table 3.As1 because the EF is considered to be zero, that is, not applicable. If any CH_4 emissions occur, the concentrations are too low to be measured. As stated in the NIR, this approach is based on country-specific information from the University of Copenhagen and measurements performed in 1999–2008. The ERT recommends that the Party report in CRF table 3.As1 the number of mink and report "NE" in the corresponding column, while including its reasoning in the NIR.	Yes. Comparability
A.4	3.A.1 Cattle – CH_4	The Party reported in its NIR (p.402) that its estimation of the national Y_m value for dairy cattle was based on the Karoline model developed by the Danish Centre for Food and Agriculture. The Y_m value in NIR table 5.6 is a constant of 6.00 for 2002–2019, while the measurements reported by Hellwing, Weisbjerg and Lund (2014) range between 5.98 and 6.13. However, there is no justification in the NIR for the Party's selection of the Y_m value. During the review, the Party clarified that the Y_m values in Hellwing, Weisbjerg and Lund (2014) are from a range of feeding tests with different feeding practices and the results are within range of the results from the Karoline model. The authors of the article confirmed that the Y_m value of 6.0 best reflects the feeding of Danish dairy cattle, when uncertainties and variations in feeding practices are taken into account. No data were available to provide an annual Y_m factor for 2002–2019. The ERT agrees with the Party's approach. The ERT recommends that the Party include in the NIR a justification of the Y_m value used.	Yes. Transparency
A.5	3.B Manure management – N_2O	CRF table 3.B(b) and the NIR (table 5.36, p.432) contain inconsistent values for typical animal mass for sheep (70 and 48.5 kg, respectively), goats (60 and 38.5 kg, respectively) and horses (600 and 438 kg, respectively). During the review, the Party clarified that the animal mass values given in NIR table 5.36 represent the average weight for mother sheep and lambs, mother goats and kids, and all horse categories. The weights given in the CRF table are for mother sheep, including lambs, and for goats, including kids. For horses, the weight in the CRF table is for the	Yes. Convention reporting adherence

ID#	*Finding classification*	*Description of finding with recommendation or encouragement*	*Is finding an issue/problem?*[a]
		largest group. This is not clearly explained in the NIR, so this section and the table will be updated in the next submission. The animal weights were not used for estimating emissions because excretion rates per animal were provided by the Danish normative figures per animal. The ERT recommends that the Party ensure consistency between the NIR and CRF table 3.B(b) and provide documentation showing how the typical animal mass values for sheep, goats and horses reported in NIR table 5.36 were derived.	
A.6	3.B Manure management – N_2O	The Party reported in its NIR (p.446) that the EF for NO_X from manure management was updated to the EF given in the EMEP/EEA guidebook. This increased emission estimates by 109–262 per cent for 1990–2018, and no justification was provided. During the review, the Party clarified that the EMEP/EEA guidebook is the standard reference document for estimating and reporting air pollution emissions under the Convention on Long-Range Transboundary Air Pollution and the European Union directive on national emission ceilings, and as such, Denmark is obligated to update its emissions inventory when new versions of the guidebook are adopted. For the 2020 submission, the emission estimates for NO_X were based on EFs given in table 3.3 of the *EMEP/EEA air pollutant emission inventory guidebook 2016*. The EFs for NO_X were updated in table 3.3 of the EMEP/EEA guidebook, and these EFs were used to estimate emissions of NO_X for the 2021 submission. Emissions of NO_X affect indirect emissions of N_2O from manure management. The ERT recommends that the Party provide in the NIR additional details justifying the increases in the EF for NO_X from manure management by referring to the update provided in the EMEP/EEA guidebook and information on the impact on the N_2O emission estimates.	Yes. Transparency
A.7	3.B.2 Sheep – N_2O	The Party reported in its NIR (p.432) that the Danish Nex rate for mother sheep is 12.8 kg N/animal for 2019, while NIR table 5.36 states that the Danish Nex rate for mother sheep is 6.6 kg N/animal for 2019. CRF table 3.B(b) gives the value of 6.59 kg N/animal for that year. During the review, the Party clarified that in NIR table 5.36, an error occurred when the animal category was named. The Nex rate given in NIR table 5.36 is the average for all sheep, so the category should have been named sheep – mother and lambs. The column heading will be corrected in the next annual submission. The ERT recommends that the Party include the correct values and category names for the Nex rate for sheep in NIR table 5.36 and ensure that consistent information is reported in the NIR and CRF table 3.	Yes. Convention reporting adherence
LULUCF			
L.17	4.A Forest land – CO_2	The Party changed its approach by using NFI surveys to estimate the carbon stock changes in pools of living biomass, litter and deadwood under forest land for 2002 onward, although the procedures for conducting the NFI survey itself have remained the same. However, the Party did not include in its NIR information on this new approach, which caused a considerable number of recalculations under some categories for the latest submission. During the review, the Party clarified that it used full sampling of five-year measurements for 2007 onward, whereas the previous methodology was based on just a fifth of the size of the NFI sampling and different part of measurement was used for each year, which caused high inter-annual variation owing to differences between sites. The Party also clarified that the new approach of applying NFI surveys could lead the understandable calm trend in carbon pools reflecting normal management and age structure in recent years. The ERT observed that the Party remeasured only a third of permanent sample plots every five years, while the remaining two thirds were measured	Yes. Transparency

ID#	Finding classification	Description of finding with recommendation or encouragement	Is finding an issue/problem?[a]
		for non-permanent plots selected at random in each year, which may lead to site variations being picked up instead of reflecting inter-annual variations. Furthermore, the ERT considers that the new approach of using the NFI survey may not reflect all the components of sample plots for each reporting year. The ERT recommends that the Party include in the NIR information on the approaches for using the NFI surveys or the forest census to estimate the carbon stock changes in pools of living biomass, litter and deadwood under forest land for 1990–2006 and for 2007 onward to enable consistency to be assessed for all reporting years.	
L.18	4.D.1.2 Flooded land remaining flooded land – CO_2	In DKE CRF table, the Party reported carbon stock changes in organic soils as "NE" for Greenland and "NO" for Denmark under subcategory 4.D.1.2 Flooded land remaining flooded land. During the review, the Party clarified that it reported "NE" for Greenland because there are only a few established water reservoirs in Greenland. The Party further explained that there are no methods in the 2006 IPCC Guidelines for estimating emissions. The ERT agrees that the explanation is in line with the 2006 IPCC Guidelines (vol. 4, chap. 7.3.1). The ERT considers that the Party should report "NE" instead of "NO" for all carbon pools under both Greenland and Denmark, since some areas are reported under the category. The ERT recommends that the Party change its reporting from "NO" to "NE" for all carbon pools under subcategory 4.D.1.2 Flooded land remaining flooded land and justify its use of the notation key by explaining that a methodology is not provided by the 2006 IPCC Guidelines in NIR sections 6.5.9 and 16.6.6.	Yes. Convention reporting adherence
L.19	4.E.2 Land converted to settlements – CO_2	Denmark recalculated the carbon stock changes for mineral soils for the entire time series between the 2020 and 2021 submissions; estimates of net CO_2 emissions increased by 18.1–2,207.8 per cent. During the review, the Party clarified that it changed the EF for calculating the carbon stock changes in mineral soils. The Party previously used a 100-year transition period to determine final organic carbon stock in settlements, but instead used a 30-year equilibrium period for the 2021 submission. The ERT recommends that the Party include in the NIR information on the EF used in the calculation for mineral soils under the category land converted to settlements.	Yes. Transparency
L.20	4(II) Emissions/ removals from drainage and rewetting and other management of organic/mineral soils – N_2O	The Party estimated and reported N_2O emissions from drained organic soils in forest land for Greenland but did not report N_2O emissions from rewetted organic soils for Greenland in DNK CRF table 4(II). The text in NIR section 16.6.11 has not been updated since the previous submission and still reports emissions as "NE" (see ID# G.1 in table 3). During the review, the Party clarified that emissions from rewetted organic soils should be reported as "NO" for Greenland. The ERT recommends that the Party report "NO" for N_2O emissions from rewetted organic soils for Greenland and update the text in NIR section 16.6.11.	Yes. Comparability
Waste			
W.27	5.B.1 Composting – CH_4 and N_2O	The Party reported in CRF table 5.B AD for composting of food and garden waste as "NO" despite reporting emissions related to the activity (e.g. 3.46 kt CH_4 and 0.25 kt N_2O for 2019) and including AD in its NIR (figure 7.3.2 and annex 3F, table 3.2). During the review, the Party clarified that the incorrect notation key was entered in CRF table 5.B. In response to the draft review report, the Party explained that it was unable to report the AD for dry	Yes. Convention reporting adherence

ID#	*Finding classification*	*Description of finding with recommendation or encouragement*	*Is finding an issue/problem?*[a]
		matter, as required by the CRF table, and it will therefore correct the notation key to "NE" in the next annual submission.	
		The ERT recommends that the Party report in CRF table 5.B the correct AD for composting of food and garden waste. If AD are not available, the ERT recommends that the Party report AD as "NE".	
KP-LULUCF			
KL.8	FM – CO_2	The Party changed its approach by using NFI surveys to estimate the carbon stock changes in pools of living biomass, litter and deadwood under forest land for 2007 onward (see ID# L.17 above). However, the Party did not include in its NIR information on the new approach, which caused a considerable number of recalculations.	Yes. Transparency
		During the review, the Party clarified how its approach changed and explained that the new approach is consistent with the FMRL calculations as it does not cause any changes to the NFI samplings, such as sampling intervals or density.	
		The ERT recommends that the Party include in the next NIR information on the approaches for using the NFI surveys or the forest census to estimate the carbon stock changes in pools of living biomass, litter and deadwood under forest land for FMRL and for the second commitment period and explain how the estimates are consistent.	
KL.9	GM – CO_2	The Party recalculated the EF for land converted to settlements (see ID# L.19 above). As a result, carbon stock changes for GM were also recalculated.	
		The ERT recommends that the Party include in its next NIR information on the EF used in the calculation for mineral soils for GM.	

[a] Recommendations made by the ERT during the review are related to issues as defined in para. 81 of the UNFCCC review guidelines or problems as defined in para. 69 of the Article 8 review guidelines.

VI. Application of adjustments

11. The ERT did not identify the need to apply any adjustments for the 2021 annual submission of Denmark.

VII. Accounting quantities for activities under Article 3, paragraph 3, and, if any, activities under Article 3, paragraph 4, of the Kyoto Protocol

12. Table I.5 presents the accounting quantities for KP-LULUCF reported by Denmark and the final values agreed by the ERT. The final quantities of units to be issued and cancelled are presented in table I.6.

VIII. Questions of implementation

13. No questions of implementation were identified by the ERT during the individual review of the Party's 2021 annual submission.

Annex I

Overview of greenhouse gas emissions and removals and data and information on activities under Article 3, paragraphs 3–4, of the Kyoto Protocol, as submitted by Denmark in its 2021 annual submission

1. Tables I.1–I.4 provide an overview of the total GHG emissions and removals as submitted by Denmark.

Table I.1
Total greenhouse gas emissions and removals for Denmark, base year–2019
(kt CO_2 eq)

	Total GHG emissions excluding indirect CO_2 emissions		*Total GHG emissions and removals including indirect CO_2 emissions*[a]		*Land-use change (Article 3.7 bis as contained in the Doha Amendment)*[b]	*KP-LULUCF (Article 3.3 of the Kyoto Protocol)*[c]	*KP-LULUCF (Article 3.4 of the Kyoto Protocol)*	
	Total including LULUCF	*Total excluding LULUCF*	*Total including LULUCF*	*Total excluding LULUCF*			*CM, GM, RV, WDR*	*FM*
FMRL								409.00
Base year[d]	76 563.60	70 055.24	77 700.28	71 191.92	8.807		7 567.40	
1990	76 243.75	69 735.40	77 380.43	70 872.07				
1995	82 389.90	77 695.65	83 462.24	78 767.99				
2000	74 919.69	70 338.21	75 764.32	71 182.85				
2010	65 072.85	63 046.59	65 569.02	63 542.76				
2011	59 631.09	57 883.28	60 058.94	58 311.12				
2012	54 387.21	53 346.87	54 774.50	53 734.17				
2013	55 888.52	55 110.15	56 251.21	55 472.84		59.86	3 969.05	–3 373.57
2014	52 381.76	50 884.94	52 712.91	51 216.09		52.45	5 173.97	–3 829.93
2015	48 928.86	48 306.93	49 245.89	48 623.96		484.32	4 178.62	–3 857.83
2016	52 050.69	50 322.63	52 355.23	50 627.18		393.71	4 452.92	–2 992.49
2017	49 679.61	48 021.51	49 977.23	48 319.13		–190.74	3 992.40	–2 405.21
2018	51 334.32	47 860.46	51 618.16	48 144.30		38.31	5 358.21	–1 805.34
2019	46 382.77	43 970.83	46 652.76	44 240.83		–278.01	4 979.67	–1 949.08

Note: Emissions and removals reported in the sector other (sector 6) are not included in the total GHG emissions.

[a] The Party reported indirect CO_2 emissions in CRF table 6.

[b] The value reported in this column relates to GHG emissions from conversion of forests (deforestation) in 1990 as contained in the report on the review of the Party's report to facilitate the calculation of the assigned amount for the second commitment period of the Kyoto Protocol.

[c] Activities under Article 3, para. 3, of the Kyoto Protocol, namely AR and deforestation.

[d] "Base year" refers to the base year under the Kyoto Protocol, which is 1990 for CO_2, CH_4 and N_2O and 1995 for HFCs, PFCs, SF_6 and NF_3. The base year for CM and GM under Article 3, para. 4, of the Kyoto Protocol is 1990. For activities under Article 3, para. 3, of the Kyoto Protocol and FM under Article 3, para. 4, only the inventory years of the commitment period must be reported.

Table I.2
Greenhouse gas emissions and removals by gas for Denmark, excluding land use, land-use change and forestry, 1990–2019
(kt CO_2 eq)

	CO_2[a]	*CH_4*	*N_2O*	*HFCs*	*PFCs*	*Unspecified mix of HFCs and PFCs*	*SF_6*	*NF_3*
1990	54 710.08	7 904.91	8 214.67	NO, NA	NO, NA	NO, NA	42.41	NO, NA
1995	62 674.59	8 309.35	7 421.80	257.86	0.63	NO, NA	103.76	NO, NA
2000	55 136.37	8 174.47	7 026.41	766.19	22.57	NO, NA	56.84	NO, NA
2010	49 666.67	7 634.21	5 357.25	837.43	10.22	NO, NA	36.97	NO, NA
2011	44 643.02	7 470.01	5 355.61	757.31	7.71	NO, NA	77.46	NO, NA
2012	40 227.45	7 362.14	5 255.15	756.48	3.47	NO, NA	129.47	NO, NA
2013	42 108.58	7 271.71	5 250.01	688.93	3.70	NO, NA	149.90	NO, NA
2014	37 874.57	7 229.89	5 329.76	625.21	2.65	NO, NA	154.00	NO, NA
2015	35 520.72	7 156.23	5 358.54	467.05	0.02	NO, NA	121.40	NO, NA
2016	37 315.93	7 205.97	5 477.78	523.32	0.01	NO, NA	104.17	NO, NA
2017	35 040.71	7 215.48	5 562.13	424.26	1.09	NO, NA	75.45	NO, NA
2018	34 956.19	7 308.07	5 311.91	494.93	0.01	NO, NA	73.18	NO, NA
2019	31 167.26	7 170.94	5 494.49	335.79	1.11	NO, NA	71.24	NO, NA
Percentage change 1990–2019	**–43.0**	**–9.3**	**–33.1**	**NA**	**NA**	**NA**	**68.0**	**NA**

Note: Emissions and removals reported in the sector other (sector 6) are not included in this table.
[a] Including indirect CO_2 emissions as reported in CRF table 6.

Table I.3
Greenhouse gas emissions and removals by sector for Denmark, 1990–2019
(kt CO_2 eq)

	Energy	*IPPU*	*Agriculture*	*LULUCF*	*Waste*	*Other*
1990	53 525.55	2 362.76	13 088.16	6 508.36	1 895.60	NO
1995	61 655.75	2 919.78	12 463.86	4 694.25	1 728.60	NO
2000	54 396.94	3 717.89	11 601.14	4 581.48	1 466.88	NO
2010	49 612.65	1 914.25	10 825.02	2 026.25	1 190.84	NO
2011	44 256.38	2 056.46	10 807.08	1 747.82	1 191.20	NO
2012	39 692.50	2 092.48	10 810.00	1 040.34	1 139.18	NO

	Energy	*IPPU*	*Agriculture*	*LULUCF*	*Waste*	*Other*
2013	41 488.86	2 055.79	10 800.52	778.37	1 127.68	NO
2014	37 173.82	2 011.13	10 900.75	1 496.82	1 130.39	NO
2015	34 864.61	1 836.18	10 793.63	621.93	1 129.54	NO
2016	36 473.89	2 045.14	10 956.65	1 728.05	1 151.48	NO
2017	34 070.18	2 029.34	11 039.01	1 658.10	1 180.60	NO
2018	33 998.83	2 049.16	10 881.36	3 473.86	1 214.95	NO
2019	30 264.70	1 840.71	10 897.64	2 411.93	1 237.78	NO
Percentage change 1990–2019	**–43.5**	**–22.1**	**–16.7**	**–62.9**	**–34.7**	**NA**

Notes: (1) Denmark did not report emissions or removals in the sector other (sector 6); the corresponding cells in the CRF tables were left blank; (2) totals include indirect CO_2 emissions reported in CRF table 6.

Table I.4

Greenhouse gas emissions and removals from activities under Article 3, paragraphs 3–4, of the Kyoto Protocol by activity, base year–2019, for Denmark

(kt CO_2 eq)

	Article 3.7 bis as contained in the Doha Amendment[a]	*Activities under Article 3.3 of the Kyoto Protocol*		*FM and elected activities under Article 3.4 of the Kyoto Protocol*				
	Land-use change	*AR*	*Deforestation*	*FM*	*CM*	*GM*	*RV*	*WDR*
FMRL				409.00				
Technical correction				–82.62				
Base year[b]	8.807				5 196.33	2 371.07	NA	NA
2013		–121.17	181.03	–3 373.57	2 158.10	1 810.94	NA	NA
2014		–240.01	292.45	–3 829.93	3 220.22	1 953.75	NA	NA
2015		–309.59	793.91	–3 857.83	2 186.46	1 992.16	NA	NA
2016		–306.94	700.65	–2 992.49	2 335.04	2 117.88	NA	NA
2017		–368.95	178.21	–2 405.21	1 933.61	2 058.79	NA	NA
2018		–520.43	558.74	–1 805.34	3 171.76	2 186.44	NA	NA
2019		–643.36	365.36	–1 949.08	2 827.46	2 152.21	NA	NA
Percentage change base year–2019					**–45.6**	**–9.2**	**NA**	**NA**

Note: Values in this table include emissions from land subject to natural disturbances, if applicable.

[a] The value reported in this column relates to 1990.

[b] The base year for CM and GM under Article 3, para. 4, of the Kyoto Protocol is 1990. For activities under Article 3, para. 3, of the Kyoto Protocol and FM under Article 3, para. 4, only the inventory years of the commitment period must be reported.

2. Table I.5 provides information on the Party's accounting quantities for reporting under Article 3, paragraphs 3–4, of the Kyoto Protocol.

Table I.5

Accounting quantities for activities under Article 3, paragraph 3, and forest management and any elected activities under Article 3, paragraph 4, of the Kyoto Protocol for Denmark

(kt CO_2 eq)

GHG source/sink activity	*Net emissions/removals*									*Accounting parameters*	*Accounting quantity*[a]
	Base year[b]	*2013*	*2014*	*2015*	*2016*	*2017*	*2018*	*2019*	*Total*[c]		
A.1. AR		–121.168	–240.008	–309.589	–306.942	–368.953	–520.429	–643.364	–2 510.455		–2 510.455
Excluded emissions from natural disturbances[d]		NA	NA	NA	NA	NA	NA	NA	NA		NA
Excluded subsequent removals from land subject to natural disturbances		NA	NA	NA	NA	NA	NA	NA	NA		NA
A.2. Deforestation		181.029	292.453	793.914	700.653	178.215	558.737	365.359	3 070.360		3 070.360
B.1. FM									–20 213.449		–22 498.129
Net emissions/ removals		–3 373.569	–3 829.934	–3 857.828	–2 992.490	–2 405.208	–1 805.343	–1 949.077	–20 213.449		
Excluded emissions from natural disturbances[d]		NA	NA	NA	NA	NA	NA	NA	NA		NA
Excluded subsequent removals from land subject to natural disturbances		NA	NA	NA	NA	NA	NA	NA	NA		NA
Any debits from newly established forest		NA	NA	NA	NA	NA	NA	NA	NA		NA
FMRL[e]										409.000	
Technical corrections to FMRL										–82.617	
FM cap										19 822.068	19 822.068
B.2. CM (if elected)	5 196.330	2 158.105	3 220.224	2 186.460	2 335.038	1 933.608	3 171.762	2 827.462	17 832.660		–18 541.649
B.3. GM (if elected)	2 371.071	1 810.941	1 953.748	1 992.157	2 117.880	2 058.787	2 186.444	2 152.207	14 272.164		–2 325.331
B.4. RV (if elected)	NA	NA	NA	NA	NA	NA	NA	NA	NA		NA
B.5. WDR (if elected)	NA	NA	NA	NA	NA	NA	NA	NA	NA		NA

[a] Cumulative net emissions and removals for all years of the commitment period reported in the annual submission under review.

[b] Net emissions and removals from CM, GM, RV and/or WDR, if elected, in the Party's base year as established in decision 9/CP.2.

[c] The accounting quantity is the total quantity of units to be issued or cancelled for a particular activity.

[d] The Party indicated that it does not intend to exclude emissions from natural disturbances.

[e] As inscribed in the appendix to the annex to decision 2/CMP.7 in kt CO_2 eq per year.

3. Table I.6 provides an overview of key relevant data from Denmark's reporting under Article 3, paragraphs 3–4, of the Kyoto Protocol.

Table I.6
Key relevant data for Denmark under Article 3, paragraphs 3–4, of the Kyoto Protocol from its 2021 annual submission

Parameter	*Data values*
Periodicity of accounting	(a) AR: annual accounting (b) Deforestation: annual accounting (c) FM: annual accounting (d) CM: annual accounting (e) GM: annual accounting (f) RV: not elected (g) WDR: not elected
Elected activities under Article 3, paragraph 4, of the Kyoto Protocol	CM and GM
Election of application of provisions for natural disturbances	No
3.5% of total base-year GHG emissions, excluding LULUCF and including indirect CO_2 emissions	2 477.758 kt CO_2 eq (19 822.068 kt CO_2 eq for the duration of the commitment period)
Cancellation of assigned amount units, certified emission reductions and emission reduction units and/or issuance of RMUs in the national registry for:	
1. AR	Issue 651 283 RMUs
2. Deforestation	Cancel 2 308 613 units
3. FM	Issue 13 836 167 RMUs
4. CM	Issue 8 361 306 RMUs
5. GM	Issue 1 103 574 RMUs

Note: Values in this table reflect the difference in the accounting quantities for activities under Article 3, para. 3, and FM and any elected activities under Article 3, para. 4, of the Kyoto Protocol as reported in table I.5 between this report and the previously published review report for the Party.

Annex II

Information to be included in the compilation and accounting database

Tables II.1–II.7 include the information to be included in the compilation and accounting database for Denmark. Data shown are from the Party's annual submission, including the latest revised estimates submitted, adjustments (if applicable) and the final data to be included in the compilation and accounting database.

Table II.1
Information to be included in the compilation and accounting database for 2019, including on the commitment period reserve, for Denmark
(t CO_2 eq)

	Original submission	*Revised submission*	*Adjustment*	*Final value*
CPR	242 440 102	–	–	242 440 102
Annex A emissions				
CO_2	31 167 259	–	–	31 167 259
CH_4	7 170 936	–	–	7 170 936
N_2O	5 494 492	–	–	5 494 492
HFCs	335 795	–	–	335 795
PFCs	1 108	–	–	1 108
Unspecified mix of HFCs and PFCs	NO, NA	–	–	NO, NA
SF_6	71 241	–	–	71 241
NF_3	NO, NA	–	–	NO, NA
Total Annex A sources	**44 240 830**	–	–	**44 240 830**
Activities under Article 3, paragraph 3, of the Kyoto Protocol				
AR	–643 364	–	–	–643 364
Deforestation	365 359	–	–	365 359
FM and elected activities under Article 3, paragraph 4, of the Kyoto Protocol				
FM	–1 949 077	–	–	–1 949 077
CM	2 827 462	–	–	2 827 462
CM for the base year	5 196 330	–	–	5 196 330
GM	2 152 207	–	–	2 152 207
GM for the base year	2 371 071	–	–	2 371 071

Table II.2
Information to be included in the compilation and accounting database for 2018 for Denmark
(t CO_2 eq)

	Original submission	*Revised submission*	*Adjustment*	*Final value*
Annex A emissions				
CO_2	34 956 192	–	–	34 956 192
CH_4	7 308 074	–	–	7 308 074
N_2O	5 311 911	–	–	5 311 911
HFCs	494 933	–	–	494 933
PFCs	7	–	–	7
Unspecified mix of HFCs and PFCs	NO, NA	–	–	NO, NA
SF_6	73 184	–	–	73 184
NF_3	NO, NA	–	–	NO, NA
Total Annex A sources	**48 144 301**	–	–	**48 144 301**

	Original submission	*Revised submission*	*Adjustment*	*Final value*
Activities under Article 3, paragraph 3, of the Kyoto Protocol				
AR	–520 429	–	–	–520 429
Deforestation	558 737	–	–	558 737
FM and elected activities under Article 3, paragraph 4, of the Kyoto Protocol				
FM	–1 805 343	–	–	–1 805 343
CM	3 171 762	–	–	3 171 762
CM for the base year	5 196 330	–	–	5 196 330
GM	2 186 444	–	–	2 186 444
GM for the base year	2 371 071	–	–	2 371 071

Table II.3
Information to be included in the compilation and accounting database for 2017 for Denmark
(t CO_2 eq)

	Original submission	*Revised submission*	*Adjustment*	*Final value*
Annex A emissions				
CO_2	35 040 708	–	–	35 040 708
CH_4	7 215 479	–	–	7 215 479
N_2O	5 562 129	–	–	5 562 129
HFCs	424 262	–	–	424 262
PFCs	1 094	–	–	1 094
Unspecified mix of HFCs and PFCs	NO, NA	–	–	NO, NA
SF_6	75 454	–	–	75 454
NF_3	NO, NA	–	–	NO, NA
Total Annex A sources	**48 319 126**	–	–	**48 319 126**
Activities under Article 3, paragraph 3, of the Kyoto Protocol				
AR	–368 953	–	–	–368 953
Deforestation	178 215	–	–	178 215
FM and elected activities under Article 3, paragraph 4, of the Kyoto Protocol				
FM	–2 405 208	–	–	–2 405 208
CM	1 933 608	–	–	1 933 608
CM for the base year	5 196 330	–	–	5 196 330
GM	2 058 787	–	–	2 058 787
GM for the base year	2 371 071	–	–	2 371 071

Table II.4
Information to be included in the compilation and accounting database for 2016 for Denmark
(t CO_2 eq)

	Original submission	*Revised submission*	*Adjustment*	*Final value*
Annex A emissions				
CO_2	37 315 928	–	–	37 315 928
CH_4	7 205 972	–	–	7 205 972
N_2O	5 477 777	–	–	5 477 777
HFCs	523 319	–	–	523 319
PFCs	8	–	–	8
Unspecified mix of HFCs and PFCs	NO, NA	–	–	NO, NA
SF_6	104 172	–	–	104 172
NF_3	NO, NA	–	–	NO, NA
Total Annex A sources	**50 627 176**	–	–	**50 627 176**
Activities under Article 3, paragraph 3, of the Kyoto Protocol				
AR	–306 942	–	–	–306 942

	Original submission	*Revised submission*	*Adjustment*	*Final value*
Deforestation	700 653	–	–	700 653
FM and elected activities under Article 3, paragraph 4, of the Kyoto Protocol				
FM	–2 992 490	–	–	–2 992 490
CM	2 335 038	–	–	2 335 038
CM for the base year	5 196 330	–	–	5 196 330
GM	2 117 880	–	–	2 117 880
GM for the base year	2 371 071	–	–	2 371 071

Table II.5
Information to be included in the compilation and accounting database for 2015 for Denmark
(t CO_2 eq)

	Original submission	*Revised submission*	*Adjustment*	*Final value*
Annex A emissions				
CO_2	35 520 724	–	–	35 520 724
CH_4	7 156 226	–	–	7 156 226
N_2O	5 358 540	–	–	5 358 540
HFCs	467 053	–	–	467 053
PFCs	18	–	–	18
Unspecified mix of HFCs and PFCs	NO, NA	–	–	NO, NA
SF_6	121 398	–	–	121 398
NF_3	NO, NA	–	–	NO, NA
Total Annex A sources	**48 623 959**	–	–	**48 623 959**
Activities under Article 3, paragraph 3, of the Kyoto Protocol				
AR	–309 589	–	–	–309 589
Deforestation	793 914	–	–	793 914
FM and elected activities under Article 3, paragraph 4, of the Kyoto Protocol				
FM	–3 857 828	–	–	–3 857 828
CM	2 186 460	–	–	2 186 460
CM for the base year	5 196 330	–	–	5 196 330
GM	1 992 157	–	–	1 992 157
GM for the base year	2 371 071	–	–	2 371 071

Table II.6
Information to be included in the compilation and accounting database for 2014 for Denmark
(t CO_2 eq)

	Original submission	*Revised submission*	*Adjustment*	*Final value*
Annex A emissions				
CO_2	37 874 568	–	–	37 874 568
CH_4	7 229 895	–	–	7 229 895
N_2O	5 329 760	–	–	5 329 760
HFCs	625 212	–	–	625 212
PFCs	2 653	–	–	2 653
Unspecified mix of HFCs and PFCs	NO, NA	–	–	NO, NA
SF_6	154 005	–	–	154 005
NF_3	NO, NA	–	–	NO, NA
Total Annex A sources	**51 216 093**	–	–	**51 216 093**
Activities under Article 3, paragraph 3, of the Kyoto Protocol				
AR	–240 008	–	–	–240 008
Deforestation	292 453	–	–	292 453
FM and elected activities under Article 3, paragraph 4, of the Kyoto Protocol				

	Original submission	*Revised submission*	*Adjustment*	*Final value*
FM	–3 829 934	–	–	–3 829 934
CM	3 220 224	–	–	3 220 224
CM for the base year	5 196 330	–	–	5 196 330
GM	1 953 748	–	–	1 953 748
GM for the base year	2 371 071	–	–	2 371 071

Table II.7
Information to be included in the compilation and accounting database for 2013 for Denmark
(t CO_2 eq)

	Original submission	*Revised submission*	*Adjustment*	*Final value*
Annex A emissions				
CO_2	42 108 583	–	–	42 108 583
CH_4	7 271 710	–	–	7 271 710
N_2O	5 250 014	–	–	5 250 014
HFCs	688 933	–	–	688 933
PFCs	3 695	–	–	3 695
Unspecified mix of HFCs and PFCs	NO, NA	–	–	NO, NA
SF_6	149 900	–	–	149 900
NF_3	NO, NA	–	–	NO, NA
Total Annex A sources	**55 472 836**	–	–	**55 472 836**
Activities under Article 3, paragraph 3, of the Kyoto Protocol				
AR	–121 168	–	–	–121 168
Deforestation	181 029	–	–	181 029
FM and elected activities under Article 3, paragraph 4, of the Kyoto Protocol				
FM	–3 373 569	–	–	–3 373 569
CM	2 158 105	–	–	2 158 105
CM for the base year	5 196 330	–	–	5 196 330
GM	1 810 941	–	–	1 810 941
GM for the base year	2 371 071	–	–	2 371 071

Annex III

Additional information to support findings in table 2

Missing categories that may affect completeness

The only category for which an estimation method is included in the 2006 IPCC Guidelines that was reported as "NE" or for which the ERT otherwise determined that there may be an issue with the completeness of the reporting in the Party's inventory is 5.B.1 composting (CH_4 and N_2O for the Faroe Islands (See ID# W.15 in table 3)).

Annex IV

Reference documents

A. Reports of the Intergovernmental Panel on Climate Change

IPCC. 2006. *2006 IPCC Guidelines for National Greenhouse Gas Inventories*. S Eggleston, L Buendia, K Miwa, et al. (eds.). Hayama, Japan: Institute for Global Environmental Strategies. Available at http://www.ipcc–nggip.iges.or.jp/public/2006gl.

IPCC. 2014. *2013 Supplement to the 2006 IPCC Guidelines for National Greenhouse Gas Inventories: Wetlands*. T Hiraishi, T Krug, K Tanabe, et al. (eds.). Geneva: IPCC. Available at https://www.ipcc.ch/publication/2013–supplement–to–the–2006–ipcc–guidelines–for–national–greenhouse–gas–inventories–wetlands/.

B. UNFCCC documents

Annual review reports

Reports on the individual reviews of the 2013, 2014, 2015, 2016, 2018 and 2020 annual submissions of Denmark, contained in documents FCCC/ARR/2013/DNK, FCCC/ARR/2014/DNK, FCCC/ARR/2015/DNK, FCCC/ARR/2016/DNK, FCCC/ARR/2018/DNK and FCCC/ARR/2020/DNK, respectively.

Other

Aggregate information on greenhouse gas emissions by sources and removals by sinks for Parties included in Annex I to the Convention. Note by the secretariat. Available at https://unfccc.int/sites/default/files/resource/AGI_2021_Final%20Version.pdf.

Annual status report for Denmark for 2021. Available at https://unfccc.int/sites/default/files/resource/asr2021_DNK.pdf.

C. Other documents used during the review

Responses to questions during the review were received from Ole-Kenneth Nielsen (Aarhus University), including additional material on the methodology and assumptions used. The following references may not conform to UNFCCC editorial style as some have been reproduced as received:

EEA. 2016. *EMEP/EEA air pollutant emission inventory guidebook 2016*. Luxembourg: Publications Office of the European Union. Available at https://www.eea.europa.eu/publications/emep-eea-guidebook-2016.

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Elsgaard L, Görres, C.M., Hoffman, C.C., Blicher-Mathiesen, G., Schelde K. & Petersen S.O. 2012: Net ecosystem exchange of CO_2 and carbon balance for eight temperate organic soils under agricultural management. Agriculture Ecosystems and Environment 162:52-67.

Hellwing, A.L.F., Weisbjerg, M.R. & Lund, P., 2014: Note: Calculation of Ym for dairy cows in Denmark. Department of Animal Science, Aarhus University, AU Foulum, P.O. Box 50, DK-8830 Tjele, Denmark.

Johannsen, VK, Nord-Larsen T, Bentsen NS and Vesterdal L. 2019. Danish National Forest Accounting Plan 2021-2030 - resubmission 2019. (1 ed.) Frederiksberg: Institut for Geovidenskab og Naturforvaltning, Københavns Universitet. IGN Rapport. Available at https://static-curis.ku.dk/portal/files/232139225/DNFAP_revised_2019_web20191220.pdf.

Nielsen, O.-K., Plejdrup, M.S., Winther, M., Gyldenkærne, S., Thomsen, M., Nielsen, M, Mikkelsen, M.H., Albrektsen, R., Hjelgaard, K. & Bruun, H.G. 2020. Quality manual for the Danish greenhouse gas inventory. Version 3. Aarhus University, DCE – Danish Centre for environment and Energy, 44 pp. Scientific Report No. 406. Available at http://dce2.au.dk/pub/SR406.pdf.

Nord-Larsen T, and Johannsen VK. 2016. Danish National Forest Inventory: Design and calculations.Department of Geosciences and Natural Resource Management, University of Copenhagen. IGN Report. Available at http://static-curis.ku.dk/portal/files/164970017/Danish_National_Forest_Inventory.pdf.